# DRAFT ENVIRONMENTAL IMPACT REPORT

# SFPUC Alameda Creek Recapture Project

## Volume 1

PLANNING DEPARTMENT
CASE NO. 2015-004827ENV
STATE CLEARINGHOUSE NO. 2015062072

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|---|---|---|
| Screencheck Administrative Draft | Draft EIR Publication Date: | November 30, 2016 |
| | Draft EIR Public Hearing Date: | January 5, 2017 |
| | Draft EIR Public Comment Period: | November 30, 2016 through January 17, 2017 |

SAN FRANCISCO
**PLANNING**
DEPARTMENT

*Written comments should be sent to:*
Lisa Gibson, Acting Environmental Review Officer | 1650 Mission Street, Suite 400 |
San Francisco, CA 94103 or Lisa.Gibson@sfgov.org

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**DATE:** November 30, 2016

**TO:** Distribution List for the Alameda Creek Recapture Project Draft EIR

**FROM:** Lisa Gibson, Acting Environmental Review Officer

**SUBJECT:** Request for the Final Environmental Impact Report for the Alameda Creek Recapture Project Project (Planning Department File No. 2015-004827ENV

This is the Draft of the Environmental Impact Report (EIR) for the Alameda Creek Recapture Project. A public hearing will be held on the adequacy and accuracy of this document. After the public hearing, our office will prepare and publish a document titled "Responses to Comments," which will contain [a summary of] all relevant comments on this Draft EIR and our responses to those comments. It may also specify changes to this Draft EIR. Those who testify at the hearing on the Draft EIR will automatically receive a copy of the Responses to Comments document, along with notice of the date reserved for certification; others may receive a copy of the Responses to Comments and notice by request or by visiting our office. This Draft EIR together with the Responses to Comments document will be considered by the Planning Commission in an advertised public meeting and will be certified as a Final EIR if deemed adequate.

After certification, we will modify the Draft EIR as specified by the Responses to Comments document and print both documents in a single publication called the Final EIR. The Final EIR will add no new information to the combination of the two documents except to reproduce the certification resolution. It will simply provide the information in one document, rather than two. Therefore, if you receive a copy of the Responses to Comments document in addition to this copy of the Draft EIR, you will technically have a copy of the Final EIR.

We are aware that many people who receive the Draft EIR and Responses to Comments have no interest in receiving virtually the same information after the EIR has been certified. To avoid expending money and paper needlessly, we would like to send copies of the Final EIR [in Adobe Acrobat format on a CD] to private individuals only if they request them. Therefore, if you would like a copy of the Final EIR, please fill out and mail the postcard provided inside the back cover to the Environmental Planning division of the Planning Department within two weeks after certification of the EIR. Any private party not requesting a Final EIR by that time will not be mailed a copy. Public agencies on the distribution list will automatically receive a copy of the Final EIR.

Thank you for your interest in this project.

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# GLOSSARY AND ACRONYMS

## Glossary

**100-year flood –** A flood that has a 1-percent chance of being equaled or exceeded in any given year.

**A-weighted decibel (dBA) –** Since the human ear is not equally sensitive to all sound frequencies within the entire spectrum, human response is factored into sound descriptions in a process called “A-weighting,” expressed as “dBA.” The dBA, or A-weighted decibel, refers to a scale of noise measurement that approximates the range of sensitivity of the human ear to sounds of different frequencies.

**aggregate** – Concrete that contains inert granular materials such as sand, gravel, or crushed stone.

**Alquist-Priolo Earthquake Fault Zone –** The Alquist-Priolo Earthquake Fault Zoning Act was passed in 1972 to mitigate the hazard of surface faulting to structures for human occupancy. In accordance with this act, the state geologist established regulatory zones called “earthquake fault zones” around the surface traces of active faults and published maps showing these zones. Within these zones, buildings for human occupancy cannot be constructed across the surface trace of active faults. Each earthquake fault zone extends approximately 200 to 500 feet on either side of the mapped fault trace.

**alluvium –** Consists of unconsolidated mixtures of gravel, sand, clay, and silt typically deposited by streams.

**aquifer** – Permeable subsurface materials (soil, sediments, and rock) that contain groundwater. Aquifers may be large or small, local or regional, shallow or deep, and confined or unconfined, depending on the subsurface geologic conditions. The permeable materials that surround an unconfined aquifer allow the water table to fluctuate in response to recharge (precipitation in the wet season) and discharge (evapotranspiration in the dry season). A confined aquifer is contained within impermeable materials and, as a result, the water table does not fluctuate.

**anadromous** – Anadromous fish hatch (rear) in freshwater, migrate to the ocean (saltwater) to grow and mature, and migrate back to freshwater to spawn and reproduce (i.e., steelhead, salmon).

**asbestos –** A term used for several types of naturally occurring fibrous materials found in many parts of California, some of which have been found to be cancer-causing agents.

**beneficial uses** – Those uses of water as defined in the State of California Water Code (Chapter 10 of Part 2 of Division 2), including but not limited to agricultural, domestic, municipal, industrial, power generation, fish and wildlife habitat, recreation, and mining.

**biological monitoring** – The periodic examination of biological specimens for the purposes of monitoring their exposure to or the effects of potentially toxic chemicals in the environment. Biological monitoring is typically performed by analyzing the amount of a toxic substance or its metabolites in body tissues and fluids. Also refers to assessing the biological status of populations and communities of organisms at risk in order to protect them and to gain an early warning of possible hazards to human health.

**Biological Opinion** – Document issued under the authority of the Federal Endangered Species Act stating the U.S. Fish and Wildlife Service and/or the National Marine Fisheries Service findings as to whether a federal action is likely to jeopardize the continued existence of a threatened or endangered species or result in the destruction or adverse modification of critical habitat.

**carbon dioxide-equivalent ($CO_2e$)** – Represented as a single number, the total carbon footprint resulting from all different greenhouse gases generated by a project.

**channel** – A natural or artificial watercourse, with a defined bed and banks to confine and convey continuously or periodically flowing water.

**chlorination / dechlorination** – A disinfection process that involves the addition of free chlorine, whether as chlorine gas or liquid sodium hypochlorite. Dechlorination is the process of removing chlorine from a substance such as water.

**colluvium** – A loose deposit of rock debris accumulated through the action of gravity at the base of a cliff or slope.

**Community Noise Equivalent Level (CNEL)** – Because community receptors are more sensitive to unwanted noise intrusion during the evening and at night, state law requires that, for planning purposes, an artificial dBA increment be added to "quiet time" noise levels to form a 24-hour noise descriptor called the Community Noise Equivalent Level (CNEL). CNEL adds a 5-dBA "penalty" during the evening hours (7:00 p.m. to 10:00 p.m.) and a 10-dBA penalty during the night hours (10:00 p.m. to 7:00 a.m.).

**cultural resource** – A fragile and nonrenewable remain of human activity that is valued by or significantly representative of a culture or that contains significant information about a culture. Cultural resources encompass archaeological, traditional, and built environment resources, including landscapes or districts, sites, buildings, structures, objects, or cultural practices that are usually greater than 50 years of age and possess architectural, historic, scientific, or other technical value.

**critical riffle** – A stream channel segment with the highest probability of hindering steelhead passage. Critical riffles are characterized by relatively high width-to-depth ratios that can potentially impede steelhead migration through insufficient water depths or result in losses of habitat connectivity of they become dewatered.

**cumulatively considerable** – A CEQA term used to indicate whether or not a cumulative impact is significant.

**day-night noise level (Ldn)** – Another 24-hour noise descriptor, called the day-night noise level (Ldn), is similar to CNEL. While both add a 10-dBA penalty to all nighttime noise events between 10:00 p.m. and 7:00 a.m., Ldn does not add the evening 5-dBA penalty. In practice, Ldn and CNEL usually differ by less than 1 dBA at any given location for transportation noise sources.

**deciduous trees** – Trees that drop their leaves each year, typically in winter.

**discharge** – The flow of surface water in a stream or canal or the outflow of groundwater from a flowing artesian well, ditch, or spring. Also refers to the discharge of liquid from a facility, or to chemical emissions into the air through designated venting mechanisms.

**disinfection and disinfection byproducts** – Disinfection is the treatment process used to inactivate and destroy disease-causing bacteria, viruses, and other waterborne microorganisms. Chlorine, a commonly and historically used disinfectant in drinking water, provides a high degree of public health protection from bacteria and viruses. However, in 1974 it was discovered that chlorine reacts with natural organic and inorganic matter in water to form disinfection byproducts. The major groups of disinfection byproducts produced by chlorination are trihalomethanes and haloacetic acids, and these byproducts have been shown to cause health effects in laboratory animals. Thus, based on numerous toxicological studies, the U.S. EPA adopted the Stage 1 and Stage 2 Disinfectants and Disinfection Byproducts Rules to lower the public health risk associated with potential exposure to disinfection byproducts.

**Dissolved Oxygen (DO)** – The oxygen freely available in water, which is vital to fish and other aquatic life and for the prevention of odors. DO levels are considered an important indicator of a water body's ability to support desirable aquatic life.

**disturbance** – Any event or series of events that disrupt ecosystem, community, or population structure and alter the physical environment.

**diversion** – The use of part of a stream flow as water supply; a channel for diverting water to sites where it can be used and disposed of.

**earthquake faults** –

> *Reverse faults* involve predominantly vertical movement in which the upper block moves upward in relation to the lower block.
>
> *Thrust faults* are low-angle reverse faults.

**ecosystem** – A geographically identifiable area that encompasses unique physical and biological characteristics. It is the sum of the plant community, animal community, and environment in a particular region or habitat.

**endangered species** – Any species or subspecies of bird, mammal, fish, amphibian, reptile, or plant that is in serious danger of becoming extinct throughout all or a significant portion of its range. Federally endangered species are officially designated by the U.S. Fish and Wildlife

Service or the National Marine Fisheries Service and published in the Federal Register. Species may also be listed under the California Endangered Species Act by the Department of Fish and Game.

**endemic species** – Endemic species are species that are geographically restricted.

**enhancement** – Measures that develop or improve the quality or quantity of existing conditions or resources beyond a condition or level that would have occurred without an action (i.e., beyond compensation).

**environmental cases (hazardous materials)** – Sites suspected of releasing hazardous substances or that have had cause for hazardous materials investigations and are identified on regulatory agency lists. These are sites where soil and/or groundwater contamination is known or suspected to have occurred.

**expansive soils** – These types of soils are characterized by their ability to undergo significant volume change (shrink and swell) due to variations in soil moisture content.

**fault creep** – Movement along a fault that does not entail earthquake activity.

**filter pack** – Graded granular material (usually coarse sand or fine gravel) that is placed between the filter pipes and the streambed to prevent fine-grained particles from entering and clogging the filter pipes.

**floodplain** – Land adjacent to a watercourse over which water flows in times of flood. The limits of the flood plain are defined by the peak level of a 1 in 100 year return period flood.

**flow** – The volume of water passing a given point per unit of time.

**fugitive dust** – "Fugitive" emissions generally refer to those emissions that are released to the atmosphere by some means other than through a stack or tailpipe.

**groundwater recharge** – Inflow to aquifers from precipitation, infiltration, through-flow, and/or other means that replaces groundwater lost through pumping or other forms of discharge.

**hazardous materials** – Defined in Section 25501(h) of the California Health and Safety Code, are materials that, because of their quantity, concentration, or physical or chemical characteristics, pose a substantial present or potential hazard to human health and safety or to the environment if released to the workplace or environment. Hazardous materials have been and are commonly used in commercial, agricultural, and industrial applications as well as in residential areas to a limited extent.

**hazardous waste** – Any material that is relinquished, recycled, or inherently waste-like. Title 22 of the California Code of Regulations, Division 4.5, Chapter 11 contains regulations for the classification of hazardous wastes. A waste is considered a hazardous waste if it is toxic (causes human health effects), ignitable (has the ability to burn), corrosive (causes severe burns or damage to materials), or reactive (causes explosions or generates toxic gases) in accordance with the criteria established in Article 3. Article 4 lists specific hazardous wastes, and Article 5 identifies specific waste categories, including Resource Conservation and Recovery Act (RCRA) hazardous wastes, non-RCRA hazardous wastes, extremely hazardous wastes, and special wastes.

**heritage trees** – Large, old, or historically important trees that get special protection local municipalities and state law.

**hydrology** – The science that deals with the waters above and below land surfaces; their occurrence, circulation, and distribution, both in time and space; their biological, chemical, and physical properties; and their reaction with their environment, including their relation to living beings.

**juvenile** – A young or sexually immature animal.

**lateral spreading** – A phenomenon where large blocks of intact, nonliquefied soil move downslope on a liquefied substrate of large aerial extent.

**Leq** – Time variations in noise exposure are typically expressed in terms of a steady-state energy level (called Leq) that represents the acoustical energy of a given measurement. Leq (24) is the steady-state energy level measured over a 24-hour period.

**Levee** – An embankment raised to prevent a river from overflowing.

**liquefaction** – A phenomenon in which saturated granular sediments temporarily lose their shear strength during periods of earthquake-induced, strong groundshaking. The susceptibility of a site to liquefaction is a function of the depth, density, and water content of the granular sediments and the magnitude of earthquakes likely to affect the site.

**level of service goals and objectives (WSIP)** – The SFPUC's Water System Improvement Program (WSIP) includes levels of service for the regional water system that define the system performance objectives through 2030 and assist in the design of the facility improvement projects. The WSIP levels of service address the following categories: water quality, seismic reliability, delivery reliability, and water supply.

**mafic rocks** – Igneous rocks containing a group of dark-colored minerals, composed chiefly of magnesium and iron.

**Maximally Exposed Individual (MEI)** – A hypothetical person located at the receptor location where the highest exposure to toxic air contaminants emitted from a given source or project is predicted.

**mitigation** – One or all of the following: (1) Avoiding an impact altogether by not taking a certain action or parts of an action; (2) minimizing impacts by limiting the degree or magnitude of an action and its implementation; (3) rectifying an impact by repairing, rehabilitating, or restoring the affected environment; (4) reducing or eliminating an impact over time by preservation and maintenance operations during the life of an action; and (5) compensating for an impact by replacing or providing substitute resources or environments.

**permitted hazardous materials uses** – Facilities that use hazardous materials or handle hazardous wastes but comply with current hazardous materials and hazardous waste regulations.

**PPV** – To assess the potential for structural damage associated with vibration, the vibratory ground motion in the vicinity of the affected structure is measured in terms of peak particle velocity (PPV) in the vertical and horizontal directions (vector sum), typically in units of inches per second (in/sec).

**Program Environmental Impact Report** – One type of environmental review document identified under the California Environmental Quality Act that may be used to evaluate a plan or program that has multiple components (projects and actions) or to address a series of actions that are related.

**rearing** – Stage in development when juvenile fish spend feeding in nursery areas of rivers, lakes, streams, and estuaries before migration, or the care and support for young fish.

**redds** — Small depressions in the sand or gravel of a riverbed created by breeding trout or salmon for use as a spawning area.

**regional water system –** The entire SFPUC water system starting at Hetch Hetchy Reservoir and ending in San Francisco; the regional system includes all facilities serving the SFPUC wholesale and retail customers, except for the retail customers in San Francisco. The SFPUC regional water system consists of a complex network of facilities covering a geographic range of about 160 miles, from the Sierra Nevada on the east to San Francisco on the west. The regional water system crosses seven counties—Tuolumne, Stanislaus, San Joaquin, Alameda, Santa Clara, San Mateo, and San Francisco. The regional water system includes over 280 miles of pipelines, over 60 miles of tunnels, 11 reservoirs, 5 pump stations, and 2 water treatment plants.

**riffles** – A stretch of choppy water caused by stones or other objects in a river or stream.

**riparian** – The land adjacent to a natural watercourse such as a river or stream. Riparian areas support vegetation that provides important wildlife habitat, as well as important fish habitat when sufficient to overhang the bank.

**Supervisory Control and Data Acquisition (SCADA)** – SCADA systems allow for remote monitoring and operation of facilities.

**sedimentation** – The deposition of material suspended in a stream system, whether in suspension (suspended load) or on the bottom (bedload).

**seiche** – Earthquake-induced oscillating waves in an enclosed water body.

**sensitive receptors** – A subset of the population is sensitive or more vulnerable to (i.e., "receives") effects of noise, air quality, or a specified resource than the general population.

**serpentine** – A naturally occurring group of minerals that can be formed when ultramafic rocks are metamorphosed during uplift to the earth's surface. Serpentinite is a rock consisting of one or more serpentine minerals. This rock type is commonly associated with ultramatic rock along earthquake faults. Small amounts of chrysotile asbestos, a fibrous form of serpentine minerals, are common in serpentinite.

**siltation** – Sediment influx from either erosion or from sediment carried into a water body by inflowing rivers and tributaries.

**siphon** – In the context of water transmission systems, a siphon is a U-shaped pipeline composed of a drop pipe, a lateral pipe, and a riser pipe. The hydraulic head within the system allows the pipeline to be routed under surface features (such as rivers, creeks, railroad tracks, etc.) while continuing to operate under gravity, despite the drop in elevation.

**spawning** – Laying (and fertilizing) eggs in the process of reproduction.

**special-status species** – Several species known to occur within the general region of the project area are accorded "special status" because of their recognized rarity or vulnerability to habitat loss or population decline. Some of these species receive specific protection in federal and/or state endangered species legislation. Others have been designated as "sensitive species" or "species of special concern" on the basis of adopted policies of federal, state, or local resource agencies. These species are referred to collectively as "special-status species."

**spill sites** – Locations where a spill of hazardous materials has been reported to the state or federal regulatory agencies.

**stream baseflow** – Groundwater that enters surface streams. Groundwater discharge to creeks occurs in areas where the water table intersects and flows into the creek channel. Baseflow augmentation from groundwater is intrinsically related to the type of streamflow regime, whether ephemeral, intermittent, or perennial. Ephemeral streams flow only during and immediately after storms; intermittent streams flow only during certain times of the year (e.g., the rainy season); and perennial streams flow continuously during wet and dry times, with baseflow dependent on groundwater movement into the channel. Ephemeral and intermittent creeks are dependent on precipitation for streamflow; however, due to baseflow from groundwater, perennial creeks are capable of maintaining sustainable amounts of low flow, even during the dry season.

**subsidence** – The lowering of the land surface which can occur in response to groundwater pumping.

**substrate** – The materials found in streambeds or riverbeds (i.e., large and small boulders, stone, rubble, cobble, pebble, coarse and fine gravel, sand, silt, and clay). The surface upon which an organism grows or is attached.

**subsurface water or flow** – In the Sunol Valley, subsurface water is water that moves below the ground surface in the Stream Channel Gravels and Younger Alluvium (high transmissivity) and above the Older Alluvium and Livermore Gravels (low transmissivity).

**surface water** – All water that is naturally open to the atmosphere (i.e., rivers, lakes, reservoirs, ponds, streams, impoundments, seas, estuaries, etc.).

**suspended particulates (PM10 and PM2.5)** – Particulate matter is a class of air pollutants that consists of solid and liquid airborne particles in an extremely small size range. Particulate matter is measured in two size ranges: PM10 for particles less than 10 microns in diameter, and PM2.5 for particles less than 2.5 microns in diameter.

**sustainability** - Sustainability or sustainable development can be defined as development that meets the needs of the present without compromising the ability of future generations to meet their needs.

**swales** – Areas where winter rain collects but does not stand as long, as in vernal pools.

**terrestrial species** – Types of species of animals and plants that live on or grow from the land.

**thalweg** – The path of a line connecting the lowest points of cross-sections along a streambed.

**threatened species** – Legal status afforded to plant or animal species that are likely to become endangered within the foreseeable future throughout all or a significant portion of their range, as determined by the U.S. Fish and Wildlife Service or the National Marine Fisheries Service. Species may also be listed under the California Endangered Species Act by the Department of Fish and Wildlife.

**vehicle miles traveled (VMT)** – Number of miles traveled by vehicles within a specified region within a specific time period.

**ultramafic rocks** – These rock units are formed in high-temperature environments well below the surface of the earth.

**vernal pools** – Seasonal wetlands formed in gently undulating or rolling topography where the soil is underlain by a slowly permeable claypan or hardpan.

**water rights** – In California, the legal right to the use of a water resource.

**waters of the United States** – A broad federal definition that describes U.S. Army Corps of Engineers jurisdiction over deep-water habitats and special aquatic sites, including wetlands, as follows:

a. The territorial seas with respect to the discharge of fill material.
b. Coastal and inland waters, lakes, rivers, and streams that are navigable waters of the United States, including their adjacent wetlands.
c. Tributaries to navigable waters of the United States, including wetlands.
d. Interstate waters and their tributaries, including adjacent wetlands.

All other waters of the United States not identified above, such as isolated wetlands and lakes, intermittent streams, prairie potholes, and other waters that are not a part of a tributary system to interstate waters or navigable waters of the United States, the degradation or destruction of which could affect interstate commerce.

**watershed** – A region or area bounded peripherally by waters diverging and draining ultimately to a particular watercourse or body of water.

**watershed management** – The net result of numerous and varied actions in a watershed that directly affect watershed function and productivity. Actions may include, but are not limited to, land use decision-making, restoration and enhancement projects, monitoring and assessment of watershed condition, natural resource allocation and use, parcel management techniques, and education programs. Watershed management includes protection of existing healthy conditions.

**wetland** – A zone periodically or continuously submerged or having high soil moisture, which has aquatic and/or riparian vegetation components, and is maintained by water supplies significantly in excess of those otherwise available through local precipitation.

# Acronyms and Abbreviations

| | |
|---|---|
| °C | degrees Celsius |
| °F | degrees Fahrenheit |
| | |
| AB | Assembly Bill |
| ABAG | Association of Bay Area Governments |
| ACA | Alameda Creek Alliance |
| ACDEH | Alameda County Department of Environmental Health |
| ACFCD | Alameda County Flood Control and Water Conservation District |
| ACFD | Alameda County Fire Department |
| ACDD | Alameda Creek Diversion Dam |
| ACEH | Alameda County Environmental Health Department |
| ACPWA | Alameda County Public Works Agency |
| ACRP | Alameda Creek Recapture Project |
| ACTC | Alameda County Transportation Commission |
| ACTIA | Alameda County Transportation Improvements Authority |
| ACWD | Alameda County Water District |
| afy | acre-feet per year |
| AC Transit | Alameda County Transit |
| ADRR | Archeological Data Recovery Report |
| AF | acre-feet |
| AMIP | Adaptive Management Implementation Plan |
| APE | Area of Potential Effects |
| APSA | Aboveground Petroleum Storage Act |
| ASCE | American Society of Civil Engineers |
| ASDHM | Alameda System Daily Hydrologic Model |
| ASF | age-sensitivity factor |
| ATCM | Airborne Toxic Control Measure |
| AWS | Alameda whipsnake |
| | |
| BAAQMD | Bay Area Air Quality Management District |
| BARDP | Bay Area Regional Desalination Project |

| | |
|---|---|
| BART | Bay Area Rapid Transit |
| BAWSCA | Bay Area Water Supply and Conservation Agency |
| bgs | below ground surface |
| BMPs | best management practices |
| BO | Biological Opinion |
| BSSC | Building and Seismic Safety Council |
| | |
| CAA | Clean Air Act |
| C-APE | CEQA Area of Potential Effects |
| Cal-EPA | California Environmental Protection Agency |
| CAL FIRE | California Department of Forestry and Fire Protection |
| Cal/OSHA | California Occupational Safety and Health Administration |
| CalRecycle | California Department of Resources, Recycling, and Recovery |
| Caltrans | California Department of Transportation |
| Cal Water | California Water Service Company |
| CAP | Clean Air Plan |
| CARB | California Air Resources Board |
| CBC | California Building Code |
| CBIA | California Building Industry Association |
| CCA | community choice aggregation |
| CCAA | California Clean Air Act |
| CCC | Central California Coast |
| CCR | California Code of Regulations |
| CCSF | City and County of San Francisco |
| CCWD | Contra Costa Water District |
| CDC | California Department of Conservation |
| CDFG | California Department of Fish and Game (now called CDFW) |
| CDFW | California Department of Fish and Wildlife (formerly CDFG) |
| CDPH | California Department of Public Health |
| CDRP | Calaveras Dam Replacement project |
| CEC | California Energy Commission |
| CEQA | California Environmental Quality Act |
| CESA | California Endangered Species Act |
| CFR | Code of Federal Regulations |
| cfs | cubic feet per second |
| CGS | California Geological Survey |
| $CH_4$ | methane |
| CIWMB | California Integrated Waste Management Board |
| CMA | Congestion Management Agency |
| CMP | Congestion Management Program |
| CNDDB | California Natural Diversity Database |
| CNEL | Community Noise Equivalent Level |
| CNPS | California Native Plant Society |
| CO | carbon monoxide |
| $CO_2$ | carbon dioxide |
| $CO_2e$ | carbon dioxide-equivalent |
| Corps | U.S. Army Corps of Engineers |

| | |
|---|---|
| CPUC | California Public Utilities Commission |
| CRLF | California red-legged frog |
| CRSMP | construction risk and soils management plan |
| CTS | California tiger salamander |
| CUPA | Certified Unified Program Agency |
| CWA | Clean Water Act |
| | |
| dB | decibel |
| dBA | A-weighted decibel |
| DBH | diameter at breast height |
| DPM | diesel particulate matter |
| DPS | Distinct Population Segment |
| DSOD | Division of Safety of Dams |
| DTSC | California Department of Toxic Substances Control |
| DWR | California Department of Water Resources |
| | |
| EBMUD | East Bay Municipal Utility District |
| EBRPD | East Bay Regional Park District |
| ECAP | East County Area Plan |
| EIR | Environmental Impact Report |
| EO | Executive Order |
| EP | Environmental Planning |
| ERO | Environmental Review Officer |
| ESL | Environmental Screening Levels |
| ESZ | Ecological Sensitivity Zone |
| EV | Electric Vehicle |
| | |
| FARR | Final Archeological Resources Report |
| FEMA | Federal Emergency Management Agency |
| FESA | Federal Endangered Species Act |
| FIRM | Flood Insurance Rate Map |
| FMMP | Farmland Mapping and Monitoring Program |
| FTA | Federal Transit Administration |
| FYLF | Foothill yellow-legged frog |
| | |
| g | acceleration due to gravity |
| GE | General Electric |
| GHG | greenhouse gas |
| GIS | geographic information system |
| gpm | gallons per minute |
| GWh | gigawatts per hour |
| GWP | global warming potential |
| | |
| $H_2O$ | water |
| HASP | Health and Safety Plan |
| HDPE | high-density polyethylene |
| HHWP | Hetch Hetchy Water & Power |

| | |
|---|---|
| HMBP | Hazardous Materials Business Plan |
| HOV | High Occupancy Vehicle |
| I-680 | Interstate 680 |
| IA | Interconnection Agreement |
| IBC | International Building Code |
| kV | kilovolt |
| KVA | kilovolt-amps |
| kW | kilowatt |
| kWh | kilowatt-hours |
| Ldn | day-night noise level |
| LEED | Leadership in Energy and Environmental Design |
| Leq | steady-state energy level for noise |
| Lmax | worst-case noise level |
| LOS | level of service |
| LPG | liquid propane gasoline |
| $\mu g/m^3$ | micrograms per cubic meter |
| M | moment magnitude |
| MBTA | Migratory Bird Treaty Act |
| MCL | Maximum Contaminant Level |
| MEI | maximally exposed individual |
| MLD | Most Likely Descendant |
| mg/kg | milligrams per kilogram |
| mg/L | milligrams per liter |
| mgd | million gallons per day |
| MMT | million metric tons |
| MOU | Memorandum of Agreement |
| mph | miles per hour |
| MPO | Metropolitan Planning Organization |
| MRZ | Mineral Resource Zone |
| msl | mean sea level |
| MT | metric tons |
| MTBE | methyl tert-butyl ether |
| $MTCO_2E$ | metric tons of $CO_2E$ |
| MW | megawatts |
| MWh | megawatt-hours |
| $N_2O$ | nitrous oxide |
| NAAQS | national ambient air quality standards |
| NAHC | California Native American Heritage Commission |
| NEPA | National Environmental Policy Act |
| NHPA | National Historic Preservation Act |
| NIT | New Irvington Tunnel |
| NMFS | National Marine Fisheries Service |

| | |
|---|---|
| $NO_2$ | nitrogen dioxide |
| $NO_x$ | nitrogen oxide |
| NOI | Notice of Intent |
| NOP | Notice of Preparation |
| NPDES | National Pollutant Discharge Elimination System |
| NPS | National Park Service |
| NRA | National Recovery Act |
| NRCS | Natural Resources Conservation Service |
| NRHP | National Register of Historic Places |
| NTU | Nephelometric Turbidity Units |
| NWIC | Northwest Information Center |
| NWP | nationwide permit |
| | |
| $O_3$ | ozone |
| OAP | Ozone Attainment Plan |
| OEM | Office of Emergency Management |
| OHP | Office of Historic Preservation |
| OPR | Office of Planning and Research |
| OSHA | Occupational Safety and Health Administration |
| | |
| PCBs | polychlorinated biphenyls |
| PEIR | Program Environmental Impact Report |
| PG&E | Pacific Gas and Electric Company |
| PM10 | particulate matter, 10 microns or less in diameter |
| PM2.5 | particulate matter, 2.5 microns or less in diameter |
| ppm | parts per million |
| PPV | peak particle velocity |
| PRC | California Public Resources Code |
| PTSF | Percent Time-Spent-Following |
| PVC | polyvinyl chloride |
| | |
| REB | Resource Efficient Building |
| RMS | root mean square |
| ROG | reactive organic gases |
| ROW | right-of-way |
| RPG | Registered Professional Geologist |
| RPS | Renewable Portfolio Standard |
| RWQCB | California Regional Water Quality Control Board |
| | |
| SAAQS | state ambient air quality standards |
| SABPL | San Antonio Backup Pipeline |
| SBA | South Bay Aqueduct |
| SB | Senate Bill |
| SCADA | Supervisory Control and Data Acquisition |
| SCS | sustainable communities strategy |
| SDC | Seismic Design Category |
| SFDE | San Francisco Department of the Environment |

| | |
|---|---|
| SFBAAB | San Francisco Bay Area Air Basin |
| SFPUC | San Francisco Public Utilities Commission |
| SFWD | San Francisco Water Department |
| SHPO | State Historic Preservation Officer |
| SIP | State Implementation Plan |
| SMARA | Surface Mining and Reclamation Act of 1975 |
| SMP | Surface Mining Permit |
| SMP-24 | Surface Mining Permit 24 |
| SMP-30 | Surface Mining Permit 30 |
| SMP-32 | Surface Mining Permit 32 |
| $SO_2$ | sulfur dioxide |
| SPCC | Spill Prevention Control and Countermeasure plan |
| SR 84 | State Route 84 |
| SVP | Society of Vertebrate Paleontology |
| SVRM | Sunol Valley Resource Management |
| SVWC | Spring Valley Water Company |
| SVWTP | Sunol Valley Water Treatment Plant |
| SWIS | Solid Waste Information System |
| SWPPP | storm water pollution prevention plan |
| SWRCB | State Water Resources Control Board |
| | |
| TACs | toxic air contaminants |
| TDS | total dissolved solids |
| TIS | Transportation Impact Study |
| TMDLs | total maximum daily loads |
| TMP | Traffic Management Plan |
| TOCs | total organic compounds |
| TPH | total petroleum hydrocarbons |
| TPH-diesel | total petroleum hydrocarbons as diesel |
| TPH-gasoline | total petroleum hydrocarbons as gasoline |
| TTLC | Total Threshold Limit Concentration |
| TTLP | Toxic Characteristic Leaching Procedure |
| | |
| UAAR | Updated Alternatives Analysis Report |
| UCMP | University of California Museum of Paleontology |
| U.S. EPA | U.S. Environmental Protection Agency |
| USA | Utilities Service Alert |
| USFWS | U.S. Fish and Wildlife Service |
| USGS | U.S. Geological Survey |
| UST | underground storage tank |
| | |
| v/c | volume-to-capacity ratio |
| VMT | vehicle miles travelled |
| VOC | volatile organic compound |
| | |
| WDR | waste discharge requirements |
| WEIP | Watershed and Environmental Improvement Program |

| | |
|---|---|
| WET | waste extraction test |
| WMP | Watershed Management Plan |
| WQVF | Water Quality Vulnerability Zones |
| WRCC | Western Region Climate Center |
| WSIP | Water System Improvement Program |
| WTP | water treatment plant |
| Zone 7 | Zone 7 Water Agency |

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# CHAPTER 1
# Summary

## 1.1 Introduction and Purpose of the Project

The San Francisco Public Utilities Commission (SFPUC) is proposing the Alameda Creek Recapture Project (ACRP or proposed project) as part of improvements to its regional water system. The ACRP is one component of the SFPUC's Water System Improvement Program (WSIP) that would recapture water that will be released from Calaveras Reservoir and/or bypassed around the Alameda Creek Diversion Dam (ACDD) during future operation of Calaveras Reservoir. Released and bypassed water will flow naturally down Alameda Creek through the Sunol Valley and will percolate into and collect in a former quarry pit referred to as Pit F2. The SFPUC would recapture water collected in Pit F2 by pumping it to existing SFPUC water supply facilities in the Sunol Valley for treatment and eventual distribution to its water supply customers in the Bay Area. The recaptured water would maintain the historical contribution from the Alameda Watershed to the SFPUC regional water system, in accordance with the City and County of San Francisco's (CCSF) existing water rights.

Pit F2 is located in the Sunol Valley approximately six miles downstream of Calaveras Reservoir and 0.5-mile south of the Interstate 680/State Route 84, as shown in **Figure 1-1**. The ACRP would include the construction of several facilities in and around Pit F2 to pump the recaptured water from the quarry pit and convey it to existing water supply infrastructure in the SFPUC Alameda Watershed, as shown in the preliminary site plan in **Figure 1-2**. All project components are located in the Sunol Valley, an unincorporated area of Alameda County, on Alameda Watershed lands owned by the CCSF and managed by the SFPUC.

Under the San Francisco Administrative Code, Chapter 31, the San Francisco Planning Department, Environmental Planning Division is responsible for conducting the environmental review of all CCSF projects pursuant to the requirements of the California Environmental Quality Act (CEQA). Thus, Environmental Planning on behalf of CCSF, the lead agency, has prepared this Environmental Impact Report (EIR) in compliance with CEQA and Chapter 31 of the San Francisco Administrative Code. The SFPUC is the project sponsor for CCSF proposing to implement the ACRP. This EIR is being distributed to the public and decision-makers to disclose the potential physical impacts of the ACRP so that an informed judgment can be made about the project's environmental consequences prior to approval of the project.

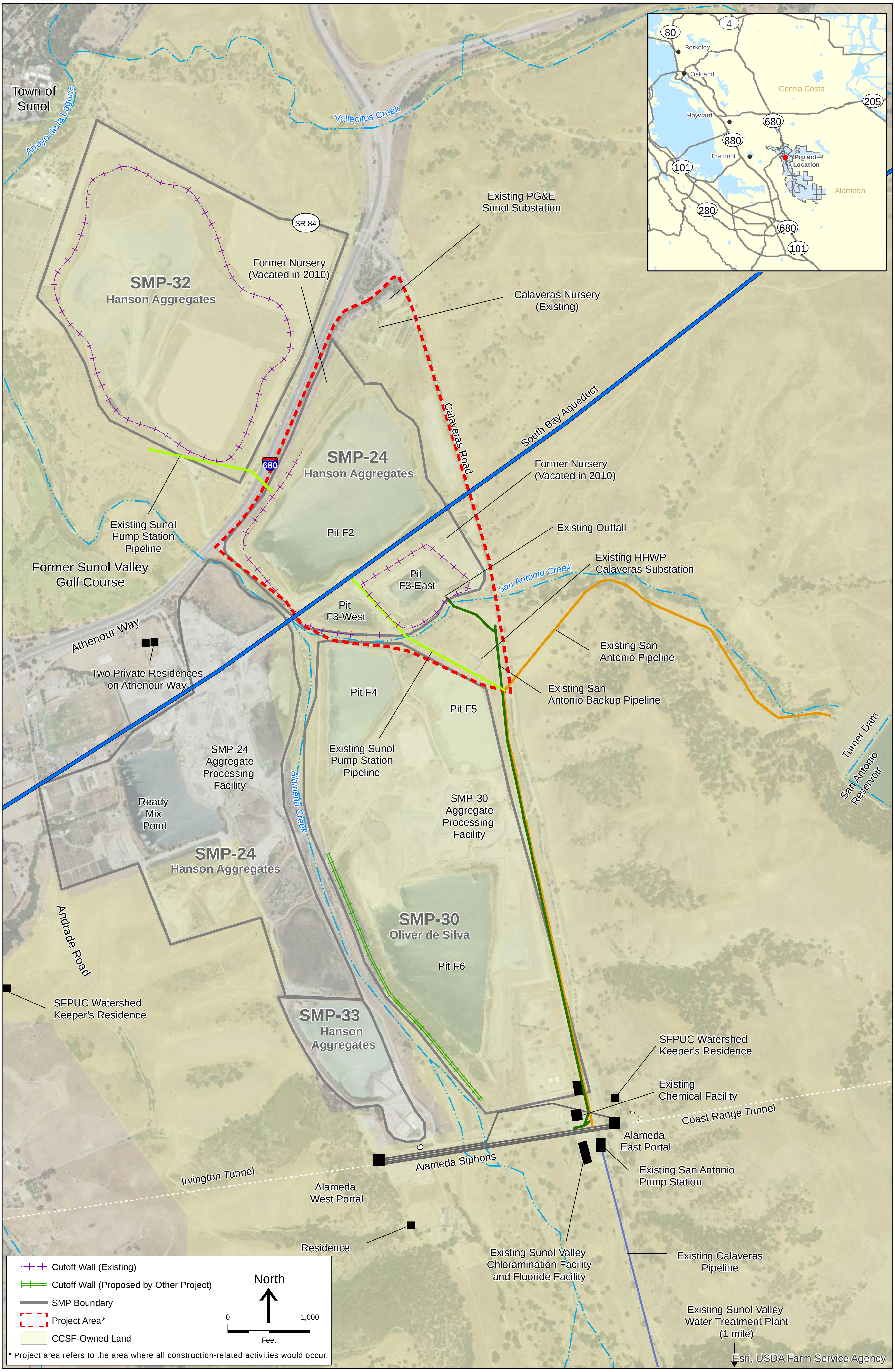
# 1.2 Background

## 1.2.1 Water System Improvement Program

In October 2008, the SFPUC adopted a systemwide program, the WSIP (also known as the "Phased WSIP Variant") (SFPUC Resolution 08-200). The WSIP is a comprehensive program designed to improve the regional water system with respect to water quality, seismic response, and water delivery based on a planning horizon through the year 2030, and to improve the regional system with respect to water supply to meet water delivery needs in the SFPUC service area through the year 2018. The WSIP consists of a water supply strategy and modifications to system operations as well as construction of a series of facility improvement projects in seven counties—Tuolumne, Stanislaus, San Joaquin, Alameda, Santa Clara, San Mateo, and San Francisco. One of the identified facility improvement projects of the WSIP is a water recapture project in the Sunol Valley region. Further details on the WSIP is in Chapter 2 of this EIR.

To address the potential environmental impacts of the WSIP in compliance with CEQA, the San Francisco Planning Department prepared a Program EIR (PEIR) on the proposed WSIP, which the San Francisco Planning Commission certified in October 2008 (San Francisco Planning Department, 2008; San Francisco Planning Commission Motion No. 17734). The PEIR evaluated the environmental impacts of the WSIP water supply strategy and system operations at a project level of detail, and evaluated the environmental impacts of the WSIP facility improvement projects at a program level of detail. As part of the SFPUC's approval of the WSIP in 2008, it also adopted CEQA Findings on the program, including a statement of overriding considerations, and a mitigation monitoring and reporting program (SFPUC Resolution 08-0200).

This project-level EIR on the ACRP tiers from the WSIP PEIR consistent with CEQA Guidelines Section 15168(c), which provides for environmental review of subsequent activities in a program in light of the program. This EIR incorporates by reference the relevant analyses presented in the PEIR with respect to the WSIP's impacts and mitigation measures that apply to the ACRP. The PEIR is available on the Planning Department's website at http://www.sfplanning.org.

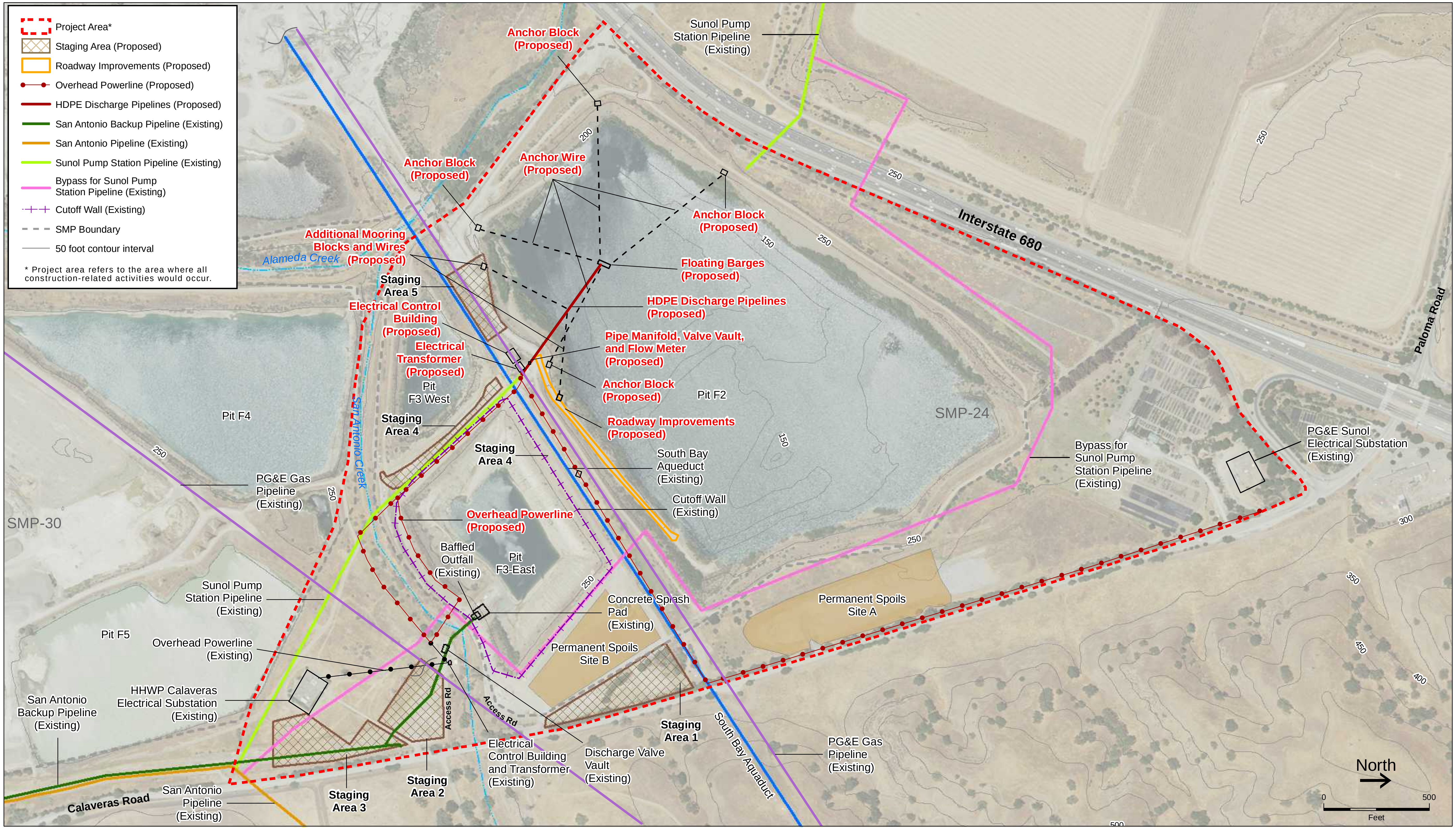


SOURCE: ESA, 2015; Date of aerial photo is 2014.

SFPUC Alameda Creek Recapture Project

**Figure 1-1**

Project Vicinity Map



SOURCE: SFPUC, 2014a

SFPUC Alameda Creek Recapture Project

**Figure 1-2**

Preliminary Site Plan

### 1.2.2 Relationship of the ACRP to the Calaveras Dam Replacement Project

The Calaveras Dam Replacement project (CDRP), another WSIP facility improvement project, will restore the storage capacity of Calaveras Reservoir and is designed to help the SFPUC meet the WSIP level of service goals related to seismic reliability and water delivery reliability. The CDRP EIR was certified in 2011,[1] and the CDRP is currently under construction, with completion scheduled for spring 2019.

As part of the future operations plan for Calaveras Reservoir under the CDRP, the SFPUC agreed to implement bypass and instream flow schedules for Alameda and Calaveras Creeks, respectively, to be protective of the federally-threatened Central California Coast (CCC) steelhead (*Oncorhynchus mykiss*) distinct population segment (DPS) in these creeks below the Alameda Creek Diversion Dam (ACDD) and Calaveras Dam, respectively. The required bypass schedule at the ACDD limits operation of the ACDD to December through March; requires that SFPUC maintain minimum bypass flows of 30 cubic feet per second (cfs) when water is present in upper Alameda Creek above the ACDD; and sets a maximum diversion rate of 370 cfs (prior operations allowed for diversions of up to 650 cfs year-round). The operational restrictions and minimum bypass requirements of the CDRP permits[2,3] on future operation of the ACDD will reduce the period of time and the rate at which SFPUC can divert water from Alameda Creek to Calaveras Reservoir.

Through the ACRP, the SFPUC proposes to recapture Alameda Creek water that will be bypassed around the ACDD and released from Calaveras Reservoir in accordance with CDRP permit requirements. The total amount of water to be recaptured would be equivalent to that which would have otherwise been stored in Calaveras Reservoir within the SFPUC's existing pre-1914 water rights. The primary purpose of the project is to ensure the WSIP's goals and objectives related to water supply and reliability can be met by maintaining diversions to the extent feasible under the SFPUC's existing water rights, while meeting the terms of the CDRP permit requirements.

## 1.3 Project Objectives

The primary goal of the ACRP is to recapture water that the SFPUC will release from Calaveras Reservoir and bypass around the ACDD when the SFPUC implements the instream flow schedules required as part of the regulatory permits for future operations of Calaveras Reservoir. The recaptured water would maintain the historical contribution from the Alameda Watershed to the SFPUC regional water system, in accordance with the CCSF existing water rights. The project-specific objectives of the ACRP are as follows:

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[1] San Francisco Planning Department, 2011. Final Environmental Impact Report for the San Francisco Public Utilities Commission Calaveras Dam Replacement Project. San Francisco Planning Department File No. 2005.0161E, State Clearinghouse No. 2005102102. Certified January 27, 2011.

[2] National Marine Fisheries Service (NMFS), 2011. Biological Opinion for Calaveras Dam Replacement Project in Alameda and Santa Clara Counties. Tracking No. 2005/07436. March 5, 2011.

[3] California Department of Fish and Game (CDFG), 2011. *Streambed Alteration Agreement for Calaveras Dam Replacement Project.* Notification No. 1600-2010-0322-R3. June 28, 2011.

- Recapture the water that would have otherwise been stored in Calaveras Reservoir due to the release and bypass of flows from Calaveras Dam and the ACDD, respectively, to meet instream flow requirements, thereby maintaining the historical annual transfers from the Alameda Watershed system to the SFPUC regional water system.
- Minimize impacts on water supply during drought, system maintenance, and in the event of water supply problems or transmission disruptions in the Hetch Hetchy system.
- Maximize local watershed supplies.
- Maximize the use of existing SFPUC facilities and infrastructure.
- Provide a sufficient flow to the Sunol Valley Water Treatment Plant (SVWTP) to meet its minimum operating requirements.

## 1.4 Project Description

Following an introduction and description of background information in Chapter 2, Chapter 3 of this EIR presents a detailed summary of the proposed project description, as summarized below.

### 1.4.1 Project Components

The key project components are as follows.

- Four 400-horsepower vertical turbine pumps on floating barges centrally located in Pit F2, approximately 400 feet from the shore, with a mooring system to secure the floating barges
- Four 700-foot-long, 16-inch-diameter high density polyethylene (HDPE) flexible discharge pipelines extending from each vertical turbine pump to a new pipe manifold located on shore
- A 100-foot-long, 36-inch-diameter welded steel pipeline connection between the new pipe manifold and the existing Sunol Pump Station Pipeline
- Throttling valves and a flow meter
- An electrical control building
- An electrical transformer, and up to fifteen power and fiber optic line poles and 1,800 feet of overhead power lines extending from Hetch Hetchy Water and Power (HHWP) Calaveras Electrical Substation to the new electrical control building.[4] In addition, approximately 2,800 feet of overhead fiber optic communication lines would extend from the HHWP Calaveras Electrical Substation to the new electrical control building below the overhead power lines along the new and existing power poles

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[4] Alternatively, as described in Section 3.3.7, if the HHWP Calaveras Electrical Substation cannot meet the power needs of the ACRP, power would come from the PG&E Sunol Electrical Substation. Under this alternative power option, overhead power lines would extend from existing power poles along Calaveras Road west to the new electrical control building. See Section 3.3.7 for more information.

## 1.4.2 Project Construction

Construction is expected to begin in the fall of 2017 and to be completed in the spring of 2019, with an overall duration of 18 months. Project construction would generally occur Monday through Saturday between 7 a.m. and 7 p.m. Truck hauling and deliveries would occur Monday through Friday between 7 a.m. and 7 p.m.; hauling and deliveries would not occur on Saturday or Sundays. Construction activities would include staging/laydown, site clearing, demolition, drilling, earth work, structural placement and backfilling, concrete and paving work, dewatering, excavation, and trenching in the project area. Calaveras Road would be the primary construction access route to the project area. Two existing quarry access roads that run east-to-west along either side of San Antonio Creek would provide secondary access to the ACRP site. No construction work would be conducted within the Alameda Creek bed, bank, or channel.

The contractor would use five primary staging areas located along the gravel access roads bordering quarry Pits F2, F3-East, and F3-West and adjacent to Calaveras Road. These staging areas would provide a combined total of 8.8 acres for vehicle and equipment parking, temporary stockpiling of excavated material, and materials storage. All proposed staging areas are within previously disturbed areas on CCSF-owned Alameda Watershed lands.

## 1.4.3 Project Operations

Recapture operations under the ACRP would occur after implementation of the instream flow schedules required as part of the regulatory permits for future operations of Calaveras Reservoir and the ACDD. ACRP operations would not commence until the CDRP is completed and SFPUC implements the instream flow schedules of bypasses at ACDD and releases from Calaveras Reservoir and resumes operation of Calaveras Reservoir with its fully restored historical capacity. The instream flow schedules will provide for various amounts of year-round flow in Alameda Creek, depending on the amount of rainfall.

Using the proposed ACRP facilities described above, the SFPUC would pump water that has collected in Pit F2 by natural infiltration and seepage, and the recaptured water would be transferred to the regional water system for municipal use. The recapture operation of the ACRP would be conducted within the CCSF's existing pre-1914 appropriative water rights. The volume of recaptured water would be tracked daily to ensure the operation is conducted within these water rights.

The SFPUC estimated the ACRP recapture volume using historical hydrology for the period October 1995 to September 2013, and accounting for future CDRP operations, including the bypasses and releases. The volume of water bypassed and released, and subsequently available for recapture, would vary from year to year based on precipitation and the specific requirements of the instream flow schedules. For the hydrologic period of October 1995 to September 2013, SFPUC estimated that the average annual recapture volumes would be 7,178 acre-feet per year, with a range of 4,878 to 9,161 acre-feet per year.

Pumping from Pit F2 would generally take place between April and December. SFPUC plans to use four pumps on floating barges to pump water from Pit F2 directly to the SVWTP or San Antonio Reservoir. In general, the SFPUC intends to operate Pit F2 within an upper and lower limit of water elevations in Pit F2, based on the relationship of water elevation to water volume. The operating elevations would range from 240 to 150 feet above msl; however, during periods of rare and extreme drought, it may be necessary to lower the water elevation in Pit F2 as low as 100 feet above msl. At its lowest point, the bottom of Pit F2 is roughly 10 feet above msl. SFPUC would manage water elevations in Pit F2 by using a water level sensor in Pit F2 to monitor water elevations.

## 1.5 Summary of Project Impacts and Mitigation Measures

Chapter 4 of this EIR describes land use plans and policies that apply to the ACRP and identifies the potential for the ACRP to conflict with those plans or policies adopted for the purpose of avoiding or mitigating environmental effects. Chapter 5, Environmental Setting, Impacts, and Mitigation Measures, of this EIR presents the environmental impact analyses for 18 resource areas consistent with San Francisco Planning Department Guidelines and Appendix G of the CEQA Guidelines. For each resource area, the impact analysis describes the environmental setting, identifies significance criteria used in the analysis, evaluates potential physical effects of the ACRP, and provides feasible mitigation measures that would reduce significant impacts to a less-than-significant level. A summary of all impacts and mitigation measures is provided at the end of this chapter in **Table 1-1**. The categories used to designate impact significance are:

- **Less-Than-Significant (LS).** Impact would not exceed the defined significance criteria, or would be eliminated or reduced to a less-than-significant level through compliance with existing local, state, and federal laws and regulations.

- **Less than Significant with Mitigation (LSM).** Impact would be reduced to a less-than-significant level through implementation of the identified mitigation measure(s).

The proposed project was determined to have no significant and unavoidable impacts. All ACRP project-level impacts would be either less than significant, or reduced to less-than-significant levels with implementation of the identified mitigation measures.

## 1.6 Alternatives to the Proposed Project

Chapter 6 of this EIR summarizes the growth-inducing impacts of the project, as identified in the WSIP PEIR, and presents a summary of the project's cumulative impacts, significant environmental effects and irreversible changes, and areas of controversy. Chapter 7, Alternatives, evaluates two alternatives to the proposed project:

- **Alternative A: No Project Alternative.** The SFPUC would not construct the ACRP, but the SFPUC would be expected to pursue other actions to make up for the loss of yield from the Alameda Watershed.

- **Alternative B: Regional Desalination Alternative.** This alternative consists of implementation of the Bay Area Regional Desalination Project (BARDP), a collaboration of five Bay Area water agencies—including the SFPUC—to investigate a year-round regional water supply project using desalination and water transfers to serve the needs of residents and businesses in the region. The BARDP would construct a 10 to 20 million gallon per day (mgd) desalination treatment facility located in eastern Contra Costa County. The desalination facility would turn brackish water from Suisun Bay into a reliable, drought-proof drinking water supply. It would rely on the available capacity of an extensive network of existing pipelines and interties that already connect the participating agencies, as well as existing wastewater outfalls and pump stations in the region. The SFPUC would not directly receive desalinated water but rather, would receive an exchange of about 9 mgd of potable water with another water agency through an existing intertie facility that would theoretically compensate for the loss of yield from the Alameda Watershed.

Although the No Project Alternative would avoid the construction-related impacts of the proposed project, it would not meet the basic project objectives of the ACRP. In addition, the No Project Alternative would also jeopardize the SFPUC's ability to meet the adopted WSIP goals and objectives related to water supply and delivery reliability. The alternatives analysis determined that Alternative B, Regional Desalination Alternative, could meet the ACRP's second objective of "minimiz[ing] impacts on water supply during drought, system maintenance, and in the event of water supply problems or transmission disruptions in the Hetch Hetchy system." The estimated yield of 9 mgd from this alternative would theoretically compensate for the loss of yield from the Alameda watershed if the ACRP were not implemented. This alternative would also meet the project objective of maximizing the use of existing SFPUC facilities and infrastructure, through use of the Hayward Intertie as well as through the SFPUC's continued maintenance and operation of the regional water system in the Alameda watershed. However, this alternative would fail to meet all other ACRP objectives. The alternative would avoid all of the construction-related impacts of the proposed project in the Sunol Valley but would involve a project of much greater scale and magnitude than the ACRP, with the potential to result in significant environmental impacts that would not occur under the ACRP.

The alternatives analysis determined that the proposed project would be the environmentally superior alternative. Chapter 7 also describes 36 alternative concepts or strategies to the ACRP that were considered but rejected from further consideration in this EIR.

## 1.7 Areas of Controversy and Issues to be Resolved

On June 24, 2015, the San Francisco Planning Department issued a Notice of Preparation (NOP) to interested members of the public, organizations, and agencies to inform them of the intent to prepare an EIR on the ACRP and to provide them an opportunity to comment on the issues and provide input on the scope of the EIR. Consistent with CEQA, the Planning Department conducted a public scoping process, including a 33-day scoping period from June 24 to July 27, 2015 and a scoping meeting on July 9, 2015. Comments received during the scoping period from community members and agencies, include the following:

- SFPUC water rights to the water that infiltrates into Pit F2

- Ability to meet WSIP level of service goals and objectives related to water supply during both non-drought and drought periods
- Effects to Alameda Creek, Alameda Creek watershed, and downstream agencies
- Origin of water that would be recaptured or pumped out of Pit F2 at various times of operation and hydrologic connections
- Effects on anadromous fish passage in Alameda Creek
- Effects on groundwater levels and groundwater supplies
- Effects on Alameda Creek surface flow through the Sunol Valley and downstream into Niles Canyon
- Effects on amphibians and aquatic reptiles and cumulative effects with CDRP
- Effects of changes in surface water and subsurface water levels on biological resources, including sycamore alluvial woodlands
- Cost of the project

A scoping report was prepared that summarizes the comments received on the project, including a transcript of oral testimony at the July 9, 2015 scoping session (see **Appendix NOP**). Chapter 2 of this EIR provides further detail on the public comments received and provides a cross-reference to where each comment is addressed in this document.

## TABLE 1-1
## SUMMARY OF ACRP IMPACTS AND MITIGATION MEASURES

| ENVIRONMENTAL IMPACT | MITIGATION MEASURES | IMPACT SIGNIFICANCE |
|---|---|---|
| **Land Use** | | |
| **Impact LU-1:** Project construction would not have a substantial impact on the existing character of the vicinity. | None required. | LS |
| **Impact LU-2:** The project operations would not conflict with land use plans and policies adopted for the purpose of avoiding or mitigating an environmental effect. | None required. | LS |
| **Impact LU-3:** Project operations would not result in substantial long-term or permanent impacts on the existing character of the vicinity. | None required. | LS |
| **Impact C-LU:** The project, in combination with past, present, and probable future projects, would not substantially affect land use. | None required. | LS |
| **Aesthetics** | | |
| **Impact AE-1:** Project construction would not result in a substantial adverse effect on scenic vistas or temporarily degrade the visual character of the site and its surroundings. | None required. | LS |
| **Impact AE-2:** The proposed project would not result in long-term adverse effects on scenic vistas and scenic resources or degrade the visual character of the site and its surroundings. | None required. | LS |
| **Impact AE-3:** The proposed project would not create a new permanent source of substantial light or glare. | None required. | LS |
| **Impact C-AE:** The project, in combination with past, present, and probable future projects, would not substantially affect aesthetics. | None required. | LS |
| **Population and Housing** | | |
| No impacts related to population and housing. | Not Applicable | Not Applicable |

Categories of Impact Significance:
LS = Less-Than-Significant Impact (no mitigation required)
LSM = Less-Than-Significant Impact with Mitigation (less than significant or potentially significant impact, but can be reduced to less than significant with mitigation)

### TABLE 1-1 (Continued)
### SUMMARY OF ACRP IMPACTS AND MITIGATION MEASURES

| ENVIRONMENTAL IMPACT | MITIGATION MEASURES | IMPACT SIGNIFICANCE |
|---|---|---|
| **Cultural Resources** | | |
| **Impact CUL-1:** Project construction could cause a substantial adverse change in the significance of an archaeological resource that qualifies as a historical or unique archaeological resource. | **Mitigation Measure M-CUL-1: Accidental Discovery of Archaeological Resources.**<br>The following mitigation measure is required to avoid any potential adverse effect from the proposed project on accidentally discovered buried or submerged historical resources as defined in *CEQA Guidelines* Section 15064.5(a) and (c). The project sponsor shall distribute the Planning Department archeological resource "ALERT" sheet to the project prime contractor; to any project subcontractor (including demolition, excavation, grading, foundation, pile driving, etc. firms); or utilities firm involved in soils disturbing activities within the project site. Prior to any soils disturbing activities being undertaken each contractor is responsible for ensuring that the "ALERT" sheet is circulated to all field personnel including, machine operators, field crew, pile drivers, supervisory personnel, etc. The project sponsor shall provide the Environmental Review Officer (ERO) with a signed affidavit from the responsible parties (prime contractor, subcontractor(s), and utilities firm) to the ERO confirming that all field personnel have received copies of the Alert Sheet.<br>Should any indication of an archeological resource be encountered during any soils disturbing activity of the project, the project Head Foreman and/or project sponsor shall immediately notify the ERO and shall immediately suspend any soils disturbing activities in the vicinity of the discovery until the ERO has determined what additional measures should be undertaken.<br>If the ERO determines that an archeological resource may be present within the project site, the project sponsor shall retain the services of an archaeological consultant from the pool of qualified archaeological consultants maintained by the Planning Department archaeologist. The archeological consultant shall advise the ERO as to whether the discovery is an archeological resource, retains sufficient integrity, and is of potential scientific/historical/cultural significance. If an archeological resource is present, the archeological consultant shall identify and evaluate the archeological resource. The archeological consultant shall make a recommendation as to what action, if any, is warranted. Based on this information, the ERO may require, if warranted, specific additional measures to be implemented by the project sponsor.<br>Measures might include: preservation in situ of the archeological resource; an archaeological monitoring program; or an archeological testing program. If an archeological monitoring program or archeological testing program is required, it shall be consistent with the Environmental Planning (EP) division guidelines for such programs. The ERO may also require that the project sponsor immediately implement a site security program if the archeological resource is at risk from vandalism, looting, or other damaging actions. | LSM |

Categories of Impact Significance:
LS = Less-Than-Significant Impact (no mitigation required)
LSM = Less-Than-Significant Impact with Mitigation (less than significant or potentially significant impact, but can be reduced to less than significant with mitigation)

## TABLE 1-1 (Continued)
## SUMMARY OF ACRP IMPACTS AND MITIGATION MEASURES

| ENVIRONMENTAL IMPACT | MITIGATION MEASURES | IMPACT SIGNIFICANCE |
|---|---|---|
| **Cultural Resources (cont.)** | | |
| **Impact CUL-1** (cont.) | The project archeological consultant shall submit a Final Archeological Resources Report (FARR) to the ERO that evaluates the historical significance of any discovered archeological resource and describes the archeological and historical research methods employed in the archeological monitoring/data recovery program(s) undertaken. Information that may put at risk any archeological resource shall be provided in a separate removable insert within the final report.<br>Copies of the Draft FARR shall be sent to the ERO for review and approval. Once approved by the ERO, copies of the FARR shall be distributed as follows: California Archaeological Site Survey Northwest Information Center (NWIC) shall receive one (1) copy and the ERO shall receive a copy of the transmittal of the FARR to the NWIC. The Environmental Planning division of the Planning Department shall receive one bound copy, one unbound copy and one unlocked, searchable PDF copy on CD three copies of the FARR along with copies of any formal site recordation forms (CA DPR 523 series) and/or documentation for nomination to the National Register of Historic Places/California Register of Historical Resources. In instances of high public interest or interpretive value, the ERO may require a different final report content, format, and distribution than that presented above. | |
| **Impact CUL-2:** Project construction could result in a substantial adverse effect related to the disturbance of human remains. | **Mitigation Measure M-CUL-2: Accidental Discovery of Human Remains.**<br>The treatment of human remains and of associated or unassociated funerary objects discovered during any soils disturbing activity shall comply with applicable State and Federal laws. This shall include immediate notification of the Coroner of Alameda County and in the event of the Coroner's determination that the human remains are Native American remains, notification of the California State Native American Heritage Commission (NAHC) who shall appoint a Most Likely Descendant (MLD) (PRC Section 5097.98). The archeological consultant, project sponsor, ERO, and MLD shall have up to but not beyond six days of discovery to make all reasonable efforts to develop an agreement for the treatment of human remains and associated or unassociated funerary objects with appropriate dignity (CEQA Guidelines. Sec. 15064.5(d)). The agreement should take into consideration the appropriate excavation, removal, recordation, analysis, custodianship, curation, and final disposition of the human remains and associated or unassociated funerary objects. Nothing in existing State regulations or in this mitigation measure compels the SFPUC and the ERO to accept recommendations of an MLD. The archeological | LSM |

Categories of Impact Significance:

| | |
|---|---|
| LS = | Less-Than-Significant Impact (no mitigation required) |
| LSM = | Less-Than-Significant Impact with Mitigation (less than significant or potentially significant impact, but can be reduced to less than significant with mitigation) |

### TABLE 1-1 (Continued)
### SUMMARY OF ACRP IMPACTS AND MITIGATION MEASURES

| ENVIRONMENTAL IMPACT | MITIGATION MEASURES | IMPACT SIGNIFICANCE |
|---|---|---|
| **Cultural Resources (cont.)** | | |
| **Impact CUL-2** (cont.) | consultant shall retain possession of any Native American human remains and associated or unassociated burial objects until completion of any scientific analyses of the human remains or objects as specified in the treatment agreement if such as agreement has been made or, otherwise, as determined by the archeological consultant and the ERO. | |
| **Impact C-CUL:** The project, in combination with past, present, and probable future projects, could substantially affect cultural resources. | **Mitigation Measure M-CUL-1: Accidental Discovery of Archaeological Resources.**<br>(See Impact CUL-1.)<br>**Mitigation Measure M-CUL-2: Accidental Discovery of Human Remains.**<br>(See Impact CUL-2.) | LSM |
| **Transportation and Circulation** | | |
| **Impact TR-1:** Construction of the proposed project would not substantially conflict with an applicable plan, ordinance, or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of travel. | None required. | LS |
| **Impact TR-2:** Project construction activities would not result in inadequate emergency access. | None required. | LS |
| **Impact TR-3:** Project construction activities could decrease the safety of public roadways for vehicles, bicyclists, and pedestrians. | None required. | LS |
| **Impact TR-4:** Project operations and maintenance activities would not substantially alter transportation conditions, increase vehicle miles travelled (VMT), and would not cause conflicts with emergency vehicle, transit, bicycle, and pedestrian travel. | None required. | LS |
| **Impact C-TR:** The project, in combination with past, present, and probable future projects, would not substantially affect transportation and circulation. | None required. | LS |

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## TABLE 1-1 (Continued)
## SUMMARY OF ACRP IMPACTS AND MITIGATION MEASURES

| ENVIRONMENTAL IMPACT | MITIGATION MEASURES | IMPACT SIGNIFICANCE |
|---|---|---|
| **Noise and Vibration** | | |
| **Impact NO-1:** Construction of the project would not result in a substantial temporary increase in ambient noise levels at the closest residential receptors, and would not expose persons to substantial noise levels in excess of standards established in the Alameda County Noise Ordinance. | None required. | LS |
| **Impact NO-2:** Construction activities would not result in excessive groundborne vibration. | None required. | LS |
| **Impact NO-3:** Project operations would not result in a substantial increase in ambient noise levels in the project vicinity or significant impacts related to the exposure of people to noise levels in excess of standards established by the Alameda County Noise Ordinance. | None required. | LS |
| **Impact C-NO:** The project, in combination with past, present, and probable future projects, would not substantially affect noise and vibration. | None required. | LS |
| **Air Quality** | | |
| **Impact AQ-1:** Emissions generated during project construction activities could violate air quality standards and contribute substantially to an existing air quality violation. | **Mitigation Measure M-AQ-1a: BAAQMD Basic Construction Measures**.<br>To limit dust, criteria pollutants, and precursor emissions associated with project construction, the following BAAQMD-recommended Basic Construction Measures shall be included in all construction contract specifications for the proposed project:<br>• All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered two times per day.<br>• All haul trucks transporting soil, sand, or other loose material off-site shall be covered.<br>• All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited.<br>• All vehicle speeds on unpaved roads shall be limited to 15 mph.<br>• All paving shall be completed as soon as possible. Building pads shall be laid as soon as possible after grading unless seeding or soil binders are used. | LSM |

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## TABLE 1-1 (Continued)
## SUMMARY OF ACRP IMPACTS AND MITIGATION MEASURES

| ENVIRONMENTAL IMPACT | MITIGATION MEASURES | IMPACT SIGNIFICANCE |
|---|---|---|
| **Air Quality (cont.)** | | |
| **Impact AQ-1** (cont.) | • Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to 5 minutes (as required by the California airborne toxics control measure Title 13, Section 2485 of California Code of Regulations [CCR]). Clear signage shall be provided for construction workers at all access points.<br>• All construction equipment shall be maintained and properly tuned in accordance with manufacturer's specifications. All equipment shall be checked by a certified visible emissions evaluator.<br>• Post a publicly visible sign with the telephone number and person to contact at the SFPUC regarding dust complaints. This person shall respond and take corrective action within 48 hours. The BAAQMD's phone number shall also be visible to ensure compliance with applicable regulations. | |
| **Impact AQ-2:** Project construction activities would not create objectionable odors affecting a substantial number of people. | None required. | LS |
| **Impact AQ-3:** Implementation of the proposed project could conflict with or obstruct implementation of the 2010 Clean Air Plan. | **Mitigation Measure M-AQ-1: BAAQMD Basic Construction Measures.**<br>(See Impact AQ-1, above, for description.) | LSM |
| **Impact C-AQ:** The project, in combination with past, present, and probable future projects, could substantially affect air quality. | **Mitigation Measure M-AQ-1: BAAQMD Basic Construction Measures**.<br>(See Impact AQ-1, above, for description.) | LSM |
| **Greenhouse Gas Emissions** | | |
| **Impact C-GG-1:** Project construction and operation would not generate GHG emissions that could have a significant impact on the environment, or conflict with any applicable plan, policy, or regulation adopted for the purpose of reducing GHG emissions. | None required. | LS |
| **Wind and Shadow** | | |
| No impacts related to wind and shadow. | Not Applicable | Not Applicable |

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| | |
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### TABLE 1-1 (Continued)
### SUMMARY OF ACRP IMPACTS AND MITIGATION MEASURES

| ENVIRONMENTAL IMPACT | MITIGATION MEASURES | IMPACT SIGNIFICANCE |
|---|---|---|
| **Recreation** | | |
| **Impact RE-1:** The proposed project would not substantially degrade existing recreational uses during construction. | None required. | LS |
| **Impact C-RE:** The project, in combination with past, present, and probable future projects, would not substantially affect recreational resources. | None required. | LS |
| **Utilities and Service Systems** | | |
| **Impact UT-1:** Project construction would not result in a substantial adverse effect related to landfill capacity. | None required. | LS |
| **Impact UT-2:** Project construction would not result in a substantial adverse effect related to compliance with federal, state, and local statutes and regulations pertaining to solid waste. | None required. | LS |
| **Impact C-UT:** The project, in combination with past, present, and probable future projects, would not substantially affect utilities and service systems. | None required. | LS |
| **Public Services** | | |
| No impacts related to public services. | Not Applicable | Not Applicable |
| **Terrestrial Biological & Fishery Resources** | | |
| **Impact BI-1:** Construction of the proposed project could have a substantial adverse effect on special-status species. | **Mitigation Measure M-BI-1a: General Protection Measures.**<br>The SFPUC shall ensure that the following general measures are implemented by the contractor(s) during construction to minimize or avoid impacts on biological resources:<br>• Construction contractor(s) shall limit the construction disturbance area to that necessary for project construction and avoid outside areas by posting signage delineating the construction disturbance area with flags, stakes, or fencing.<br>• Protective fencing shall be installed outside the driplines of all trees to be retained that are located within 50 feet of any grading, road improvements, underground utilities, or other | LSM |

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## TABLE 1-1 (Continued)
## SUMMARY OF ACRP IMPACTS AND MITIGATION MEASURES

| ENVIRONMENTAL IMPACT | MITIGATION MEASURES | IMPACT SIGNIFICANCE |
|---|---|---|
| **Terrestrial Biological & Fishery Resources (cont.)** | | |
| **Impact BI-1** (cont.) | construction activity. A biologist who is experienced in special-status species and sensitive habitat identification and the SFPUC must first approve any encroachment beyond these fenced areas. The contractor shall maintain the temporary fencing until all construction activities are completed. No construction activities, parking, or staging shall occur beyond the fenced areas.<br>• Project-related vehicles shall observe a 15-mile-per-hour speed limit on unpaved roads in the work area, or as otherwise determined by the applicable regulatory agencies.<br>• The contractor shall provide closed garbage containers for the disposal of all food-related trash items (e.g., wrappers, cans, bottles, food scraps). All garbage shall be collected daily from the project area and placed in a closed container, from which garbage shall be removed weekly.<br>• Construction personnel shall not feed or otherwise attract fish or wildlife in the project area.<br>• No pets shall be allowed in the project area.<br>• No firearms shall be allowed in the project area.<br>• Staging areas shall be located at least 50 feet from riparian habitat, creeks, and wetlands.<br>• If vehicle or equipment fueling or maintenance is necessary, it shall be performed in the designated staging areas and at least 50 feet from riparian habitat, creeks, or wetlands.<br>• In cases where excavations require dewatering, the intakes shall be screened with a maximum mesh size of 5 millimeters.<br>**Mitigation Measure M-BI-1b: Worker Training and Awareness Program.**<br>The SFPUC shall ensure that mandatory biological-resources awareness training is provided to all construction personnel as follows:<br>• The training shall be developed and provided by a biologist who is experienced in special-status species and sensitive habitat identification or a construction compliance manager familiar with the sensitive species that may occur in the project area.<br>• The training shall be provided before any work, including vegetation clearing and grading, occurs within the work area boundaries. | |

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### TABLE 1-1 (Continued)
### SUMMARY OF ACRP IMPACTS AND MITIGATION MEASURES

| ENVIRONMENTAL IMPACT | MITIGATION MEASURES | IMPACT SIGNIFICANCE |
|---|---|---|
| **Terrestrial Biological & Fishery Resources (cont.)** | | |
| **Impact BI-1** (cont.) | • The training shall provide education on the natural history of the special-status species potentially occurring in the project area, and discuss the required mitigation measures to avoid impacts on the special-status species and the penalties for failing to comply with biological mitigation requirements.<br>• If new construction personnel are added to the project, the contractor shall ensure that they receive training prior to starting work. The subsequent training of personnel can include a videotape of the initial training and/or the use of written materials rather than in-person training by a biologist.<br>**Mitigation Measure M-BI-1c: Prevent Movement of Sensitive Wildlife Species through the Work Areas.**<br>To prevent CTS, CRLF, and AWS, western pond turtle, and American badger from moving through the project area, the SFPUC or its contractors shall install temporary wildlife exclusion fencing along the work area boundaries (including access roads, staging areas, spoils sites etc.) prior to the start of project construction activities. The SFPUC shall ensure that the temporary fencing is continuously maintained until all construction activities are completed and that construction equipment is confined to the designated work areas. The fencing shall be made of suitable material that does not allow any of the animals listed above to pass through, and the bottom shall be buried to a depth of 6 inches (or to a sufficient depth as specified by the applicable resource agencies) so that these species cannot crawl under the fence. Fencing shall be equipped with exit funnels at least every 200 feet. To provide wildlife refugia and minimize CTS and CRLF mortality during construction, 2-foot by 4-foot plywood coverboards shall be placed adjacent to the exclusion fence at a minimum interval of least 200 feet, alternating inside and outside of the fence.<br>During fence installation and immediately prior to any initial ground-disturbing or vegetation removal activities, a biologist who is experienced in special-status species and sensitive habitat identification shall be present onsite to monitor for any special-status species present in suitable habitat within the fence installation area. If a special-status species is present within the fence installation area, work shall cease in the vicinity of the animal, and the animal shall be allowed to relocate of its own volition unless relocation is permitted by state and/or federal regulatory agencies. After construction is completed, the exclusion fencing and cover boards shall be removed. | |

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## TABLE 1-1 (Continued)
## SUMMARY OF ACRP IMPACTS AND MITIGATION MEASURES

| ENVIRONMENTAL IMPACT | MITIGATION MEASURES | IMPACT SIGNIFICANCE |
|---|---|---|
| **Terrestrial Biological & Fishery Resources (cont.)** | | |
| **Impact BI-1** (cont.) | **Mitigation Measure M-BI-1d: Preconstruction Surveys and Construction Monitoring and Protocols for California Tiger Salamander, California Red-Legged Frog, and Alameda Whipsnake.**<br>***Preconstruction Surveys***<br>Prior to initial ground-disturbing activities in the project area, a biologist who is experienced in the identification of CTS, CRLF, and AWS shall survey the project area for the presence of CTS, CRLF, and AWS, as follows:<br>*California tiger salamander and California red-legged frog*. Not more than two weeks prior to the onset of work activities (including equipment mobilization) and immediately prior to commencing work, a biologist who is experienced in the identification of CTS and CRLF shall survey suitable habitat in the project area for CTS and CRLF. Burrow areas identified within the project boundaries shall be temporarily fenced and avoided, where feasible. If a burrow is present within the construction footprint and cannot be avoided, the biologist shall coordinate with USFWS and CDFW to avoid impacts to CTS and CRLF to the extent feasible using the most recent CTS and CRLF clearance methodology recognized by the USFWS and CDFW.<br>*Alameda whipsnake*. Not more than two weeks prior to the onset of work activities (including equipment mobilization) and immediately prior to commencing work, a biologist who is experienced in the identification of AWS shall conduct a reconnaissance survey of suitable upland habitat for AWS in the project area.<br>Federal or state listed species shall only be relocated upon authorization from federal (USFWS) and/or state (CDFW) regulatory agencies. Otherwise, encountered individuals shall be allowed to relocate of their own volition.<br>***Construction Monitoring and Protocols***<br>At the beginning of each workday that includes initial ground disturbance, including grading, excavation, and vegetation-removal activities, a biologist who is experienced in the identification of CTS, CRLF, and AWS (biological monitor) shall conduct onsite monitoring for the presence of CTS, CRLF, and AWS in the area where ground disturbance or vegetation removal shall occur. The following protective provisions shall apply: | |

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## TABLE 1-1 (Continued)
## SUMMARY OF ACRP IMPACTS AND MITIGATION MEASURES

| ENVIRONMENTAL IMPACT | MITIGATION MEASURES | IMPACT SIGNIFICANCE |
|---|---|---|
| **Terrestrial Biological & Fishery Resources (cont.)** | | |
| **Impact BI-1** (cont.) | • Suitable CTS, CRLF, and AWS habitat shall be surveyed immediately prior to any ground-disturbing or vegetation removal activities.<br>• Perimeter fences shall be inspected to ensure they do not have any tears or holes, that the bottoms of the fences are still buried, and that no individuals have been trapped in the fences.<br>• Coverboards shall be inspected once a month between June 15 and October 15, once a week from October 15 to June 15, daily during a rain event, and once following the rain event (within 48 hours of the rain event), or as otherwise approved by USFWS and/or CDFW.<br>• Any CTS, CRLF, or AWS found along and inside the fence shall be closely monitored until they move away from the construction area or, if they don't move out of the work area of their own volition shall be relocated by the biologist with authorization from USFWS and/or CDFW. The time to wait for the animal to move of its own volition shall be determined by the biological monitor and as approved by USFWS and/or CDFW.<br>• All open trenches or holes and areas under parked vehicles shall be checked for the presence of CTS, CRLF, and AWS.<br>• All excavated or deep-walled holes or trenches greater than 2 feet shall be covered at the end of each workday using plywood, steel plates, or similar materials, or escape ramps shall be constructed of earth fill or wooden planks to allow animals to exit. Before such holes are filled, they shall be thoroughly inspected for trapped animals.<br>• Project personnel shall be required to immediately report any harm, injury, or mortality of a special-status species during construction (including entrapment) to the construction foreman or biological monitor, and the construction foreman or biological monitor shall immediately notify the SFPUC. The SFPUC shall provide verbal notification to the USFWS Endangered Species Office in Sacramento, California and/or to the local CDFW warden or biologist (as applicable) and written notification as requested by the agencies.<br>The SFPUC shall designate an SFPUC representative as the point of contact in the event that a CTS, CRLF, or AWS is discovered onsite when the biological monitor is not present. | |

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## TABLE 1-1 (Continued)
## SUMMARY OF ACRP IMPACTS AND MITIGATION MEASURES

| ENVIRONMENTAL IMPACT | MITIGATION MEASURES | IMPACT SIGNIFICANCE |
|---|---|---|
| **Terrestrial Biological & Fishery Resources (cont.)** | | |
| **Impact BI-1** (cont.) | If the biological monitor or construction personnel find any of these species within the work area, construction activities shall cease in the immediate vicinity. The animals shall be allowed to relocate of its own volition outside of the work area or, if they don't move out of the work area of their own volition shall be relocated by a biologist who is experienced in the identification of CTS and CRLF. Federal or state listed species shall not be relocated without authorization from federal (USFWS) and/or state (CDFW) regulatory agencies.<br>Once all initial ground-disturbing activities are completed, the biological monitor shall perform spot checks of the project area at least once a week, and during rain events, for the duration of construction to ensure that the perimeter fence is in good order, trenches are being covered if left open overnight (or escape ramps provided), project personnel are conducting checks beneath parked vehicles prior to their movement, and all other required biological protection measures are being followed.<br>All observations of federally and state-listed species shall be recorded in the CNDDB.<br>**Mitigation Measure M-BI-1e: Prepare and Implement a Vegetation Restoration Plan and Compensatory Mitigation.**<br>To restore temporarily impacted habitat for CTS, CRLF and AWS, the SFPUC shall prepare and implement a vegetation restoration plan with detailed specifications for minimizing the introduction of invasive weeds and restoring all temporarily disturbed areas, and shall ensure that the contractor successfully implements the plan. The plan shall indicate the best time of year for seeding to occur.<br>To facilitate preparation of the plan, the SFPUC shall ensure that, prior to construction, a botanist (experienced in identifying sensitive plant species in the project area) performs additional preconstruction surveys of the areas to collect more detailed vegetation composition data, including species occurrence, vegetation characterization (tree diameter size, etc.), and percent cover of plant species. Photo documentation shall be used to show pre-project conditions.<br>The minimum weed control and restoration measures as well as success criteria to be included in the vegetation restoration plan are described below. | |

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## TABLE 1-1 (Continued)
## SUMMARY OF ACRP IMPACTS AND MITIGATION MEASURES

| ENVIRONMENTAL IMPACT | MITIGATION MEASURES | IMPACT SIGNIFICANCE |
|---|---|---|
| **Terrestrial Biological & Fishery Resources (cont.)** | | |
| **Impact BI-1** (cont.) | ***Invasive Weed Control Measures***<br>Invasive weeds such as yellow star-thistle, purple star-thistle, Italian thistle, bull thistle, milk thistle, shortpod mustard, jubata or pampas grass, and stinkwort readily colonize soils that have been disturbed by grading or other mechanical disturbance. Although much of the project area has an extensive weed infestation and relatively few native species, the SFPUC shall incorporate the following measures into the construction plans and specifications to prevent the further spread of invasive weeds into nearby areas:<br>• Construction equipment shall arrive at the project area free of soil, seed, and plant parts to reduce the likelihood of introducing new weed species.<br>• Any imported fill material, soil amendments, gravel etc., required for construction and/or restoration activities that would be placed within the upper 12 inches of the ground surface shall be free of vegetation and plant material.<br>• Certified, weed-free, imported erosion-control materials (or rice straw in upland areas) shall be used exclusively, as applicable (this measure concerns biological material and does not preclude the use of silt fences, etc.).<br>• The environmental awareness training program for construction personnel shall include an orientation regarding the importance of preventing the spread of invasive weeds.<br>• To reduce the seed bank in weed-dominated ruderal areas, the contractor shall mow, disk, apply spot-applications of herbicide to weeds, and/or remove weeds, as appropriate (i.e., before seed set and dispersal) and prior to surface clearing and site preparation.<br>• The top 3 inches of soil shall not be conserved and re-spread due to the high levels of weed seeds it contains. This soil may be disposed of offsite or in the spoils deposit area.<br>• Before tracked and heavy construction equipment leaves the project area, any accumulation of plant debris, soil, and mud shall be washed off the equipment or otherwise removed onsite, and air filters shall be blown out.<br>• The restoration plan shall specify measures to remove and/or control weeds in the project area, including _not_ conserving and respreading the surface layer of soil which contains a high level of weed seeds. | |

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### TABLE 1-1 (Continued)
### SUMMARY OF ACRP IMPACTS AND MITIGATION MEASURES

| ENVIRONMENTAL IMPACT | MITIGATION MEASURES | IMPACT SIGNIFICANCE |
|---|---|---|
| **Terrestrial Biological & Fishery Resources (cont.)** | | |
| **Impact BI-1** (cont.) | • No invasive species shall be used in any restoration seeding.<br>• Implementation of these measures during construction and site restoration activities shall be verified and documented by a biological or environmental monitor.<br>***Minimum Restoration Measures***<br>Restoration areas are areas within the project area that would be disturbed during project-related construction activities but would subsequently be restored to their preconstruction conditions, or better. Current SFPUC policy specifies that no container stock or soil-containing plant materials may be used for revegetation on Watershed lands to avoid inadvertent introduction of non-native plant pathogens like phytophthora (*Phytophthora species*). The use or exclusion of container stock for restoration actions shall abide by effective SFPUC directives at the time of planting. To restore temporarily-disturbed areas, the SFPUC shall ensure the following:<br>• The SFPUC shall specify that topsoil is not salvaged to minimize respreading of weeds. All areas proposed for disturbance are composed of poorly-sorted alluvium containing cobbles, gravels, sand and silt and material from any depth can be used as material for final grading.<br>• Grassland, ruderal, coyote brush scrub and mixed scrub areas shall be reseeded with a native or non-invasive grass and forb seed mix.<br>• Willow thickets within Pit F2 shall be allowed to revegetate naturally; planting willow stakes is impractical on the steep slopes of the pits. Willow thickets elsewhere, if impacted, shall be replanted using willow stakes derived from cuttings of local willow plants.<br>• For any tree to be removed, the SFPUC shall ensure that replacement trees are planted within or in the vicinity of the project area as follows:<br>– For each isolated locally native tree removed that is 6 inches in diameter at breast height [dbh] or 10 inches aggregate dbh for multi-trunk trees, one replacement planting shall be installed per inch of diameter of trees removed. Replacement plantings shall be of the same species as that removed, unless site conditions are unsuitable, in which case a suitable native species shall be installed. For example, eight planting basins shall be planted with coast live oak acorns to replace one 8-inch coast live oak tree. Seeds shall be used at planting sites rather than container stock to prevent the spread of soil-borne pathogens such as phytophthora. | |

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## SUMMARY OF ACRP IMPACTS AND MITIGATION MEASURES

| ENVIRONMENTAL IMPACT | MITIGATION MEASURES | IMPACT SIGNIFICANCE |
|---|---|---|
| **Terrestrial Biological & Fishery Resources (cont.)** | | |
| **Impact BI-1** (cont.) | – Trees shall be replaced within the first year after the completion of construction or as soon as possible in an area where construction is completed during a favorable time of year as determined by an arborist or biologist with experience in restoration.<br>– Replacement trees shall be planted in or near the location from where trees were removed as feasible and in locations suitable for the replacement species.<br>– Selection of replacement sites and installation of replacement plantings shall be supervised by an arborist or biologist with experience in restoration. Irrigation of tree plantings during the initial establishment period shall be provided as deemed necessary by an arborist or biologist with experience in restoration.<br>– An arborist or biologist with experience in restoration shall monitor new plantings at least once a year for five years (seven years for oaks) or as otherwise determined by the applicable resource agencies.<br>– Any replacement plantings installed as remediation for failed plantings shall be planted as stipulated here for original plantings, and shall be monitored for a period of five years (seven years for oaks) following installation, or as otherwise determined by the applicable resource agencies.<br>***Minimum Success Criteria***<br>Unless the applicable resource agencies determine different but equivalent or more stringent criteria should be applied, the success criteria for restoring temporarily disturbed areas shall be as follows:<br>• All temporarily disturbed areas shall be restored to approximate their baseline condition. Vegetation cover shall be at least 70 percent of the baseline; that is, absolute cover of the revegetation site shall be no less than 70 percent of baseline absolute cover of native and naturalized species (i.e., excluding target invasives). Cover in the revegetation site shall contain no more than 10 percent absolute cover of target invasives or no more cover of invasives than the baseline, whichever is greater, as defined in the summary table, below. | |

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## TABLE 1-1 (Continued)
## SUMMARY OF ACRP IMPACTS AND MITIGATION MEASURES

<table>
<tr><th>ENVIRONMENTAL IMPACT</th><th>MITIGATION MEASURES</th><th>IMPACT SIGNIFICANCE</th></tr>
<tr><td colspan="3"><b>Terrestrial Biological & Fishery Resources (cont.)</b></td></tr>
<tr><td><b>Impact BI-1</b> (cont.)</td><td>
<ul>
<li>Vegetation within restoration areas shall be functional, fully established, and self-sustaining as evidenced by successive years of healthy vegetative growth; observed increase in vegetative cover, canopy cover, and/or plant height; successful flowering, seed set, and/or vegetative reproduction over the five-year monitoring period.</li>
<li>Revegetation work shall start within one year of construction completion.</li>
<li>Revegetation of grassland areas shall be monitored at least once a year for five years or as otherwise determined by the applicable resource agencies. With the exception of oak trees, which shall be monitored for up to seven years, all other replacement trees shall be monitored for five years.</li>
<li>Restoration areas shall be monitored for target invasive plants quarterly in the first five years following replanting. If invasive plants are found during the five-year monitoring period, they shall be removed as necessary to support meeting the cover and vegetation composition success criteria.</li>
<li>Monitoring and maintenance shall continue until the minimum success criteria specified in the <b>Table M-BI-1E</b>, below are met, or as otherwise determined by the applicable resource agencies.</li>
</ul>
<p><b>TABLE M-BI-1E<br>MINIMUM SUCCESS CRITERIA FOR VEGETATION RESTORATION</b></p>
<table>
<tr><th>Parameter</th><th>Field Indicator/Measurement</th></tr>
<tr><td>Vegetative Cover</td><td><b>Grassland:</b> 70 percent relative cover (relative cover is cover compared with baseline) of typical native and naturalized grassland species known from the Sunol Region by the end of the fifth monitoring year.<br><b>Individual Native Trees:</b> 65 percent survivorship by the fifth monitoring year.</td></tr>
<tr><td>Invasive Species</td><td>At the end of the fifth monitoring year, a restoration area shall have no more cover by invasives than the baseline. Invasive plant species shall be defined as any high-level species on the California Invasive Plant Council Inventory</td></tr>
</table>
</td><td></td></tr>
</table>

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## TABLE 1-1 (Continued)
## SUMMARY OF ACRP IMPACTS AND MITIGATION MEASURES

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|---|---|---|
| **Terrestrial Biological & Fishery Resources (cont.)** | | |
| **Impact BI-1** (cont.) | ***Compensatory Mitigation***<br>The SFPUC shall fully compensate for permanent losses of non-native grassland and ruderal habitat that provide potential low-quality upland refugia and dispersal habitat for CTS and CRLF, as well as potential low quality foraging and dispersal habitat for AWS. This area is approximately 0.43 acre. Compensatory mitigation may occur through habitat enhancements at any one of the SFPUC's Bioregional Habitat Restoration sites, such as the Goat Rock compensation site and the San Antonio Creek compensation site, or through purchase of credits at an off-site mitigation bank. Permanently impacted areas shall be mitigated at a ratio of 2:1, unless otherwise approved by USFWS and/or CDFW. Enhancements at the SFPUC's Bioregional Habitat Restoration sites shall be conducted in accordance with the SFPUC's Sunol Region Mitigation and Monitoring Plan, which specifies the success criteria and mechanisms for monitoring to ensure compensation.<br>**Mitigation Measure M-BI-1f: Measures to Minimize Disturbance to Western Burrowing Owl.**<br>• The SFPUC shall implement one of the following two measures to avoid and minimize impact on western burrowing owl:<br>1. The SFPUC shall provide evidence (in the form of a burrowing owl habitat assessment, focused survey, etc.) to, and receive concurrence from, CDFW that western burrowing owl are not expected to occur within the project area and a 500-foot buffer.<br>2. If the potential for presence of western burrowing owl cannot be ruled out, the SFPUC shall implement preconstruction surveys for burrowing owl as follows:<br>a. A biologist with experience in western burrowing owl identification (qualified biologist) shall conduct preconstruction surveys of suitable habitat within the project area, and in a 500-foot buffer of the project area (as access is allowed on adjacent private lands), to locate active breeding or wintering burrowing owl burrows less than 14 days prior to construction and/or prior to exclusion fencing installation. If no burrowing owls are detected, no additional action is necessary.<br>b. If burrowing owls are detected during the nesting and fledging seasons (April 1 to August 15 and August 16 to October 15, respectively), the SFPUC shall establish a no-disturbance buffer around the nesting location to avoid disturbance or destruction of | |

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## TABLE 1-1 (Continued)
## SUMMARY OF ACRP IMPACTS AND MITIGATION MEASURES

| ENVIRONMENTAL IMPACT | MITIGATION MEASURES | IMPACT SIGNIFICANCE |
|---|---|---|
| **Terrestrial Biological & Fishery Resources (cont.)** | | |
| **Impact BI-1** (cont.) | the nest site until after the breeding season or after the biologist determines that the young have fledged or would not be affected by planned construction activities. The extent of these buffers shall be determined by the biologist and would depend on the level of noise or construction disturbance; line of sight between the nest and the disturbance; ambient noise under existing conditions (baseline noise) and other disturbances; and consideration of other topographical or artificial barriers.<br>c. If burrowing owls are detected during the non-breeding (winter) season (October 16 to March 31), the SFPUC shall establish a no-disturbance buffer around any active burrows. The extent of the buffer shall be determined by the biologist. If active winter burrows are found that would be directly affected by ground-disturbing activities, owls can be displaced from winter burrows according to recommendations made in the *Staff Report on Burrowing Owl Mitigation*.[5] Burrowing owls should not be excluded from burrows unless or until a Burrowing Owl Exclusion Plan is developed by the qualified biologist.<br>**Mitigation Measure M-BI-1g: Measures to Minimize Disturbance to Special-Status Bird Species.**<br>The SFPUC shall conduct tree and shrub removal in the project area during the nonbreeding season (generally August 16 through February 14) for migratory birds and raptors if possible. In the event that the construction schedule requires work during the breeding season, then tree and shrub removal may have to occur during the breeding season.<br>If the SFPUC must conduct construction activities during the avian breeding season (February 15 to August 15), the SFPUC shall retain a wildlife biologist who is experienced in identifying birds and their habitat to conduct nesting-raptor surveys in and within 500 feet of the project area (as access is allowed on adjacent private lands). Migratory bird surveys shall be conducted within at least 250 feet of all work areas (as access is allowed on adjacent private lands). All migratory bird and active raptor nests within these areas shall be mapped. These surveys shall be conducted within two weeks prior to initiation of construction activities at any time between February 15 and August 15. If no active nests are detected during surveys, no additional mitigation is required. | |

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[5] California Department of Fish and Game, 2012. Staff Report on Burrowing Owl Mitigation. March 7, 2012.

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## TABLE 1-1 (Continued)
## SUMMARY OF ACRP IMPACTS AND MITIGATION MEASURES

| ENVIRONMENTAL IMPACT | MITIGATION MEASURES | IMPACT SIGNIFICANCE |
|---|---|---|
| **Terrestrial Biological & Fishery Resources (cont.)** | | |
| **Impact BI-1** (cont.) | If migratory bird and/or active raptor nests are found in the project area or in the adjacent surveyed area, the SFPUC shall establish a no-disturbance buffer around the nesting location to avoid disturbance or destruction of the nest site until after the breeding season or after the biologist determines that the young have fledged (usually late June through mid-July). The extent of these buffers shall be determined by the biologist and would depend on the species' sensitivity to disturbance (which can vary among species); the level of noise or construction disturbance; line of sight between the nest and the disturbance; ambient noise under existing conditions (baseline noise) and other disturbances; and consideration of other topographical or artificial barriers. CDFW and/or USFWS shall be consulted regarding nesting bird buffers if the species is a listed species.<br>**Mitigation Measure M-BI-1h: Conduct Preconstruction Surveys for Special-Status Bats and Implement Avoidance and Minimization Measures.**<br>A pre-construction survey for special-status bats shall be conducted by a biologist who is experienced in the identification of special-status bats (qualified biologist) in advance of any tree removal to identify potential bat habitat and identify active roost sites. Should potential roosting habitat or active bat roosts be found in trees to be disturbed under the project, the following measures shall be implemented:<br>• Trimming of trees shall occur when bats are active, approximately between the periods of March 1 to April 15 and August 15 to October 15; outside of bat maternity roosting season (approximately April 15 to August 15) if a maternity roost is present and outside of months of winter torpor (approximately October 15 to February 28 or as determined by a biologist who is experienced in the identification of special-status bats), to the extent feasible.<br>• If trimming of trees during the periods when bats are active is not feasible and bat roosts being used for maternity or hibernation purposes are found on or in the immediate vicinity of the project area where these activities are planned, a no-disturbance buffer as determined by a biologist who is experienced in the identification of special-status bats shall be established around these roost sites until they are determined to be no longer in-use as maternity or hibernation roosts or the young are volant.<br>Buffer distances may be adjusted around roosts depending on the level of surrounding ambient activity (i.e., if the project area is adjacent to a road or active quarry area) and if an obstruction, such as a large rock formation, is within line-of-sight between the nest and construction. For bat | |

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## TABLE 1-1 (Continued)
## SUMMARY OF ACRP IMPACTS AND MITIGATION MEASURES

| ENVIRONMENTAL IMPACT | MITIGATION MEASURES | IMPACT SIGNIFICANCE |
|---|---|---|
| **Terrestrial Biological & Fishery Resources (cont.)** | | |
| **Impact BI-1** (cont.) | species that are State-sensitive species (i.e. any of the species of special concern with potential to occur on the project area), an SFPUC representative, supported by the qualified biologist, shall consult with CDFW regarding modifying roosts buffers, prohibiting construction within the buffer, and modifying construction around maternity and hibernation roosts.<br>• A biologist who is experienced in the identification of special-status bats shall be present during tree trimming and disturbance to rock crevices or outcrops if bat roosts are present. Trees and rock crevices with roosts shall be disturbed only when no rain is occurring or is forecast to occur for three days and when daytime temperatures are at least 50 degrees Fahrenheit (°F).<br>• Trimming of trees containing or suspected to contain roost sites shall be done under supervision of a biologist who is experienced in the identification of special-status bats and implemented over two days. On one day, branches and limbs not containing cavities or fissures in which bats could roost shall be cut only using chainsaws. The following day, branches or limbs containing roost sites shall be trimmed, under the supervision of the biologist, also using chainsaws.<br>• Bat roosts that begin during construction shall be presumed to be unaffected, and no buffer shall be necessary.<br>**Mitigation Measure M-BI-1i: Avoidance and Minimization Measures for American Badger.**<br>The following measures shall be implemented to avoid and minimize impacts on American badger:<br>a) A biologist who is experienced in American badger identification (qualified biologist) shall conduct preconstruction surveys for American badger dens prior to the start of construction at potentially affected sites. The survey results shall be submitted to the SFPUC.<br>b) Areas of suitable habitat for American badger in the project area include non-native grasslands. Surveys shall be conducted wherever this vegetation community exists within 100 feet of the project area boundary. Surveys shall be phased to occur within 14 days prior to disturbance.<br>c) If no potential American badger dens are found during the preconstruction surveys, no further action is required.<br>d) If the qualified biologist determines that any potential dens identified during the preconstruction surveys are inactive, the biologist shall excavate the dens by hand with a shovel to prevent use by badgers during construction. | |

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## TABLE 1-1 (Continued)
## SUMMARY OF ACRP IMPACTS AND MITIGATION MEASURES

| ENVIRONMENTAL IMPACT | MITIGATION MEASURES | IMPACT SIGNIFICANCE |
|---|---|---|
| **Terrestrial Biological & Fishery Resources (cont.)** | | |
| **Impact BI-1** (cont.) | e) If active badger dens are found during the course of preconstruction surveys, the following measures shall be taken to avoid and minimize adverse effects on American badger:<br>i. Relocation shall be prohibited during the badger pupping season (typically February 15 to June 1).<br>ii. Construction activities shall not occur within 50 feet of active badger dens. The biologist shall contact CDFW immediately if natal badger dens are detected to determine suitable buffers.<br>iii. If the qualified biologist determines that potential dens within the project area, and outside the breeding season, may be active, the biologist shall notify the CDFW. Badgers shall be passively relocated from active dens during the non-breeding season. Passive relocation may include incrementally blocking the den entrance with soil, sticks, and debris for three to five days to discourage use of these dens prior to project disturbance. After the qualified biologist determines that badgers have abandoned any active dens found within the project area, the dens shall be hand-excavated with a shovel to prevent re-use during construction. | |
| **Impact BI-2:** Construction of the proposed project could have a substantial adverse effect on riparian habitat and other sensitive habitats. | **Mitigation Measure M-BI-2: Avoidance and Protection Measures for Riparian Habitats and Wetlands.**<br>The SFPUC and its contractors shall avoid impacts on riparian habitats and jurisdictional wetlands, by implementing the following measures:<br>• A silt fence shall be installed adjacent to all riparian habitats and wetlands to be avoided within 50 feet of any proposed construction activity, and signs installed indicating the required avoidance. No equipment mobilization, grading, clearing, or storage of equipment or machinery, or similar activity, shall occur until a biologist who is experienced in the identification of riparian habitats and wetlands has inspected and approved the fencing installed around these features. This restriction applies to both onsite construction and any offsite mitigation area. The SFPUC shall ensure that the temporary fencing is continuously maintained until all construction activities are completed. No construction activities, including equipment movement, material storage, or temporary spoil stockpiling, shall be allowed within the fenced areas protecting riparian habitats and wetlands.<br>• Exposed slopes shall be stabilized immediately upon the completion of construction activities. | LSM |

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## TABLE 1-1 (Continued)
## SUMMARY OF ACRP IMPACTS AND MITIGATION MEASURES

| ENVIRONMENTAL IMPACT | MITIGATION MEASURES | IMPACT SIGNIFICANCE |
|---|---|---|
| **Terrestrial Biological & Fishery Resources (cont.)** | | |
| **Impact BI-2** (cont.) | **Mitigation Measure M-BI-1a: General Protection Measures.**<br>(See Impact BI-1, above, for description.)<br>**Mitigation Measure M-BI-1b: Worker Training and Awareness Program.**<br>(See Impact BI-1, above, for description.)<br>**Mitigation Measure M-BI-1e: Prepare and Implement a Vegetation Restoration Plan and Compensatory Mitigation.**<br>(See Impact BI-1, above, for description). | |
| **Impact BI-3:** Construction of the proposed project could have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act through direct removal, filling, hydrological interruption, or other means. | **Mitigation Measure M-BI-1a: General Protection Measures.**<br>(See Impact BI-1, above, for description.)<br>**Mitigation Measure M-BI-1b: Worker Training and Awareness Program.**<br>(See Impact BI-1, above, for description.)<br>**Mitigation Measure M-BI-1e: Prepare and Implement a Vegetation Restoration Plan and Compensatory Mitigation.**<br>(See Impact BI-1, above, for description.)<br>**Mitigation Measure M-BI-2: Avoidance and Protection Measures for Riparian Habitats and Wetlands.**<br>(See Impact BI-2, above, for description.) | LSM |
| **Impact BI-4:** Project construction would not interfere substantially with the movement of any native resident or migratory wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites. | None required. | LS |
| **Impact BI-5:** Project operations would not have a substantial adverse effect on special-status species. | None required. | LS |

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## TABLE 1-1 (Continued)
## SUMMARY OF ACRP IMPACTS AND MITIGATION MEASURES

| ENVIRONMENTAL IMPACT | MITIGATION MEASURES | IMPACT SIGNIFICANCE |
|---|---|---|
| **Terrestrial Biological & Fishery Resources (cont.)** | | |
| **Impact BI-6:** Project operations could have a substantial adverse effect on riparian habitat or other sensitive natural community, including wetland habitats. | **Mitigation Measure M-BI-6: Riparian Habitat Monitoring and Enhancement Mitigation**<br>**Mitigation Measure M-BI-6a: Baseline riparian habitat mapping.**<br>Prior to commencing project operations, the SFPUC shall prepare a plan to submit to the Environmental Review Officer (ERO) for review and approval describing quantitative methods for measuring extent of baseline riparian habitat and subsequent changes in extent following commencement of project operations. The SFPUC shall map the extent of tree-supporting riparian alliances (i.e., sandbar and arroyo willow thickets and mixed riparian forest) along Alameda Creek Subreaches A, B, and C1, starting from the confluence with San Antonio Creek and extending downstream to about the northern end of the former Sunol Valley Golf Club (see Figure 5.14-2).<br>**Mitigation Measure M-BI-6b: Annual riparian habitat monitoring and reporting.**<br>Once ACRP recapture operations begin, the SFPUC shall conduct annual monitoring within Subreaches A, B, and C1, applying the same mapping protocol used to establish the baseline map (Mitigation Measure M-BI-6a), to document the extent of tree-supporting riparian alliances. A reduction in extent of tree-supporting riparian alliances from the baseline conditions, as calculated below, shall trigger implementation of habitat enhancement measures described in Mitigation Measure M-BI-6c on a 1:1 ratio based on extent.<br>Changes in the extent of tree-supporting woody riparian alliances shall be calculated as the difference in extent between the baseline conditions and a multi-year rolling average based on the current year and the years preceding.<br>The SFPUC shall prepare and submit to the ERO an annual report documenting the annual monitoring of riparian habitat and any associated habitat enhancement activities, with the first year report consisting of baseline monitoring and plan for habitat enhancement (see Mitigation Measure M-BI-6c).<br>In the future, when quarry operations cease, implementation of this mitigation measure shall cease. | LSM |

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## TABLE 1-1 (Continued)
## SUMMARY OF ACRP IMPACTS AND MITIGATION MEASURES

| ENVIRONMENTAL IMPACT | MITIGATION MEASURES | IMPACT SIGNIFICANCE |
|---|---|---|
| **Terrestrial Biological & Fishery Resources (cont.)** | | |
| **Impact BI-6** (cont.) | **Mitigation Measure M-BI-6c: Habitat enhancement, Subreaches B and C1 to achieve no net loss of tree-supporting riparian alliances.**<br>The SFPUC shall develop a habitat enhancement plan to be reviewed and approved by the Environmental Review Officer and shall implement the plan based on the triggers described in Mitigation Measure M-BI-6b. The plan shall be consistent with the SFPUC's Sunol Valley Restoration Report (in prep.) and shall consist of a combination of plantings such as valley oaks and sycamores in the floodplain, and protecting and managing natural valley oak and sycamore recruits. Mitigation gains in woody riparian habitat shall be calculated in the same manner as losses are calculated in Mitigation Measure M-BI-6b. To the extent feasible, habitat enhancement shall be implemented in a portion of Subreaches B and C1, and in all cases, within the Sunol Valley.<br>No net loss will be considered to be achieved under this mitigation measure at such time that the SFPUC establishes and maintains woody riparian habitat that fully replaces the baseline extent of woody riparian habitat in accordance with the approved habitat enhancement plan. Upon documentation that this performance standard has been satisfied, the SFPUC may request ERO approval to discontinue the monitoring and enhancement actions required under this mitigation measure.<br>This measure shall be superseded at such time that the SFPUC implements the Sunol Valley Restoration Report that accomplishes the equivalent or greater habitat enhancement.<br>In the future, when quarry operations cease, implementation of this mitigation measure shall cease. | |
| **Impact BI-7:** Project operations would not interfere substantially with the movement of any native resident or migratory wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites. | None required. | LS |

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### TABLE 1-1 (Continued)
### SUMMARY OF ACRP IMPACTS AND MITIGATION MEASURES

| ENVIRONMENTAL IMPACT | MITIGATION MEASURES | IMPACT SIGNIFICANCE |
|---|---|---|
| **Terrestrial Biological & Fishery Resources (cont.)** | | |
| **Impact BI-8:** Construction and operations of the proposed project could conflict with local policies or ordinances protecting biological resources. | **Mitigation Measure M-BI-1a: General Protection Measures.**<br>(See Impact BI-1, above, for description.)<br>**Mitigation Measure M-BI-1b: Worker Training and Awareness Program.**<br>(See Impact BI-1, above, for description.)<br>**Mitigation Measure M-BI-1c: Prevent Movement of Sensitive Wildlife Species through the Work Areas.**<br>(See Impact BI-1, above, for description.)<br>**Mitigation Measure M-BI-1d: Preconstruction Surveys and Construction Monitoring and Protocols for California Tiger Salamander, California Red-Legged Frog, and Alameda Whipsnake.**<br>(See Impact BI-1, above, for description.)<br>**Mitigation Measure M-BI-1e: Prepare and Implement a Vegetation Restoration Plan and Compensatory Mitigation.**<br>(See Impact BI-1, above, for description.)<br>**Mitigation Measure M-BI-1f: Measures to Minimize Disturbance to Western Burrowing Owl.**<br>(See Impact BI-1, above, for description.)<br>**Mitigation Measure M-BI-1g: Measures to Minimize Disturbance to Special-Status Bird Species.**<br>(See Impact BI-1, above, for description.)<br>**Mitigation Measure M-BI-1h: Conduct Preconstruction Surveys for Any Special-Status Bats and Implement Avoidance and Minimization Measures.**<br>(See Impact BI-1, above, for description.)<br>**Mitigation Measure M-BI-1i: Avoidance and Minimization Measures for American Badger.**<br>(See Impact BI-1, above, for description.)<br>**Mitigation Measure M-BI-2: Avoidance and Protection Measures for Riparian Habitats and Wetlands.**<br>(See Impact BI-2, above, for description.) | LSM |

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## SUMMARY OF ACRP IMPACTS AND MITIGATION MEASURES

| ENVIRONMENTAL IMPACT | MITIGATION MEASURES | IMPACT SIGNIFICANCE |
|---|---|---|
| **Terrestrial Biological & Fishery Resources (cont.)** | | |
| **Impact BI-8** (cont.) | **Mitigation Measure M-BI-6a: Baseline riparian habitat monitoring.**<br>(See Impact BI-6, above, for description.)<br>**Mitigation Measure M-BI-6b: Annual riparian habitat monitoring and reporting.**<br>(See Impact BI-6, above, for description.)<br>**Mitigation Measure M-BI-6c: Habitat enhancement, Subreaches B and C1 to achieve no net loss of tree-supporting riparian alliances.**<br>(See Impact BI-6, above, for description.) | |
| **Impact BI-9:** Construction of the proposed project would not degrade the quality of habitat in Alameda Creek or interfere with the movement of common native fish species. | None required. | LS |
| **Impact BI-10:** Project operations would not degrade the quality of habitat in Alameda Creek or substantially interfere with the movement of common native fish species. | None required. | LS |
| **Impact BI-11:** Project operations would not substantially interfere with the movement or migration of special-status fish species, including CCC steelhead DPS. | None required. | LS |
| **Impact BI-12:** Construction and operation of the proposed project would not conflict with local policies or ordinances protecting fisheries resources. | None required. | LS |
| **Impact C-BI-1:** The project, in combination with past, present, and probable future projects, could substantially affect terrestrial biological resources. | **Mitigation Measure M-BI-1a: General Protection Measures** (See Impact BI-1)<br>**Mitigation Measure M-BI-1b: Worker Training and Awareness Program** (See Impact BI-1)<br>**Mitigation Measure M-BI-1c: Prevent Movement of Sensitive Wildlife Species through the Work Areas** (See Impact BI-1) | LSM |

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### TABLE 1-1 (Continued)
### SUMMARY OF ACRP IMPACTS AND MITIGATION MEASURES

| ENVIRONMENTAL IMPACT | MITIGATION MEASURES | IMPACT SIGNIFICANCE |
|---|---|---|
| **Terrestrial Biological & Fishery Resources (cont.)** | | |
| **Impact C-BI-1** (cont.) | **Mitigation Measure M-BI-1d: Preconstruction Surveys and Construction Monitoring and Protocols for California Tiger Salamander, Red-Legged Frog, and Alameda Whipsnake** (See Impact BI-1)<br>**Mitigation Measure M-BI-1e: Prepare and Implement a Vegetation Restoration Plan and Compensatory Mitigation** (See Impact BI-1)<br>**Mitigation Measure M-BI-1f: Measures to Minimize Disturbance to Western Burrowing Owl** (See Impact BI-1)<br>**Mitigation Measure M-BI-1g: Measures to Minimize Disturbance to Special-Status Bird Species** (See Impact BI-1)<br>**Mitigation Measure M-BI-1h: Conduct Preconstruction Surveys for Special-Status Bats and Implement Avoidance and Minimization Measures** (See Impact BI-1)<br>**Mitigation Measure M-BI-1i: Avoidance and Minimization Measures for American Badger**<br>(See Impact BI-1)<br>**Mitigation Measure M-BI-2: Avoidance and Protection Measures for Riparian Habitats and Wetlands.** (See Impact BI-2)<br>**Mitigation Measure M-C-BI: Coordination of Measures for Monitoring and Habitat Enhancement in Subreaches A, B, and C1**<br>In the event that implementation of the SMP-30 quarry expansion, SMP-30 cut-off wall, and PG&E Line 303 relocation (either individually or collectively) are determined to result in downstream impacts to riparian habitat in Subreaches A, B, and C1 of Alameda Creek (i.e., tree-supporting riparian vegetation alliances), and mitigation measures are required by those projects to mitigate significant impacts to riparian habitat in these subreaches, then the SFPUC shall coordinate or as necessary modify the habitat enhancement plan it developed to implement Mitigation Measure M-BI-6c, to ensure that habitat restoration and enhancement efforts along Alameda Creek are consistent with each other in these subreaches.<br>**Mitigation Measure M-BI-6a: Baseline riparian habitat monitoring.**<br>(See Impact BI-6, above, for description.) | |

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### TABLE 1-1 (Continued)
### SUMMARY OF ACRP IMPACTS AND MITIGATION MEASURES

| ENVIRONMENTAL IMPACT | MITIGATION MEASURES | IMPACT SIGNIFICANCE |
|---|---|---|
| **Terrestrial Biological & Fishery Resources (cont.)** | | |
| **Impact C-BI-1** (cont.) | **Mitigation Measure M-BI-6b: Annual riparian habitat monitoring and reporting.**<br>(See Impact BI-6, above, for description.)<br>**Mitigation Measure M-BI-6c: Habitat enhancement, Subreaches B and C1 to achieve no net loss of tree-supporting riparian alliances.**<br>(See Impact BI-6, above, for description.) | |
| **Impact C-BI-2:** The project, in combination with past, present, and probable future projects, would not substantially affect fisheries resources. | None required. | LS |
| **Geology and Soils** | | |
| **Impact GE-1:** The project would not be located on a geologic unit that could become unstable as a result of project construction. | None required. | LS |
| **Impact GE-2:** Project construction would not result in substantial soil erosion and loss of topsoil. | None required. | LS |
| **Impact GE-3:** Project construction could result in a substantial adverse effect by directly or indirectly destroying a unique paleontological resource or site or unique geologic feature. | **Mitigation Measure M-GE-3: Accidental Discovery of Paleontological Resources.**<br>If construction workers discover potential fossils, all earthwork associated with the mooring piers shall stop immediately until a qualified professional paleontologist can assess the nature and importance of the find. Based on the scientific value or uniqueness of the find, the paleontologist may record the find and allow work to continue, or recommend salvage and recovery of the fossil. The paleontologist may also propose modifications to the stop-work radius based on the nature of the find, site geology, and the activities occurring on the site. Recommendations for any necessary treatment shall be consistent with the SVP 1995 Guidelines and currently accepted scientific practices. If required, treatment for fossil remains may include preparation and recovery of fossil materials so that they can be housed in an appropriate museum or university collection, and may also include preparation and publication of a report describing the finds. The paleontologist's recommendations shall be subject to review and approval by the ERO or designee. The SFPUC | LSM |

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## TABLE 1-1 (Continued)
## SUMMARY OF ACRP IMPACTS AND MITIGATION MEASURES

| ENVIRONMENTAL IMPACT | MITIGATION MEASURES | IMPACT SIGNIFICANCE |
|---|---|---|
| **Geology and Soils (cont.)** | | |
| **Impact GE-3** (cont.) | shall be responsible for ensuring that treatment is implemented and reported to the San Francisco Planning Department. If no report is required, the SFPUC shall nonetheless ensure that information on the nature, location, and depth of all finds is readily available to the scientific community through university curation or other appropriate means. | |
| **Impact GE-4:** The project would not be located on a geologic unit that could become unstable as a result of project operations. | None required. | LS |
| **Impact GE-5:** Project operations would not result in substantial soil erosion or loss of topsoil. | None required. | LS |
| **Impact GE-6:** The project would not expose people or structures to substantial adverse effects related to the risk of property loss, injury, or death due to rupture of a known earthquake fault. | None required. | LS |
| **Impact GE-7:** The project would not expose people or structures to substantial adverse effects related to the risk of property loss, injury, or death due to seismically-induced groundshaking. | None required. | LS |
| **Impact GE-8:** The project would not expose people or structures to substantial adverse effects related to the risk of property loss, injury, or death due to seismically-induced ground failure, including liquefaction, lateral spreading, or settlement. | None required. | LS |
| **Impact GE-9:** The project would not expose people or structures to substantial adverse effects related to the risk of property loss, injury, or death due to seismically-induced landslides or other slope failures. | None required. | LS |

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## TABLE 1-1 (Continued)
## SUMMARY OF ACRP IMPACTS AND MITIGATION MEASURES

| ENVIRONMENTAL IMPACT | MITIGATION MEASURES | IMPACT SIGNIFICANCE |
|---|---|---|
| **Geology and Soils (cont.)** | | |
| **Impact GE-10:** The project would not create substantial risks to life or property due to expansive or corrosive soils. | None required. | LS |
| **Impact GE-11:** The project would not substantially change the topography or any unique geologic or physical features of the project area. | None required. | LS |
| **Impact C-GE:** The project, in combination with past, present, and probable future projects, could substantially affect paleontological resources. | ***Geological Resources*:**<br>None required.<br>***Paleontological Resources*:**<br>**Mitigation Measure M-GE-3: Accidental Discovery of Paleontological Resources** (see Impact GE-3 above) | LSM |
| **Hydrology and Water Quality** | | |
| **Impact HY-1:** Project construction would not substantially degrade water quality as a result of dewatering effluent discharges, increased soil erosion and sedimentation of downstream water bodies, or an accidental release of hazardous materials. | None required. | LS |
| **Impact HY-2:** Operation of the ACRP would not substantially alter the movement of subsurface water or substantially affect groundwater recharge in the Sunol Valley such that it would affect the production rate of pre-existing nearby wells. | None required. | LS |
| **Impact HY-3:** Operation of the ACRP would not substantially alter water quality in Alameda Creek. | None required. | LS |
| **Impact HY-4:** Operation of the ACRP would not alter flood hazards. | None required. | LS |

Categories of Impact Significance:
LS = Less-Than-Significant Impact (no mitigation required)
LSM = Less-Than-Significant Impact with Mitigation (less than significant or potentially significant impact, but can be reduced to less than significant with mitigation)

### TABLE 1-1 (Continued)
### SUMMARY OF ACRP IMPACTS AND MITIGATION MEASURES

| ENVIRONMENTAL IMPACT | MITIGATION MEASURES | IMPACT SIGNIFICANCE |
|---|---|---|
| **Hydrology and Water Quality (cont.)** | | |
| **Impact HY-5:** Operation of the ACRP would not cause downstream water users, as a result of project-induced flow changes, to alter their operations in a way that would result in significant adverse environmental impacts. | None required. | LS |
| **Impact C-HY:** The project, in combination with past, present, and probable future projects, would not substantially affect hydrology and water quality. | None required. | LS |
| **Hazards and Hazardous Materials** | | |
| **Impact HZ-1:** Project construction would not result in a substantial adverse effect related to reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment. | None required. | LS |
| **Impact HZ-2:** Project construction would not result in a substantial adverse effect related to accident conditions involving the release of hazardous construction chemicals into the environment. | None required. | LS |
| **Impact HZ-3:** Project construction would not impair implementation of, or physically interfere with, an adopted emergency response plan or emergency evacuation plan. | None required. | LS |
| **Impact HZ-4:** Project construction would not expose people or structures to a significant risk of property loss, injury, or death involving fires. | None required. | LS |
| **Impact HZ-5:** Project operations would not result in a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials. | None required. | LS |

Categories of Impact Significance:
LS = Less-Than-Significant Impact (no mitigation required)
LSM = Less-Than-Significant Impact with Mitigation (less than significant or potentially significant impact, but can be reduced to less than significant with mitigation)

## TABLE 1-1 (Continued)
## SUMMARY OF ACRP IMPACTS AND MITIGATION MEASURES

| ENVIRONMENTAL IMPACT | MITIGATION MEASURES | IMPACT SIGNIFICANCE |
|---|---|---|
| **Hazards and Hazardous Materials (cont.)** | | |
| **Impact C-HZ:** The project, in combination with past, present, and probable future projects, would not substantially affect hazards and hazardous materials. | None required. | LS |
| **Mineral and Energy Resources** | | |
| **Impact ME-1:** Project construction would not result in the temporary loss of availability of known mineral resources that would be of value to the region or residents of the state, or the temporary loss of availability of a locally important mineral resource recovery site. | None required. | LS |
| **Impact ME-2:** Project construction would not result in substantial adverse effects related to the use of large amounts of fuel or energy, or the use of these resources in a wasteful manner. | None required. | LS |
| **Impact ME-3:** Project operations would not result in the permanent loss of availability of known mineral resources that would be of value to the region or residents of the state, or the permanent loss of availability of a locally important mineral resource recovery site. | None required. | LS |
| **Impact ME-4:** Project operations could encourage activities that use large amounts of fuel or energy, or the use of these resources in a wasteful manner. | **Mitigation Measure ME-4: (WSIP PEIR Measure 4.15-2, Incorporation of Energy Efficiency Measures)**<br>Consistent with the Energy Action Plan II priorities for reducing energy usage, the SFPUC will ensure that energy-efficient equipment is used in all WSIP projects. A repair and maintenance plan will also be prepared for each facility to minimize power use. The potential for use of renewable energy resources (such as solar power) at facility sites will be evaluated during project-specific design. | LSM |
| **Impact C-ME:** The project, in combination with past, present, and probable future projects, could substantially affect energy resources. | **Mitigation Measure ME-4: (WSIP PEIR Measure 4.15-2, Incorporation of Energy Efficiency Measures)** | LSM |

Categories of Impact Significance:
LS = Less-Than-Significant Impact (no mitigation required)
LSM = Less-Than-Significant Impact with Mitigation (less than significant or potentially significant impact, but can be reduced to less than significant with mitigation)

## TABLE 1-1 (Continued)
## SUMMARY OF ACRP IMPACTS AND MITIGATION MEASURES

| ENVIRONMENTAL IMPACT | MITIGATION MEASURES | IMPACT SIGNIFICANCE |
|---|---|---|
| **Agriculture and Forest Resources** | | |
| **Impact AG-1:** Implementation of the proposed project would not result in the conversion of Unique Farmland, as shown on the maps pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use. | None required. | LS |
| **Impact C-AG:** The project, in combination with past, present, and probable future projects, would not substantially affect agricultural and forestry resources. | None required. | LS |

Categories of Impact Significance:

LS = Less-Than-Significant Impact (no mitigation required)

LSM = Less-Than-Significant Impact with Mitigation (less than significant or potentially significant impact, but can be reduced to less than significant with mitigation)

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# CHAPTER 2

# Introduction and Background

## 2.1 Introduction

The San Francisco Public Utilities Commission (SFPUC) is proposing the Alameda Creek Recapture Project (ACRP or proposed project). The primary goal of the ACRP is the downstream recapture of water that the SFPUC will release from Calaveras Reservoir and/or bypass around the Alameda Creek Diversion Dam to comply with permit requirements as part of the future operations plan for the Calaveras Dam Replacement project (CDRP). The in-stream flow schedules are required by the Calaveras Dam Replacement Project's California Department of Fish and Wildlife (CDFW) Streambed Alteration Agreement and National Marine Fisheries Service (NMFS) Biological Opinion. The ACRP would recapture the water in the Sunol Valley, approximately 6 miles downstream of Calaveras Reservoir, by collecting Alameda Creek water that naturally infiltrates into quarry pit F2 and pumping the water directly to either San Antonio Reservoir or the Sunol Valley Water Treatment Plant (SVWTP). The proposed project components include: four turbine pumps mounted on barges that would be floated on the water surface of the quarry pit and attached to the shore using a mooring system; four flexible discharge pipelines extending from each turbine pump to a new pipe manifold located on shore; a new pipeline connection between the pipe manifold and the existing Sunol Pump Station Pipeline; throttling valves, a flow meter; an electrical control building; and an electrical transformer and overhead power lines. No construction would occur in the bed, bank, or channel of Alameda Creek.

The proposed project is a component of the SFPUC's Water System Improvement Program (WSIP), which the SFPUC adopted in 2008. The WSIP is comprised of numerous facility improvement projects designed to: (1) maintain high-quality water; (2) reduce vulnerability to earthquakes; (3) increase delivery reliability and improve the ability to maintain the system; (4) meet customer purchase requests in nondrought and drought periods; (5) enhance sustainability in all system activities; and (6) achieve a cost-effective, fully operational system. Implementation of the proposed project would contribute to meeting the overall WSIP goals and objectives.[1] The ACRP is a key regional facility improvement project in the WSIP. In the WSIP Program Environmental Impact Report (PEIR), the proposed project was referred to as the "Alameda Creek Fisheries Enhancement Project,"[2] but has since been renamed as the Alameda Creek Recapture Project.

# 2.2 Background – Regional Water System and the Water System Improvement Program

## 2.2.1 SFPUC Regional Water System Overview

The City and County of San Francisco (CCSF), through the SFPUC, owns and operates a regional water system that extends from the Sierra Nevada to San Francisco and serves drinking water to 2.6 million people in San Francisco, San Mateo, Santa Clara, Alameda, and Tuolumne Counties. The regional water system consists of water conveyance, storage, treatment, and distribution facilities, and delivers water to retail and wholesale customers. The existing system includes over 280 miles of pipeline, over 60 miles of tunnels, 11 reservoirs, 5 pump stations, and 2 water treatment plants. In 2015, the SFPUC delivered about 200 million gallons per day (mgd) of water to its customers.[3] The source of the water supply is a combination of local supplies from streamflow and runoff in the Alameda Creek watershed and in the San Mateo Creek and Pilarcitos Creek watersheds (referred to together as the Peninsula watershed), which is supplemented by imported supplies from the Tuolumne River watershed. The Tuolumne River provides approximately 85 percent of the total supplies, and the local watersheds provide the remaining 15 percent. **Figure 2-1** illustrates the general location of the SFPUC regional system, and **Figure 2-2** shows the location of the regional water supply watersheds.

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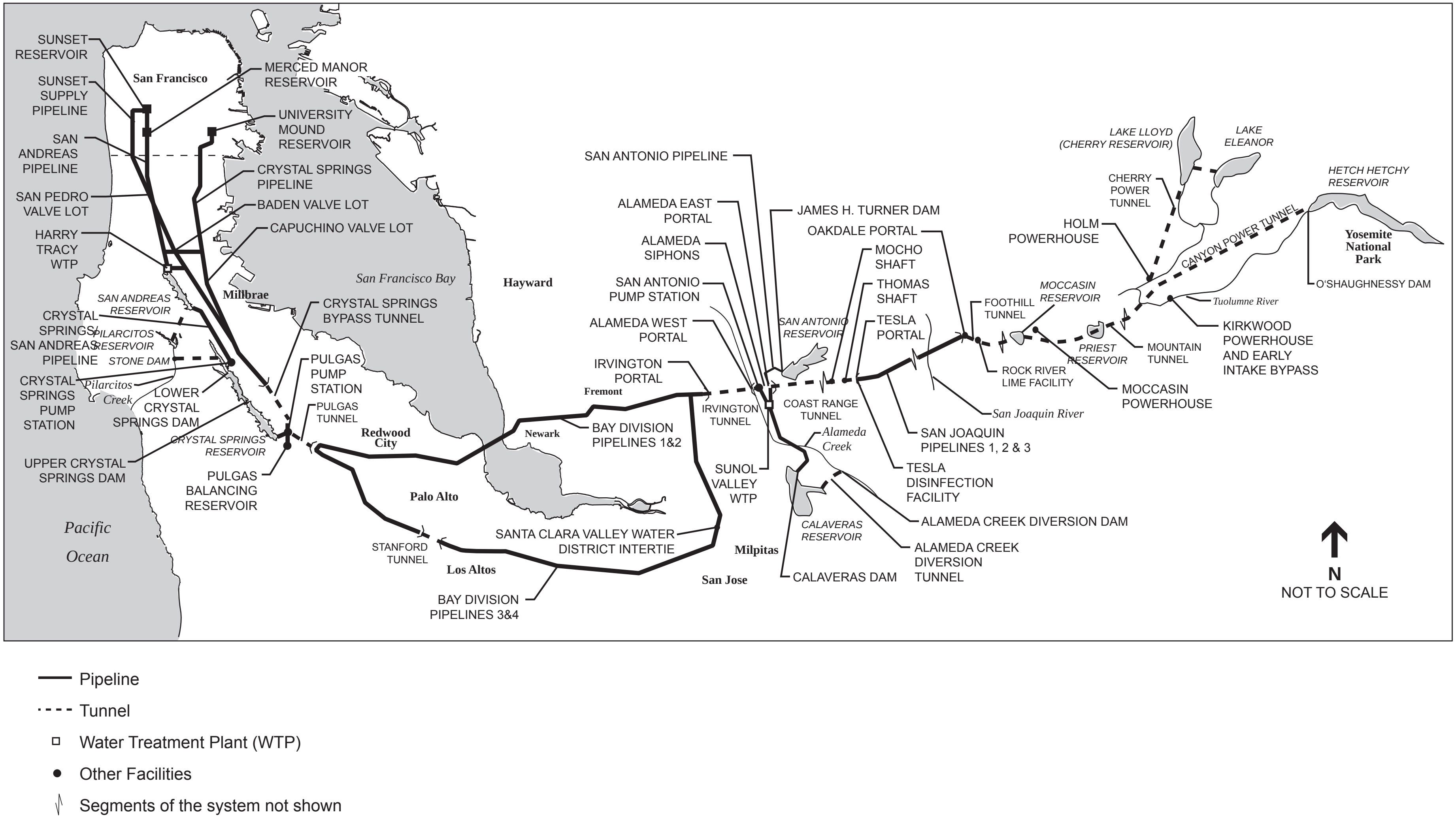
[1] San Francisco Planning Department, *San Francisco Public Utilities Commission's Water System Improvement Program, Final Program Environmental Impact Report*, File No. 2005.0159E, State Clearinghouse No. 2005092026, Certified October 30, 2008. Available online at http://www.sf-planning.org/index.aspx?page=1829.

[2] San Francisco Planning Department, *San Francisco Public Utilities Commission's Water System Improvement Program, Final Program Environmental Impact Report*. File No. 2005.0159E, State Clearinghouse No. 2005092026, Certified October 30, 2008. Available online at http://www.sf-planning.org/index.aspx?page=1829.

[3] San Francisco Public Utilities Commission, 2015. *2015 Water Supply Development Report*. From Steven R. Ritchie, Assistant General Manager, Water, to SFPUC Commissioners Vietor, Moran, Caen, Courtney, and Kwon, through Harlan L. Kelly, Jr., General Manager.

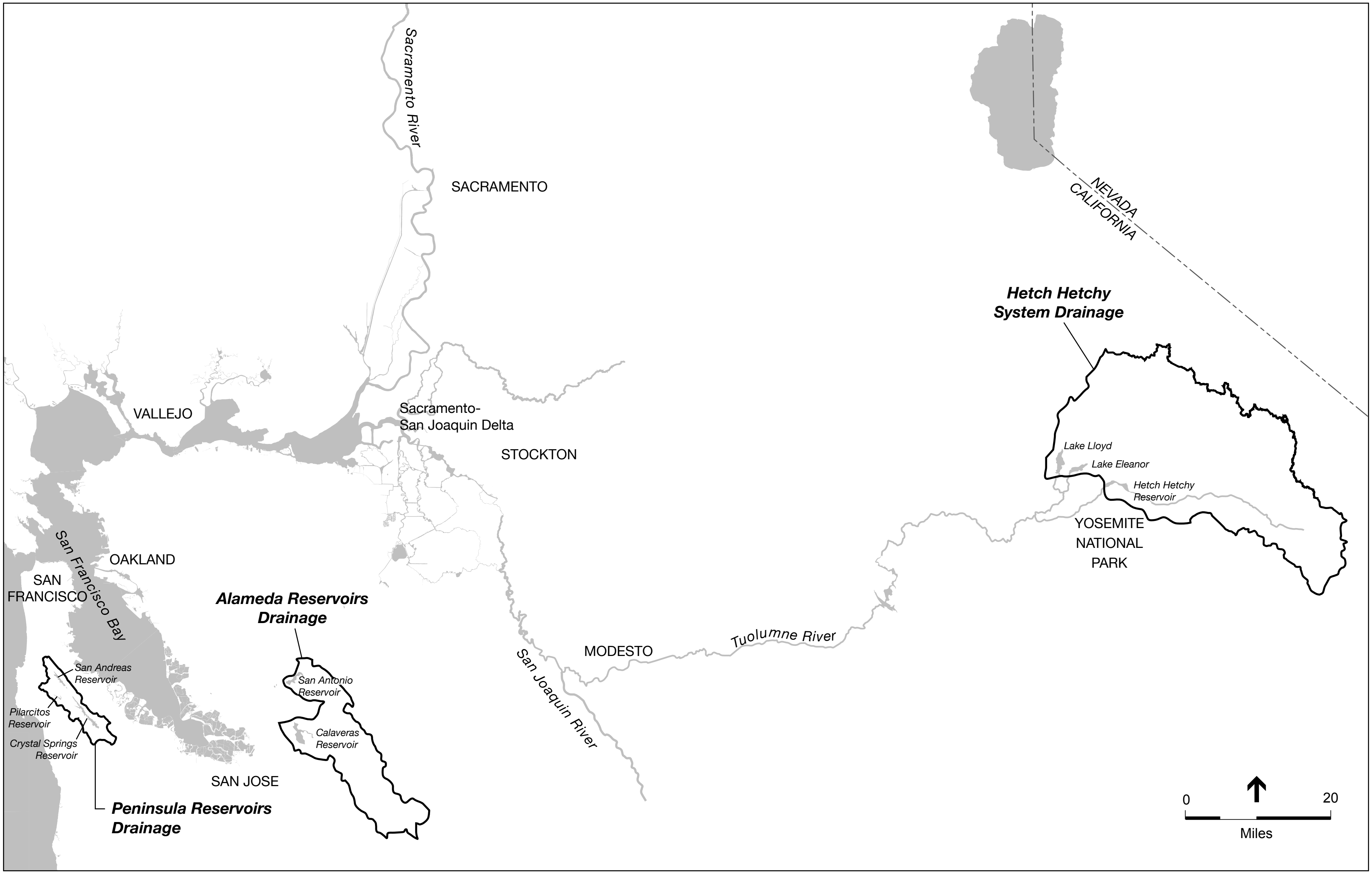


SOURCE: San Francisco Planning Department, 2008

SFPUC Alameda Creek Recapture Project

**Figure 2-1**

SFPUC Regional Water System



SOURCE: San Francisco Planning Department, 2008

SFPUC Alameda Creek Filter Recapture Project

**Figure 2-2**
SFPUC Water Supply Watersheds

Water from the upper Tuolumne River watershed that is captured in Hetch Hetchy Reservoir can be delivered to SFPUC customers without filtration, provided it meets all federal[4] and State[5] "filtration avoidance" requirements. The SFPUC maintains the filtration avoidance status for Hetch Hetchy water by proactively operating and maintaining facilities to prevent contamination of water supplies, and, when unfavorable changes in water quality do occur, by diverting the quality-impaired Hetch Hetchy water out of the regional water system to prevent the water from being delivered to customers.[6] SFPUC water supplies from the Alameda and Peninsula watersheds do not meet the filtration avoidance criteria and require filtration before delivery to customers.

The SFPUC serves about one-third of its water supplies directly to retail customers, primarily in San Francisco, and about two-thirds of its water supplies to wholesale customers by contractual agreement. The wholesale customers are represented by the Bay Area Water Supply and Conservation Agency (BAWSCA), which consists of 26 member agencies, as shown on **Figure 2-3**.[7] Some of these wholesale customers have access to other sources of water in addition to the supplies they receive from the SFPUC regional water system, while others rely completely on the SFPUC for water.

### 2.2.2 SFPUC Water System Improvement Program

On October 30, 2008, the SFPUC adopted the Water System Improvement Program (WSIP) (known as the "Phased WSIP Variant") and the WSIP goals and objectives (SFPUC Resolution 08-200).[8] The adopted WSIP will improve the reliability of the regional water system with respect to water quality, seismic response, and water delivery based on a planning horizon through the year 2030. The WSIP will also improve the regional system with respect to water supply to meet water delivery needs in the service area for projected demand levels through the year 2018. The program area spans seven counties—Tuolumne, Stanislaus, San Joaquin, Alameda, Santa Clara, San Mateo, and San Francisco.

The WSIP includes a water supply strategy, modifications to system operations, and construction of a series of facility infrastructure improvement projects. The overall goals of the WSIP are to maintain high-quality water; reduce vulnerability to earthquakes; increase delivery reliability and improve the ability to maintain the system; meet customer purchase requests in nondrought and drought periods; enhance sustainability in all system activities; and achieve a cost-effective, fully

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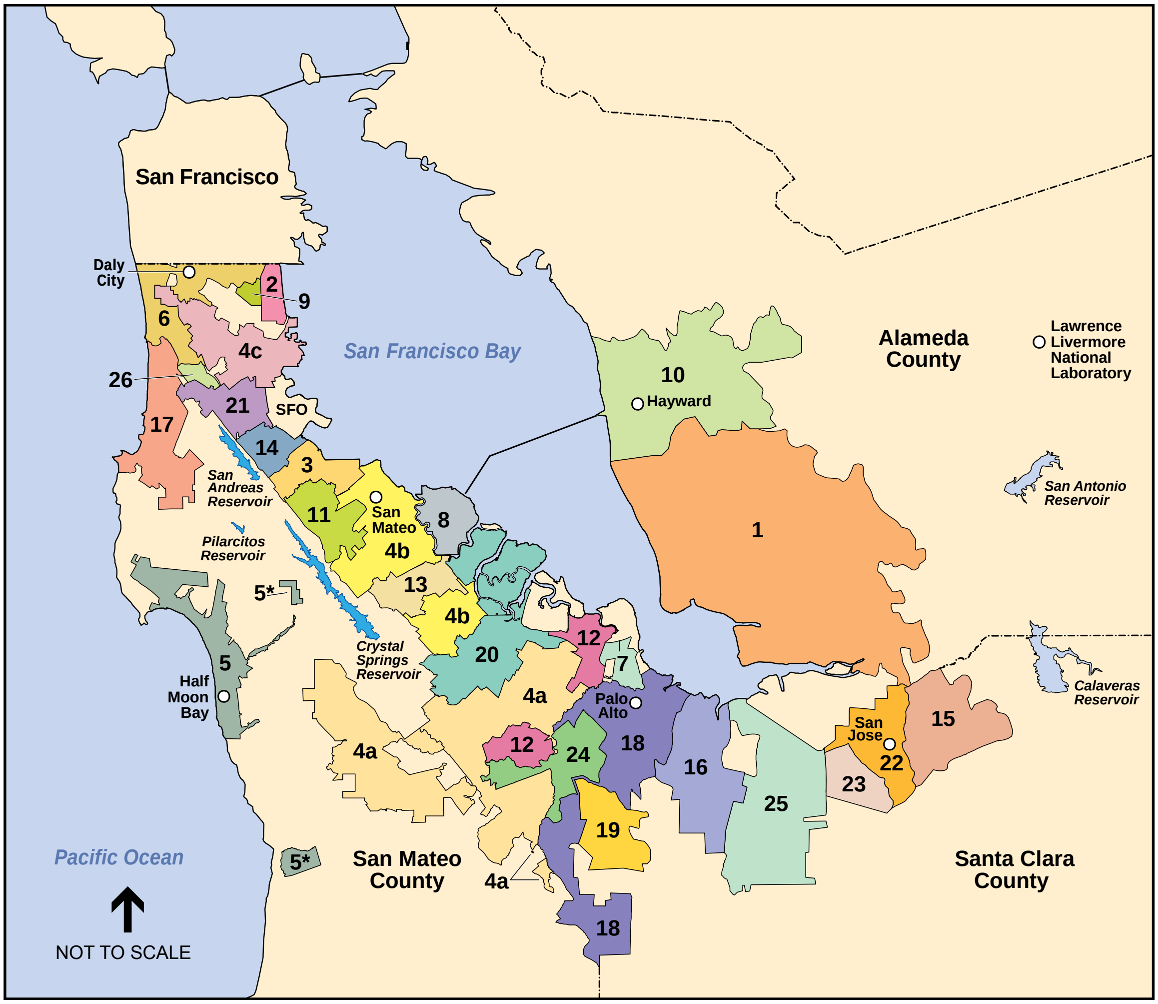
[4] In 1991, the U.S. Environmental Protection Agency (U.S. EPA) adopted the Surface Water Treatment Rule, which includes water quality provisions for unfiltered water systems. In 1993, the U.S. EPA approved Hetch Hetchy water supplies as an unfiltered source that meets all filtration avoidance criteria contained in the federal statute.

[5] In 1998, the state added filtration avoidance provisions to Title 22 of the California Code of Regulations, under which the California Department of Public Health currently regulates the Hetch Hetchy water system.

[6] San Francisco Planning Department, *San Francisco Public Utilities Commission's Water System Improvement Program, Final Program Environmental Impact Report*, File No. 2005.0159E, State Clearinghouse No. 2005092026, Certified October 30, 2008. Available online at http://www.sf-planning.org/index.aspx?page=1829.

[7] The Cordilleras Mutual Water Association is an additional wholesale customer receiving water from the SFPUC, but it is not a BAWSCA member and is not shown in Figure 2-3. It is a small water association serving 18 single-family homes in San Mateo County.

[8] San Francisco Public Utilities Commission (SFPUC), SFPUC Resolution 08-200, Water System Improvement Program California Environmental Quality Act Findings: Findings of Fact, Evaluation of Mitigation Measures and Alternatives, and Statement of Overriding Considerations. October 2008.



## Legend

**(Wholesale customers and members of Bay Area Water Supply and Conservation Agency)**

**1** Alameda County Water District
**2** City of Brisbane
**3** City of Burlingame
**4a** CWS – Bear Gulch
**4b** CWS – Mid-Peninsula
**4c** CWS – South San Francisco
**5** Coastside County Water District
**6** City of Daly City
**7** City of East Palo Alto
**8** Estero Municipal Improvement District
**9** Guadalupe Valley Municipal Improvement District
**10** City of Hayward
**11** Town of Hillsborough
**12** City of Menlo Park
**13** Mid-Peninsula Water District
**14** City of Millbrae
**15** City of Milpitas
**16** City of Mountain View
**17** North Coast County Water District
**18** City of Palo Alto
**19** Purissima Hills Water District
**20** City of Redwood City
**21** City of San Bruno
**22** City of San Jose (North)
**23** City of Santa Clara
**24** Stanford University
**25** City of Sunnyvale
**26** Westborough Water District

***** Portions of Coastside County Water District not served by the SFPUC regional water system.

NOTE: For the purposes of this EIR, the California Water Service (CWS) Company is a single wholesale customer with three different water service districts.

SOURCE: BAWSCA, 2010

SFPUC Alameda Creek Recapture Project

**Figure 2-3**
SFPUC Water Service Area –
San Francisco and SFPUC Wholesale Customers

operational system (see **Table 2-1**). To further these program goals, the WSIP also includes objectives that address system performance in the areas of water quality, seismic reliability, delivery reliability, and water supply.

### TABLE 2-1
### WSIP GOALS AND OBJECTIVES

| Program Goal | System Performance Objective |
|---|---|
| Water Quality – *maintain high quality water* | • Design improvements to meet current and foreseeable future federal and state water quality requirements.<br>• Provide clean, unfiltered water originating from Hetch Hetchy Reservoir and filtered water from local watersheds.<br>• Continue to implement watershed protection measures. |
| Seismic Reliability – *reduce vulnerability to earthquakes* | • Design improvements to meet current seismic standards.<br>• Deliver basic service to the three regions in the service area (East/South Bay, Peninsula, and San Francisco) within 24 hours after a major earthquake. Basic service is defined as average winter-month usage, and the performance objective for the regional system is 229 million gallon per day (mgd). The performance objective is to provide delivery to at least 70 percent of the turnouts (i.e., water diversion connecting points from the regional system to customers) in each region, with 104, 44, and 81 mgd delivered to the East/South Bay, Peninsula, and San Francisco regions, respectively.<br>• Restore facilities to meet average-day demand of up to 300 mgd within 30 days after a major earthquake. |
| Delivery Reliability – *increase delivery reliability and improve the ability to maintain the system* | • Provide operational flexibility to allow for planned maintenance shutdown of individual facilities without interrupting customer service.<br>• Provide operational flexibility to minimize the risk of service interruption due to unplanned facility upsets or outages.<br>• Provide operational flexibility and system capacity to replenish local reservoirs as needed.<br>• Meet estimated average annual demand of up to 300 mgd under the conditions of one planned shutdown of a major facility for maintenance concurrent with one unplanned facility outage due to a natural disaster, emergency, or facility failure/upset. |
| Water Supply – *meet customer water needs in nondrought and drought periods* | • Meet average annual water demand of 265 mgd from the SFPUC watersheds for retail and wholesale customers during nondrought years for system demands through 2018.<br>• Meet dry-year delivery needs through 2018 while limiting rationing to a maximum 20 percent systemwide reduction in water service during extended droughts.<br>• Diversify water supply options during nondrought and drought periods.<br>• Improve use of new water sources and drought management, including groundwater, recycled water, conservation, and transfers. |
| Sustainability – *enhance sustainability in all system activities* | • Manage natural resources and physical systems to protect watershed ecosystems.<br>• Meet, at a minimum, all current and anticipated legal requirements for the protection of fish and wildlife habitat.<br>• Manage natural resources and physical systems to protect public health and safety. |
| Cost-effectiveness – *achieve a cost-effective, fully operational system* | • Ensure the cost-effective use of funds.<br>• Maintain a gravity-driven system.<br>• Implement a regular inspection and maintenance program for all facilities. |

SOURCE: San Francisco Public Utilities Commission (SFPUC), 2008. SFPUC Resolution 08-200, Water System Improvement Program California Environmental Quality Act Findings: Findings of Fact, Evaluation of Mitigation Measures and Alternatives, and Statement of Overriding Considerations. October 2008.

The San Francisco Planning Department prepared a Program Environmental Impact Report (PEIR) to address the potential environmental impacts of the WSIP (San Francisco Planning Department, 2008). The San Francisco Planning Commission certified the WSIP PEIR on October 30, 2008.[9] The SFPUC approved the WSIP and made findings pursuant to the California Environmental Quality Act (CEQA), including a statement of overriding considerations, and adopted a mitigation monitoring and reporting program for the WSIP (SFPUC Resolution 08-200). The relationship of this document to the WSIP PEIR is described below in Section 2.4, Purpose of this EIR.

### 2.2.3 Regional Water System Facilities

The regional water system begins with Hetch Hetchy Reservoir and O'Shaughnessy Dam, which are located in Yosemite National Park on the main stem of the Tuolumne River in the Sierra Nevada. From Hetch Hetchy Reservoir, raw surface water is transported westward within a series of tunnels (Canyon Power, Mountain, and Foothill Tunnels) to the Oakdale Portal. Approximately 3 miles upstream from the Oakdale Portal is the Rock River Lime Facility, where chemicals are added to water in the Foothill Tunnel for corrosion control. From the Oakdale Portal, water is conveyed within the San Joaquin Pipelines to the Tesla Disinfection Facility at the Tesla Portal, where it is disinfected primarily using ultra-violet disinfection. The option to disinfect using sodium hypochlorite is also available at the Tesla Portal site. Following disinfection, the Hetch Hetchy water enters the 25-mile-long Coast Range Tunnel and is conveyed west to the Alameda East Portal in the Sunol Valley, which connects the Coast Range Tunnel to the Alameda Siphons.

The Alameda Siphons are four parallel pipelines that extend approximately 3,000 feet from the Alameda East Portal across the Sunol Valley and beneath Alameda Creek to the Alameda West Portal. Under normal operating conditions, local water supplies from the Alameda watershed that have been treated at the Sunol Valley Water Treatment Plant (SVWTP) enter the regional water system and are blended with Hetch Hetchy supplies in the Alameda Siphons. At the Sunol Valley Chloramination Facility and the fluoride facility located south of the Alameda Siphons, chloramine is added to the blended water for secondary disinfection, fluoride is added to prevent tooth decay, and the pH of the blended water is adjusted for corrosion control. The blended water exits the Sunol Valley at the Alameda West Portal, where it enters the Irvington Tunnels and is conveyed westward to Bay Area customers.

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[9] San Francisco Planning Department, *San Francisco Public Utilities Commission's Water System Improvement Program, Final Program Environmental Impact Report*, File No. 2005.0159E, State Clearinghouse No. 2005092026, Certified October 30, 2008 (San Francisco Planning Commission Motion No. 17734).

## 2.3 Relationship of the ACRP to the Calaveras Dam Replacement Project

Calaveras Reservoir, located at the southern end of the SFPUC Alameda watershed and approximately 6 miles upstream of the ACRP project area, collects and stores local runoff, including flows from Alameda, Calaveras, and Arroyo Hondo Creeks. The Alameda Creek Diversion Dam and Tunnel divert flows from Alameda Creek into Calaveras Reservoir. Water diverted and stored at Calaveras Reservoir is conveyed to the Sunol Valley Water Treatment Plant (SVWTP) for treatment prior to delivery to customers, or to San Antonio Reservoir for storage prior to being treated at the SVWTP.

In 2001, due to seismic safety deficiencies of Calaveras Dam, the California Department of Water Resources Division of Safety of Dams placed interim operational restrictions on Calaveras Reservoir that have limited the reservoir’s water storage volume to approximately 40 percent of its historical storage capacity. The Calaveras Dam Replacement Project (CDRP), another key regional facility improvement project of the WSIP, will restore the storage capacity of Calaveras Reservoir and is designed to help the SFPUC meet the WSIP level of service goals related to seismic reliability and water delivery reliability.[10] The Calaveras Dam Replacement project is currently under construction, with completion scheduled for spring 2019.

Operation of the ACRP is dependent on the implementation of instream flow schedules associated with the Calaveras Dam Replacement Project (CDRP), and would not commence until construction of the CDRP is completed. **Table 2-2** summarizes the SFPUC's future operations and management of facilities associated with the CDRP.

### 2.3.1 Regulatory Considerations – Instream Flow Releases and Bypasses

As part of the approval of the CDRP, the SFPUC committed to release specified flows from Calaveras Reservoir and to bypass certain flows around the Alameda Creek Diversion Dam to support spawning and rearing habitat for steelhead above the Sunol Valley once construction of the CDRP is completed. The flow releases from the reservoir will vary between 5 and 12 cfs depending on the time of year and the classification of the water year type as either dry or normal/wet (see Section 5.16, Hydrology and Water Quality, for more information on the instream flow schedules). The bypasses will result from the SFPUC limiting diversions at the Alameda Creek Diversion Dam to December through March and, during that time, only diverting flows above 30 cfs up to 370 cfs (prior operations allowed for diversions of up to 650 cfs year-round). To enable the bypasses, the SFPUC will operate the Alameda Creek Diversion Dam differently than it has done historically. In the past, the SFPUC began diversions in the fall and diverted all flow for which it had capacity in the reservoir up to 650 cfs.

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[10] San Francisco Planning Department, 2011. *Final Environmental Impact Report for the San Francisco Public Utilities Commission Calaveras Dam Replacement Project*. San Francisco Planning Department File No. 2005.0161E, State Clearinghouse No. 2005102102. Certified January 27, 2011.

## TABLE 2-2
## SUMMARY OF CDRP OPERATIONAL CHANGES AND MANAGEMENT ACTIONS

| Parameter | Operational Change/Management Action | Timing/Trigger |
|---|---|---|
| Calaveras Reservoir water elevations | Upon completion of construction activities, Calaveras Reservoir will be re-filled to a maximum pool elevation of 756 feet. Reservoir levels will be managed to maintain sufficient available storage, to minimize uncontrolled spills, and to maximize carryover storage. | Upon completion of CDRP construction |
| Bypasses around Alameda Creek Diversion Dam (ACDD) | No diversions from Alameda Creek to Calaveras Reservoir from April 1 through November 30. Between December 1 and March 31, a minimum bypass flow up to 30 cfs will be provided immediately below the ACDD when water is present in upper Alameda Creek above the ACDD, and diversion rate to Calaveras reservoir shall not exceed 370 cfs. | Upon completion of CDRP construction |
| Streamflow releases from Calaveras Reservoir | SFPUC will continuously release water from low-flow valves and cone valves located at the base of the new Calaveras Dam. The rate of release will depend on water-year type but will range from 5 to 12 cfs. The releases will be made in accordance with flow release ramping criteria that prescribe rates and timing of both increases and decreases in releases to minimize stranding native fish species and/or dewatering redds.[1] | Upon completion of CDRP construction |
| Temperature criteria for summer rearing juvenile steelhead | Summer flow releases from Calaveras Reservoir to Calaveras Creek during summer and early fall will be managed to achieve approximately 15 degrees Celsius (°C) or less at the outlet works. | Upon completion of CDRP construction |
| Compliance monitoring for Calaveras Reservoir releases and ACDD bypasses | Streamflow will be monitored to establish compliance below both the ACDD and Calaveras Dam at the following gages: (1) USGS Gage 11172955 in Alameda Creek immediately below ACDD; and (2) USGS Gage 11173500 in Calaveras Creek below Calaveras Dam. Water temperature will be monitored below Calaveras Dam. | Following the removal of all downstream barriers to fish passage and implementation of the CDRP in-stream flow schedules, once steelhead have been reintroduced into the upper watershed. |
| Timing restrictions for cone valve testing | Cone valve testing will be conducted during periods when high flows are present and, if possible, at a time that avoids the steelhead spawning and egg incubation period. | Upon completion of CDRP construction |
| Adaptive Management Implementation Plan (AMIP) | SFPUC will implement an adaptive management strategy to manage and support steelhead in the southern Alameda Creek watershed. The AMIP will assist in evaluating the performance of SFPUC's future management actions and addressing uncertainties regarding steelhead recovery. The AMIP includes steelhead conservation measures; research, data collection, investigations, and analyses to inform future steelhead management decisions; and a steelhead monitoring program.<br>The AMIP steelhead monitoring program will measure operational implementation performance, short- and long term biological responses, and trends in habitat conditions. The specific components include streamflow monitoring, temperature monitoring, steelhead migration monitoring, steelhead/rainbow trout spawning monitoring, aquatic population and community characteristics monitoring, in-stream conditions monitoring, and riparian conditions monitoring. Potential contingency actions include, but are not limited to, adjusting flow schedules to achieve desired flow velocity and depth conditions, restoring or enhancing habitat. | Following the removal of all downstream barriers to fish passage and implementation of the CDRP in-stream flow schedules, once steelhead have been reintroduced into the upper watershed. |

NOTE:

[1] *Redds* are small depressions in the sand or gravel of a riverbed created by breeding trout or salmon for use as a spawning area.

SOURCE: National Marine Fisheries Service (NMFS), 2011. *Biological Opinion for Calaveras Dam Replacement Project in Alameda and Santa Clara Counties.* Tracking No. 2005/07436. March 5, 2011; and California Department of Fish and Game (CDFG), 2011. *Streambed Alteration Agreement for Calaveras Dam Replacement Project*. Notification No. 1600-2010-0322-R3. June 28, 2011.

The CDRP will enable the SFPUC to return the Calaveras Reservoir to its pre-existing level before the Department of Safety of Dams required the lowering of the reservoir. As the CDRP will restore the historic capacity of the reservoir, the ACRP has been designed to operate within the SFPUC's existing pre-1914 appropriative water rights for Calaveras Dam and Alameda Creek Diversion Dam. The intent of the SFPUC is to operate the ACRP in a manner designed to recover the required fishery flow releases and bypasses that the SFPUC would otherwise have historically been able to retain in Calaveras Reservoir.

Upon completion of construction of the CDRP, the SFPUC will implement the instream flow schedules in accordance with the CDRP regulatory permit requirements. **Figure 2-4** provides an overview of instream flow schedules and shows the relationship of the ACRP to the CDRP releases and bypasses. The SFPUC used the Alameda System Daily Hydrologic Model (ASDHM)[11] to estimate the volume of water the SFPUC would recapture to offset the loss of water supply yield from the SFPUC Alameda watershed due to the bypasses and releases, without expanding the CCSF's existing water rights. Using historical hydrology data for the period of October 1995 through September 2013, the model estimated an average annual recapture volume of 7,178 acre-feet per year, with a range of 4,878 to 9,161 acre-feet per year.[12]

## 2.3.2 Water Rights Considerations

The SFPUC operates the Alameda Creek Diversion Dam and Calaveras Reservoir under pre-1914 appropriative water rights that were originally established by the Spring Valley Water Company in 1910. The two facilities were constructed under a unified plan of development that contemplated the storage of water from Upper Alameda Creek in Calaveras Reservoir. The SFPUC acquired the Spring Valley Water Company, including the Alameda Creek Diversion Dam and Calaveras Reservoir and its water rights, in 1930. An appropriative water right allows the holder to divert water from a water source to a place of use not connected to the water source. Pre-1914 appropriative water rights refer to water rights recognized in California that an appropriator established before California enacted a formal water rights permit system in 1914 (and has maintained since 1914). Pre-1914 appropriative water rights have priority over post-1914 appropriative water rights, and the exercise of a pre-1914 appropriative right may be changed provided the change does not result in the initiation of a new water right or cause injury to other legal users of the water involved.

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[11] ASDHM was first developed during the Calaveras Dam Replacement Project permitting process and has been continuously modified and improved. For more information on the model and the assumptions incorporated into the model, please refer to "Dhakal, A. S., E. Buckland, S. McBain, 2012. Overview of Methods, Models, and Results to Develop Unimpaired, Impaired, and Future Flow and Temperature Estimates along Lower Alameda Creek for Hydrologic Years 1996-2009. 81 pp".

[12] The ACRP Notice of Preparation (NOP) identified a target recapture volume of up to 9,820 acre-feet per year. The NOP target recapture volume was estimated using the Alameda System Daily Hydrologic Model (ASDHM) framework and the premise that the difference in the volume of water diverted to Calaveras Reservoir at the ACDD and released from Calaveras Dam represents an average annual water supply loss associated with the in-stream flow schedules. Subsequent to publication of the NOP, the estimated recapture volumes were refined to limit the average annual water supply loss to the available storage in Calaveras Reservoir. When Calaveras Reservoir storage is considered, the target volume of water available for recapture is less than the potentially available volume.

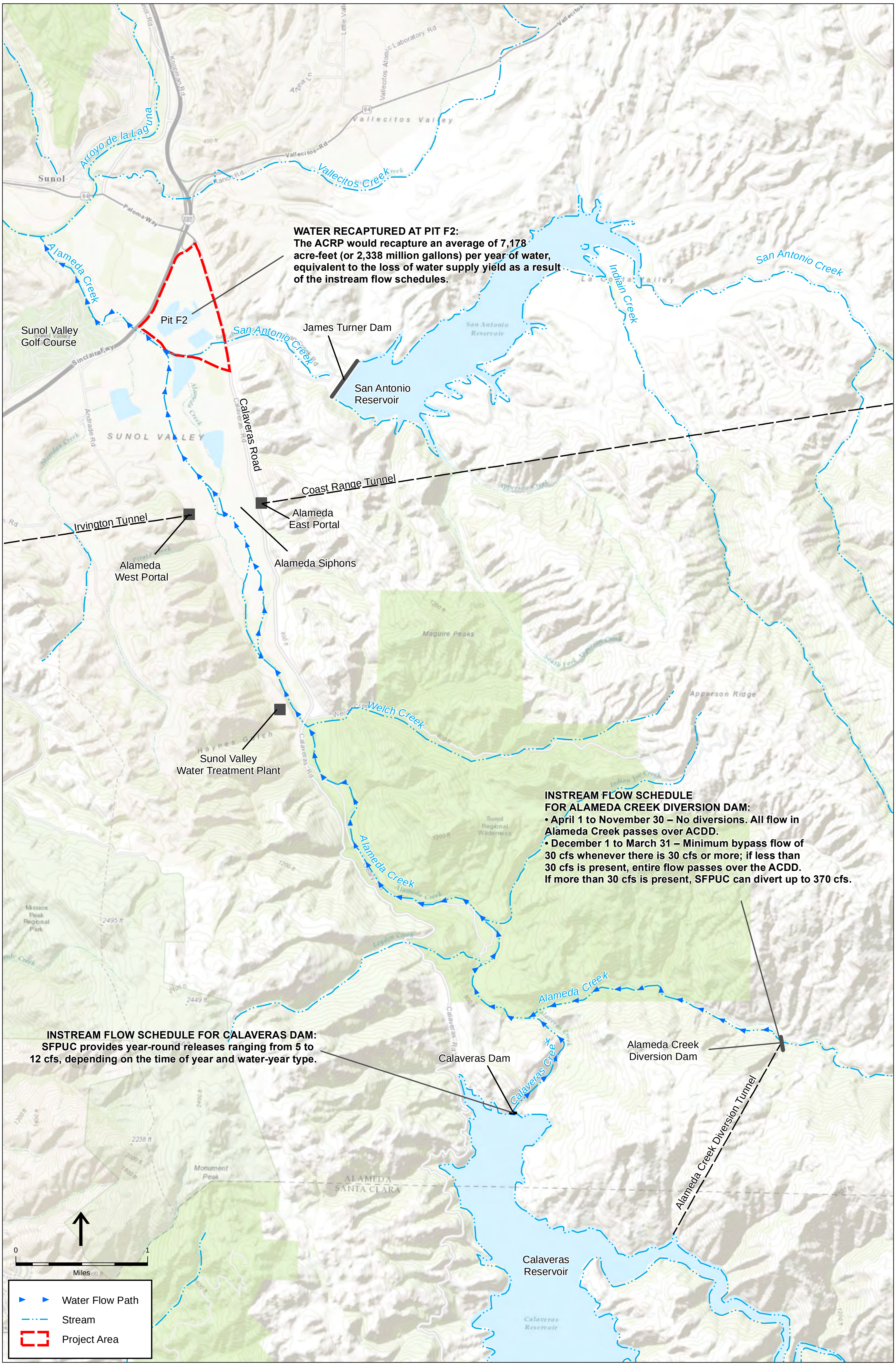
The SFPUC's pre-1914 appropriative water rights have priority over other appropriative water rights in the Alameda Creek watershed. The Alameda County Water District (ACWD) and Alameda County Flood Control and Water Conservation District, Zone 7, have post-1914 appropriative water rights in Del Valle Reservoir. Also, the ACWD has a post-1914 appropriative water right to divert water from Alameda Creek from the Fremont flood control channel to off stream quarry pits for groundwater recharge purposes. The SFPUC also has a post-1914 appropriative water right to operate Turner Dam and San Antonio Reservoir. Due to a 1920 State Water Commission award (as explained below) and subsequently modified at ACWD's request in the 1930s, the State Water Resources Control Board held in 1960 that the ACWD's post-1914 appropriative right permit was junior in right to the City's subsequent application for storage at San Antonio Reservoir.

Past water rights disputes between the Spring Valley Water Company and the ACWD, representing farmers exercising overlying groundwater rights in the Niles Cone, resulted in a 1920 formula by the State Water Commission referred to as the "Bailey Formula." The Bailey Formula was designed to assure the release of a volume of water into Alameda Creek from Calaveras Reservoir to replace the volume of water that would have percolated to storage into the Niles Cone through the bed of Alameda Creek if Calaveras Dam had not been built. In response to the ACWD's urgent requests in the 1930s, the SFPUC advanced water to ACWD under the Bailey Formula to address seawater intrusion and allow groundwater pumping in the Niles Cone area to continue. The SFPUC's early advance of water created a large credit balance under the Bailey Formula, and as a result, the SFPUC has no current obligation to make any water releases to the ACWD under the Bailey Formula and subsequent agreements between the parties.

The ACRP is designed to operate under the SFPUC's existing water rights and would only recover the volume of water that the SFPUC historically would have stored in Calaveras Reservoir if it were not required to make the fishery releases and bypasses. The method that SFPUC will employ to assure it operates the ACRP to recover this volume of water is explained in Chapter 3, Project Description.

### 2.3.3 Background of ACRP

As described above, the ACRP was previously referred to as the Alameda Creek Fishery Enhancement Project in the WSIP PEIR. For well over a decade, the SFPUC has conducted studies and investigations to develop a project that would recapture water that will be required to be released from Calaveras Reservoir for purposes of fishery enhancement. The SFPUC completed the *Alameda Creek Fishery Enhancement Needs Assessment & Alternatives Analysis* and *Final Updated Alternatives Analysis Report for Alameda Creek Fishery Enhancement Project* in 2004 and 2009, respectively. These reports identified numerous alternative technologies, options, and alternatives for recapturing water downstream of Calaveras Reservoir for return to the regional water supply system, while still meeting the goals of fishery enhancement along Alameda Creek. These studies resulted in the selection of the Upper Alameda Creek Filter Gallery Project in 2009 as the preferred alternative, but in 2013, the SFPUC abandoned that project due to extensive environmental and regulatory permit issues. The SFPUC then re-scoped the project and developed the Alameda Creek



**WATER RECAPTURED AT PIT F2:**
**The ACRP would recapture an average of 7,178 acre-feet (or 2,338 million gallons) per year of water, equivalent to the loss of water supply yield as a result of the instream flow schedules.**

**INSTREAM FLOW SCHEDULE FOR ALAMEDA CREEK DIVERSION DAM:**
- **April 1 to November 30 – No diversions. All flow in Alameda Creek passes over ACDD.**
- **December 1 to March 31 – Minimum bypass flow of 30 cfs whenever there is 30 cfs or more; if less than 30 cfs is present, entire flow passes over the ACDD. If more than 30 cfs is present, SFPUC can divert up to 370 cfs.**

**INSTREAM FLOW SCHEDULE FOR CALAVERAS DAM:**
**SFPUC provides year-round releases ranging from 5 to 12 cfs, depending on the time of year and water-year type.**

SOURCE: ESA, 2015

SFPUC Alameda Creek Recapture Project

**Figure 2-4**
Overview of CDRP Instream Flow Schedules and ACRP Downstream Recapture

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Recapture Project (ACRP), which is the proposed project and the subject of this project-level EIR. Please refer to Chapter 7 for more detailed description of the background studies and investigations that led to the ultimate selection of the ACRP as the proposed project.

## 2.4 Purpose of this Environmental Impact Report

Under the San Francisco Administrative Code, Chapter 31, the San Francisco Planning Department, through its Environmental Planning section (EP), is the lead agency responsible for implementing CEQA requirements for all projects sponsored by the CCSF or conducted in San Francisco, including those sponsored by the SFPUC. CEQA requires the preparation of an EIR when a proposed project could significantly affect the physical environment. EP determined that the ACRP, for which the SFPUC is the project sponsor, could cause significant environmental impacts, and that preparation of an EIR is required for the project to comply with CEQA.

EP has prepared this EIR to tier off of the WSIP PEIR in accordance with CEQA Guidelines Section 15168(c), which provides for environmental review of subsequent activities under the same program. The WSIP PEIR evaluated the impacts of the WSIP facility improvement projects, including the proposed project, at a programmatic level, based on the conceptual information available at that time. This EIR presents the proposed project as it is now envisioned, and analyzes its effects at a project-level of detail to provide the public and responsible and trustee agencies reviewing the project with information about the ACRP's potential project-specific effects on the environment. This EIR describes the potential environmental impacts resulting from implementation of the ACRP, identifies mitigation measures for reducing impacts to a less-than-significant level where feasible, and evaluates alternatives to the project.

## 2.5 Notice of Preparation and Public Scoping Process

In accordance with Sections 15063 and 15082 of the CEQA Guidelines, on June 24, 2015, the San Francisco Planning Department, as lead agency, sent a Notice of Preparation (NOP) to responsible and trustee agencies, as well as to interested entities and individuals, to begin the formal CEQA scoping process. The purpose of the scoping process is to allow the public and government agencies to comment on the issues and provide input on the scope of the EIR. The NOP mailing list included approximately 730 local, state, and federal agencies; regional and local interest groups; and property owners within 300 feet of the project area. The scoping period began on June 24, 2015 and ended on July 27, 2015. The NOP included a preliminary discussion of the potential environmental impacts of the project with respect to the following resource topics: hydrology and water quality; aquatic and terrestrial biological resources; land use; aesthetics; hazardous materials; noise; and air quality. The NOP and other information related to the project and public scoping process was also posted on the San Francisco Planning Department website and placed in the legal classified section of the San Francisco Examiner, Argus Courier (Fremont), Tri-Valley Times (Pleasanton), and Oakland Tribune.

Pursuant to CEQA Guidelines Section 15083, the San Francisco Planning Department held a public workshop and scoping meeting on July 9, 2015 at the Sunol Glen School in Sunol, California. Attendees were provided with an opportunity to provide oral comments and express concerns regarding the potential effects of the project.

The Planning Department summarized the public scoping process and the comments received during the scoping process in a scoping report. Key environmental concerns raised during the scoping period are summarized in **Table 2-3**, which also cross-references applicable EIR sections where these comments are addressed. The NOP and scoping report are provided in **Appendix NOP** of this EIR.

**TABLE 2-3**
**SUMMARY OF SCOPING COMMENTS**

| Commenter | Summary of Comment | Coverage in the EIR |
|---|---|---|
| California Department of Conservation, Office of Mine Reclamation<br>(Beth Hendrickson) | The reclamation plan for SMP-24 will need to be amended to account for the proposed new end use. | • Plans & Policies |
| Caltrans<br>(Patricia Maurice) | Coordinate with Caltrans on the traffic analysis and if ACRP construction overlaps with construction of State Route 84–Niles Canyon Road Safety Improvements. | • Cumulative Projects<br>• Transportation and Circulation |
| | Describe criteria for determining whether preparation of a Transportation Impact Study (TIS) is required. | • Transportation and Circulation |
| | Preparation of a TIS or Traffic Management Plan (TMP) may be required if project-related traffic restrictions or detours affect State highways. | • Transportation and Circulation |
| | Project work that requires movement of oversized or excessive load vehicles on State facilities requires a transportation permit. | • Transportation and Circulation |
| | An encroachment permit is required for any work or traffic control that encroaches the State ROW. | • Transportation and Circulation |
| | Discuss the project's fair share contribution, financing, scheduling, and implementation responsibilities associated with planned improvements on the State ROW. | • Transportation and Circulation |
| DWR DSOD<br>(Y-Nhi D. Enzier) | Describes criteria for dams under the DWR DSOD's jurisdiction and states that, as the project would not involve an aboveground barrier, the project would not be subject to DSOD jurisdiction. | • Permits and Approvals |
| SF Bay RWQCB<br>(Brian Wines) | Discuss/describe SFPUC's water rights to the water that infiltrates into Pit F2. | • Project Description<br>• Introduction & Background |

### TABLE 2-3 (Continued)
### SUMMARY OF SCOPING COMMENTS

| Commenter | Summary of Comment | Coverage in the EIR |
|---|---|---|
| SF Bay RWQCB<br>(Brian Wines)<br>(cont.) | Evaluate the potential for the project to increase the regional rate of infiltration into the subsurface and quarry pits (i.e., losses) in the Sunol Valley, and associated effects on surface flows in and fish passage along Alameda Creek. | • Hydrology and Water Quality<br>• Appendices HYD1 and HYD2<br>• Fishery Resources |
| BAWSCA<br>(Michael Hurley) | Confirm and/or update any information derived from the WSIP PEIR, as appropriate. | • Introduction and Background<br>• Project Description<br>• WSIP PEIR Consistency and Analysis and Mitigation Measures, Applicability to the Proposed Project |
| | Clarify the basis for the target recapture amount (9,820 afy) and demonstrate how the target amount satisfies WSIP level of service goals and objectives related to water supply during both non-drought and drought periods. | • Introduction and Background<br>• Project Description |
| | Provide information to support the assumption that water quality in Pit F2 would be adequate and pretreatment would not be needed prior to conveying the water to the SVWTP or San Antonio Reservoir. | • Project Description |
| | Provide information regarding the mechanism for infiltration of water into Pit F2 and any other means by which water enters/exits Pit F2 (evaporation/precipitation). | • Hydrology and Water Quality<br>• Appendices HYD1 and HYD2 |
| ACWD<br>(Robert Shaver, General Manager) | Due to the timing and rate of releases/bypasses and recapture, during certain periods the ACRP may capture flows that are neither releases nor bypasses. Additional water originating from sources other than Calaveras Reservoir and the ACDD, such as Welch Creek, may be captured. Due to this mechanism of operations, it is difficult to define the ACRP as strictly a "recapture" facility. | • Operations (Project Description)<br>• Appendix HYD1 |
| | Evaluate potential impacts to Alameda Creek, the Alameda Creek watershed, and downstream agencies. | • Hydrology and Water Quality<br>• Appendices HYD1 and HYD2<br>• Fishery Resources<br>• Terrestrial Biological Resources |
| | Surface water and groundwater interactions are complex and dynamic physical processes. Alameda System Daily Hydrologic Model (ASDHM) will need to be substantially modified to fully analyze the project's impacts on stream flow, subsurface flow, and groundwater. The EIR should describe the origin of the water that will be recaptured or pumped out of Pit F2 at various times of operation. | • Hydrology and Water Quality<br>• Appendices HYD1 and HYD2 |

### TABLE 2-3 (Continued)
### SUMMARY OF SCOPING COMMENTS

| Commenter | Summary of Comment | Coverage in the EIR |
|---|---|---|
| ACWD<br>(Robert Shaver)<br>(cont.) | Provide sufficient detail to analyze impacts associated with differing rates of release and recapture on: anadromous fish passage in Alameda Creek Flood Control Channel, Niles Canyon, and Sunol Valley; aquatic and riparian habitat in Niles Canyon and Sunol Valley; and ACWD groundwater recharge operations and water supply. The EIR should evaluate impacts separately for dry, average, and wet year conditions. | • Project Description<br>• Hydrology and Water Quality<br>• Appendices HYD1 and HYD2<br>• Fishery Resources<br>• Terrestrial Biological Resources |
| | Clarify the basis for the target recapture amount (9,820 afy) vs. the 6,300 afy identified for the Alameda Creek Fishery Enhancement project in the WSIP. | • Introduction and Background<br>• Project Description |
| | Discuss/describe SFPUC's water rights to the water that infiltrates into Pit F2. | • Introduction and Background<br>• Project Description |
| | The cumulative impact analysis should consider other projects being pursued by the Alameda Creek Fisheries Restoration Workgroup. | • Cumulative Projects |
| | Evaluate potential impacts to waters of the U.S. and permit requirements under the Clean Water Rule published on 6/29/15 in the Federal Register (80 FR 37054), and take into account the recent holding in the case Siskiyou County Farm Bureau v. Department of Fish and Wildlife C.D.O.S. 5632, No. C073735 (6/1/15). | • Permits and Approvals<br>• Fishery Resources<br>• Terrestrial Biological Resources |
| | Evaluate potential impacts to DWR South Bay Aqueduct. | • Geology and Soils |
| | The commenter encourages the SFPUC to coordinate w/ACWD on the scoping and assessment of project alternatives, including operational alternatives of the proposed project. | • Alternatives Analysis |
| Zone 7 Water Agency<br>(Elke Rank) | Evaluate potential impacts on groundwater supplies as there will be water losses associated with the instream flow schedules (evapo-transpiration, surface water outflow, soil moisture and bank storage increases, and infiltration of stream flow to parts of the groundwater basin where it may become unrecoverable or non-beneficial). | • Hydrology and Water Quality<br>• Appendices HYD1 and HYD2 |
| | Require groundwater monitoring at key locations around the groundwater basin to ensure ACRP operations are not having an unacceptable impact on groundwater supplies. | • Project Description |
| North Coast County Water District<br>(Janice Zavala-Clark) | Mailing list correction RE General Manager at North Coast County Water District | N/A |

**TABLE 2-3 (Continued)**
**SUMMARY OF SCOPING COMMENTS**

| Commenter | Summary of Comment | Coverage in the EIR |
|---|---|---|
| Alameda Creek Alliance [ACA] (Jeff Miller) | The SFPUC's current concept for the ACRP is an improvement over previous concepts that involved construction of infrastructure in the Alameda Creek channel. | • Alternatives Analysis |
| | Describe the origin of the water that infiltrates into Pit F2, the hydrologic connections between the groundwater that infiltrates into Pit F2 and the Sunol Valley Groundwater Basin, and the hydrologic connections between this water and surface water in Alameda Creek above, adjacent to, and below the project reach. The project should evaluate impacts on surface flow in Alameda Creek through the Sunol Valley and downstream into Niles Canyon, and the associated impacts on fisheries and other aquatic resources through Niles Canyon. | • Hydrology and Water Quality<br>• Appendices HYD1, HYD2, and BIO2<br>• Fishery Resources<br>• Terrestrial Biological Resources |
| | Recapture of summer flows released from Calaveras Reservoir that are intended to enhance rearing habitat in upper Alameda Creek would have no impact on trout rearing conditions or trout migration. However, recapturing the water that will be bypassed at the ACDD that is specifically intended to benefit upstream and downstream migration of adult and juvenile trout along the length of Alameda Creek from ACDD downstream to the SF Bay is an issue.<br>*"Yet the March 5, 2011 Biological Opinion ("BO") by the National Marine Fisheries Service for the Calaveras Dam Replacement Project explicitly anticipated (pp 49-52) that bypass flows at the Alameda Creek Diversion Dam would provide suitable migration conditions for steelhead trout from Alameda Creek below the ACDD all the way downstream through Niles Canyon and Lower Alameda Creek to San Francisco Bay. The BO stated (p 52) that "CDRP minimum flows from the southern watershed when combined with flows from the northern watershed (at the confluence with the Arroyo de la Laguna) through Niles Canyon are expected to provide suitable conditions for adult upstream migration and smolt downstream migration. These flows will arrive at the upstream end of the Alameda Creek Flood Control Channel and ACWD will provide bypass flows at their water diversion facilities for fish passage through the Flood Channel."* | • Appendices HYD1, HYD2, and BIO2<br>• Fishery Resources |

### TABLE 2-3 (Continued)
### SUMMARY OF SCOPING COMMENTS

| Commenter | Summary of Comment | Coverage in the EIR |
|---|---|---|
| Jeff Miller<br>(Alameda Creek Alliance) | Describe the source for the recaptured flow and where it originates from.<br>Describe if there is a hydraulic connection between the recaptured flow and surface flows in Alameda Creek.<br>Include an evaluation of the change in groundwater infiltration rates when pumping is happening.<br>Include an evaluation of the pumping effects on surface flow in Niles Canyon or in downstream reaches of the creek.<br>Describe the cold water flows coming in the summer and the flows that infiltrate into the subsurface. | • Hydrology and Water Quality<br>• Appendices HYD1 and HYD2<br>• Fishery Resources |
| Save the Frogs<br>(Kerry Kriger) | Consider the project's contribution to cumulative impacts on stream-dwelling amphibians and aquatic reptiles together with the CDRP impacts to the same species. | • Terrestrial Biological Resources |
| | The commenter urges the SFPUC to uphold its Environmental Stewardship Policy. Evaluate impacts on the federally endangered foothill yellow-legged frog and western pond turtle (neither of which was identified in the NOP), as well as common amphibians. | • Terrestrial Biological Resources |
| | Assess the potential for ACRP operations to lower groundwater levels and result in stream base flow depletion in Alameda Creek at times of the year that are critical for amphibians, snakes, and turtles. The commenter is concerned that the ACRP's recapture rate may be out of sync with the timing of the bypasses and releases and result in the capture of water from other origins. The EIR should evaluate how the magnitude, timing, and duration of surface flows in lower San Antonio Creek and Alameda Creek may be changed by the proposed recapture of water. | • Appendices HYD1 and HYD2<br>• Terrestrial Biological Resources |
| | Assess the potential for ACRP operations to lower groundwater levels and adversely affect Sycamore alluvial woodlands. | • Appendices HYD1 and HYD2<br>• Terrestrial Biological Resources |
| | Clarify the basis for the target recapture amount (9,820 afy) vs. the 6,300 afy identified for the Alameda Creek Fishery Enhancement project in the WSIP and provide additional information regarding how the water bypassed/released will coincide with the water recaptured. Commenter expresses the opinion that evaluation of the proposed recapture separately from the evaluation of CDRP is piecemealing. | • Introduction and Background<br>• Project Description<br>• Impact Overview |

## TABLE 2-3 (Continued)
## SUMMARY OF SCOPING COMMENTS

| Commenter | Summary of Comment | Coverage in the EIR |
|---|---|---|
| Save the Frogs<br>(Kerry Kriger)<br>(cont.) | The EIR should:<br>*"(1) describe in detail the flow paths of water that recharge the groundwater basin and provide summer baseflows to San Antonio Creek and Alameda Creek;*<br>*(2) quantify what percent of bypass and release flows will actually enter the groundwater and clearly illustrate whether this project is truly recapturing flows or simply mining groundwater in excess of amounts released and bypassed;*<br>*(3) evaluate the impacts of groundwater extraction on riparian flora and fauna under various climate change scenarios which may exacerbate fluctuations between series of extremely wet and extremely dry years; and*<br>*(4) detail the likely impacts on amphibians and reptiles, as described above. Because the dynamic interactions among surface water, ground water, and rock moisture are extremely complex, we would like to see direct observations and controlled physical tests made to trace water sources and address our questions about impacts on in-stream flow conditions."* | • Hydrology and Water Quality<br>• Appendices HYD1 and HYD2<br>• Fishery Resources<br>• Terrestrial Biological Resources |
| Jim O'Laughlin | Commenter expresses opinion that the project is not needed; SFPUC has other more substantive water supply sources. | • Introduction and Background<br>• Project Description |
| | Commenter suggests that SFPUC should shift their focus to improving watershed management to better utilize water resources. | • Introduction and Background |
| | Commenter suggests that SFPUC operate the ACRP to recapture water during wet periods (as opposed to dry periods). | • Project Description |
| | Commenter asks if the CDRP instream flow schedules will support restoration of steelhead in the watershed. | • Introduction and Background |
| | Evaluate the potential for the ACRP to adversely affect groundwater levels in the Sunol Valley. | • Hydrology and Water Quality<br>• Appendix HYD2 |
| | Consider options for improving the visual quality of Pit F2. | • Aesthetics |
| | *"- What is the cost of the project?*<br>*- How much electricity be used and what would it cost?*<br>*- Does the existing Pump Station Pipeline take water out of the South Bay Aqueduct? How much?*<br>*- What approvals will Alameda County have to provide for this project?* | • Project Description<br>• Utilities and Service Systems<br>• Permits and Approvals<br>• Introduction and Background |

**TABLE 2-3 (Continued)**
**SUMMARY OF SCOPING COMMENTS**

| Commenter | Summary of Comment | Coverage in the EIR |
|---|---|---|
| Jim O'Laughlin (cont.) | - *Exactly what is required of the SFPUC in regards to increased flow into Alameda Creek for steelhead habitat ?"* | |
| Connie DeGrange | Include an evaluation of the impacts of the draw-down that would result from pumping Pit F2. | • Hydrology and Water Quality<br>• Appendices HYD1 and HYD2<br>• Terrestrial Biological Resources<br>• Fishery Resources |
| Bob Foster | Describe other alternatives to the project that have been rejected by the SFPUC. | • Alternatives |
| Jim O'Laughlin | Evaluate what impacts there is going to be on the groundwater levels, especially below Pit F2.<br>Describe if there is a way for the project to provide acceleration of the reclamation plan for Pit F2.<br>Include an alternative that evaluates only the legally responsible operations based on current historical agreements, and does not include the project. | • Hydrology and Water Quality<br>• Appendices HYD1 and HYD2<br>• Alternatives |

# 2.6 Draft EIR and Final EIR

This Draft EIR is available for public review and comment during the public review period noted on the cover, during which time the Planning Commission will hold a public hearing on the Draft EIR to receive oral public comment. Following the close of the public comment period, the Planning Department will prepare and publish a Responses to Comments document, containing written responses all substantive comments received on the Draft EIR as well as copies of the comments received. The document may also contain specific changes and revisions to the Draft EIR.

This Draft EIR, together with the Responses to Comments document (including revisions to the Draft EIR), will be considered by the San Francisco Planning Commission in an advertised public meeting, and then certified as a Final EIR if deemed adequate.

# 2.7 Organization of the Draft EIR

This EIR is organized into eight chapters, as discussed below:

- **Chapter 1, Summary.** This chapter presents a summary of the proposed project, identifies potentially significant environmental impacts and mitigation measures, and describes the alternatives considered in this EIR. It also addresses areas of controversy and issues to be resolved.

- **Chapter 2, Introduction and Background.** This chapter provides project background information and describes the purpose and organization of the EIR, as well as the environmental review process.

- **Chapter 3, Project Description.** This chapter describes the proposed project, including the project objectives, project components, project construction, and project operations. The chapter also lists required permits and approvals.

- **Chapter 4, Plans and Policies.** This chapter describes applicable land use plans and policies and their relevance to the project, and then discusses the project's consistency with those plans.

- **Chapter 5, Environmental Setting, Impacts, and Mitigation Measures.** This chapter is divided into sections covering each environmental resource topic. Each section describes the environmental and regulatory setting, the criteria used to determine impact significance, and the approach to the analysis for that resource topic. The criteria used to determine the significance of project impacts is based primarily on the San Francisco Planning Department's Initial Study Checklist,[13] which is based on CEQA Guidelines Appendix G. In order to address the specific hydrologic issues pertinent to the ACRP, additional criteria was developed to address the potential for ACRP operations to affect downstream water users in a manner that would result in adverse environmental effects. The section then presents an analysis of potential environmental impacts and the project-specific mitigation measures that have been developed to address significant and potentially significant impacts. Each resource section also includes an evaluation of cumulative impacts with respect to that resource topic.

- **Chapter 6, Other CEQA Issues.** This chapter discusses growth-inducing effects, summarizes the cumulative impacts, identifies the significant environmental effects that cannot be avoided if the proposed project is implemented, and describes the significant irreversible impacts.

- **Chapter 7, Alternatives.** This chapter describes the alternatives to the proposed project and compares their impacts to those of the proposed project. This chapter also identifies the environmentally superior alternative and summarizes the alternatives that were considered but screened from further analysis.

- **Chapter 8, EIR Authors and Consultants.** This chapter lists the EIR authors, consultants, project sponsors, and organizations and persons consulted.

Technical and supporting information for the EIR are presented in appendices.

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[13] San Francisco Planning Department, 2015. *Environmental Review Guidelines, Appendix B: Initial Study Checklist*· Revised August 10, 2015.

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# CHAPTER 3
# Project Description

## 3.1 Project Location and Setting

The proposed Alameda Creek Recapture Project (ACRP or proposed project) is in unincorporated Alameda County, south of the Interstate 680 (I-680) / State Route 84 (SR 84) interchange and west of Calaveras Road. **Figure 3-1** shows the regional location of the project. The proposed facilities would be in the Sunol Valley[1] on the east side of Alameda Creek, approximately 6 miles north of Calaveras Reservoir and 1 mile west of San Antonio Reservoir. The ACRP area is within the San Francisco Public Utilities Commission (SFPUC) Alameda watershed system. The SFPUC Alameda watershed, the boundaries of which are shown in Figure 3-1, refers to lands that are owned by the City and County of San Francisco (CCSF) and managed by the SFPUC as part of the Hetch Hetchy regional water system; the SFPUC Alameda watershed is within the much larger hydrologic boundary of the Alameda Creek watershed (refer to **Figure 5.17-1** in Section 5.17, Hydrology and Water Quality).

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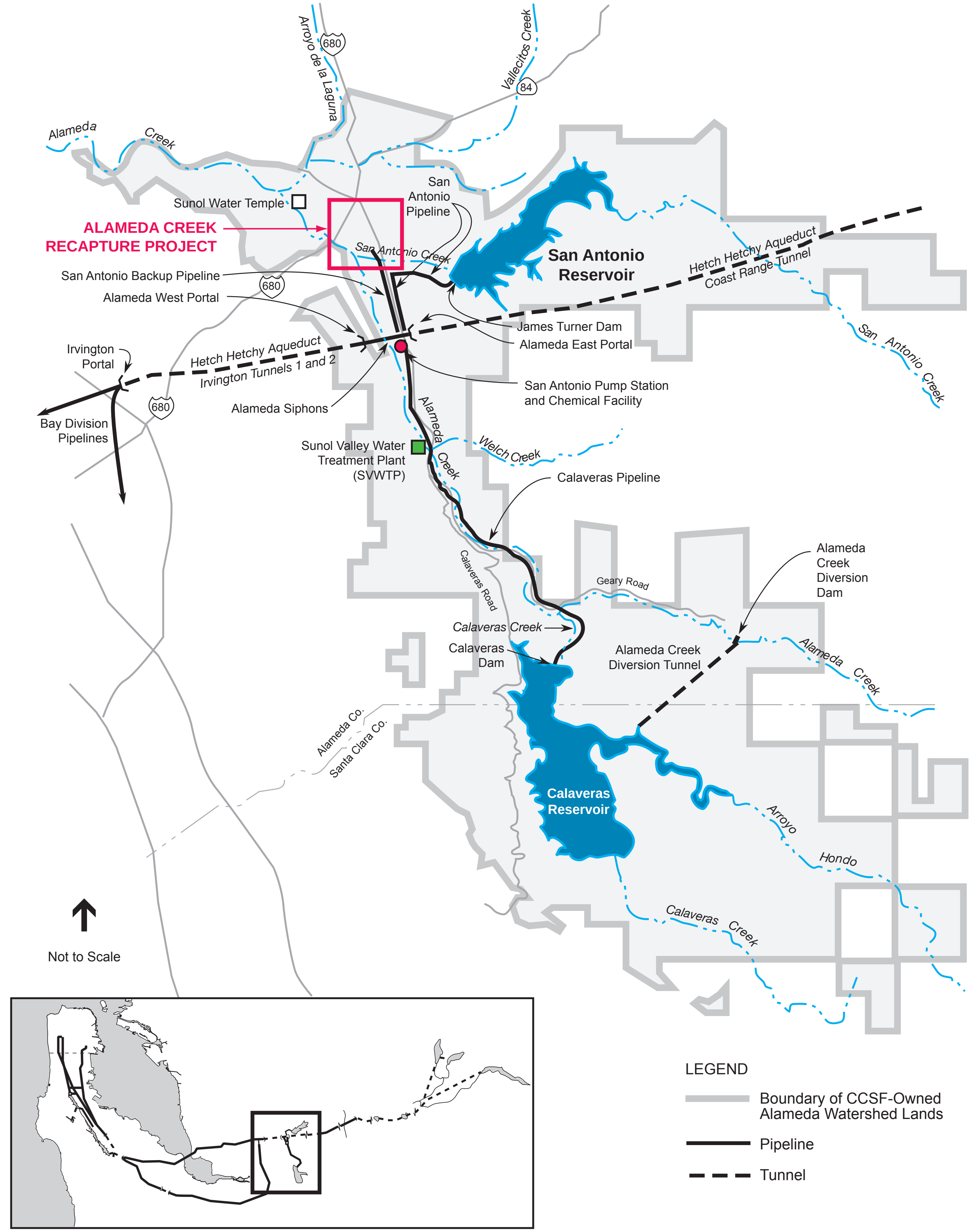
[1] The Sunol Valley is a north-south trending valley that extends approximately 5 miles from the confluence of Alameda and Welch Creeks in the south to Niles Canyon in the north. The Sunol Valley drains to Alameda Creek.



SOURCE: San Francisco Planning Department, 2008

SFPUC Alameda Creek Recapture Project

**Figure 3-1**

Overview of Alameda Watershed Facilities

Existing SFPUC facilities within the Sunol Valley include numerous water transmission facilities including the Alameda Siphons, Coast Range Tunnel, Irvington Tunnels 1 and 2, Alameda East Portal, Alameda West Portal, Calaveras Pipeline, San Antonio Pipeline, San Antonio Backup Pipeline, Sunol Pump Station Pipeline, Sunol Pump Station, and San Antonio Pump Station; water treatment facilities including Sunol Valley Water Treatment Plant (SVWTP), Sunol Valley Chloramination Facility, a fluoride facility, and a chemical facility; and the Hetch Hetchy Water & Power (HHWP) Calaveras Substation. Other land uses in the project vicinity include commercial gravel quarries, commercial nurseries, the Pacific Gas & Electric Company (PG&E) Sunol Substation, several private residences, grazing land, and regional open space.

Gravel quarries are present in the Sunol Valley along Alameda Creek between the Alameda Siphons and Arroyo de la Laguna. As shown on **Figure 3-2**, the project area[2] intersects one commercial gravel quarry that is operated by Hanson Aggregates under Surface Mining Permit 24 (SMP-24), which includes Pits F2, F3-East, and F3-West. These pits in SMP-24 were in active use for aggregate extraction until 2007 and are currently used only to store and manage water to support active mining for Hanson Aggregates' operations under Surface Mining Permit 32 (SMP-32), located north of the project area. The reclamation plan for SMP-24 identifies the long term use of the area for water storage. A second commercial gravel quarry, operated by Oliver de Silva, Inc. under Surface Mining Permit 30 (SMP-30), including Pits F4, F5, and F6, is located immediately south of, but outside of, the project area. SMP-30 Pit F6 is currently in active use for aggregate extraction. Most of the SMP-24 area and all of the SMP-30 area are on SFPUC Alameda watershed lands that the quarry operators lease from the CCSF. As a result of the aggregate processing facilities and large quarry pits in the Sunol Valley, this reach of Alameda Creek is referred to as the Quarry Reach.[3] (Refer to Section 5.19.1.1 in Section 5.19, Mineral and Energy Resources, for additional information regarding past and present mining operations in the Sunol Valley.)

The nearest communities to the proposed project are the unincorporated town of Sunol (approximately 1 mile northwest of the project area), the city of Fremont (approximately 4 miles to the west), and the city of Pleasanton (approximately 5 miles to the north). Regional access to the project area is provided by I-680 and SR 84; local access is provided by Calaveras Road.

# 3.2 Project Background

## 3.2.1 WSIP Goals and Objectives

As described in Section 2.2 of Chapter 2, Introduction and Background, the ACRP is part of the SFPUC's Water System Improvement Program (WSIP). With the exception of the water supply goal, the WSIP goals and objectives (shown in Table 2-1) are based on a planning horizon through 2030. The water supply goal is based on a planning horizon through 2018. The overall goals of the WSIP for the regional water system are to:

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[2] Project area refers to the area within which all construction-related disturbance would occur.

[3] The Quarry Reach of Alameda Creek extends from the Alameda Siphons in the south to I-680 in the north. Sand and gravel mining is a predominant land use along this reach.

- Maintain high-quality water
- Reduce vulnerability to earthquakes
- Increase water delivery reliability
- Meet customer water supply needs
- Enhance sustainability
- Achieve a cost-effective, fully operational system

The WSIP identifies the ACRP[4] as a "key regional facility improvement project." Implementation of all of the key regional projects is needed to meet the WSIP level of service goals and system performance objectives.[5] As described below, the ACRP is consistent with the WSIP goals related to water supply.

## 3.2.2 Relationship to Calaveras Dam Replacement Project

The approved Calaveras Dam Replacement project (CDRP), another key regional facility improvement project of the WSIP, is designed to help the SFPUC meet the WSIP level of service goals related to water supply, seismic reliability and water delivery reliability.[6] The CDRP is currently under construction, with completion anticipated in 2019. The SFPUC included the ACRP in the WSIP because as part of the CDRP, the SFPUC intended to implement instream flow releases to improve habitat conditions for native rainbow trout in accordance with a 1997 Memorandum of Understanding (MOU) with the California Department of Fish and Game (now the California Department of Fish and Wildlife [CDFW]). The MOU envisioned the downstream recapture of an amount of water equivalent to the instream releases.

In 2011, as part of the future operations plan for Calaveras Reservoir under the CDRP, the SFPUC agreed to implement flow bypass and instream flow release schedules for Alameda and Calaveras Creeks, respectively, to be protective of the federally threatened Central California Coast (CCC) steelhead (*Oncorhynchus mykiss*) distinct population segment (DPS) in these creeks below the Alameda Creek Diversion Dam (ACDD) and Calaveras Dam and upstream of Sunol Valley (refer to **Figure 2-4** in Chapter 2, Introduction and Background). The required bypass schedule at the ACDD limits operation of the ACDD to December through March; requires that SFPUC maintain minimum bypass flows of 30 cubic feet per second (cfs) when water is present in upper Alameda Creek above the ACDD; and sets a maximum diversion rate of 370 cfs (prior operations allowed for diversions of up to 650 cfs year-round). The operational restrictions and minimum bypass requirements of the CDRP permits[7,8] on future operation of the ACDD will reduce the period of

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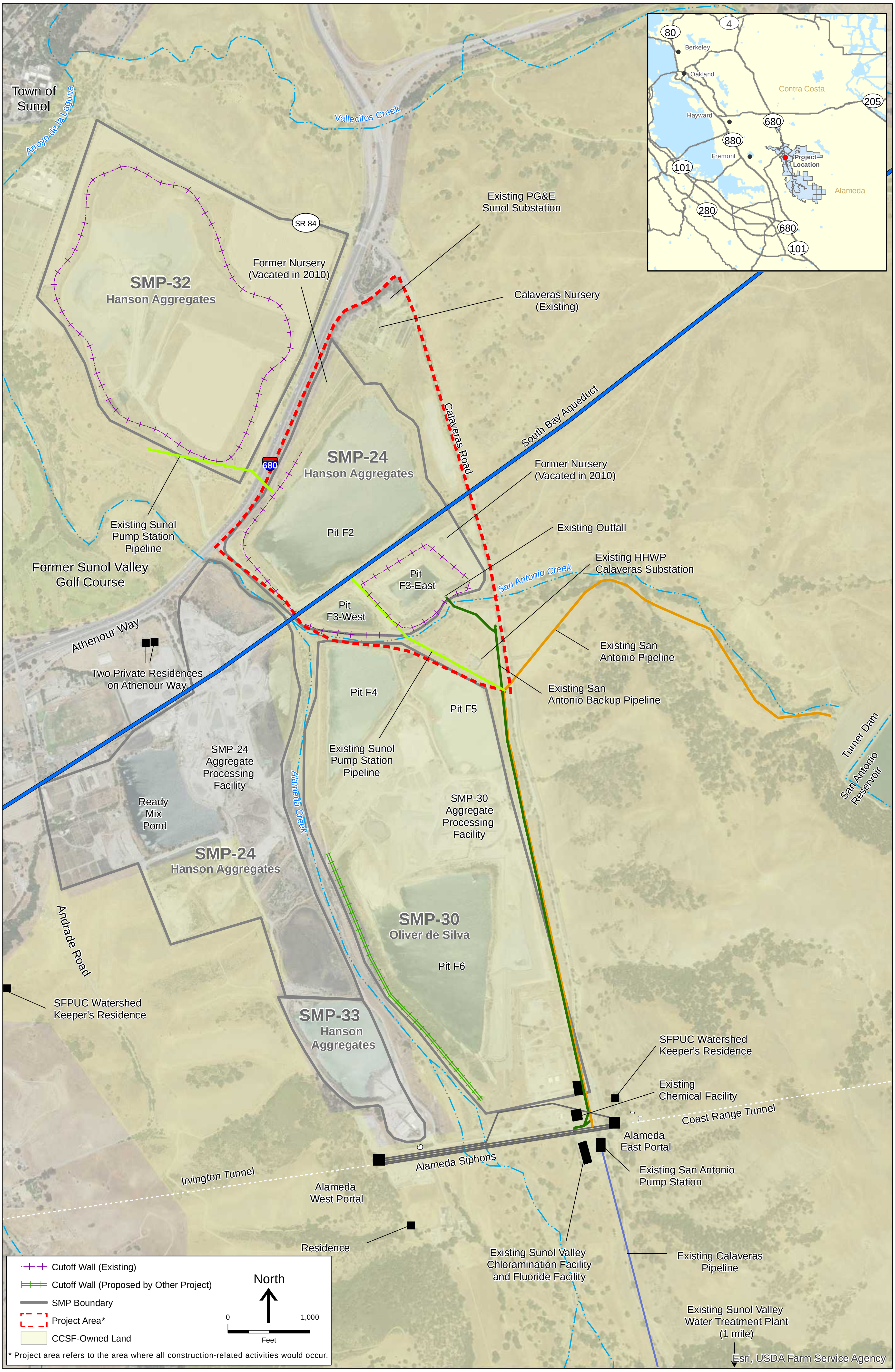
[4] The ACRP is listed in the WSIP Program Environmental Impact Report (PEIR) under its former title, the Alameda Creek Fishery Enhancement project.

[5] San Francisco Planning Department, 2008. *Final Program Environmental Impact Report on the San Francisco Public Utilities Commission's Water System Improvement Program*. San Francisco Planning Department File No. 2005.0159E, State Clearinghouse No. 2005092026. Certified October 30, 2008.

[6] San Francisco Planning Department, 2011. *Final Environmental Impact Report for the San Francisco Public Utilities Commission Calaveras Dam Replacement Project*. San Francisco Planning Department File No. 2005.0161E, State Clearinghouse No. 2005102102. Certified January 27, 2011.

[7] National Marine Fisheries Service (NMFS), 2011. *Biological Opinion for Calaveras Dam Replacement Project in Alameda and Santa Clara Counties.* Tracking No. 2005/07436. March 5, 2011.

[8] California Department of Fish and Game (CDFG), 2011. *Streambed Alteration Agreement for Calaveras Dam Replacement Project.* Notification No. 1600-2010-0322-R3. June 28, 2011.



SOURCE: ESA, 2015; Date of aerial photo is 2014.

SFPUC Alameda Creek Recapture Project

**Figure 3-2**
Project Vicinity Map

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time and the rate at which SFPUC can divert water from Alameda Creek to Calaveras Reservoir. As a result, the amount of Alameda Creek water that is diverted into Calaveras Reservoir will be reduced, causing a reduction in the volume of water entering Calaveras Reservoir. The instream flow schedule for Calaveras Creek below Calaveras Dam will provide year-round releases from Calaveras Reservoir, ultimately causing a reduction in the amount of water from Calaveras Creek and Arroyo Hondo that is stored in Calaveras Reservoir.

Through the ACRP, the SFPUC proposes to recapture an amount of Alameda Creek water equivalent to that which will be bypassed around the ACDD and released from Calaveras Reservoir in accordance with CDRP permit requirements. Without these bypasses and releases, this amount of water would have been stored in Calaveras Reservoir within the SFPUC’s existing pre-1914 water rights.

The ACRP would further the SFPUC's ability to achieve the established WSIP level of service goals and objectives related to water supply during both non-drought and drought periods by recapturing water that will be released from Calaveras Reservoir and bypassed around the ACDD and returning that water to the regional water system.

The SFPUC operates Calaveras Reservoir and the ACDD under the City and County of San Francisco's (CCSF) pre-1914 appropriative water rights that were originally established by the Spring Valley Water Company. Implementation of the ACRP would not increase the firm yield of the regional water system. However, the ACRP is needed to avoid the loss of yield to the regional system from the SFPUC Alameda watershed (water historically stored in Calaveras Reservoir) that will occur with implementation of the instream flow schedules under the CDRP.

If the bypassed and released water is not recaptured, the SFPUC cannot maintain its historical transfers of water from Calaveras Reservoir to the SVWTP and San Antonio Reservoir without decreasing the amount of water stored in Calaveras Reservoir compared to conditions that existed before 2001. Calaveras Reservoir provides the largest volume of local reservoir storage in the regional water system, and carry-over storage in Calaveras Reservoir is a critical component in maintaining the regional system's water supply and delivery reliability, including the SFPUC’s ability to supply water during droughts and critical maintenance periods, as well as in the event of water supply problems or transmission disruptions in the Hetch Hetchy system.

## 3.3 Project Goals and Objectives

The primary goal of the ACRP is to recapture water that the SFPUC will release from Calaveras Reservoir and bypass around the Alameda Creek Diversion Dam (ACDD) when the SFPUC implements the instream flow schedules required as part of the regulatory permits for future operations of Calaveras Reservoir. The recaptured water would maintain the historical contribution from the Alameda Watershed to the SFPUC regional water system, in accordance with the CCSF existing water rights. The project-specific objectives of the ACRP are as follows:

- Recapture the water that would have otherwise been stored in Calaveras Reservoir due to the release and bypass of flows from Calaveras Dam and the ACDD, respectively, to meet instream flow requirements, thereby maintaining the historical annual transfers from the Alameda Watershed system to the SFPUC regional water system.

- Minimize impacts on water supply during drought, system maintenance, and in the event of water supply problems or transmission disruptions in the Hetch Hetchy system.
- Maximize local watershed supplies.
- Maximize the use of existing SFPUC facilities and infrastructure.
- Provide a sufficient flow to the SVWTP to meet its minimum operating requirements.

## 3.4 Project Components

Approximately 6 miles downstream of the Calaveras Reservoir in the Sunol Valley, surface water and subsurface flow along Alameda Creek naturally infiltrates into several large quarry excavations (quarry pits) located on the east side of the creek. Under the ACRP, the SFPUC would pump Alameda Creek water from SMP-24 quarry Pit F2 and transfer it to the regional water system for municipal use. Pit F2 is located downstream (north) of the confluence with San Antonio Creek and south of I-680 and the confluence with Arroyo de la Laguna; it is no longer in active use for aggregate extraction but used to store and manage water to support active mining and aggregate processing for other quarry pits. Implementation of the ACRP would require that SFPUC construct several improvements in and around Pit F2 to pump the recaptured water from the quarry pit and convey it to existing water supply infrastructure in the Sunol Valley. The preliminary site plan is shown in **Figure 3-3**. The key project components are as follows.

- Four 400-horsepower vertical turbine pumps on floating barges centrally located in Pit F2, approximately 400 feet from the shore, with a mooring system to secure the floating barges
- Four 700-foot-long, 16-inch-diameter high density polyethylene (HDPE) flexible discharge pipelines extending from each vertical turbine pump to a new pipe manifold located on shore
- A 100-foot-long, 36-inch-diameter welded steel pipeline connection between the new pipe manifold and the existing Sunol Pump Station Pipeline
- Throttling valves and a flow meter
- An electrical control building
- An electrical transformer, and up to fifteen power and fiber optic line poles, and 1,800 feet of overhead power lines extending from HHWP Calaveras Electrical Substation to the new electrical control building.[9] In addition, approximately 2,800 feet of overhead fiber optic communication lines would extend from the HHWP Calaveras Electrical Substation to the new electrical control building below the overhead power lines along the new and existing power poles

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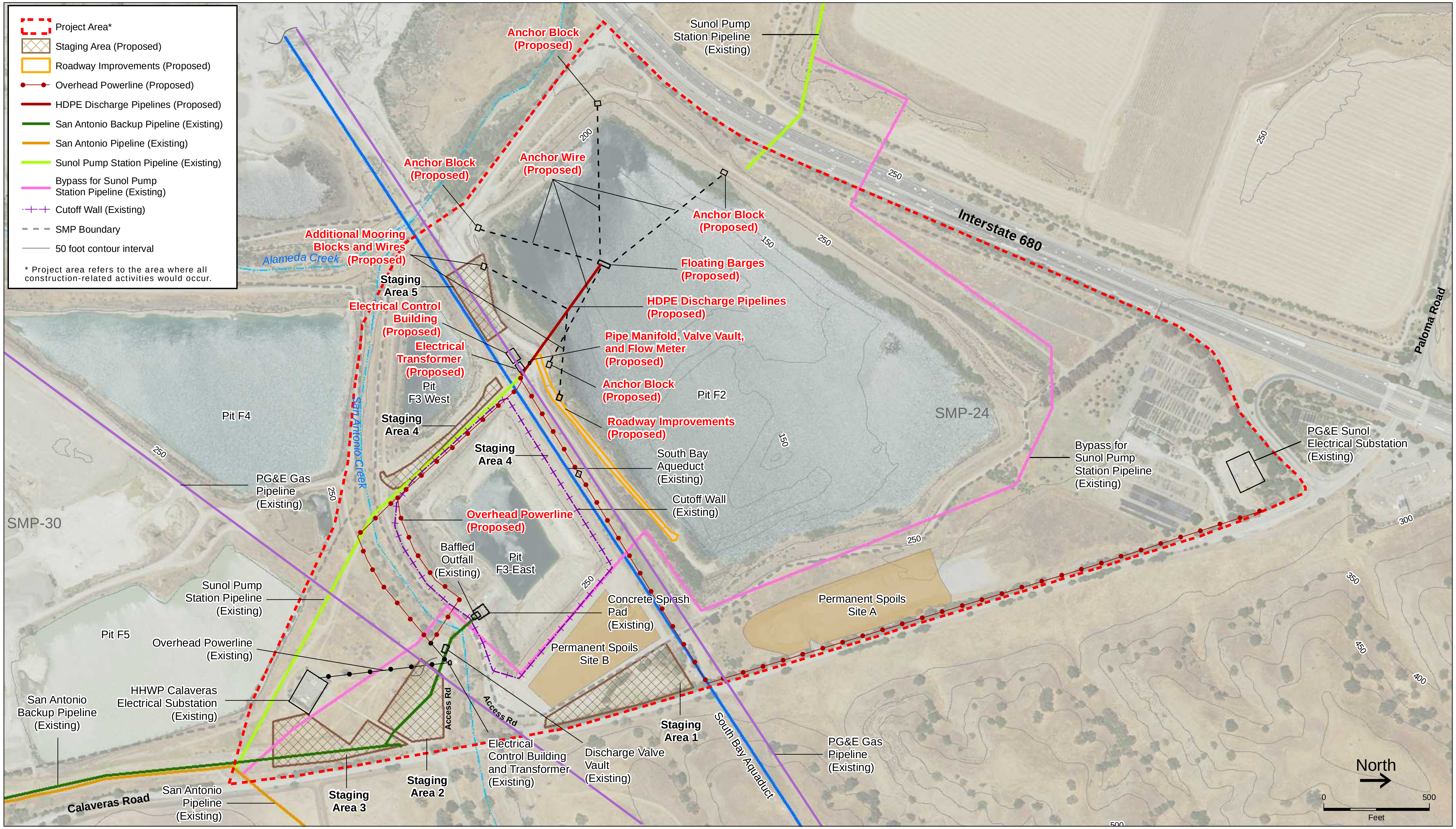
[9] Alternatively, as described in Section 3.3.7, if the HHWP Calaveras Electrical Substation cannot meet the power needs of the ACRP, power would come from the PG&E Sunol Electrical Substation. Under this alternative power option, overhead power lines would extend from existing power poles along Calaveras Road west to the new electrical control building. See Section 3.3.7 for more information.



SOURCE: SFPUC, 2014a

SFPUC Alameda Creek Recapture Project

**Figure 3-3**

Preliminary Site Plan

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The SFPUC conducted water quality monitoring in Pit F2 from June 2014 to July 2016, and has determined at this time that no pretreatment would be required prior to conveying the water to the SVWTP or San Antonio Reservoir. The monitoring data generally indicates that with the possible exception of total coliform levels, the water quality in Pit F2 meets Title 22 standards; however, further discussion with the State Water Resources Control Board, Division of Drinking Water is needed to confirm that additional treatment requirements would be unnecessary.[10]

## 3.4.1 Pumps on Floating Barges

The pump system would consist of four 400-horsepower vertical turbine pumps, each mounted onto separate fiberglass barges that would float on the water surface in Pit F2. Each barge would be approximately 18 feet long, 14 feet wide, and 4 feet deep (hull) and would hold one complete pump/motor assembly. Four legs under each barge hull would be used for ballasting and would provide bottom-out support. The four fiberglass barges would be tethered together. Platforms would be installed between the barges to allow access from one barge to the next.[11]

A mooring system would be installed to secure the barges and to prevent them from making contact with the quarry pit walls and would also prevent tension between pump discharge flanges and the HDPE discharge pipelines. The mooring system would be comprised of manual winches installed at the barge corners, galvanized wire rope (mooring line), and four drilled pier anchors on shore. Each pier would be 30 inches in diameter and 30 feet deep. A concrete post mounted on each pier would extend approximately 4 feet above the ground surface.[12]

The access road leading into Pit F2 (approximately 1,200 linear feet) along the south side of the pit would be developed with a 12-inch gravel subbase to improve access to the pond, particularly for heavy equipment.

## 3.4.2 HDPE Discharge Pipelines

Each vertical turbine pump would discharge into separate 700-foot-long, 16-inch-diameter HDPE discharge pipelines that would connect to the pipe manifold on shore. The HDPE discharge pipelines would float on the surface of the water and lay on the slope surface of the quarry pit. Flotation collars and/or other types of strap-on flotation devices might be used to ensure flotation of the discharge pipelines on the water surface. At approximately 265 feet above mean sea level (msl), the HDPE discharge pipelines would transition from aboveground to underground, terminating at the pipe manifold, approximately 80 feet from the edge of the quarry pit.[13] Approximately 80 feet of the 700-foot-long HDPE discharge pipelines would be buried roughly 7 feet below ground. Similar to the floating barges, a mooring system would be installed to restrain the HDPE pipeline floating on the water surface from moving. This would require two additional mooring anchors, for a total of six anchors, as shown in Figure 3-3.

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[10] Personal Communication from Daniel Kim, SFPUC, on September 13, 2016.
[11] Ibid.
[12] Ibid.
[13] Ibid.

### 3.4.3 Pipe Manifold

The four 16-inch-diameter HDPE discharge pipelines would connect to a pipe manifold located on land near the edge of the quarry pit. The pipe manifold would merge flows from the four 16-inch diameter HDPE pipelines into a 36-inch-diameter steel pipeline connection (described below) to the existing Sunol Pump Station Pipeline. The inlets of the manifold would be equipped with throttling valves, check valves, and isolation valves to allow facility operators to isolate flows and take pumps offline for maintenance and repairs. The manifold and all of its adjoined parts would be housed underground.[14]

### 3.4.4 New Pipeline Connection to Existing Sunol Pump Station Pipeline

A 100-foot-long segment of 36-inch-diameter steel pipeline would connect the outlet of the pipe manifold to the existing Sunol Pump Station Pipeline. The connection point would be a concrete bell or spigot joint or a steel butt-strap.[15]

### 3.4.5 Throttling Valves and Flow Meter

The downstream side of each HDPE discharge pipeline would include a throttling valve before connecting to the pipe manifold. The throttling valves would be housed within a partially-buried concrete vault measuring approximately 15 feet long, 37 feet wide, and 17 feet deep. The vault would extend approximately 2.5 feet above grade and would be equipped with access hatches to allow for maintenance.[16] A flow meter would be installed along the new steel 36-inch-diameter pipeline connection, approximately 50 feet downstream of the pipe manifold. The flow meter would be located entirely underground. If necessary, the throttling valves, in combination with the flow meter, would be used to regulate the flow of the single-speed vertical turbine pumps. The throttling valves would be motorized by means of an actuator.

### 3.4.6 Electrical Control Building

A pre-engineered metal electrical control building would be located on the south side of Pit F2 and would house the electrical equipment and instrumentation for the proposed project. The building would be approximately 28 feet wide, 66 feet long, and 28 feet tall set on an approximately 34 feet by 75 feet concrete pad. A portion of the existing access road along the south side of Pit F2 would be paved for the driveway and parking area for the electrical control building. Chain-link security fencing would enclose an approximately 16,700-square-foot area around the electrical control building and transformer. The fencing would be 8 feet tall. Exterior lighting fixtures would be either compact fluorescent or LED light controlled by a time clock/photocell and light switch. Exterior lights would face downward and would be

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[14] Ibid.
[15] Ibid.
[16] Ibid.

shielded.[17,18] Six madrone trees would be planted around the building: five on the south side for shading and one on the north side. The building would be designed to include space for future solar equipment and for the roof to support future solar panels.

Approximately 2,800 feet of fiber optic communication lines would be installed overhead between the electrical control building and the HHWP Calaveras Electrical Substation. The new communication lines would connect to existing communication lines that extend between the HHWP Calaveras Electrical Substation and SVWTP and would be mounted on the same poles as the overhead power lines. An alternate form of communication would be to use an AT&T network service instead of installing fiber optic lines to the HHWP Calaveras Electrical Substation. The project would install a new AT&T communication line approximately 1,900 feet long between the electrical control building and an existing pole-mounted AT&T box on Calaveras Road. The AT&T line would run east between Pond F2 and Pond F3 East.

## 3.4.7 Power Supply Infrastructure

### 3.4.7.1 Electrical Transformer

A new outdoor electrical transformer would be constructed adjacent to the electrical control building. The transformer would be oil-cooled with vegetable oil, which is biodegradable and less flammable than standard transformer oils. The electrical transformer would be approximately 9 feet long and 7 feet wide. The concrete pad beneath the transformer would be approximately 21 feet long and 16 feet wide and would be curbed to provide secondary containment for any spilled oil. An outlet pipe would drain water out of the containment area, but if oil is detected, the flow would stop. If an oil leak is detected, the system would send an alarm to SFPUC facility operators to clean up the oil manually in accordance with a Spill Prevention Control and Countermeasure (SPCC) plan. The secondary containment would have the capability to store a minimum of 660 gallons of oil leakage plus an additional 20 percent volume.[19]

### 3.4.7.2 Uninterruptible Power Supply

The electrical control building would be constructed with an uninterruptible battery power supply for the Supervisory Control and Data Acquisition (SCADA)[20] system to enable SFPUC facility operators to operate instrumentation and security equipment remotely during an emergency.[21]

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[17] Ibid.

[18] San Francisco Public Utilities Commission (SFPUC), 2014. Alameda Creek Recapture Project 10% Design Drawings for Conceptual Engineering Report. November 2014.

[19] San Francisco Public Utilities Commission (SFPUC), 2014a. Final Conceptual Engineering Report for Alameda Creek Recapture Project. Prepared by SFPUC Engineering Management Bureau. November 21, 2014.

[20] SCADA systems allow for remote monitoring and operation of facilities.

[21] San Francisco Public Utilities Commission (SFPUC), 2014. *Final Conceptual Engineering Report for Alameda Creek Recapture Project*, Prepared by SFPUC Engineering Management Bureau. November 21, 2014.

### 3.4.7.3 Power from HHWP Calaveras Electrical Substation (Preferred Power Option)

Electrical power for project operations would be provided by one of two options: either the existing HHWP Calaveras Electrical Substation at the southeastern project area boundary (just west of Calaveras Road and south of San Antonio Creek) or the PG&E Sunol Substation at the northern tip of the project area (just south of the I-680/SR 84 interchange). Both substations are shown on Figure 3-3.

If power is provided by HHWP Calaveras Substation (preferred option), approximately 1,800 feet of 21.6 kilovolt (kV) overhead powerlines would be installed between the HHWP Calaveras Electrical Substation and the new electrical transformer at the new electrical control building. The power lines would transition from aboveground to underground at the last power pole. At the last power pole, the power lines would be encased in an underground electrical conduit and would provide an underground power connection between the electrical transformer and the electrical control building. It is estimated that up to 15 poles (10 to 12 power poles and 3 poles for the fiber optic line) would be installed for the approximately 1,800-foot-long overhead powerline; no powerline poles would be installed within riparian areas. The poles would be approximately 50 feet tall and 12 inches in diameter.[22] Figure 3-3 shows two possible alignments for the overhead powerline, either north or south of San Antonio Creek, and the SFPUC would select one of these alignments during final project design.

Approximately 700 feet of underground and submersible power cables would connect the turbine pumps mounted on floating barges in Pit F2 to the electrical control building. The power cables would be placed in an underground electrical conduit for approximately 80 feet, between the transformer and the point where the cables would daylight at the southern quarry pit slope. At the southern quarry pit slope, the cables would transition into submersible cables, and would be attached and aligned parallel to the 620-foot-long segment of the HDPE discharge pipelines. The bundled power cables and HDPE discharge pipelines would extend across the surface of the quarry pit slope and then floated across the water to connect to the vertical turbine pumps.[23]

### 3.4.7.4 Power from PG&E Sunol Substation (Alternative Power Option)

If the HHWP Calaveras Substation is not capable of supporting the electrical loads of the proposed project, power would be provided by the PG&E Sunol Substation. For this option approximately 1,900 feet (10 new power poles) of new overhead powerlines would be constructed between existing overhead powerlines along Calaveras Road and the electrical transformer at the electrical control building. The overhead power lines would be routed between Pit F2 and Pits F3-East and F3-West. All other electrical power lines under this option would be the same as described above for the HHWP Calaveras Substation.

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[22] Ibid.

[23] San Francisco Public Utilities Commission (SFPUC), 2014. *Alameda Creek Recapture Project 10% Design Drawings for Conceptual Engineering Report*. November 2014.

# 3.5 Project Construction

## 3.5.1 Site Access, Site Preparation, and Construction Staging

### 3.5.1.1 Site Access

Calaveras Road would be the primary construction access route to the project area. Two existing access roads off Calaveras Road that run east-to-west along either side of San Antonio Creek would provide access to the ACRP site. Two-way traffic would be maintained along Calaveras Road for the majority of the construction phase, but one lane could be closed periodically for short periods (up to 10 minutes) as large construction vehicles with larger turning radii turn right into the project area. Project construction activities would not affect access to private property or local businesses in the Sunol Valley.

### 3.5.1.2 Site Clearing and Preparation

Before construction mobilization, the contractor would clear and grade the construction work area (including staging areas) by removing vegetation and debris as necessary to provide a relatively level surface for the movement of construction equipment. In addition to grading the ground surface, the contractor might need to mow or place gravel over staging areas for fire prevention purposes. Some trees and/or vegetation on the side wall of Pit F2 could require trimming and/or removal to accommodate installation of the discharge pipelines and mooring lines. In addition, one mature tree that exists near the proposed electrical control building and electrical transformer would also be removed.

### 3.5.1.3 Staging Areas

As shown on Figure 3-3, the contractor would use five primary staging areas located along the gravel access roads bordering quarry Pits F2, F3-East, and F3-West and adjacent to Calaveras Road. These staging areas would provide a combined total of 8.8 acres for vehicle and equipment parking, temporary stockpiling of excavated material, and materials storage. Any mining equipment, such as portable hoses and unused pipe sections, located within the proposed staging areas would need to be temporarily relocated during construction activities. All proposed staging areas are within previously disturbed areas on CCSF-owned lands.[24] The characteristics of the staging areas are summarized in **Table 3-1**.

## 3.5.2 Spoils Management and Disposal

Proposed excavation and construction activities would generate excess soil and rock material (spoils) totaling approximately 2,236 cubic yards. The estimated volume of spoils that would be generated during construction of each project component is presented in **Table 3-2**, below. It is anticipated that most of the excess excavated material generated during project construction could be placed at either one of two permanent spoils placement sites along Calaveras Road (see Figure 3-3,

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[24] https:www///earth.google.com. Google Earth imagery for Sunol Valley. Provided via Personal Communication from Kimberly Stern Liddell, SFPUC on September 19, 2016.

## TABLE 3-1
## CONSTRUCTION STAGING AREAS

| Staging Area | Location | Approximate Space Available (acres) | Description |
|---|---|---|---|
| 1 | Along west side of Calaveras Road, extends from South Bay Aqueduct to existing access road that runs along north side of San Antonio Creek | 2.4 | Flat area with non-native grassland; accessible via existing access road |
| 2 | Southwest of Calaveras Road and San Antonio Creek crossing | 2.5 | Flat area with non-native grassland; accessible via existing access road and gate located just south of San Antonio Creek |
| 3 | Southwest of Calaveras Road and San Antonio Creek crossing, just east of HHWP Calaveras Electrical Substation | 2.1 | Flat area with non-native grassland; accessible via existing access road and gate located just south of San Antonio Creek |
| 4 | Between Pit F3-East and Pit F3-West, along the east side of the dirt access road | 0.6 | Flat area with dirt and gravel; accessible via existing access road and gate located north of San Antonio Creek |
| 5 | Between Pit F3-West and Pit F2 | 1.2 | Flat area with dirt and gravel; accessible via existing access road and gate located north of San Antonio Creek |

SOURCE: San Francisco Public Utilities Commission (SFPUC), 2014. Alameda Creek Recapture Project 10% Design Drawings for Conceptual Engineering Report. November 2014.

## TABLE 3-2
## CONSTRUCTION TRENCH DIMENSIONS AND EXCESS SPOILS

| Project Component | Quantity | Diameter (feet) | Depth (feet) | Volume (cubic yards) |
|---|---|---|---|---|
| Mooring anchors for floating barges | 4 | 2.5 | 30 | 22 |
| Power poles | 15 | 1 | 6 | 3 |
| | **Trench Length (feet)** | **Trench Width (feet)** | **Trench Depth (feet)** | **Volume (cubic yards)** |
| 36-inch-diameter pipeline connection to Sunol Pump Station Pipeline | 112 | 5 | 10 | 210 |
| HDPE discharge pipelines and electrical conduit | 556 | 3 | 6.5 | 402 |
| Electrical control building | 70 | 30 | 2.5 | 205 |
| Transformer pad | 21 | 16 | 2 | 30 |
| Throttle valve vault | 17 | 37 | 13 | 310 |
| Pit F2 Access Road | 1,200 | 20 | 1 | 1,200 |
| | | | **Total Excess Spoils =** | **2,382** |

SOURCE: San Francisco Public Utilities Commission (SFPUC), 2014. *Final Conceptual Engineering Report for Alameda Creek Recapture Project*, Prepared by SFPUC Engineering Management Bureau. November 21, 2014.

above). Alternatively, if feasible, the spoils could be temporarily placed at either the SMP-24 or SMP-30 aggregate processing facilities for subsequent processing, resale, and reuse by the quarry operators. Spoils determined to be of poor quality or excess spoils that could not be sold for reuse or permanently placed in an earthen berm at the permanent spoils sites (such as existing pipe, large concrete blocks, etc.) would be hauled out of the Sunol Valley and disposed of at one or more of the following waste disposal facilities: Altamont Landfill in Livermore; Tri-Cities Landfill in Fremont, or Vasco Road Landfill in Livermore. It is estimated that about 90 percent of spoils (2,143 cubic yards) would be disposed of within the Sunol Valley and up to 10 percent of the total excess spoils (239 cubic yards) could require offsite disposal. This estimate is based on handling of spoils from the San Antonio Backup Pipeline project, another WSIP facility improvement project recently built in the vicinity of this project.[25]

As stated in the paragraph above, unless provided to the quarry for sale or required to be hauled offsite, excess spoils generated during project construction would be placed in permanent berms at two spoils placement sites along Calaveras Road. Construction spoils from ACRP would be spread out over 2.5 acres at one of the permanent spoils sites, both of which are larger than 2.5 acres. Permanent Spoils Site A encompasses 3.4 acres and is located south of I-680, adjacent to the west side of Calaveras Road (see Figure 3-3). This site has also been used for the permanent placement of approximately 330,000 cubic yards of spoils generated by the New Irvington Tunnel project, another recently completed WSIP facility improvement project in the Sunol Valley. Spoils generated during construction of the ACRP would be piled to a maximum height of 20 feet above the elevation of Calaveras Road with 2:1 (horizontal: vertical) slopes. The permanent berm would have a 20-foot setback from Calaveras Road. Trees along this section of Calaveras Road would be preserved.

Excess spoils could also be placed in a permanent berm at the Permanent Spoils Site B. This site encompasses approximately 5.5 acres immediately east of Pit F3-East and west of Calaveras Road (see Figure 3-3). Spoils would be piled to a maximum height of 25 feet and with 2:1 (horizontal: vertical) slope. This site has already been used for the permanent placement of approximately 100,000 cubic yards of spoils generated by other WSIP facility improvements projects in the Sunol Valley, including the San Antonio Backup Pipeline project and Alameda Siphons Seismic Reliability Upgrade project.

### 3.5.3 Demolition

Before the new 36-inch-diameter pipeline connection to the Sunol Pump Station Pipeline is installed, the construction contractor would demolish an approximately 100-foot-long section of the existing Sunol Pump Station Pipeline, a concrete manhole, and the inactive 100-foot-long aboveground emergency intertie pipeline associated with the South Bay Aqueduct.[26,27] In addition,

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[25] Personal Communication from Jesus Almaguer, SFPUC, on September 12, 2016.

[26] SFPUC, 2014. *Alameda Creek Recapture Project 10% Design Drawings for Conceptual Engineering Report.* November 2014.

[27] SFPUC, 2014. *Final Conceptual Engineering Report for Alameda Creek Recapture Project*. Prepared by SFPUC Engineering Management Bureau. November 21, 2014.

there is a 22-inch-diameter PG&E natural gas transmission pipeline located at the proposed site of the electrical control building that is currently planned to be retired and abandoned in September 2017 (prior to construction of the proposed project), and a 300-foot segment of this pipeline needs to be removed before the electrical control building can be constructed. Removal of this pipeline segment may be done by PG&E prior to ACRP construction, or by SFPUC as part of ACRP construction. For the purposes of this EIR, it is assumed that the SFPUC would demolish and remove the 300-foot segment of the PG&E pipeline at this location.

To demolish these structures, the construction contractor would excavate the areas around these two existing pipeline segments to expose these structures. Construction workers would use a cutting saw to cut the pipes into manageable sections, then remove the pipe sections from the trench and transport them to an adjacent staging area using a crane or excavator. At the staging areas, workers would use jackhammers to separate concrete and metal. The concrete and metal debris would then be hauled to a landfill or recycling facility for reuse.

## 3.5.4 Pumps on Floating Barges

The barges, vertical turbine pumps, and motors would be delivered to the ACRP site and assembled by the construction contractor. A mobile crane would be required to lift the equipment off the delivery truck and lower them into the quarry pit.

Drilled cast-in-place concrete piers would be used to support the proposed mooring anchors. A drill rig would excavate a 30-inch-diameter boring for each pier. A casing or drilling fluid may be used to prevent caving of the drilled hole.[28] Construction workers would use cranes to lower the mooring lines into place.

## 3.5.5 HDPE Discharge Pipelines and Power Cables

The construction contractor would use a HDPE butt fusion machine to join HDPE pipe segments. The contractor would attach the submersible power cables to the aboveground section of HDPE discharge pipelines, between the turbine pumps and elevation 265 feet above msl on the Pit F2 quarry pit slope. At 265 feet above msl, the discharge pipelines would transition to underground. The contractor would install the pipe floats on the aboveground section. A mobile crane would be used to lower the aboveground section of the bundled HDPE discharge pipelines/power cables into Pit F2 and on the surface of the quarry pit walls. The 80-foot-long segment of HDPE pipe between the quarry pit slope and the pipe manifold would be installed by open cut trench methods similar to the 36-inch-diameter pipeline connection to the Sunol Pump Station Pipeline. The trench for the underground section of the HDPE discharge pipelines would be approximately 3 feet wide and 7 feet deep.[29] (See Section 3.5.6, below, for a discussion of open-trench pipeline installation activities). Each pump would be attached to one 16-inch diameter, 700-foot long HDPE discharge pipeline.

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[28] SFPUC, 2014. *Final Conceptual Engineering Report for Alameda Creek Recapture Project*, Prepared by SFPUC Engineering Management Bureau. November 21, 2014.

[29] Ibid.

## 3.5.6 New Pipeline Connection to Sunol Pump Station Pipeline, Pipe Manifold, Throttling Valve Vault, and Flow Meter

The construction contractor would install the 36-inch-diameter pipeline connection to the Sunol Pump Station Pipeline, pipe manifold, throttling valve vault, and flow meter using open-cut construction. The trench for the new 100-foot-long 36-inch-diameter steel pipeline connection would be approximately 5 feet wide and 8 feet deep. The pipe would be installed in 20- to 40-foot-long sections and welded together. Prior to backfilling the trench, the contractor would install the pipe manifold, throttle valve vault, and flow meter in the trench.

The overall construction sequence for installation of pipelines would involve: clearing and grading the ground surface along the pipeline alignment; excavating the trench; preparing and installing pipeline sections; installing the pipe manifold, throttle valve vault, and flow meter; backfilling the trench; regrading the ground surface; and revegetating or paving the alignment, as appropriate.

The traditional open-trench construction method involves using a conventional backhoe, excavator, or other mechanized excavation equipment. The pipeline trench would be stabilized with trench boxes or by shoring, or laying back and benching slopes to prevent the walls from collapsing during construction. The contractor would line the trench bottom with a bedding of sand or other appropriate material that would be shaped to support the pipeline. Installers would then place sections of the new pipelines in the trench, and then backfill the trench with excavated or imported fill material. The pipelines would be cleaned before they are connected to the regional water system and placed in operation.

## 3.5.7 Electrical Control Building

The construction contractor would grade the electrical control building site to accommodate the proposed electrical control building, electrical transformer, parking area, and driveway. The electrical control buildings would occupy an approximately 34- by 75-foot poured concrete pad. After pouring the foundation, the contractor would assemble the pre-engineered building over the concrete pad.[30] Once the electrical control building has been erected, the contractor would pave the driveway and parking area and install the barbed-wire security fence. Six madrone trees (five on the south side and one on the north side) would be planted.

## 3.5.8 Installation of Powerline and Cables

Installation of the new overhead powerline between the electrical transformer and either the HHWP Calaveras Substation or the PG&E Sunol Substation would occur in two phases: (1) installing the 15 power poles, and (2) installing and tensioning the power and communication lines. Access to each power pole would be needed at least twice. Power poles are typically set by mechanically digging a hole up to 6 feet deep, placing the pole in the hole, and backfilling. At each of the pole locations, an approximately 50-by-50-foot area would be needed for laydown

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[30] Ibid.

and assembly, and a limited amount of vegetation might require removal, but grading is not expected. Construction workers would use standard rubber-tired line trucks to access the alignment and to install and tension the new overhead power line. The puller/tensioner would be mounted on a utility truck or on a double-axle trailer. Where the proposed overhead powerline would cross over San Antonio Creek, construction workers may need to trim vegetation to facilitate construction. An arborist would monitor any tree trimming that is required during installation of powerlines over San Antonio Creek to ensure tree survival.

Using open-trench construction methods for underground power lines, construction workers would install the following power line segments. The power lines would run from the HHWP substation to the last power pole with overhead wires, from the last power pole to the ACRP transformer with underground wires (90 feet), from the transformer to the electrical control building with underground wires (30 feet), from the building to the disconnect switches with underground wires (80 feet), and from the disconnect switches to the barges with underground wires for 120 feet and above ground wires parallel and attached to the HDPE pipes for 580 feet. The trench for the underground sections would be 2 feet wide and 3 feet deep. After installing the power line and electrical conduit in the trench, construction workers would backfill the trench and restore the ground surface.

## 3.5.9 General Construction Activities

### 3.5.9.1 Construction Dewatering

Three types of dewatering discharges would be necessary during project construction: (1) dewatering of groundwater and/rainwater in open excavations; (2) dewatering of potable water in existing pipelines[31] before new connections are made; and (3) discharges of water after cleaning the newly installed pipes before they are connected to the regional water system.

Dewatering of excavated areas would be temporary and would only be necessary when surface water or subsurface water is encountered. It is anticipated that construction workers would encounter water in construction excavations, including excavations for the drilled piers and pipeline trenches. If lowering the water level in Pit F2 is necessary to facilitate construction in open excavations, the construction contractor would adhere to the recommendations made in the final Geotechnical Evaluation Report regarding acceptable drawdown rates to address the potential for slope instability in the quarry pit walls.[32] The contractor would treat water from excavated areas as necessary prior to discharge. The treatment could include settling tanks or filter bags to allow sediment to settle out. Water from excavated areas would be discharged to vegetated upland areas (so it could infiltrate naturally into the ground) or would be discharged to San Antonio Creek, Alameda Creek, or Pit F3-East (after treatment for sediment, if necessary) in accordance with applicable regulatory requirements.

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[31] Pipelines are kept “charged” (full of potable water) when not in use.

[32] T&R/RYGC, 2014. *Geotechnical Evaluation for the Alameda Creek Recapture Project, Sunol California, SFPUC Project No. CUW 352.01.* December 23, 2014.

Before connecting the 36-inch-diameter pipeline to the existing Sunol Pump Station Pipeline, the contractor would drain the water from the Sunol Pump Station Pipeline and discharge it to Pit F3-East, San Antonio Creek, or Alameda Creek. System operators would clean the newly installed 36-inch-diameter pipeline connection by removing materials and debris and flushing with water before bringing the pipe into service. Wash water from newly installed pipelines and pipeline connections would also be discharged to Pit F3-East, San Antonio Creek, or Alameda Creek in accordance with applicable regulatory requirements.

### 3.5.9.2 SFPUC Standard Construction Measures

The SFPUC has established Standard Construction Measures[33] that are implemented for the purpose of avoiding impacts to existing resources to the extent feasible. The Standard Construction Measures include activities such as seismic and geotechnical studies, implementation of traffic control measures, compliance with applicable local and State dust control regulations, implementation of erosion and sedimentation controls, undertaking of measures to minimize noise disruption to nearby neighbors and sensitive receptors during construction, hazardous site assessments in accordance with any applicable local requirements or commercial standards, screening for biological resources, nighttime construction lighting controls, and screening for cultural resources. In addition to environmental construction specifications which will include any mitigation measures, the SFPUC would ensure that the ACRP construction contract specifications include uniform minimum provisions to incorporate the Standard Construction Measures. The SFPUC would also implement the following measures pertaining to seismic and geotechnical issues, hazardous materials, and traffic during project planning, construction, and operation:

> **Seismic and Geotechnical Studies:** The SFPUC requires that projects prepare a characterization of the soil types and potential for liquefaction, subsidence, landslide, fault displacement, and other geological hazards at the project site and be engineered and designed as necessary to minimize risks to safety and reliability due to such hazards.[34] A geotechnical investigation has been prepared for the ACRP and the SFPUC is committed to implementing the recommendations of the project-specific geotechnical study.[35]
>
> **Hazardous Materials:** The SFPUC requires that where there is reason to believe that site soil or groundwater that would be disturbed during project construction may contain hazardous materials, the SFPUC shall undertake an assessment of the site in accordance with any applicable local requirements (e.g., Maher Ordinance) or using reasonable commercial standards (e.g., Phase I and Phase Il assessments, as needed). If hazardous materials will be disturbed, the SFPUC shall prepare a plan and implement the plan for treating, containing or removing the hazardous materials in accordance with any applicable local, State and federal regulations so as to avoid any adverse exposure to the material during and after construction. In addition, any unidentified hazardous materials

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[33] San Francisco Public Utilities Commission (SFPUC), 2015. *"SFPUC Standard Construction Measures."* Memorandum from Harlan L. Kelly, Jr., General Manager, to Michael Carlin, Juliet Ellis, Barbara Hale, Kathryn How, Tommy Moala, Steven Ritchie, and Eric Sandler. Dated July l, 2015.

[34] San Francisco Public Utilities Commission (SFPUC), 2015. *"SFPUC Standard Construction Measures."* Memorandum from Harlan L. Kelly, Jr., General Manager, to Michael Carlin, Juliet Ellis, Barbara Hale, Kathryn How, Tommy Moala, Steven Ritchie, and Eric Sandler. Dated July l, 2015.

[35] T&R/RYGC. 2014. *Geotechnical Evaluation for the Alameda Creek Recapture Project, Sunol California, SFPUC Project No. CUW 352.01.* December 23, 2014.

encountered during construction likewise will be characterized and appropriately treated, contained or removed to avoid any adverse exposure. Measures will also be implemented to prevent the release of hazardous materials used during construction, such as storing them pursuant to manufacturer recommendation, maintaining spill kits onsite, and containing any spills that occur to the extent safe and feasible followed by collection and disposal in accordance with applicable laws. SFPUC will report spills of reportable quantity to applicable agencies (e.g., the Governor's Office of Emergency Services).[36] This measure would be implemented during project construction activities.

**Traffic:** The SFPUC requires that projects implement traffic control measures sufficient to maintain traffic and pedestrian circulation on streets affected by construction of the project. Traffic control measures may include, but not be limited to, flaggers and/or construction warning signage of work ahead; scheduling truck trips during non-peak hours to the extent feasible; maintaining access to driveways, private roads, and off-street commercial loading facilities by using steel trench plates or other such method; and coordination with local emergency responders to maintain emergency access. For projects in San Francisco, the measures will also, at a minimum, be consistent with the requirements of San Francisco Municipal Transportation Agency (SFMTA)'s Blue Book. Any temporary rerouting of transit vehicles or relocation of transit facilities would be coordinated with the applicable transit agency, such as SFMTA Muni Operations in San Francisco. All projects will obtain encroachment permits from the applicable jurisdiction for work in public roadways.[37] This measure would be implemented during project construction activities.

## 3.5.10 Site Cleanup and Restoration

Project construction activities would result in approximately 13 acres of ground disturbance (see **Table 3-3**, below). Once the construction site is demobilized, the contractor would remove any added gravel, contour the site to its original profile, and hydroseed all other vegetated areas that were disturbed during construction. The SFPUC would restore disturbed areas to their preconstruction conditions. Restoration of the project area would include reestablishing preconstruction contours and drainage patterns and revegetating disturbed areas that were vegetated prior to construction. In addition, six madrone trees would be planted around the perimeter of the electrical control building to provide shade.

## 3.5.11 Construction Equipment and Workforce

**Table 3-4** summarizes the construction activities and workforce associated with the various project components. Earthwork activities and project construction would likely require backhoes, excavators, bulldozers, loaders, boom trucks, cranes, drill rigs, concrete transport trucks, concrete pump trucks, water trucks, air compressors, generators, and pipe-cutting and welding equipment.

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[36] San Francisco Public Utilities Commission (SFPUC), 2015. *"SFPUC Standard Construction Measures."* Memorandum from Harlan L. Kelly, Jr., General Manager, to Michael Carlin, Juliet Ellis, Barbara Hale, Kathryn How, Tommy Moala, Steven Ritchie, and Eric Sandler. Dated July l, 2015

[37] San Francisco Public Utilities Commission (SFPUC), 2015. *"SFPUC Standard Construction Measures."* Memorandum from Harlan L. Kelly, Jr., General Manager, to Michael Carlin, Juliet Ellis, Barbara Hale, Kathryn How, Tommy Moala, Steven Ritchie, and Eric Sandler. Dated July l, 2015.

**TABLE 3-3**
**ANTICIPATED GROUND DISTURBANCE**

| Project Component | Area (square feet) | Approximate Area (acres) |
|---|---|---|
| Mooring anchors for floating barges | 30 | <0.1 |
| Power poles (based on 50- by 50-foot area around each power pole) | 37,500 | 0.9 |
| 36-inch pipeline connection | 560 | <0.1 |
| 16-inch pipeline | 1,020 | <0.1 |
| Electrical control building and electrical transformer[a] | 14,200 | 0.3 |
| Throttle valve vault | 555 | <0.1 |
| Spoils placement at Permanent Spoils Site A or B[b] | 108,900 | 2.5 |
| Staging Area 1 | 104,550 | 2.4 |
| Staging Area 2 | 108,900 | 2.5 |
| Staging Area 3 | 91,500 | 2.1 |
| Staging Area 4 | 26,136 | 0.6 |
| Staging Area 5 | 52,272 | 1.2 |
| **Total Disturbance Area =** | **546, 123** | **13** |

NOTES:

[a] The total area of surface disturbance at the electrical control building and transformer site includes the enclosed paved driveway and parking area.

[b] Excess spoils generated during construction would be placed in a permanent berms at one of these two sites. ACRP spoils would be spread out over a 2.5-acre area.

SOURCE: SFPUC, 2014. *Alameda Creek Recapture Project 10% Design Drawings for Conceptual Engineering Repor*t. November 2014.
SFPUC, 2014. *Final Conceptual Engineering Report for Alameda Creek Recapture Project*, Prepared by SFPUC Engineering Management Bureau. November 21, 2014.

Pavers and rollers would be used to pave the new parking area and driveway for the new electrical control building. Individual crew sizes would range from 4 to 10 workers, depending on the construction activities taking place.

### 3.5.12 Construction Schedule

Project construction would generally occur Monday through Saturday between 7 a.m. and 7 p.m. Truck hauling and deliveries would occur Monday through Friday between 7 a.m. and 7 p.m.; hauling and deliveries would not occur on Saturdays or Sundays. Construction is expected to begin in the fall of 2017 and to be completed in the spring of 2019, with an overall duration of 18 months.[38]

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[38] SFPUC, 2014. *Final Conceptual Engineering Report for Alameda Creek Recapture Project. Prepared by SFPUC Engineering Management Bureau*. November 21, 2014.

## TABLE 3-4
## SUMMARY OF CONSTRUCTION ACTIVITIES, EQUIPMENT, AND DURATION

| Project Component(s) | Proposed Construction Activities | Construction Equipment | Construction Crew | Construction Duration |
|---|---|---|---|---|
| Turbine pumps and barge floatation system | Assemble pumps and barges; install assembled pumps/barges in Pit F2 | • Pipe-cutting and welding equipment<br>• Trucks for materials delivery<br>• Arch welding machine<br>• Pickup trucks<br>• Generator<br>• Mobile crane<br>• Air compressor | Generally 10 workers per day | 3 months |
| Mooring system | Vegetation removal; grading; drill boreholes for concrete piers; concrete form work | • Concrete truck<br>• Mobile crane<br>• Drill rig<br>• Haul trucks for spoils transport<br>• Dewatering pumps<br>• Graders<br>• Baker tank (s) | Generally 6 workers per day | 0.5 month |
| Electrical control building and transformer | Vegetation removal; site grading and preparation; concrete formwork; install pre-engineered metal building and transformer; site paving and revegetation | • Graders<br>• Excavators<br>• Bulldozers<br>• Dump trucks<br>• Welding equipment<br>• Haul trucks for spoils transport<br>• Concrete truck<br>• Flatbed truck | Generally 6 workers per day | 7 months |
| HDPE discharge pipelines, 36-inch-diameter pipeline connection to Sunol Pump Station Pipeline, Pipe Manifold, and Throttle Valve Vault | Vegetation removal; grading and trench excavation; construction dewatering; trench preparation; pipeline installation; installation of manifold system for dewatering pipeline; and pipeline cutting and welding. | • Flatbed trucks<br>• Backhoes<br>• Excavators<br>• Pipe cutting and welding equipment<br>• Haul trucks for spoils transport<br>• Baker tank(s)<br>• Pickup trucks<br>• Arc welding machine<br>• Generators<br>• Air compressors<br>• Crane<br>• Trucks for materials delivery<br>• Compaction equipment<br>Skip loader | Generally 8 workers per day | 6 months |
| Spoils Disposal | Spoils testing; hauling spoils; dust control; soil compaction; and grading. | • Backhoes<br>• Water trucks<br>• Haul trucks | Generally 4 workers per day | 1 month |
| | | | **Overall Construction Schedule** | **Fall 2017 through Spring 2019 (18 months total)** |

# 3.6 Operations and Maintenance

## 3.6.1 Proposed Operations

### 3.6.1.1 Recapture Volumes

Recapture operations under the ACRP would occur after implementation of the instream flow schedules required as part of the regulatory permits for future operations of Calaveras Reservoir and the ACDD. ACRP operations would not commence until the CDRP is completed and SFPUC implements the instream flow schedules of bypasses at ACDD and releases from Calaveras Reservoir (referred to as "bypasses and releases"). The proposed project would recapture the bypasses and releases as needed and as available at the existing quarry Pit F2 in the Sunol Valley, downstream of the compliance points for the bypasses and releases below the ACDD and Calaveras Dam, respectively. The project would utilize the natural infiltration of water into the ground in the vicinity of Pit F2 and its detention in the pit as the means by which the water would be recaptured. Using the proposed ACRP facilities described above in Section 3.4, the SFPUC would then pump water from Pit F2, and the recaptured water would be transferred to the regional water system for municipal use. The recapture operation of the ACRP would be conducted within the CCSF's existing pre-1914 appropriative water rights. The volume of recaptured water would be tracked daily to ensure the operation is conducted within these water rights.

The SFPUC used the Alameda System Daily Hydrologic Model (ASDHM) framework to estimate the volume of water the SFPUC would recapture to offset the loss of water supply yield from the SFPUC Alameda watershed due to the bypasses and releases, without expanding the City and County of San Francisco's (CCSF's) existing water rights. The SFPUC estimated the ACRP recapture volume using historical hydrology for the period October 1995 to September 2013, and accounting for future CDRP operations, including the bypasses and releases. The volume of water bypassed and released, and subsequently available for recapture, would vary from year to year based on precipitation and the specific requirements of the instream flow schedules. For the hydrologic period of October 1995 to September 2013, SFPUC estimated average annual recapture volumes of 7,178 acre-feet per year, with a range of 4,878 to 9,161 acre-feet per year.[39] This estimated average recapture volume is equivalent to the estimated average loss of yield associated with the bypasses and releases, and for the purposes of this EIR, assumes future water years, on average, will be similar to the modeled hydrologic period.

**Table 3-5** summarizes the proposed recapture volumes based on the 18-year historical hydrology period. To determine the recapture volume, the SFPUC conducted a series of calculations taking into account the daily volume of bypasses and releases, as well as available storage in Calaveras Reservoir. The average annual volume of water bypassed and released (i.e., annual sum of daily bypasses and releases), and potentially available for recapture is shown in Table 3-5, Row 1.

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[39] The recapture volumes presented in this EIR are calculated values derived from the ASDHM, which used 18 years of hydrological data to determine estimated recapture volumes under those historical conditions. Although the estimates appear precise, the reader should keep in mind the modeled nature of these estimates values.

Table 3-5, Row 2 presents the estimated portion of Pit F2 inflow from the bypasses and releases, and Row 3 presents the estimated volume of water proposed for recapture on an average annual basis.

**TABLE 3-5**
**SIMULATED CDRP BYPASSES AND RELEASES AND ACRP RECAPTURE VOLUMES**
**(acre-feet per year)**

| Operational Parameter | 18-year Hydrologic Period | | Wet Year | | Dry Year | |
|---|---|---|---|---|---|---|
| | Average | Range | Average | Range | Average | Range |
| 1. CDRP Bypasses and Releases (annual sum of daily flows) | 14,695 | 8,238 – 26,185 | 18,345 | 11,142 – 26,185 | 10,133 | 8,238 – 14,570 |
| 2. Portion of Pit F2 Inflow from Bypasses and Releases | 8,691 | 6,749 – 10,348 | 9,615 | 8,546 – 10, 348 | 7,536 | 6,749 – 8,568 |
| 3. ACRP Recapture Volume | 7,178 | 4,878 – 9,161 | 6,151 | 4,878 – 9,161 | 8,462 | 7,555 – 9,161 |

NOTE: CDRP bypasses and releases, infiltration into Pit F2, and ACRP recapture based on 18-years of historical hydrology and simulated future operation of CDRP from October 1995 to September 2013.

When Calaveras Reservoir storage capacity is considered, the target volume of water available for recapture is less than the potentially available volume. This is because the project's calculated recapture volume is limited by available storage in Calaveras Reservoir. For example, on a day when Calaveras Reservoir fills to capacity, the volume of bypassed and released water available for recapture is zero; the calculated water available for recapture starts accumulating again when Calaveras Reservoir storage recedes and there is unused storage capacity in the reservoir. Thus, the amount of water available for recapture on any given day is the lesser of the volume of water bypassed and released, or available (unused) storage volume in Calaveras Reservoir. Stated otherwise, at any time, the sum of water stored in Calaveras Reservoir and the volume of water available for recapture in Pit F2 would not exceed the total available capacity of the reservoir. The estimated volume of water proposed for recapture on an average annual basis is presented in Table 3-5, Row 3. This volume of bypassed and released water would be recaptured from Pit F2, and is equivalent to the volume of water that is the loss of yield to the SFPUC regional water system.

Water downstream of the bypass and release compliance points fills Pit F2 by natural infiltration. Other sources of water in the watershed also contribute to water entering Pit F2. Table 3-5, Row 2 presents the estimated portion of Pit F2 inflow from the bypasses and releases only. In addition to bypasses and releases, inflow to Pit F2 from other sources in the watershed includes contributions from the downstream watersheds below Calaveras and San Antonio Reservoirs as well as direct contributions from watersheds east of the quarry reach. Therefore, the total annual inflow to Pit F2 from all sources (i.e., infiltration of bypasses and releases plus other watershed sources) would be greater than the volume of water shown in Table 3-5, Row 2.

As shown on Table 3-5, the *average* annual volume of water proposed for recapture during the modeled period (Row 3, 18-year Hydrologic Period) is less than the *average* inflow from bypasses and releases during the same period (Row 2, 18-year Hydrologic Period). Likewise, during wet years, the *average* annual volume of water proposed for recapture (Row 3, Wet Year) is less than the *average* inflow from bypasses and releases (Row 2, Wet Year). However, this might not be the case during dry years; during these years, recapture operations would account for carryover released and bypassed water collected in Pit F2 during prior wet years, consistent with existing operations of Calaveras Reservoir storage. Thus, during dry years, similar to water storage operations at Calaveras Reservoir, the ACRP operations could recapture water previously stored in Pit F2 during wet years as well as a portion of the bypasses and releases from the current year, as reflected in Table 3-5 (Row 3, Dry Year Average is greater than Row 2, Dry Year Average).

On average, the total annual volume of water that infiltrates into Pit F2 would exceed the volume of water recaptured. This excess volume represents the portion of bypassed and released water that infiltrates Pit F2 but is not proposed for recapture, plus inflow to Pit F2 from other sources including contributions from the downstream watershed below Calaveras and San Antonio Reservoirs and direct accretions from watersheds east of the quarry reach.

### 3.6.1.2 Operating Parameters

Pumping from Pit F2 would generally take place between April and December. SFPUC plans to use four pumps on floating barges to pump water from Pit F2 directly to the SVWTP or San Antonio Reservoir. It is anticipated that, in most cases, the water withdrawn from Pit F2 would be conveyed to the SVWTP and thereby reduce the volume of water conveyed from Calaveras Reservoir to SVWTP, enabling the SFPUC to conserve water in Calaveras Reservoir and maintain the historical annual transfers from the Alameda Watershed system to the regional water system. The SFPUC would pump water from Pit F2 at a flow rate of approximately 30 cfs everyday over the pumping period, which is based on the minimum flow rate needed to operate the SVWTP.[40] If the recaptured water is conveyed to San Antonio Reservoir, the water would be used to fill the available storage at that reservoir and subsequently would be treated at the SVWTP for delivery to the SFPUC service area.[41] It is anticipated that on average, the ACRP would operate for approximately 121 days a year. The various pumping scenarios are described in Section 3.6.1.3 below.

In general, the SFPUC intends to operate Pit F2 within an upper and lower limit of water elevations in Pit F2, based on the relationship of water elevation to water volume. The operating elevations would range from 240 to 150 feet above msl; however, during periods of rare and extreme drought, it may be necessary to lower the water elevation in Pit F2 as low as 100 feet above msl. At its lowest point, the bottom of Pit F2 is roughly 10 feet above msl. SFPUC would manage water elevations in Pit F2 by using a water level sensor in Pit F2 to monitor water

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[40] If the flow rate from Pit F2 is less than 30 cfs (e.g., if one or more of the ACRP pumps are out of service), SFPUC would augment the inflow into SVWTP with another water supply source (i.e., water stored in San Antonio Reservoir or Calaveras Reservoir) to provide the minimum flow rate.

[41] San Francisco Public Utilities Commission (SFPUC), 2014a. Final Conceptual Engineering Report for Alameda Creek Recapture Project. Prepared by SFPUC Engineering Management Bureau. November 21, 2014

elevations.[42] **Figure 3-4** depicts the proposed normal operating scenario, showing the anticipated variation in water elevations in Pit F2 over the course of a water year. **Figure 3-5** shows the Pit F2 water depth-to-volume relationship developed from 2006 LIDAR data, which can be used to estimate the volume of water stored in the quarry pit based on the water level in the pit.

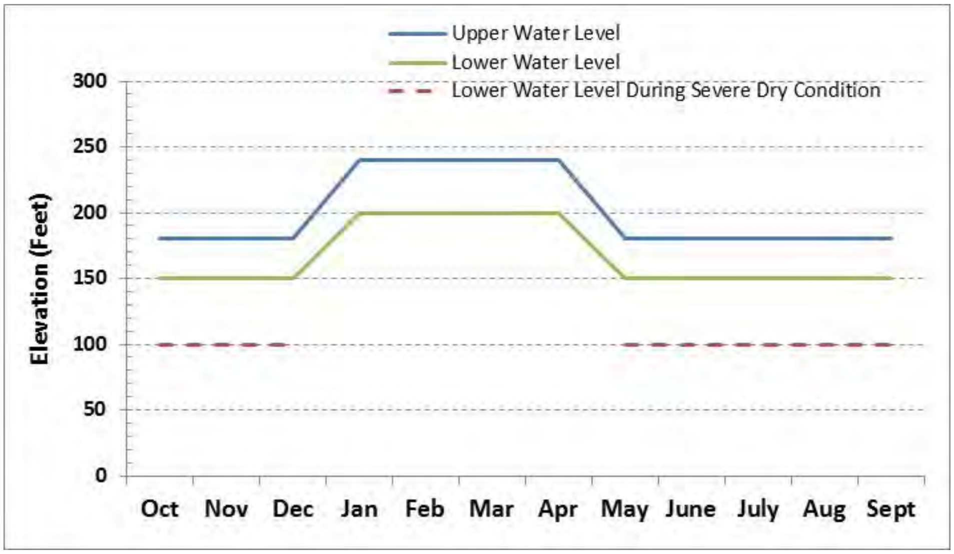

**Figure 3-4**
Proposed Operating Scenario

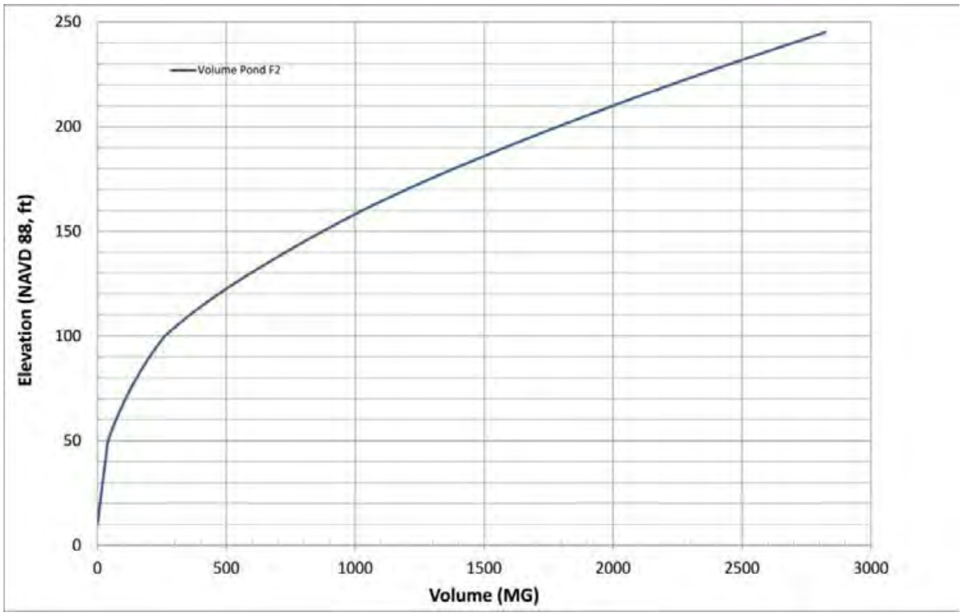

**Figure 3-5**
Pit F2 Water Elevation to Volume Relationship

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[42] SFPUC, 2014. *Final Conceptual Engineering Report for Alameda Creek Recapture Project.* Prepared by SFPUC Engineering Management Bureau. November 21, 2014.

To avoid the potential for instability of the quarry pit slopes, water levels in Pit F2 would be controlled in accordance with the recommendations presented in the geotechnical evaluation report prepared for the proposed project. The results of that analysis indicate the proposed normal operating drawdown condition (drawdown from 240 to 150 feet above msl) would be acceptable from a slope stability standpoint. However, below 150 feet above msl, the maximum rate of drawdown would need to be reduced from 30 cfs to about 5 cfs (about 3 inches per day or slower) to reduce the potential for deep-seated slope instability on the side slopes of Pit F2. This reduction in rate of drawdown between elevations 150 to 100 feet would be implemented immediately following the drawdown to elevation 150 feet. Pit F2 could be drawn down at a rate of 6 inches per day (or slower) below 150 feet, provided that the drawdown is first held at elevation 150 feet for at least 110 days. The SFPUC would use the drawdown rates recommended in the final geotechnical evaluation for ACRP.[43]

Any excess water in Pit F2 would be managed by the quarry operators as under existing conditions. If needed to create a dry work area for aggregate extraction, the quarry operators remove water that seeps into the active pits by pumping it into inactive pits, inactive areas of active pits, and other storage ponds. The quarry operators' general practice is to conserve water within the pits for use in aggregate processing and discharge water to the creek only when absolutely necessary.

### 3.6.1.3 Pumping Scenarios

The proposed project would provide the operational flexibility to allow pumping under three pumping scenarios.[44]

- **Transfer Water from Pit F2 to San Antonio Reservoir.** The SFPUC would transfer water from Pit F2 directly to San Antonio Reservoir using existing pipelines. No blending with other water sources would occur.
- **Transfer water from Pit F2 to SVWTP.** The SFPUC would transfer water from Pit F2 directly to the SVWTP using existing pipelines. No blending with other water sources would occur.
- **Transfer water from Pit F2 and San Antonio Reservoir to SVWTP.** The SFPUC would transfer water from Pit F2 directly to SVWTP while simultaneously transferring water from San Antonio Reservoir. The two sources would be blended at the existing connection point between the Sunol Pump Station Pipeline and San Antonio Pipeline.[45]

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[43] T&R/RYGG, 2014. *Final Geotechnical Evaluation, Alameda Creek Recapture Project, Sunol California. SFPUC Project No. CUW 352.01.* December 23, 2014.

[44] Since transfers from Calaveras Reservoir to SVWTP, and from the Hetch Hetchy system to SVWTP, occur under the existing condition through dedicated pumps and pipelines, they are not included in the list of new pumping scenarios but they do appear in the operating scenarios presented **Table 3-6**, below.

[45] SFPUC, 2014. *Alameda Creek Recapture Project Planning Phase – Conceptual Engineering Report, Alameda Creek Recapture Hydraulic Analysis*. September 2014.

Since the SVWTP and San Antonio Reservoir receive water from more than one source, five possible operating scenarios have been identified for transferring water from Pit F2 to the SFPUC water system in the Sunol Valley. The five operating scenarios are shown in **Table 3-6**, below. Scenarios 1 through 4 assume the water that is transferred from Pit F2 to SVWTP and San Antonio Reservoir would not be blended with other sources in the influent pipelines. (Although Scenarios 3 and 4 involve transfers from two different sources, the flows would not be blended in the influent pipelines because SVWTP has two inlet pipes and can receive water from two separate sources simultaneously.) Scenario 5 provides additional operational flexibility by allowing water from Pit F2 to be blended with water from San Antonio Reservoir and simultaneously transferred to SVWTP.

#### 3.6.1.4 Power Demand

Operational power demand for the ACRP is primarily associated with use of the pumps. The four 400 HP pumps would require 1,404 kilovolt-amps (KVA). In addition, the electrical control building would require general power to supply metering equipment, lighting, valve actuators, etc. The ACRP's electricity requirements were estimated to be approximately 16 KVA; therefore a total of 1,704 KVA, or 3,785,740 kilowatt-hours per year (estimated power demand plus 20 percent) power supply is assumed necessary for project operation, based on a recapture rate of approximately 7,200 acre-feet per year. As described above, either the HHWP Calaveras Substation (preferred option) or the PG&E Sunol Substation would provide electrical power for the proposed project.

### 3.6.2 Integration of ACRP with Operation of Existing Facilities in the SFPUC Water System in the Sunol Valley

SFPUC facility operators would utilize several existing facilities to pump, convey, store, and treat the water that is recaptured from Pit F2. These facilities include the San Antonio Pump Station, San Antonio Pipeline, San Antonio Backup Pipeline, Calaveras Pipeline, Sunol Pump Station Pipeline, San Antonio Reservoir, and SVWTP (see Figure 3-1, above). This section provides a brief overview of existing operations of the SFPUC water system in the Sunol Valley as they pertain to these facilities.

The SVWTP is used to treat water stored in Calaveras and San Antonio Reservoirs prior to delivery to customers. It is also used to treat quality-impaired Hetch Hetchy water on rare occasions when the Hetch Hetchy water does not meet SFPUC's domestic water supply permit conditions (e.g., there is increased turbidity). The SVWTP requires a minimum flow of 30 cfs to operate. The SVWTP has two inlet pipes and can receive water from two separate (i.e., unblended) sources simultaneously.

Water stored in Calaveras Reservoir is conveyed by gravity through the Calaveras Pipeline to the SVWTP for treatment. Water from Calaveras Reservoir can also be transferred to San Antonio Reservoir for storage via the Calaveras Pipeline and San Antonio Pipeline. Water stored in San Antonio Reservoir is conveyed via the San Antonio Pipeline to the SVWTP for treatment. The total volume of water released from Calaveras Reservoir and/or bypassed at ACDD will vary year

## TABLE 3-6
## PROPOSED OPERATING SCENARIOS

| Operating Scenario | Water Source | Destination | Objective of Transfer | Conveyance Pipelines | Pumped (P) or Gravity (G) mgd | Change from Existing Operations |
|---|---|---|---|---|---|---|
| **1** | Pit F2 | San Antonio Reservoir | Fill available storage at San Antonio Reservoir | Sunol Pump Station Pipeline & San Antonio Pipeline | 19.4 (P)* | These transfers are not possible under existing conditions. |
| **2** | Pit F2 | SVWTP | Reduce transfers from Calaveras Reservoir to SVWTP | Sunol Pump Station Pipeline, San Antonio Pipeline, & Calaveras Pipeline | 19.4 (P) | |
| **3** | Pit F2 | SVWTP | Reduce transfers from Calaveras Reservoir to SVWTP | Sunol Pump Station Pipeline, San Antonio Pipeline, & Calaveras Pipeline | 19.4 (P) | |
| | Calaveras Reservoir | | | Calaveras Pipeline | 90 (G) | No change. |
| **4** | Pit F2 | San Antonio Reservoir | Fill/maintain available storage at San Antonio Reservoir | Sunol Pump Station Pipeline & San Antonio Pipeline | 19.4 (P) | This transfer is not possible under existing conditions. |
| | Hetch Hetchy | SVWTP | | Calaveras Pipeline | 160 (P) | No change. |
| **5** | Pit F2 | SVWTP | Reduce transfers from Calaveras Reservoir to SVWTP | Sunol Pump Station Pipeline, San Antonio Pipeline, & Calaveras Pipeline | 179.4 (P)** | This transfer is not possible under existing conditions. |
| | San Antonio Reservoir | | | San Antonio Pipeline | | Under existing conditions, this transfer is pumped by the San Antonio Pump Station through the San Antonio Pipeline. |

NOTES:

* 19.4 mgd translates to 30 cfs

** 160 mgd from San Antonio Reservoir and 19.4 mgd from Pit F2

SOURCE: SFPUC, 2014. *Alameda Creek Recapture Project Existing Facilities and Operational Description*. November 2014.

to year in accordance with precipitation over the watershed, as specified in the CDRP instream flow permit requirements and the future operation of Calaveras Reservoir. The ACRP operations at Pit F2 would pump water from Pit F2 for delivery to the regional water system, as available and necessary to meet the WSIP water supply goals within the CCSF's existing water rights. With the ACRP in place, there would be no increase in the total amount of water that the SFPUC would withdraw from the Alameda Creek watershed compared to pre-2001 conditions; that is, under the proposed project, SFPUC's yield from the Alameda Creek watershed would be restored to its yield before the Department of Safety of Dams placed restrictions on the storage of water in Calaveras Reservoir.

The Alameda Siphons connects the Hetch Hetchy system with other SFPUC water facilities in the Sunol Valley and the regional distribution system. The Alameda Siphons begin at the Alameda East Portal (eastern-most terminus of the Hetch Hetchy Aqueduct), cross under the Sunol Valley and Alameda Creek, and end at the Alameda West Portal (eastern-most terminus of the Irvington Tunnel). At the Alameda Siphons, Hetch Hetchy water is blended with treated water from the SVWTP, as supplied by Calaveras and San Antonio Reservoirs, prior to delivery to regional customers. Under the ACRP, the SVWTP would also be supplied by water from Pit F2.

## 3.6.3 Maintenance Activities

SFPUC maintenance staff would visit the site to inspect the ACRP turbine pumps and barge floatation system as needed. Inspection activities could include: video inspections; photography; maintaining the pump packing box, lubricating pump bearings, checking for alignment, and checking for loose bolts. Access to the pumps would require a boat to transport maintenance staff and tools to the barges. The existing access road on the north end of the quarry pit within the pond would be used to launch the boat. Periodic servicing of the turbine pumps and motors would require a crane to retrieve them from the barge. The barges would need to be detached from the cluster and moved close to the shore. A crane would pull the motor and pump and place it on a flatbed truck to be transported to the repair shop. After the motors or pumps are repaired, they would be re-installed onto the barge. The barge would then be re-attached to the barge cluster.

An Emergency Response Plan would be prepared for the new facilities, which would include development of hazardous chemical management procedures and an emergency response plan to minimize risks from releases of hazardous materials related to their transport and use.

## 3.6.4 Staffing Requirements

It is anticipated that the ACRP would be unmanned and remotely monitored from the SVWTP. Existing SFPUC staff would periodically visit the ACRP facilities to conduct routine inspections and perform scheduled maintenance. Project implementation is not anticipated to result in an increase in SFPUC staffing requirements.

# 3.7 Required Permits and Approvals

The permits and authorizations likely to be required from federal, state, and local agencies are listed below.

## 3.7.1 Federal

- United States Fish and Wildlife Service (USFWS) – Federal Endangered Species Act consultation for potential effects to species during construction.

## 3.7.2 State

- California Department of Water Resources – Written approval for construction access within the South Bay Aqueduct right-of-way and overhead power line crossing.
- State Water Resources Control Board (SWRCB) Division of Drinking Water – Amendment to CCSF Regional Water System domestic water supply permit to utilize Pit F2 as a new source of water supply.
- California Regional Water Quality Control Board, San Francisco Bay Region – Construction General Permit coverage.
- California Department of Fish and Wildlife – California Endangered Species Act Section 2081 incidental take permit for potential effects to species during construction activities.
- Bay Area Air Quality Management District – Authority to construct permit.
- State Water Resources Control Board – Possibly a National Pollutant Discharge Elimination System (NPDES) permit for discharges of water pumped from quarry Pit F2 to San Antonio Reservoir.

## 3.7.3 Local

- San Francisco Planning Commission – Certification of the Final EIR and General Plan consistency findings.
- SFPUC – Project approval and adoption of CEQA Findings and a Mitigation Monitoring and Reporting Program.
- San Francisco Board of Supervisors –Appropriation of project funding.

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# CHAPTER 4

# Plans and Policies

**Sections**

## 4.1 Overview

Pursuant to the California Environmental Quality Act (CEQA) Guidelines Section 15125(d), this chapter describes land use plans and policies and the manner in which they apply to the Alameda Creek Recapture Project (ACRP or proposed project), and identifies the potential for the proposed project to conflict with those plans or policies adopted for the purpose of avoiding or mitigating environmental effects. Policy conflicts do not, in and of themselves, indicate a significant environmental effect within the context of CEQA environmental review, in that the intent of CEQA is to determine physical effects associated with a project. Many of the plans of the City and County of San Francisco (CCSF) and the other relevant jurisdictions contain policies that address multiple goals pertaining to different resource areas. To the extent that physical environmental impacts of a proposed project could result from conflicts with one of the goals related to a specific resource topic, such impacts are analyzed in this Environmental Impact Report (EIR) in the respective topical sections in Chapter 5.

Land use plans typically contain numerous policies emphasizing differing legislative goals, and an interpretation of consistency requires a balancing of all relevant policies. The board or commission that enacted the plan or policy determines the meaning of such policies and how individual projects satisfy those policies at the time it considers the approval of the project. Whether a project is consistent with particular plans will be determined at the time of project approval by the agency charged with making that consistency determination. In the case of this project, the Planning Department or Planning Commission will evaluate the proposed project in accordance with the *San Francisco General Plan* (General Plan). The San Francisco Public Utilities Commission (SFPUC) will evaluate the project in accordance with various adopted policies as discussed below. In each case, the approving or reviewing agency will consider any potential inconsistencies between the project and adopted plans or policies in the context of all applicable objectives and policies and will determine consistency based on a balancing of relevant policies as part of the decision process.

The plans and policies addressed in this chapter include the following:

> **City and County of San Francisco (CCSF).** San Francisco Charter, Section 4.112, San Francisco General Plan, Accountable Planning Initiative, San Francisco Floodplain Management Ordinance, and San Francisco Greenhouse Gas Reduction Ordinance.
>
> **San Francisco Public Utilities Commission (SFPUC).** Alameda Watershed Management Plan (Alameda WMP), Water Enterprise Environmental Stewardship Policy, and Right-of-Way Integrated Vegetation Management Policy.
>
> **Local Agencies.** Alameda County General Plan, East County Area Plan, Alameda Creek Watershed Management Planning, and Reclamation Plan for Surface Mining Permit-24.

The project is located entirely on extraterritorial lands owned by the CCSF in unincorporated Alameda County. There are no federal or state land use plans that directly apply to the proposed project, since the ACRP does not propose activities on land subject to federal or state jurisdiction. Federal and state land use plans and policies are not discussed further in this chapter.

Section 3.6 of Chapter 3, Project Description, describes the permits and approvals required for the project. Sections 5.2 through 5.19 of Chapter 5, Environmental Setting, Impacts, and Mitigation Measures, describe pertinent resource-specific plans (e.g., air quality management plans are discussed in Section 5.8, Air Quality; plans to reduce greenhouse gas emissions are discussed in Section 5.9, Greenhouse Gas Emissions; and water quality control plans are discussed in Section 5.16, Hydrology and Water Quality).

# 4.2 Plans and Policies Relevant to the ACRP

## 4.2.1 City and County of San Francisco Plans and Policies

The CCSF land use plans and policies are primarily applicable to projects within the jurisdictional boundaries of the city of San Francisco, although in some cases they may apply to projects outside of these boundaries. These plans include the San Francisco General Plan, which sets forth the city's comprehensive, long-term land use policy; the San Francisco Accountable Planning Initiative, which serves as the basis for resolving inconsistencies in the San Francisco General Plan; the San Francisco Floodplain Management Ordinance, which requires that structures in special flood hazard areas be protected against flood damage, and the San Francisco Greenhouse Gas Reduction Ordinance, which establish greenhouse gases (GHG) reduction emissions targets.

### 4.2.1.1 Extraterritorial Lands (San Francisco Charter, Section 4.112)

The CCSF has authority (San Francisco Charter, Section 4.112) over the management, use, and control of land it owns outside of the city, subject to the SFPUC's exclusive responsibility for the construction, management, use, and control of the city's water supplies and utilities (San Francisco

Charter, Section 8B.121).[1] Accordingly, the CCSF relies on its own plans and policies with respect to extraterritorial lands, as applicable.

Under California Government Code, Section 53090, the SFPUC receives intergovernmental immunity from the building and zoning laws of other cities and counties. The SFPUC seeks to work cooperatively with local jurisdictions where CCSF-owned facilities are sited outside of San Francisco to avoid conflicts with local building and zoning codes. Also, the SFPUC is required under Government Code Section 65402(b) to inform local governments of its plans to construct projects. The local governments have a 40-day review period to determine project consistency with their general plans. Under this requirement, the cities' or counties' determinations of consistency are advisory to the SFPUC rather than binding.

### 4.2.1.2 San Francisco General Plan

The San Francisco General Plan[2], as amended, sets forth the comprehensive, long-term land use policies for the CCSF. One of the basic goals of the general plan is "coordination of the growth and development of the city with the growth and development of adjoining cities and counties and of the San Francisco Bay Region." The general plan consists of ten issue-oriented plan elements: Air Quality, Arts, Commerce and Industry, Community Facilities, Community Safety, Environmental Protection, Housing, Recreation and Open Space, Transportation, and Urban Design. These elements set forth goals, policies, and objectives for the physical development of San Francisco. The proposed project would not obviously or substantially conflict with any General Plan goals, policies, or objectives. The compatibility of the proposed project with the General Plan goals, policies, and objectives that do not relate to physical and environmental issues will be considered by decision-makers as part of their assessment of whether to approve or disapprove the proposed project. Any potential conflicts identified as part of the process would not alter the physical environmental effects of the project.

### 4.2.1.3 Accountable Planning Initiative

In November 1986, the voters of San Francisco approved Proposition M, the Accountable Planning Initiative, which added Section 101.1 to the Planning Code to establish eight Priority Policies as a preamble to the San Francisco General Plan. The Priority Policies serve as the basis upon which inconsistencies in the general plan are resolved. The Priority Policies are as follows:

1. Neighborhood-serving retail uses shall be preserved and enhanced and future opportunities for resident employment in and ownership of such businesses enhanced.
2. Housing and neighborhood character shall be conserved and protected in order to preserve the cultural and economic diversity of the neighborhoods.
3. The City's supply of affordable housing shall be preserved and enhanced.

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[1] City and County of San Francisco (CCSF), 1996. Municipal Code - *1996 Charter.* Supp. No.1, September 2006.

[2] City and County of San Francisco (CCSF), 1988. *San Francisco General Plan*, 1988, as amended through 1996.

4. Commuter traffic shall not impede the Muni transit service or overburden streets or neighborhood parking.
5. Diverse economic base shall be maintained by protecting industrial and service sectors from displacement by commercial office development, and future opportunities for resident employment and ownership in these sectors be enhanced.
6. The City shall achieve the greatest possible preparedness to protect against injury and loss of life in an earthquake.
7. Landmarks and historic buildings shall be preserved.
8. Parks and open space and their access to sunlight and vistas shall be protected from development.

In accordance with the Accountable Planning Initiative, prior to issuing a permit for any project, or adopting legislation that requires environmental review under the CEQA, or adopting any zoning ordinance of development agreement, and before taking any action that requires a finding of consistency with the General Plan, the CCSF is required to make a determination regarding the consistency of the project with the Priority Policies. The only Priority Policy applicable to the ACRP is policy number 7 regarding historic resources, and as discussed in Section 5.5, Cultural Resources, the ACRP would not be inconsistent with this policy.

#### 4.2.1.4 San Francisco Floodplain Management Ordinance

The 2008 San Francisco Floodplain Management Ordinance, approved by San Francisco's mayor and Board of Supervisors as Chapter 2A, Article XX, Sections 2A.280-2A.285 of the City's Administrative Code, requires that new or substantially improved structures in special flood hazard areas be protected against flood damage, and prohibits uses that would increase flood risks. In general, the Ordinance requires the first floor of structures in flood zones to be constructed above the floodplain or be flood-proofed, and be consistent with applicable federal and state floodplain management regulations. The Ordinance applies to construction on CCSF-owned property located outside the boundaries of San Francisco.[3]

The proposed ACRP control building is located in a FEMA flood zone according to FEMA's mapping data, but the lowest elevation of the new building would be about 3 feet above the 1 percent-annual-chance-flood elevation of approximately 252 feet that was calculated by FEMA. SFPUC's on-ground land surveys show the ground elevation at the location of the new control building is higher than FEMA's flood elevation level. The control building could not be located outside of the flood plain due to the limited space, but based on the land surveys, the project does not require fill for construction of the control building or to maintain the existing site access

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[3] City and County of San Francisco (CCSF), Office of the City Administrator, 2016. *San Francisco Floodplain Management Program Fact Sheet*. Revised March 1, 2016.

roads.[4] Thus, because the control building would be constructed at an elevation above FEMA's flood elevation, the ACRP would not be inconsistent with this ordinance.

### 4.2.1.5 San Francisco Greenhouse Gas Reduction Ordinance

In May 2008, the City and County of San Francisco (CCSF) adopted Ordinance No. 81-08 amending the San Francisco Environment Code to establish greenhouse gases (GHG) emissions targets and departmental action plans and to authorize the San Francisco Department of the Environment to coordinate efforts to meet these targets.[5] The City ordinance establishes the following GHG emissions reduction limits and target dates by which to achieve them: determine 1990 Citywide GHG emissions by 2008, the baseline level, with reference to which target reductions are set; reduce GHG emissions by 25 percent below 1990 levels by 2017; reduce GHG emissions by 40 percent below 1990 levels by 2025; and reduce GHG emissions by 80 percent below 1990 levels by 2050. The City's GHG reduction targets are consistent with—in fact, more ambitious than—those set forth in Governor Brown's Executive Order B-30-15 and SB 32 by targeting a 40 percent reduction by 2025 rather than a 40 percent reduction by 2030. An analysis of potential project effects on global warming and GHGs is presented in Section 5.9, Greenhouse Gas Emissions, of this EIR.

## 4.2.2 SFPUC Plans and Policies

The SFPUC has adopted various plans and policies that direct its activities, including the Alameda Watershed Management Plan (WMP), the Water Enterprise Environmental Stewardship Policy, and Right-of-Way Integrated Vegetation Management Policy, all three of which are relevant to the ACRP and are described below.

### 4.2.2.1 Alameda Watershed Management Plan

The Alameda watershed encompasses 36,000 acres of CCSF-owned lands within the much larger hydrologic boundaries of the Alameda Creek watershed, including lands within the drainage areas of San Antonio and Calaveras Reservoirs as well as lands that drain to Alameda Creek in the Sunol Valley. The SFPUC adopted the Alameda WMP for the Alameda watershed to provide a policy framework for the SFPUC to make decisions about activities that are appropriate on watershed lands.[6] The Alameda WMP provides goals, policies, and management actions that address watershed activities and reflect the unique qualities of the watershed. The Alameda WMP is also intended for use by the SFPUC as watershed management implementation guidelines. Alameda watershed lands are managed by the SFPUC Natural Resources and Lands Management Division, Watershed Resource Management Section. All of the proposed project components are within the plan boundaries of the Alameda WMP.

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[4] Engineering Management Bureau, 2014. *Alameda Creek Recapture Project Conceptual Engineering Report.* November 21, 2014.

[5] City and County of San Francisco (CCSF), 2008 and 2010. *Strategies to Address Greenhouse Gas Emissions, Greenhouse Reduction Strategy. Appendix B: 2008 GHG Reduction Ordinance and applicable CEQA documentation.* November 2010.

[6] San Francisco Public Utilities Commission (SFPUC), 2001. *Final Alameda Watershed Management Plan*. April 2001.

As part of implementation of the Alameda WMP, the SFPUC reviews all plans, projects, and activities that occur within the Alameda watershed for conformity with the management plan and for compliance with environmental codes and regulations. To accomplish this, the SFPUC has established a project review team with members from various SFPUC departments as well as the City Attorney's office. Appropriate SFPUC personnel review proposals for new facilities, structures, roads, trails, projects, and leases or for improvements to existing facilities. Projects subject to this review include those that involve construction, digging or earthmoving, clearing, installation, use of hazardous materials, or other disturbance to watershed resources. In addition, projects that involve the issuance of new or revised leases and permits are subject to this review procedure.

The SFPUC considers water quality protection to be the first and foremost goal of the Alameda WMP. The goals and policies are organized around the primary goal of water quality protection and secondary goals pertaining to the local water supply, natural resources, watershed protection, land use compatibility, fiscal management, and public awareness. The primary and secondary goals of the Alameda WMP are listed below.

- ***Primary Goal***: Maintain and improve source water quality to protect public health and safety.
- ***Secondary Goals***:
  - Maximize water supply.
  - Preserve and enhance the ecological and cultural resources of the watershed.
  - Protect the watersheds, adjacent urban areas, and the public from fire and other safety hazards.
  - Continue existing compatible uses and provide opportunities for potential compatible uses on watershed lands, including educational, recreational, and scientific uses.
  - Provide a fiscal framework that balances financial resources, revenue-generating activities, and overall benefits and an administrative framework that allows implementation of the watershed management plans.
  - Enhance public awareness of water quality, water supply, conservation, and watershed protection issues.

The Sunol Valley Resources Management (SVRM) Element is part of the Alameda WMP. The goals and subgoals contained in the SVRM Element are incorporated into the goals and management actions set forth in the Alameda WMP. The SVRM Element addresses the integrated management of water resources, gravel mining resources, SFPUC facilities, cultural resources, agricultural resources, economic resources, park facilities, recreational resources, and fishery enhancement within the SFPUC Alameda watershed lands. The proposed project area is identified in the Alameda WMP and SVRM Element as future water storage for the SFPUC regional water system.[7]

While the proposed project could have adverse construction and/or operational impacts related to various environmental resources, all significant impacts would be reduced to a less-than-significant

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[7] San Francisco Public Utilities Commission (SFPUC), 1998. *Sunol Valley Resources Management Element*. November 1998.

level through the implementation of mitigation measures identified in Chapter 5, Environmental Setting, Impacts, and Mitigation Measures. Taken as a whole, the proposed project would not be inconsistent with the Alameda WMP.

#### 4.2.2.2 Water Enterprise Environmental Stewardship Policy

Adopted in June 2006, the Water Enterprise Environmental Stewardship Policy established the long-term management direction for CCSF-owned lands and natural resources affected by operation of the SFPUC regional water system within the Tuolumne River, Alameda Creek, and Peninsula watersheds.[8] It also addresses rights-of-way and properties in urban surroundings under SFPUC management. The policy includes the following:

- The SFPUC will proactively manage the watersheds under its responsibility in a manner that maintains the integrity of the natural resources, restores habitats for native species, and enhances ecosystem function.

- To the maximum extent practicable, the SFPUC will ensure that all operations of the SFPUC water system (including water diversion, storage, transport, and discharges of water); construction and maintenance of infrastructure; land management policies and practices; purchase and sale of watershed lands; and lease agreements for watershed lands protect and restore native species and the ecosystems that support them.

- The SFPUC will operate the SFPUC water system in a manner that protects and restores native fish and wildlife downstream of SFPUC dams and water diversions, within SFPUC reservoirs, and on SFPUC watershed lands.

- The SFPUC will actively monitor the health of terrestrial and aquatic habitats, both under SFPUC ownership and affected by SFPUC operations, in order to continually improve ecosystem health.

- The SFPUC will manage rights-of-way and properties in urban surroundings under its management in a manner that protects and restores habitat value where available and encourages community participation in decisions that significantly interrupt or alter current land use in these parcels.

Key implementation strategies of the Environmental Stewardship Policy include: implementation and update of the Alameda WMP; development of a conservation plan for the Alameda watershed; development of the Watershed and Environmental Improvement Program (WEIP),[9] which includes the Alameda watershed; and integration of the Environmental Stewardship Policy into the Water System Improvement Program (WSIP) and individual WSIP infrastructure projects, including the ACRP.

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[8] San Francisco Public Utilities Commission (SFPUC), 2006. *SFPUC Final Water Enterprise Environmental Stewardship Policy.* June 27, 2006.

[9] The purpose of the WEIP is to identify, prioritize, protect, and restore lands and natural resources in the vicinity of the SFPUC's regional water system and includes ecosystem and habitat protection, improvement, and restoration projects.

The proposed project could affect natural resources, habitats for native species, and ecosystem functions in the Alameda watershed. However, the implementation strategies of the Water Enterprise Environmental Stewardship Policy specifically require the integration of the policy into individual WSIP facility improvement projects such as the ACRP. As discussed in Sections 5.14, Terrestrial Biological and Fisheries Resources, and 5.16, Hydrology and Water Quality, potentially significant impacts on natural resources, habitats, or ecosystems could be mitigated to a less-than-significant level through mitigation measures identified in this EIR. Thus, the proposed project would not be inconsistent with the underlying goals of the Water Enterprise Environmental Stewardship Policy.

### 4.2.2.3 Right-of-Way Integrated Vegetation Management Policy

In February 2007, the SFPUC adopted the Right-of-Way Integrated Vegetation Management Policy to manage vegetation that poses a threat or hazard to the regional water system's operation, maintenance, and infrastructure throughout the SFPUC water distribution and collection systems. The roots of large woody vegetation can damage transmission pipelines by causing corrosion of the outer casements. Trees and other vegetation directly adjacent to pipelines can also make repairs and emergency and annual maintenance difficult, hazardous, and expensive, and can increase concerns for public safety. Fire danger within the SFPUC right-of-way is also an issue, as the SFPUC is required to comply with local fire ordinances by identifying, reducing, and managing existing vegetation to prevent potential disruption to fire protection services. Another objective of this plan is to reduce and eliminate, to the degree practicable, the use of herbicides on vegetation within the right-of-way. Specific elements of the Vegetation Management Policy address the management and removal of vegetation (including trees), annual grasses, and weeds within the SFPUC right-of-way and the management and removal of vegetation and trees on land leased or permitted by the SFPUC.[10]

Part of the overall goal of the Vegetation Management Policy is to manage vegetation that poses a threat or hazard to the regional water system's operation, maintenance, and infrastructure. Implementation of the ACRP would not result in vegetation removal along an existing SFPUC right-of-way, nor result in the future need for other entities to maintain vegetation within a SFPUC right-of-way. Impacts related to vegetation removal are discussed in Section 5.14, Terrestrial Biological and Fisheries Resources. Thus, the proposed project would not be inconsistent with the goals of the Vegetation Management Policy.

## 4.2.3 Alameda County Land Use Plans and Policies

The project is located entirely on extraterritorial lands owned by the CCSF in unincorporated Alameda County. This section describes the local land use policies of Alameda County that are relevant to the proposed project. The SFPUC is not legally bound by the land use plans and policies of Alameda County; however, these plans and policies are discussed to the extent that they provide pertinent land use planning information with respect to evaluating the project under CEQA.

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[10] San Francisco Public Utilities Commission (SFPUC), 2015. *Right-of-Way Integrated Vegetation Management Policy*. Amended January 2015.

The following aspects of the Alameda County General Plan and East County Area Plan are described as they relate to the proposed project:

> ***Building and Zoning Ordinances.*** Building and zoning ordinances are the most specific expressions of general plan goals, objectives, and policies. State law and judicial interpretations of state law (California Government Code Section 53090 et seq.) mutually exempt cities and counties from complying with each other's building and zoning ordinances. The SFPUC, which is part of the CCSF, is therefore exempt from complying with the building and zoning ordinances of other cities and counties (California Government Code Section 53091). State law also exempts public utilities and special-purpose local agencies (such as water districts) from complying with local building and zoning ordinances when locating or constructing facilities for the production, generation, storage, treatment, or transmission of water. Therefore, the facilities and improvements proposed under the ACRP are not subject to the building and zoning ordinances of Alameda County.
>
> ***Local Government Notification and Consistency Determination Requirements.*** California Government Code Section 65402(b) requires that the SFPUC inform cities and counties of its plans to construct projects or acquire or dispose of extraterritorial property within their jurisdictions. The local governments then have 40 days to determine whether the project is consistent with their general plans, although these consistency determinations are advisory to the SFPUC rather than binding. Prior to implementation of the ACRP, Alameda County would be notified pursuant to California Government Code Section 65402(b). Notwithstanding the above, where CCSF-owned facilities are sited outside of San Francisco, the SFPUC seeks to work cooperatively with local jurisdictions to avoid conflicts with local land use plans and building and zoning codes.

### 4.2.3.1 Alameda County General Plan and East County Area Plan

The Alameda County General Plan governs land use planning and development in unincorporated Alameda County. Alameda County divides its general plan into area plans and functional elements. Area plans address area-specific issues (i.e., land use, open space, circulation, noise, seismic hazards, public facilities and services) that affect both unincorporated and incorporated areas, but these plans have legal regulatory effect only within currently unincorporated areas. Functional elements address broader issues on a countywide basis and provide a comprehensive and consistent policy framework for the more specific area plans.

The East County Area Plan (ECAP) governs land use planning for eastern Alameda County.[11] The East County planning area, which includes the ACRP area, extends from the San Joaquin County line east to the city of Fremont boundary. The project area is within the county's unincorporated rural area, outside of the urban growth boundary. The ECAP designates land uses on SFPUC Alameda watershed lands as Resource Management, Water Management, and Parklands. The project area is designated as Water Management land. The Water Management designation permits watershed management, gravel quarries, agricultural uses, recreational uses, and habitat protection. Generally, this land use designation and pertinent policies of the ECAP that cover this part of the county discourage intensive development; discourage encroachment of

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[11] Alameda County Community Development Agency Planning Department. 2002. *East County Area Plan.* Modifications adopted by the Board May 2002.

urban uses and access roads; encourage preservation of cultural resources; and encourage protection of open space, agricultural land, visual features, and natural resources, specifically on SFPUC watershed lands. The ECAP supports interjurisdictional coordination among various landowners to carry out resource preservation and protection goals.

Overall, the ECAP seeks to protect environmental and human health and safety by incorporating measures to minimize exposure to excessive noise levels and air pollutants, and by designing and constructing critical facilities to reduce seismic hazards and service disruption. It is also the intent of the ECAP to discourage land use activities that adversely affect the watershed protection objectives and purposes of the SFPUC.

The proposed project's consistency with the land use policies of the Alameda County General Plan and ECAP has been addressed through an evaluation of the project's environmental impacts and identification of feasible measures to avoid or substantially lessen significant and potentially significant impacts. Such impacts and mitigations are discussed in the individual resource sections of Chapter 5, Environmental Setting, Impacts, and Mitigation Measures.

As described previously in Section 4.2.3, the ECAP designates the project area as Water Management land, which specifically allows activities related to watershed management on SFPUC Alameda watershed lands. The proposed project would not involve development of new land use activities on SFPUC watershed lands, except for facilities and activities related to water conveyance and maintenance. The ACRP would involve construction of mooring anchors, an electrical control building, electrical transformer, pipe manifold, valve vault, flow meter, and related facilities on CCSF-owned land that is currently leased to Hanson Aggregates; however, the project would not interfere or otherwise conflict with Hanson's mining operations. Active mining has been completed in quarry Pit F2, Pits F3-East, and F3-West, and these pits are now used for water management and storage by the quarry operator.

Overall, the ACRP would not be inconsistent with the objectives and policies of the Alameda County General Plan and ECAP. Implementation of the mitigation measures identified in Sections 5.2 through 5.19 (see specifically Section 5.14, Biological Resources) would avoid or reduce all significant impacts to a less-than-significant level. The proposed project would also protect the quality of life for the populations served by the SFPUC by increasing the reliability of the regional water system and maintaining a high-quality water supply.

### 4.2.3.2 Alameda Creek Watershed Management Planning

Multiple stakeholders in the Alameda Creek watershed area, including the SFPUC, Alameda County Water District, Alameda Creek Flood Control and Water Conservation District, Zone 7 Water Agency, East Bay Regional Park District, and various environmental interest groups, are involved in ongoing planning efforts to manage the Alameda Creek watershed. Although no specific plans have been adopted, planning efforts include the development of a comprehensive management plan for the watershed; the plan, which is being prepared in conjunction with the Alameda Creek Fisheries Restoration Workgroup, will focus on restoring steelhead to the Alameda Creek watershed. In

October 2006, 17 public agencies and nonprofit organizations[12] signed a formal agreement to collaborate on stream flow requirements for steelhead, other native fish and wildlife, and drinking water supplies.[13] This planning effort is discussed in Section 5.14, Biological Resources.

#### 4.2.3.3 Reclamation Plan for CA Mine ID #91-01-0013 (Surface Mining Permit 24)

Within the project area for the ACRP, Hanson Aggregates operates quarry Pits F2, F3-East and F3-West as part of the gravel mining operation authorized under Surface Mining Permit 24 (SMP-24). This permit was issued by Alameda County pursuant to the Alameda County Surface Mining Ordinance and the California Surface Mining and Reclamation Act. The Hansen Reclamation Plan for CA Mine ID #91-01-0013, Exhibit B-SMP-24 was approved by Board of Supervisors Resolution R-86-62 on January 28, 1986[14] for an aggregate mining operation. The mine has been reporting "active" with no production since 2007.[15] The Reclamation Plan identifies the long term use of the project area for water storage, and therefore the proposed project would not be inconsistent with this plan.

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[12] Participating organizations in the Alameda Creek Fisheries Restoration Workgroup include: the Alameda County Water District, Alameda County Flood Control and Water Conservation District, Alameda Creek Alliance, Coastal Conservancy, Zone 7, Pacific Gas and Electric Company, SFPUC, Alameda County Resource Conservation District, American Rivers, California Department of Fish and Game, East Bay Regional Park District, National Marine Fisheries Service, Natural Resources Defense Council, San Francisco Bay Regional Water Quality Control Board, U.S. Army Corps of Engineers, U.S. Natural Resources Conservation Service, and U.S. Fish and Wildlife Service.

[13] Alameda Creek Fisheries Restoration Workgroup, 2007. *Memorandum of Understanding (MOU). Revised June 7, 2007.*

[14] Bissel and Karn, Inc., 1986 *Hansen Reclamation Plan, Exhibit B-SMP-24, Mission Valley Rock Quarry, Sunol California.* Approved by Board of Supervisors Resolution R-86-62. January 28, 1986.

[15] Alameda Creek Fisheries Restoration Workgroup, 2007. *Memorandum of Understanding (MOU). Revised June 7, 2007.*

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# CHAPTER 5

# Environmental Setting, Impacts, and Mitigation Measures

## 5.1 Overview

Chapter 5 presents the project-level impact analysis for the Alameda Creek Recapture Project (ACRP or proposed project). For each environmental resource topic identified in Section 5.1.1, below, the environmental setting is described, the impacts of the ACRP on that resource topic are analyzed, and mitigation measures are prescribed to address significant impacts. This overview section describes the overall structure used in the individual Chapter 5 resource sections as well as the basic assumptions used in the impact analyses, including the scope of analysis, the baseline conditions used to analyze impacts, the categories of impact significance, and the assumptions for the cumulative impact analyses. As described in Chapter 2, this Environmental Impact Report (EIR) is tiered off of the Program EIR (PEIR) on the SFPUC Water System Improvement Program (WSIP) and, as a result, the systemwide water supply impacts and mitigation measures that were identified in the PEIR for the WSIP also apply to the ACRP. The WSIP systemwide water supply impacts and mitigation measures are presented in **Tables 5.1-1 and 5.1-2**, below.

### 5.1.1 Scope of Analysis

This chapter is organized into 19 sections by environmental resource topic, as follows:

| **Sections** | |
|---|---|
| 5.1 Overview | 5.11 Recreation (RE) |
| 5.2 Land Use (LU) | 5.12 Utilities and Service Systems (UT) |
| 5.3 Aesthetics (AE) | 5.13 Public Services (PS) |
| 5.4 Population and Housing (PH) | 5.14 Biological Resources (BI) |
| 5.5 Cultural Resources (CUL) | 5.15 Geology and Soils (GE) |
| 5.6 Transportation and Circulation (TR) | 5.16 Hydrology and Water Quality (HY) |
| 5.7 Noise and Vibration (NO) | 5.17 Hazards and Hazardous Materials (HZ) |
| 5.8 Air Quality (AQ) | 5.18 Mineral and Energy Resources (ME) |
| 5.9 Greenhouse Gas Emissions (GG) | 5.19 Agriculture and Forest Resources (AG) |
| 5.10 Wind and Shadow (WS) | |

Each environmental resource section in Chapter 5 contains the following elements, which are based on the requirements of the California Environmental Quality Act (CEQA):

- **Setting.** This subsection describes the existing physical environmental conditions in the vicinity of the project at an appropriate level of detail to allow the reader to understand the impact analysis for each resource topic.

- **Regulatory Framework.** This subsection describes the relevant laws and regulations that apply to protecting the environmental resources within the project area, and the governmental agencies responsible for enforcing those laws and regulations.

- **Impacts and Mitigation Measures.** This subsection evaluates the potential for the project to adversely affect the physical environment described in the setting.

  The significance criteria used to evaluate environmental impacts are defined at the beginning of each impact analysis subsection, followed by an explanation of how the significance criteria are applied in evaluating project impacts. The significance criteria used in this EIR are based on the San Francisco Planning Department's August 2015 Initial Study checklist, which is based on CEQA Guidelines Appendix G. To address the specific hydrologic issues pertinent to the ACRP, this EIR also considers additional significance criteria in Section 5.16, Hydrology and Water Quality, to address the potential for ACRP operations to affect downstream water users in a manner that would result in adverse environmental effects. The specific significance criteria used to evaluate environmental resource impacts are presented in each section of Chapter 5 before the discussion of impacts. The conclusion of each impact analysis is expressed in terms of impact significance. The categories of impact significance are defined in Section 5.1.3, below.

  This subsection also identifies mitigation measures for all significant impacts, consistent with the CEQA Guidelines (Section 15126.4[a][1]), which state that an EIR, "shall describe feasible measures which could minimize significant adverse impacts…."

  Each impact section is assigned a unique alphanumeric identifier that is comprised of that resource section's abbreviation and a number, with all impacts for that resource topic sequentially numbered. For example, land use impacts are indicated using the abbreviation "LU"; the first land use impact is Impact LU-1 and the second land use impact is Impact LU-2, etc. The mitigation measure(s) that correspond with the impact are identified with a "M" in front of the same alphanumeric code. For example, Mitigation Measure M-LU-1 addresses Impact LU-1 and Mitigation Measure M-LU-2 addresses Impact LU-2.

- **Cumulative Impacts and Mitigation Measures.** Cumulative impacts are discussed in each environmental resource section immediately following the project-level impact analysis. The analysis of cumulative impacts considers the effects of the proposed project together with those of other past, present, or reasonably foreseeable future projects proposed by the SFPUC or other entities. Cumulative impacts for each resource topic are evaluated based on the same setting, regulatory framework, and significance criteria as the project-level impacts. Additional mitigation measures are identified if the analysis determines that the ACRP's contribution to a cumulative impact is "cumulatively considerable" and therefore significant. Cumulative impacts are designated with a "C" in front of the resource code; for example, the cumulative land use impact is designated Impact C-LU. See Section 5.1.5, below, for further discussion of the approach to the cumulative impact analyses.

## 5.1.2 Baseline Conditions for Evaluation of Project Impacts

The CEQA Guidelines (Title 14, California Code of Regulations Section 15125) provide that, in most cases, the environmental conditions at the time of publication of the Notice of Preparation (NOP) of the EIR constitutes the appropriate baseline physical conditions by which the Lead Agency should evaluate project impacts. The baseline conditions for ACRP are described in the setting section of each Chapter 5 resource section. The impact analysis identifies the conditions that are anticipated to occur with implementation of the project and compares those conditions against the baseline conditions to determine if the project would result in a significant environmental impact. The impact significance determination is based on the significance criteria identified for that resource topic.

This EIR uses the physical conditions in the project area at the time of NOP publication (June 2015)—referred to as "existing conditions"—as the baseline conditions to evaluate all construction impacts and most operational impacts of the ACRP. However, the comparison of existing baseline conditions to conditions with the ACRP does not adequately capture the operational effects of the ACRP because the ACRP operation relies on implementation of instream flows as part of future operations under the Calaveras Dam Replacement project (CDRP). For the flow-dependent resources (e.g., fisheries), an adjusted baseline condition that assumes implementation of the CDRP — referred to as "with-CDRP conditions" — is used in the impact analysis for reasons explained below.

As described in Chapters 2 and 3 of this EIR, operation of the ACRP is predicated on the implementation of the CDRP instream flow schedules and future operation of Calaveras Reservoir. The impacts associated with the CDRP were evaluated in the CDRP EIR.[1] The SFPUC approved the CDRP,[2] and the CDRP is currently under construction. As part of CDRP operations, instream flow schedules will be conducted in accordance with the CDRP regulatory permit requirements.[3] In keeping with the spirit of the CDRP Biological Opinion and associated California Department of Fish and Wildlife (CDFW) permit requirements, the SFPUC will implement the instream flow schedules immediately upon completion of CDRP construction, regardless of the status of planned downstream fish passage improvement projects such as the Rubber Dam No. 1, BART Weir, and Related Fish Passage Improvements project, a joint project by Alameda County Flood Control and Water Conservation District (ACFCD) and Alameda County Water District (ACWD) that will remove downstream barriers to fish passage (see Section 5.1.5, below, for additional information regarding this project).

The existing hydrologic conditions do not reflect the conditions that will occur when the CDRP instream flow schedules are implemented. If the conditions that are anticipated to occur during

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[1] San Francisco Planning Department, 2011. *Final Environmental Impact Report for the San Francisco Public Utilities Commission Calaveras Dam Replacement Project*. San Francisco Planning Department File No. 2005.0161E, State Clearinghouse No. 2005102102. Certified January 27, 2011.

[2] San Francisco Public Utilities Commission, 2011. Public Utilities Commission City and County of San Francisco Resolution No. 11-0015. Adopted January 27, 2011.

[3] See Chapter 2, Introduction and Background, and Chapter 3, Project Description, which describe the instream flow schedules that are required by the CDRP's California Department of Fish and Game (CDFG) Streambed Alteration Agreement (CDFG, 2011) and National Marine Fisheries Service (NMFS) Biological Opinion (NMFS, 2011).

ACRP operations (i.e., both the CDRP and ACRP operating) are compared to the existing conditions (i.e., neither project operating), the comparison would show the combined flow-related changes caused by *both* the ACRP and CDRP operations. This comparison would make it difficult, if not impossible, to discern the project-specific effects of the ACRP from those of the CDRP. Since it is not possible to identify the severity of a flow-related impact or to substantiate the efficacy of flow-related mitigation measures for ACRP without first isolating the potential impacts of the ACRP, use of an alternate baseline is needed in specific cases. For fishery resources, and certain aspects of hydrology and terrestrial biological resources, the operational impacts of the ACRP cannot be fully discerned with use of the existing baseline conditions; therefore, the impact analysis and significance determinations for these operational impacts are based primarily on comparison of project effects to the with-CDRP conditions. The use of the with-CDRP baseline to assess these specific-operational impacts of the ACRP independent of the CDRP provides the public and decision-makers with information on the impacts of the ACRP itself.

As a result, where appropriate, this EIR uses two baseline conditions to evaluate the impacts of ACRP: (1) the existing conditions, which represent the physical conditions in the project vicinity at the time of publication of the ACRP NOP (June 2015); and (2) the "with-CDRP" conditions, which include the predicted hydrologic conditions in the project vicinity with implementation of the CDRP instream flow schedules.

In addition to comparing project impacts to existing conditions in most cases, this EIR also considers whether impacts that are not flow dependent would nevertheless be different under the with-CDRP conditions in the event the ACRP construction is delayed until up to two years after the CDRP goes into effect. For all environmental resource topics, the with-CDRP conditions are very similar, if not identical, to the existing conditions with respect to ACRP's construction impacts because with-CDRP conditions reflect changes in releases and bypasses to Alameda Creek, and ACRP construction would occur entirely outside of the Alameda Creek channel. For most environmental resource topics (i.e., land use, aesthetics, cultural resources, traffic, noise, recreation, air quality, GHGs, geology, hazards, utilities, etc.), the same is also true for operational impacts.

The setting discussions in the Chapter 5 environmental resource sections describe the relevant baseline conditions for each topic and, where applicable, discuss any anticipated differences between the existing conditions and with-CDRP conditions, and the approach to analysis sections describe the baseline used in the impact analysis.

## 5.1.3 Categories of Impact Significance

The categories used to designate impact significance are as follows:

- **No Impact (NI).** No adverse changes (or impacts) to the environment are expected.
- **Less-Than-Significant (LS).** Impact would not exceed the defined significance threshold, would not be a substantial adverse effect relative to the significance criteria, or would be eliminated or reduced to a less-than-significant level through compliance with existing local, state, and federal laws and regulations.

- **Less than Significant with Mitigation (LSM).** Impact would be reduced to a less-than-significant level through implementation of the identified mitigation measures.

- **Significant and Unavoidable (SU).** Impact would exceed the defined significance criteria and could not be eliminated or reduced to a less-than-significant level through compliance with existing local, state, and federal laws and regulations and for which there are no feasible mitigation measures.

- **Significant and Unavoidable with Mitigation (SUM).** Impact would exceed the defined significance criteria but could be reduced to some degree through compliance with existing local, state, and federal laws and regulations and/or implementation of all feasible mitigation measures, but cannot be reduced to a less-than-significant level.

In situations where the potential exists for an impact to occur, but not enough information (either project- or site-specific) is available to determine definitively whether or not a significant impact would occur, this EIR conservatively assumes the impact is significant.

## 5.1.4 WSIP Water Supply and Operations Strategy Impacts and Mitigation Measures

As discussed in Chapter 2, Introduction and Background, the proposed project, in addition to several other facility improvement projects, is a component of the SFPUC's Water System Improvement Program (WSIP). The Program EIR (PEIR),[4] which was certified by the San Francisco Planning Commission on October 30, 2008, addresses the potential environmental impacts of constructing and operating these facility improvement projects at a programmatic level of detail, including the programmatic impacts of the ACRP. The PEIR also addresses the impacts of the WSIP's system-wide water supply and operations strategy at a project-level of detail. Because the proposed ACRP is a component of the WSIP, it would also contribute to the WSIP's water supply and operations impacts.

The PEIR analyzed impacts related to water supply and system operations within the following geographic regions: the Tuolumne River watershed, the Alameda watershed, the Peninsula watershed, and the Westside Groundwater Basin. The PEIR also identified the cumulative effects of implementing the WSIP and associated changes in system operations in combination with other past, present, and reasonably foreseeable future projects within these four regions. It also discussed the potential effects of climate change and global warming on the predicted water supply and system operations impacts of the WSIP.

The PEIR concluded that the WSIP would result in changes in reservoir levels and associated changes in downstream flows in rivers and creeks in the three affected watersheds (Tuolumne River, Alameda, and Peninsula watersheds), potentially causing impacts on groundwater, water quality, fisheries, and terrestrial biological resources. The PEIR determined that, in the event water deliveries to customers (average annual) exceeded current levels, streamflow changes in the

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[4] The WSIP PEIR is available for public review at the San Francisco Planning Department, 1650 Mission Street, San Francisco, CA, 94103, and can be found on the San Francisco Planning Department's website at http://www.sfgov.org/planning/mea. The State Clearinghouse number for the WSIP PEIR is 2005092026.

Tuolumne River watershed could affect fisheries and terrestrial biological resources. In the Alameda watershed, the WSIP (which includes restoring the historical storage capacity of Calaveras Reservoir) could affect water levels in Calaveras and San Antonio Reservoirs; flow in Alameda, Calaveras, and San Antonio Creeks; and the fisheries and terrestrial biological resources of the reservoirs and creeks. In the Peninsula watershed, the WSIP (which includes restoring the historical storage capacity of Crystal Springs Reservoir) could affect water levels in Crystal Springs, San Andreas, and Pilarcitos Reservoirs; flow in lower San Mateo and Pilarcitos Creeks; and the fisheries and terrestrial biological resources of these reservoirs and creeks. In addition, the WSIP includes development of groundwater supplies in the North Westside Groundwater Basin and a conjunctive-use program in the South Westside Groundwater Basin that the PEIR identified could result in basin overdraft, seawater intrusion, and changes in the water levels of surface water bodies.

As stated above, the ACRP is a component of the WSIP and therefore would also contribute to the water supply and system operations impacts identified in the PEIR. **Tables 5.1-1** through **5.1-5** summarize the WSIP water supply and system operations impacts and the associated mitigation measures for each geographic region as presented in the PEIR. The reader is referred to the complete WSIP PEIR for a detailed explanation of these summary tables. Note that the significance determinations used in the PEIR are slightly different than those used in this EIR (see table footnotes in Tables 5.1-1 through 5.1-5).

In addition to water supply impacts and mitigation measures, the PEIR provides a program-level analysis of the impacts associated with WSIP facility improvement projects, including construction and operations impacts. This EIR addresses the same issues for the ACRP as were addressed in the PEIR, but at a project (rather than program) level of detail; it provides more project-specific and site-specific descriptions and analysis of project effects based on a more detailed project description and additional information about the project area. **Appendix WSIP** of this project-level EIR presents a comparison between the programmatic mitigation measures identified for the ACRP in the WSIP PEIR and the project-level mitigation measures identified for the ACRP in this EIR.

The PEIR also analyzed the growth-inducement impacts of the WSIP's systemwide operations. The proposed project, as a facility improvement project under the WSIP, would be a contributing factor in the growth-inducing potential of the WSIP and the associated indirect effects of growth. The growth-inducing impacts of the WSIP are discussed in Chapter 6, Other CEQA Issues, of this EIR.

This project-level EIR tiers from the WSIP PEIR and also incorporates by reference the relevant analyses of the PEIR with respect to the impacts and mitigation measures that apply to the ACRP. CEQA permits project sponsors to tier a project-level EIR from a program-level EIR in order to allow agencies to broadly consider the environmental effects of a series of related actions and/or policies, and then to conduct a more detailed examination of impacts in project-level EIRs. The ACRP was analyzed as part of the WSIP in the PEIR; however, this project-level EIR evaluates the actual project design, construction, and operation of the ACRP and provides more detailed information about the proposed project, its impacts, and project-specific mitigation measures. This EIR summarizes and incorporates by reference the WSIP PEIR's analysis of the impacts associated with the WSIP's water supply strategy, including the WSIP PEIR analysis and conclusions regarding growth-inducement impacts as well as impacts on the CCSF's regional water system watersheds.

## TABLE 5.1-1
## SUMMARY OF WSIP WATER SUPPLY IMPACTS AND MITIGATION MEASURES – TUOLUMNE RIVER SYSTEM AND DOWNSTREAM WATER BODIES

| Impact | Significance Determination | | | | | Mitigation Measures |
|---|---|---|---|---|---|---|
| | All Impacts (except Biological Resources) | Biological Resource Impacts | | | | |
| | | Sensitive Habitats | Key Special-Status Species | Other Species of Concern | Common Habitats and Species | |
| **STREAM FLOW** | | | | | | |
| **Impact 5.3.1-1:** Effects on flow along the Tuolumne River below O'Shaughnessy Dam. | LS | ▨ | ▨ | ▨ | ▨ | None required. |
| **Impact 5.3.1-2:** Effects on flow along Cherry Creek below Cherry Dam. | LS | ▨ | ▨ | ▨ | ▨ | None required. |
| **Impact 5.3.1-3:** Effects on flow along Eleanor Creek below Eleanor Dam. | LS | ▨ | ▨ | ▨ | ▨ | None required. |
| **Impact 5.3.1-4:** Effects on flow along the Tuolumne River below La Grange Dam. | LS | ▨ | ▨ | ▨ | ▨ | None required. |
| **Impact 5.3.1-5:** Effects on flow along the San Joaquin River and the Sacramento–San Joaquin Delta. | LS | ▨ | ▨ | ▨ | ▨ | None required. |
| **GEOMORPHOLOGY** | | | | | | |
| **Impact 5.3.2-1:** Effects on sediment transport and channel characteristics between O'Shaughnessy Dam and Don Pedro Reservoir. | LS | ▨ | ▨ | ▨ | ▨ | None required. |
| **Impact 5.3.2-2:** Effects on sediment transport and channel characteristics below La Grange Dam. | LS | ▨ | ▨ | ▨ | ▨ | None required. |

PEIR Significance Categories:
N/A = Not Applicable or no impact
LS = Less than Significant
PSM = Potentially Significant impact with Mitigation
SU = Significant and Unavoidable, even with mitigation
PSU = Potentially Significant and Unavoidable, even with mitigation

## TABLE 5.1-1 (Continued)
## SUMMARY OF WSIP WATER SUPPLY IMPACTS AND MITIGATION MEASURES – TUOLUMNE RIVER SYSTEM AND DOWNSTREAM WATER BODIES

| | **Significance Determination** | | | | | |
|---|---|---|---|---|---|---|
| | **All Impacts** (except Biological Resources) | **Biological Resource Impacts** | | | | |
| **Impact** | | **Sensitive Habitats** | **Key Special-Status Species** | **Other Species of Concern** | **Common Habitats and Species** | **Mitigation Measures** |
| **SURFACE WATER QUALITY** | | | | | | |
| **Impact 5.3.3-1:** Effects on water quality in Hetch Hetchy Reservoir and along the Tuolumne River below O'Shaughnessy Dam. | LS | ▨ | ▨ | ▨ | ▨ | None required. |
| **Impact 5.3.3-2:** Effects on water quality in Don Pedro Reservoir and along the Tuolumne River below La Grange Dam. | LS | ▨ | ▨ | ▨ | ▨ | None required. |
| **Impact 5.3.3-3:** Effects on water quality along the San Joaquin River and the Sacramento–San Joaquin Delta. | LS | ▨ | ▨ | ▨ | ▨ | None required. |
| **SURFACE WATER SUPPLIES** | | | | | | |
| **Impact 5.3.4-1:** Effects on Tuolumne River, San Joaquin River, and Stanislaus River water users. | LS | ▨ | ▨ | ▨ | ▨ | None required. |
| **Impact 5.3.4-2:** Effects on Delta water users. | LS | ▨ | ▨ | ▨ | ▨ | None required. |
| **GROUNDWATER** | | | | | | |
| **Impact 5.3.5-1:** Alteration of stream flows along the Tuolumne River, which could affect local groundwater recharge and groundwater levels. | LS | ▨ | ▨ | ▨ | ▨ | None required. |

PEIR Significance Categories:
N/A = Not Applicable or no impact
LS = Less than Significant
PSM = Potentially Significant impact with Mitigation
SU = Significant and Unavoidable, even with mitigation
PSU = Potentially Significant and Unavoidable, even with mitigation

## TABLE 5.1-1 (Continued)
## SUMMARY OF WSIP WATER SUPPLY IMPACTS AND MITIGATION MEASURES – TUOLUMNE RIVER SYSTEM AND DOWNSTREAM WATER BODIES

| Impact | Significance Determination | | | | | Mitigation Measures |
|---|---|---|---|---|---|---|
| | All Impacts (except Biological Resources) | Biological Resource Impacts | | | | |
| | | Sensitive Habitats | Key Special-Status Species | Other Species of Concern | Common Habitats and Species | |
| **GROUNDWATER (cont.)** | | | | | | |
| **Impact 5.3.5-2:** Alteration of stream flows along the Tuolumne River, which could affect local groundwater quality. | LS | | | | | None required. |
| **FISHERIES** | | | | | | |
| **Impact 5.3.6-1:** Effects on fishery resources in Hetch Hetchy Reservoir. | LS | | | | | None required. |
| **Impact 5.3.6-2:** Effects on fishery resources along the Tuolumne River between Hetch Hetchy Reservoir and Don Pedro Reservoir. | LS | | | | | None required. |
| **Impact 5.3.6-3:** Effects on fishery resources in Don Pedro Reservoir. | LS | | | | | None required. |
| **Impact 5.3.6-4:** Effects on fishery resources along the Tuolumne River below La Grange Dam. | LS when average annual deliveries from the watersheds are maintained at 265 million gallons per day (mgd) or less; PSM if deliveries exceed 265 mgd | | | | | **Measure 5.3.6-4a, Avoidance of Flow Changes by Reducing Demand for Don Pedro Reservoir Water:** The SFPUC will pursue a water transfer arrangement with the Modesto Irrigation District or Turlock Irrigation District and/or other water agencies to offset the WSIP's effects on water storage in Don Pedro Reservoir and minimize WSIP-induced changes in releases from La Grange Dam.<br>**If Measure 5.3.6-4a proves to be infeasible, the SFPUC will implement Measure 5.3.6-4b. |

PEIR Significance Categories:
N/A = Not Applicable or no impact
LS = Less than Significant
PSM = Potentially Significant impact with Mitigation
SU = Significant and Unavoidable, even with mitigation
PSU = Potentially Significant and Unavoidable, even with mitigation

## TABLE 5.1-1 (Continued)
## SUMMARY OF WSIP WATER SUPPLY IMPACTS AND MITIGATION MEASURES – TUOLUMNE RIVER SYSTEM AND DOWNSTREAM WATER BODIES

| | **Significance Determination** | | | | | |
|---|---|---|---|---|---|---|
| | | **Biological Resource Impacts** | | | | |
| **Impact** | **All Impacts** (except Biological Resources) | **Sensitive Habitats** | **Key Special-Status Species** | **Other Species of Concern** | **Common Habitats and Species** | **Mitigation Measures** |
| **FISHERIES (cont.)** | | | | | | |
| **Impact 5.3.6-4** (cont.) | | ▨ | ▨ | ▨ | ▨ | **Measure 5.3.6-4b, Fishery Habitat Enhancement:** The SFPUC will implement or fund one of two fishery habitat enhancement projects that are consistent with the Lower Tuolumne River Restoration Plan: augmentation of spawning gravel at three selected sites or the filling or isolation from the river of one of the existing inactive quarry pits. |
| **Impact 5.3.6-5:** Effects on fishery resources along the San Joaquin River. | LS | ▨ | ▨ | ▨ | ▨ | None required. |
| **TERRESTRIAL BIOLOGY** | | | | | | |
| **Impact 5.3.7-1:** Impacts on riparian habitat and related biological resources in Hetch Hetchy Reservoir and along the bedrock channel portions of the Tuolumne River from O'Shaughnessy Dam to Don Pedro Reservoir. | ▨ | LS | LS | LS | LS | None required. |
| **Impact 5.3.7-2:** Impacts on alluvial features that support meadow and riparian habitat along the Tuolumne River from O'Shaughnessy Dam to Don Pedro Reservoir. | ▨ | PSM | PSM | PSM | PSM | The SFPUC will implement Measure 5.3.7-2 to reduce adverse impacts on sensitive habitats, key special-status species, other species of concern, and common habitats and species to a less-than-significant level. |

PEIR Significance Categories:

| | |
|---|---|
| N/A = Not Applicable or no impact | SU = Significant and Unavoidable, even with mitigation |
| LS = Less than Significant | PSU = Potentially Significant and Unavoidable, even with mitigation |
| PSM = Potentially Significant impact with Mitigation | |

## TABLE 5.1-1 (Continued)
## SUMMARY OF WSIP WATER SUPPLY IMPACTS AND MITIGATION MEASURES – TUOLUMNE RIVER SYSTEM AND DOWNSTREAM WATER BODIES

| **Impact** | **Significance Determination** | | | | | **Mitigation Measures** |
|---|---|---|---|---|---|---|
| | **All Impacts** (except Biological Resources) | **Biological Resource Impacts** | | | | |
| | | **Sensitive Habitats** | **Key Special-Status Species** | **Other Species of Concern** | **Common Habitats and Species** | |
| **TERRESTRIAL BIOLOGY (cont.)** | | | | | | |
| **Impact 5.3.7-2** (cont.) | ▨ | | | | | **Measure 5.3.7-2, Controlled Releases to Recharge Groundwater in Streamside Meadows and Other Alluvial Deposits:** The SPPUC will manage releases to the Tuolumne River from Hetch Hetchy Reservoir during the spring with the goal of recharging groundwater that supports meadow and riparian habitat. The SFPUC will periodically survey meadow habitat to determine the efficacy of release management and will modify releases as necessary to sustain meadow habitat. |
| **Impact 5.3.7-3:** Impacts on biological resources in Lake Eleanor and along Eleanor Creek. | ▨ | LS | LS | LS | LS | None required. |
| **Impact 5.3.7-4:** Impacts on biological resources in Lake Lloyd and along Cherry Creek. | ▨ | LS | LS | LS | LS | None required. |
| **Impact 5.3.7-5:** Impacts on biological resources in Don Pedro Reservoir. | ▨ | LS | LS | LS | LS | None required. |

PEIR Significance Categories:
N/A = Not Applicable or no impact
LS = Less than Significant
PSM = Potentially Significant impact with Mitigation
SU = Significant and Unavoidable, even with mitigation
PSU = Potentially Significant and Unavoidable, even with mitigation

## TABLE 5.1-1 (Continued)
## SUMMARY OF WSIP WATER SUPPLY IMPACTS AND MITIGATION MEASURES – TUOLUMNE RIVER SYSTEM AND DOWNSTREAM WATER BODIES

| Impact | Significance Determination | | | | | Mitigation Measures |
|---|---|---|---|---|---|---|
| | All Impacts (except Biological Resources) | Biological Resource Impacts | | | | |
| | | Sensitive Habitats | Key Special-Status Species | Other Species of Concern | Common Habitats and Species | |
| **TERRESTRIAL BIOLOGY (cont.)** | | | | | | |
| **Impact 5.3.7-6:** Impacts on biological resources along the Tuolumne River below La Grange Dam. | ▨ | LS when average annual deliveries from the watersheds are maintained at 265 mgd or less; PSM if deliveries exceed 265 mgd | LS when average annual deliveries from the watersheds are maintained at 265 mgd or less; PSM if deliveries exceed 265 mgd | LS when average annual deliveries from the watersheds are maintained at 265 mgd or less; PSM if deliveries exceed 265 mgd | LS when average annual deliveries from the watersheds are maintained at 265 mgd or less; PSM if deliveries exceed 265 mgd | The SFPUC will implement Measures 5.3.6-4a or 5.3.7-6 to reduce adverse impacts on sensitive habitats, key special-status species, other species of concern, and common habitats and species to a less-than-significant level.<br>**Measure 5.3.6-4a, Avoidance of Flow Changes by Reducing Demand for Don Pedro Reservoir Water** – see description above.<br>**If Measure 5.3.6-4a proves to be infeasible, the SFPUC will implement Measure 5.3.7-6.<br>**Measure 5.3.7-6, Lower Tuolumne River Riparian Habitat Enhancement:** Consistent with the Lower Tuolumne River Restoration Plan, the SFPUC will protect and enhance 1 mile of riparian vegetation within the contemporary floodplain. |
| **Impact 5.3.7-7:** Conflicts with the provisions of adopted conservation plans or other approved biological resources plans for the Tuolumne Wild and Scenic River. | ▨ | LS | | | | None required. |

PEIR Significance Categories:

| | |
|---|---|
| ▨ N/A = Not Applicable or no impact | SU = Significant and Unavoidable, even with mitigation |
| LS = Less than Significant | PSU = Potentially Significant and Unavoidable, even with mitigation |
| PSM = Potentially Significant impact with Mitigation | |

## TABLE 5.1-1 (Continued)
## SUMMARY OF WSIP WATER SUPPLY IMPACTS AND MITIGATION MEASURES – TUOLUMNE RIVER SYSTEM AND DOWNSTREAM WATER BODIES

| Impact | Significance Determination | | | | | Mitigation Measures |
|---|---|---|---|---|---|---|
| | All Impacts (except Biological Resources) | Biological Resource Impacts | | | | |
| | | Sensitive Habitats | Key Special-Status Species | Other Species of Concern | Common Habitats and Species | |
| **RECREATIONAL AND VISUAL RESOURCES** | | | | | | |
| **Impact 5.3.8-1:** Effects on reservoir recreation due to changes in water system operations. | LS | | | | | None required. |
| **Impact 5.3.8-2:** Effects on river recreation due to changes in water system operations. | LS | | | | | None required. |
| **Impact 5.3.8-3:** Effects on the aesthetic values of the Tuolumne Wild and Scenic River. | LS | | | | | None required. |
| **ENERGY RESOURCES** | | | | | | |
| **Impact 5.3.9-1:** Effects on hydropower generation at facilities along the Tuolumne River. | B | | | | | None required. |

PEIR Significance Categories:
N/A = Not Applicable or no impact
LS = Less than Significant
PSM = Potentially Significant impact with Mitigation
SU = Significant and Unavoidable, even with mitigation
PSU = Potentially Significant and Unavoidable, even with mitigation

## TABLE 5.1-2
## SUMMARY OF WSIP WATER SUPPLY IMPACTS AND MITIGATION MEASURES – ALAMEDA CREEK WATERSHED

| | Significance Determination | | | | | Mitigation Measures |
|---|---|---|---|---|---|---|
| | | Biological Resource Impacts | | | | **[NOTE: Some of the mitigation measures presented in the Final EIR for the Calaveras Dam Replacement Project were superseded by the Biological Opinion and Streambed Alteration Agreement permit requirements.]**[a,b] |
| **Impact** | **All Impacts** (except Biological Resources) | **Sensitive Habitats** | **Key Special Status-Species** | **Other Species of Concern** | **Common Habitats and Species** | |
| **STREAM FLOW** | | | | | | |
| **Impact 5.4.1-1:** Effects on flow along Calaveras Creek below Calaveras Reservoir. | LS | | | | | None required. |
| **Impact 5.4.1-2:** Effects on flow along Alameda Creek below the diversion dam. | PSM[c]<br>**[NOTE: Subsequent to certification of the WSIP PEIR this determination was changed to LS.]** | | | | | **Measure 5.4.1-2, Diversion Tunnel Operation:** The SFPUC will implement operational criteria for the diversion dam requiring that water not needed to fill Calaveras Reservoir would be released to Alameda Creek below the diversion dam. **[NOTE: Because Impact 5.4.1-2 was determined to be LS subsequent to certification of the WSIP PEIR, this mitigation measure is no longer required for program implementation. Also, the Final CDRP EIR analyzed a variant that included operation of the diversion dam and tunnel consistent with the requirements of the Biological Opinion, so that basically, this mitigation measure was incorporated into the CDRP variant that was ultimately approved and is now under construction.]** |
| **Impact 5.4.1-3:** Effects in San Antonio Reservoir and along San Antonio Creek. | LS | | | | | None required. |
| **Impact 5.4.1-4:** Effects on flow along Alameda Creek below the confluence of San Antonio Creek. | LS | | | | | None required. |

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[a] National Marine Fisheries Service (NMFS), 2011. *Biological Opinion for Calaveras Dam Replacement Project in Alameda and Santa Clara Counties.* Tracking No. 2005/07436. March 5, 2011.

[b] California Department of Fish and Game (CDFG), 2011. *Streambed Alteration Agreement for Calaveras Dam Replacement Project.* Notification No. 1600-2010-0322-R3. June 28, 2011.

[c] Based on the best available information at that time, the PEIR made the conservative determination that the WSIP would result in a significant and unavoidable impact related to flow along Alameda Creek below the Alameda Creek Diversion Dam ("Alameda Creek Hydrologic Impact") (see PEIR Chapter 5, Section 5.4.1, Impact 5.4.1-2). Based upon more detailed site-specific data and evaluation, the project-level analysis presented in the Calaveras Dam Replacement Project EIR changed this PEIR impact determination to less than significant (San Francisco Planning Department, 2011a).

PEIR Significance Categories:

N/A = Not Applicable or no impact
LS = Less than Significant
PSM = Potentially Significant impact with Mitigation
SU = Significant and Unavoidable, even with mitigation
PSU = Potentially Significant and Unavoidable, even with mitigation

## TABLE 5.1-2 (Continued)
## SUMMARY OF WSIP WATER SUPPLY IMPACTS AND MITIGATION MEASURES – ALAMEDA CREEK WATERSHED

| Impact | Significance Determination | | | | | Mitigation Measures |
|---|---|---|---|---|---|---|
| | | Biological Resource Impacts | | | | |
| | **All Impacts** (except Biological Resources) | **Sensitive Habitats** | **Key Special Status-Species** | **Other Species of Concern** | **Common Habitats and Species** | |
| **GEOMORPHOLOGY** | | | | | | |
| **Impact 5.4.2-1:** Effects on channel formation and sediment transport along Calaveras Creek. | LS | ▨ | ▨ | ▨ | ▨ | None required. |
| **Impact 5.4.2-2:** Effects on channel formation and sediment transport along Alameda Creek downstream of the diversion dam and downstream of the San Antonio Creek confluence. | LS | ▨ | ▨ | ▨ | ▨ | None required. |
| **Impact 5.4.2-3:** Effects on channel formation and sediment transport along San Antonio Creek downstream of San Antonio Reservoir. | LS | ▨ | ▨ | ▨ | ▨ | None required. |
| **SURFACE WATER QUALITY** | | | | | | |
| **Impact 5.4.3-1:** Effects on water quality in Calaveras Reservoir. | LS | ▨ | ▨ | ▨ | ▨ | None required. |
| **Impact 5.4.3-2:** Effects on water quality in San Antonio Reservoir. | LS | ▨ | ▨ | ▨ | ▨ | None required. |
| **Impact 5.4.3-3:** Changes in water quality along Calaveras, San Antonio, and Alameda Creeks. | LS | ▨ | ▨ | ▨ | ▨ | None required. |
| **GROUNDWATER BODIES** | | | | | | |
| **Impact 5.4.4-1:** Changes in groundwater levels, flows, quality, and supplies. | LS | ▨ | ▨ | ▨ | ▨ | None required. |

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PSU = Potentially Significant and Unavoidable, even with mitigation

## TABLE 5.1-2 (Continued)
## SUMMARY OF WSIP WATER SUPPLY IMPACTS AND MITIGATION MEASURES – ALAMEDA CREEK WATERSHED

| Impact | Significance Determination | | | | | Mitigation Measures |
|---|---|---|---|---|---|---|
| | All Impacts (except Biological Resources) | Biological Resource Impacts | | | | |
| | | Sensitive Habitats | Key Special Status-Species | Other Species of Concern | Common Habitats and Species | |
| **FISHERIES** | | | | | | |
| **Impact 5.4.5-1:** Effects on fishery resources in Calaveras Reservoir. | B | | | | | None required. |
| **Impact 5.4.5-2:** Effects on fishery resources along Calaveras Creek below Calaveras Dam and along Alameda Creek below confluence with Calaveras Creek. | B | | | | | None required. |
| **Impact 5.4.5-3:** Effects on fishery resources along Alameda Creek downstream of Alameda Creek Diversion Dam. | PSM | | | | | **Measure 5.4.5-3a, Minimum Flows for Resident Trout in Alameda Creek:** The SFPUC will release a minimum flow of approximately 10 cubic feet per second from the diversion dam and monitor the effects of the release on resident trout spawning and egg incubation.<br>** If monitoring results for Measure 5.4.5-3a indicate the measure is unsuccessful, the SFPUC will implement Measure 5.4.5-3b.<br>**Measure 5.4.5-3b, Alameda Diversion Dam Restrictions or Fish Screens:** If after 10 years the minimum release does not sustain the resident trout population, the SFPUC will either increase releases from the diversion dam or install a fish passage barrier on the diversion tunnel.<br>**[NOTE: The Final CDRP EIR analyzed a variant that included operation of the diversion dam and tunnel consistent with the requirements of the Biological Opinion, so that basically, these mitigation measures were incorporated into the CDRP variant that was ultimately approved and is now under construction.]** |
| **Impact 5.4.5-4:** Effects on fishery resources in San Antonio Reservoir. | B | | | | | None required. |

PEIR Significance Categories:

| | |
|---|---|
| N/A = Not Applicable or no impact | SU = Significant and Unavoidable, even with mitigation |
| LS = Less than Significant | PSU = Potentially Significant and Unavoidable, even with mitigation |
| PSM = Potentially Significant impact with Mitigation | |

### TABLE 5.1-2 (Continued)
### SUMMARY OF WSIP WATER SUPPLY IMPACTS AND MITIGATION MEASURES – ALAMEDA CREEK WATERSHED

| | **Significance Determination** | | | | | |
|---|---|---|---|---|---|---|
| | | **Biological Resource Impacts** | | | | |
| **Impact** | **All Impacts** (except Biological Resources) | **Sensitive Habitats** | **Key Special Status-Species** | **Other Species of Concern** | **Common Habitats and Species** | **Mitigation Measures** |
| **FISHERIES (cont.)** | | | | | | |
| **Impact 5.4.5-5:** Effects on fishery resources along San Antonio Creek below San Antonio Reservoir. | LS | | | | | None required. |
| **Impact 5.4.5-6:** Effects on fishery resources along Alameda Creek below confluence with San Antonio Creek. | LS | | | | | None required. |
| **TERRESTRIAL BIOLOGY** | | | | | | |
| **Impact 5.4.6-1:** Effects on riparian habitat and related biological resources in Calaveras Reservoir. | | PSM | PSM | LS | LS | The SFPUC will implement Measure 5.4.6-1 to reduce adverse impacts on sensitive habitats and key special-status species to a less-than-significant level.<br>**Measure 5.4.6-1, Compensation for Impacts on Terrestrial Biological Resources:** The SFPUC will protect, restore, and enhance existing riparian habitat and/or create new habitat that compensates for WSIP-induced habitat losses at Calaveras Reservoir. Compensatory habitat may be provided as part of the SFPUC's Habitat Reserve Program. |
| Impact 5.4.6-2: Effects on riparian habitat and related biological resources along Alameda Creek, from below the diversion dam to the confluence with Calaveras Creek. | | LS | PSM | LS | N/A | The SFPUC will implement Measures 5.4.1-2 and 5.4.5-3a to reduce adverse impacts on key special-status species to a less-than-significant level.<br>Measure 5.4.1-2, Diversion Tunnel Operation – see description above.<br>Measure 5.4.5-3a, Minimum Flows for Resident Trout in Alameda Creek – see description above. |

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N/A = Not Applicable or no impact
LS = Less than Significant
PSM = Potentially Significant impact with Mitigation
SU = Significant and Unavoidable, even with mitigation
PSU = Potentially Significant and Unavoidable, even with mitigation

## TABLE 5.1-2 (Continued)
## SUMMARY OF WSIP WATER SUPPLY IMPACTS AND MITIGATION MEASURES – ALAMEDA CREEK WATERSHED

| | **Significance Determination** | | | | | |
|---|---|---|---|---|---|---|
| | | **Biological Resource Impacts** | | | | |
| **Impact** | **All Impacts** **(except Biological Resources)** | **Sensitive Habitats** | **Key Special Status-Species** | **Other Species of Concern** | **Common Habitats and Species** | **Mitigation Measures** |
| **TERRESTRIAL BIOLOGY (cont.)** | | | | | | |
| **Impact 5.4.6-3**: Effects on riparian habitat and related biological resources along Calaveras Creek, from Calaveras Reservoir to the confluence with Alameda Creek. | | LS | PSM | LS | LS | The SFPUC will implement Measure 5.4.6-3 to reduce adverse impacts on key special-status species to a less-than-significant level.<br>**Measure 5.4.6-3, Operational Procedures for Calaveras Dam Releases:** The SFPUC will manage releases from Calaveras Reservoir to mimic a more natural hydrologic regime in the creek for the benefit of terrestrial biological resources. The specifics of this mitigation measure will be determined as part of project-level CEQA review. |
| **Impact 5.4.6-4:** Effects on riparian habitat and related biological resources along Alameda Creek, from the confluence with Calaveras Creek to the confluence with San Antonio Creek. | | LS | PSM | LS | LS | The SFPUC will implement Measures 5.4.6-3 and 5.4.5-3a to reduce adverse impacts on key special-status species to a less-than-significant level.<br>**Measure 5.4.6-3, Operational Procedures for Calaveras Dam Releases** – see description above.<br>**Measure 5.4.5-3a, Minimum Flows for Resident Trout on Alameda Creek** – see description above. |
| **Impact 5.4.6-5:** Effects on riparian habitat and related biological resources in San Antonio Reservoir. | | LS | LS | LS | LS | None required. |
| **Impact 5.4.6-6:** Effects on riparian habitat and related biological resources along San Antonio Creek between Turner Dam and the confluence with Alameda Creek. | | LS | LS | LS | N/A | None required. |

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N/A = Not Applicable or no impact
LS = Less than Significant
PSM = Potentially Significant impact with Mitigation
SU = Significant and Unavoidable, even with mitigation
PSU = Potentially Significant and Unavoidable, even with mitigation

## TABLE 5.1-2 (Continued)
## SUMMARY OF WSIP WATER SUPPLY IMPACTS AND MITIGATION MEASURES – ALAMEDA CREEK WATERSHED

| Impact | Significance Determination | | | | | Mitigation Measures |
|---|---|---|---|---|---|---|
| | | Biological Resource Impacts | | | | |
| | All Impacts (except Biological Resources) | Sensitive Habitats | Key Special Status-Species | Other Species of Concern | Common Habitats and Species | |
| **TERRESTRIAL BIOLOGY (cont.)** | | | | | | |
| **Impact 5.4.6-7:** Effects on riparian habitat and related biological resources along Alameda Creek below the confluence with San Antonio Creek. | | LS | LS | LS | N/A | None required. |
| **Impact 5.4.6-8:** Conflicts with the provisions of adopted conservation plans or other approved biological resources plans. | | LS | | | | None required. |
| **RECREATIONAL AND VISUAL RESOURCES** | | | | | | |
| **Impact 5.4.7-1:** Effects on recreational facilities and/or activities. | LS | | | | | None required. |
| **Impact 5.4.7-2:** Visual effects on scenic resources or visual character of the water bodies. | LS | | | | | None required. |

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N/A = Not Applicable or no impact
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PSM = Potentially Significant impact with Mitigation
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PSU = Potentially Significant and Unavoidable, even with mitigation

## TABLE 5.1-3
## SUMMARY OF WSIP WATER SUPPLY IMPACTS AND MITIGATION MEASURES – PENINSULA WATERSHED

| | Significance Determination | | | | | **Mitigation Measures** **[NOTE: Some of the mitigation measures presented in the Final EIR for the Lower Crystal Springs Dam Replacement Project were superseded by the Biological Opinion and Streambed Alteration Agreement permit requirements.]** |
|---|---|---|---|---|---|---|
| | | **Biological Resource Impacts** | | | | |
| **Impact** | **All Impacts** (except Biological Resources) | **Sensitive Habitats** | **Key Special-Status Species** | **Other Species of Concern** | **Common Habitats and Species** | |
| **STREAM FLOW** | | | | | | |
| **Impact 5.5.1-1:** Effects on flow along San Mateo Creek. | LS | ▨ | ▨ | ▨ | ▨ | None required. |
| **Impact 5.5.1-2:** Effects on flow along Pilarcitos Creek. | LS | ▨ | ▨ | ▨ | ▨ | None required. |
| **GEOMORPHOLOGY** | | | | | | |
| **Impact 5.5.2-1:** Changes in sediment transport and channel morphology in the Peninsula watershed. | LS | ▨ | ▨ | ▨ | ▨ | None required. |
| **WATER QUALITY** | | | | | | |
| **Impact 5.5.3-1:** Effects on water quality in Crystal Springs Reservoir, San Andreas Reservoir, and San Mateo Creek. | LS | ▨ | ▨ | ▨ | ▨ | None required. |
| **Impact 5.5.3-2:** Effects on water quality in Pilarcitos Reservoir and along Pilarcitos Creek. | PSM | ▨ | ▨ | ▨ | ▨ | **Measure 5.5.3-2a, Low-head Pumping Station at Pilarcitos Reservoir:** The SFPUC will install a permanent low-head pumping station at Pilarcitos Reservoir that would enable the SFPUC to access and use an additional 350 acre-feet of water from Pilarcitos Reservoir. In years when the WSIP would cause releases from Pilarcitos Reservoir to Pilarcitos Creek to be reduced to reservoir inflow earlier in the summer than under the existing condition (about 25 percent of years in the hydrologic record), the SFPUC will use the pumping station to augment flow in Pilarcitos Creek with water from the reservoir. The pumping station will draw water from the cool pool of water below the thermocline during times when the reservoir is stratified. The pumping station outlet will be designed to ensure that water discharged to the creek is adequately aerated. |

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SU = Significant and Unavoidable, even with mitigation
PSU = Potentially Significant and Unavoidable, even with mitigation

## TABLE 5.1-3 (Continued)
## SUMMARY OF WSIP WATER SUPPLY IMPACTS AND MITIGATION MEASURES – PENINSULA WATERSHED

| | Significance Determination | | | | | |
|---|---|---|---|---|---|---|
| | | Biological Resource Impacts | | | | |
| **Impact** | **All Impacts** **(except Biological Resources)** | **Sensitive Habitats** | **Key Special-Status Species** | **Other Species of Concern** | **Common Habitats and Species** | **Mitigation Measures** |
| **WATER QUALITY (cont.)** | | | | | | |
| **Impact 5.5.3-2** (cont.) | | | | | | **Measure 5.5.3-2b, Aeration System at Pilarcitos Reservoir:** The SFPUC will install a permanent aeration system at Pilarcitos Reservoir. The SFPUC will operate the aeration system as necessary to avoid anoxic conditions and maintain good water quality conditions at the reservoir. |
| **GROUNDWATER** | | | | | | |
| **Impact 5.5.4-1:** Alteration of stream flows along Pilarcitos Creek, which could affect groundwater levels and water quality. | LS | | | | | None required. |
| **FISHERIES** | | | | | | |
| **Impact 5.5.5-1:** Effects on fishery resources in Crystal Springs Reservoir (Upper and Lower). | PSU | | | | | **Measure 5.5.5-1, Create New Spawning Habitat Above Crystal Springs Reservoir:** The SFPUC will survey the extent and quality of fish spawning habitat lost due to inundation and, if feasible, create new spawning habitat at a higher elevation. The specifics of this mitigation measure will be determined as part of project-level CEQA review. |
| **Impact 5.5.5-2:** Effects on fishery resources in San Andreas Reservoir. | LS | | | | | None required. |
| **Impact 5.5.5-3:** Effects on fishery resources along San Mateo Creek. | LS | | | | | None required. |
| **Impact 5.5.5-4:** Effects on fishery resources in Pilarcitos Reservoir. | PSM | | | | | **Measure 5.5.3-2b, Aeration System at Pilarcitos Reservoir** – see description above. |

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PSU = Potentially Significant and Unavoidable, even with mitigation

## TABLE 5.1-3 (Continued)
## SUMMARY OF WSIP WATER SUPPLY IMPACTS AND MITIGATION MEASURES – PENINSULA WATERSHED

| Impact | Significance Determination | | | | | Mitigation Measures |
|---|---|---|---|---|---|---|
| | | Biological Resource Impacts | | | | |
| | All Impacts (except Biological Resources) | Sensitive Habitats | Key Special-Status Species | Other Species of Concern | Common Habitats and Species | |
| **FISHERIES (cont.)** | | | | | | |
| **Impact 5.5.5-5:** Effects on fishery resources along Pilarcitos Creek below Pilarcitos Reservoir. | PSM[a]<br>**[NOTE: After certification of the WSIP PEIR, this determination was changed to LS.]** | | | | | **Measure 5.5.3-2a, Low-head Pumping Station at Pilarcitos Reservoir** – see description above.<br>**Measure 5.5.5-5, Establish Flow Criteria, Monitor and Augment Flow:** The SFPUC will develop a monitoring and operations plan for Stone Dam to ensure WSIP-related flow reductions downstream of Stone Dam do not impair steelhead passage and spawning during the winter months of normal and wetter hydrologic years. **[NOTE: Because Impact 5.5.5-5 was determined to be LS subsequent to certification of the WSIP PEIR, this mitigation measure is no longer required for program implementation.]** |
| **TERRESTRIAL BIOLOGY** | | | | | | |
| **Impact 5.5.6-1:** Impacts on biological resources in Upper and Lower Crystal Springs Reservoirs. | | PSM | PSM | PSM | PSM | The SFPUC will implement Measures 5.5.6-1a and 5.5.6-1b to reduce adverse impacts on sensitive habitats, key special-status species, other species of concern, and common habitats and species to a less-than-significant level. In addition, the SFPUC will implement Measure 5.5.6-1c to mitigate adverse impacts on key special-status plant species (i.e., fountain thistle) adapted to serpentine seeps. |

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[a] Based on the best available information at that time, the PEIR made the conservative determination that the WSIP could result in a significant and unavoidable impact on fishery resources in Crystal Springs Reservoir related to the inundation of spawning habitat upstream of the reservoir (see PEIR Chapter 5, Section 5.5.5, Impact 5.5.5-1). However, a review of updated, site-specific information developed following certification of the PEIR was incorporated into the project-level EIR for the Lower Crystal Springs Dam Improvements Project, which determined that impacts on fishery resources due to inundation effects would be less than significant (San Francisco Planning Department, 2010).

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SU = Significant and Unavoidable, even with mitigation
PSU = Potentially Significant and Unavoidable, even with mitigation

## TABLE 5.1-3 (Continued)
## SUMMARY OF WSIP WATER SUPPLY IMPACTS AND MITIGATION MEASURES – PENINSULA WATERSHED

| | Significance Determination | | | | | |
|---|---|---|---|---|---|---|
| | | Biological Resource Impacts | | | | |
| **Impact** | **All Impacts** (except Biological Resources) | **Sensitive Habitats** | **Key Special-Status Species** | **Other Species of Concern** | **Common Habitats and Species** | **Mitigation Measures** |
| **TERRESTRIAL BIOLOGY(cont.)** | | | | | | |
| **Impact 5.5.6-1** (cont.) | | | | | | **Measure 5.5.6-1a, Adaptive Management of Freshwater Marsh and Wetlands at Upper and Lower Crystal Springs Reservoirs:** The SFPUC will develop an adaptive management plan to minimize adverse effects of the WSIP-induced rise in average water levels, and the periodic drawdown of reservoir water levels for maintenance, on San Francisco garter snakes and California red-legged frogs.<br>**Measure 5.5.6-1b, Compensation for Impacts on Terrestrial Biological Resources:** The SFPUC will protect, restore, and enhance existing wetland and upland habitat and/or create new habitat that compensates for WSIP-induced habitat losses at Crystal Springs Reservoir. Compensatory habitat may be provided as part of the SFPUC's Habitat Reserve Program.<br>**Measure 5.5.6-1c, Compensation for Serpentine Seep-Related Special-Status Plants:** The SFPUC will protect, restore, and enhance existing habitat and/or create new habitat that compensates for WSIP-induced habitat losses for plant species adapted to serpentine seeps. |
| **Impact 5.5.6-2:** Impacts on biological resources in San Andreas Reservoir. | | LS | PSM | LS | LS | None required. |
| **Impact 5.5.6-3:** Impacts on biological resources along San Mateo Creek below Lower Crystal Springs Dam. | | LS | LS | LS | LS | None required. |
| **Impact 5.5.6-4:** Impacts on biological resources in Pilarcitos Reservoir. | | LS | PSM | LS | LS | **Measure 5.5.3-2c, Habitat Monitoring and Compensation:** The SFPUC will protect, restore, and enhance existing habitat and/or create new habitat that compensates for WSIP-induced habitat losses at Pilarcitos Reservoir. Compensatory habitat may be provided as part of the SFPUC's Habitat Reserve Program. |

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PSM = Potentially Significant impact with Mitigation
SU = Significant and Unavoidable, even with mitigation
PSU = Potentially Significant and Unavoidable, even with mitigation

## TABLE 5.1-3 (Continued)
## SUMMARY OF WSIP WATER SUPPLY IMPACTS AND MITIGATION MEASURES – PENINSULA WATERSHED

| Impact | Significance Determination | | | | | Mitigation Measures |
|---|---|---|---|---|---|---|
| | | Biological Resource Impacts | | | | |
| | **All Impacts** (except Biological Resources) | **Sensitive Habitats** | **Key Special-Status Species** | **Other Species of Concern** | **Common Habitats and Species** | |
| **TERRESTRIAL BIOLOGY(cont.)** | | | | | | |
| **Impact 5.5.6-5:** Impacts on biological resources along Pilarcitos Creek below Pilarcitos Reservoir. | | LS | LS | LS | LS | None required. |
| **Impact 5.5.6-6:** Impacts along Pilarcitos Creek below Stone Dam. | | LS | LS | LS | LS | None required. |
| **Impact 5.5.6-7:** Conflicts with the provisions of adopted conservation plans or other approved biological resource plans. | | LS | | | | None required. |
| **RECREATIONAL AND VISUAL RESOURCES** | | | | | | |
| **Impact 5.5.7-1:** Effects on recreational facilities and/or activities. | LS | | | | | None required. |
| **Impact 5.5.7-2:** Visual effects on scenic resources or the visual character of water bodies. | LS | | | | | None required. |

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## TABLE 5.1-4
## SUMMARY OF WSIP WATER SUPPLY IMPACTS AND MITIGATION MEASURES – WESTSIDE GROUNDWATER BASIN

| | Significance Determination | | |
|---|---|---|---|
| **Impact** | **North Westside Groundwater Basin** | **South Westside Groundwater Basin** | **Mitigation Measures** |
| **RECREATIONAL AND VISUAL RESOURCES** | | | |
| **Impact 5.6-1:** Basin overdraft due to pumping from the Westside Groundwater Basin. | PSM | LS | The SFPUC will implement Measure 5.6-1 to reduce adverse impacts on the North Westside Groundwater Basin to a less-than-significant level.<br>**Measure 5.6-1, Groundwater Monitoring to Determine Basin Safe Yield:** The SFPUC will continue ongoing groundwater and lake level monitoring programs to determine the safe yield of the North Westside Groundwater Basin in order to avoid overdraft and associated effects, including adverse effects on surface water features and seawater intrusion. |
| **Impact 5.6-2:** Changes in water levels in Lake Merced and other surface water features, including Pine Lake, due to decreased groundwater levels in the Westside Groundwater Basin. | PSM | N/A | The SFPUC will implement Measures 5.6-1 and 5.6-2 to reduce adverse impacts on the North Westside Groundwater Basin to a less-than-significant level.<br>**Measure 5.6-1, Groundwater Monitoring to Determine Basin Safe Yield** – see description above.<br>**Measure 5.6-2, Implementation of a Lake Level Management Plan:** The SFPUC will develop and implement a lake level management plan identifying strategies for altering pumping patterns or augmenting lake levels to maintain Lake Merced water levels within the desired long-term range. |
| **Impact 5.6-3:** Seawater intrusion due to decreased groundwater levels in the Westside Groundwater Basin. | PSM | LS | The SFPUC will implement Measure 5.6-1 to reduce adverse impacts on the North Westside Groundwater Basin to a less-than-significant level.<br>**Measure 5.6-1, Groundwater Monitoring to Determine Basin Safe Yield** – see description above. |
| **Impact 5.6-4:** Land subsidence due to decreased groundwater levels in the Westside Groundwater Basin if the historical low water levels are exceeded. | LS | LS | None required. |

PEIR Significance Categories:
N/A = Not Applicable or no impact
LS = Less than Significant
PSM = Potentially Significant impact with Mitigation
SU = Significant and Unavoidable, even with mitigation
PSU = Potentially Significant and Unavoidable, even with mitigation

## TABLE 5.1-4 (Continued)
## SUMMARY OF WSIP WATER SUPPLY IMPACTS AND MITIGATION MEASURES – WESTSIDE GROUNDWATER BASIN

| Impact | Significance Determination | | Mitigation Measures |
|---|---|---|---|
| | North Westside Groundwater Basin | South Westside Groundwater Basin | |
| **RECREATIONAL AND VISUAL RESOURCES (cont.)** | | | |
| **Impact 5.6-5:** Contamination of drinking water due to groundwater pumping in the Westside Groundwater Basin. | PSM | PSM | The SFPUC will implement Measure 5.6.5 to reduce adverse impacts on the North Westside and South Westside Groundwater Basins to a less-than-significant level.<br>**Measure 5.6-5, Drinking Water Source Assessments for Groundwater Wells:** The SFPUC will develop and implement a source water protection program for wells constructed under the Local and Regional Groundwater Projects that are considered vulnerable to contamination on the basis of the drinking water source assessment prepared in accordance with Department of Health Services regulations. |
| **Impact 5.6-6:** Drinking water contaminants above maximum contaminant levels and adverse effects of adding treated groundwater to the distribution system. | LS | LS | None required. |

<u>PEIR Significance Categories</u>:

| | |
|---|---|
| N/A = Not Applicable or no impact | SU = Significant and Unavoidable, even with mitigation |
| LS = Less than Significant | PSU = Potentially Significant and Unavoidable, even with mitigation |
| PSM = Potentially Significant impact with Mitigation | |

## TABLE 5.1-5
## SUMMARY OF WSIP WATER SUPPLY IMPACTS AND MITIGATION MEASURES – CUMULATIVE WATER SUPPLY

| | Cumulative Impact Significance Determination | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Cumulative Water Supply Impact** | **Hydrology** | **Geomorphology** | **Surface Water Quality** | **Groundwater** | **Fisheries** | **Terrestrial Biology** | **Recreational / Visual Quality** | **Mitigation Measures** |
| **Impact 5.7.2-1:** Tuolumne River – Hetch Hetchy Reservoir to Don Pedro Reservoir. | LS | LS | LS | LS | LS | LS | LS | None required. |
| **Impact 5.7.2-2:** Tuolumne River – Don Pedro Reservoir to the San Joaquin River. | LS | LS | LS | LS | LS | LS | LS | None required. |
| **Impact 5.7.2-3:** San Joaquin River, Stanislaus River, and the Delta. | LS | LS | LS | LS | LS | LS | LS | None required. |
| **Impact 5.7.3-1:** Alameda Creek watershed. | N/A | LS | LS | LS | LS | LS | LS | None required. |
| **Impact 5.7.4-1:** San Mateo Creek watershed. | LS | LS | LS | LS | LS | LS | LS | None required. |
| **Impact 5.7.4-2:** Pilarcitos Creek watershed. | LS | LS | LS | LS | LS | LS | LS | None required. |
| **Impact 5.7.5-1:** North Westside Groundwater Basin. | LS | | | | | | | None required. |
| **Impact 5.7.5-2:** South Westside Groundwater Basin. | LS | | | | | | | None required. |

NOTE: Significance determinations presented in this table assume implementation of all mitigation measures presented in WSIP PEIR Chapter 5, Section 5.6, and in PEIR Chapter 6.

PEIR Significance Categories:
N/A = Not Applicable or no impact
LS = Less than Significant
PSM = Potentially Significant impact with Mitigation
SU = Significant and Unavoidable, even with mitigation
PSU = Potentially Significant and Unavoidable, even with mitigation

## 5.1.5 Cumulative Impacts

Cumulative impacts, as defined in Section 15355 of the CEQA Guidelines, refer to two or more individual effects that, when taken together, are "considerable" or that compound or increase other environmental impacts. A cumulative impact from several projects is the change in the environment that would result from the incremental impact of the project when added to the impacts of other closely related past, present, or reasonably foreseeable future projects. Pertinent guidance for the analysis of cumulative impacts is provided in Section 15130 of the CEQA Guidelines:

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

A cumulative impact analysis for the individual resource topics is provided in each section of this chapter, immediately following the evaluation of direct project impacts and identified mitigation measures. As discussed above, cumulative impacts for each resource topic are presented at the end of each resource section in this chapter, and Chapter 6, Section 6.2, provides a summary of all of the project's cumulative impacts.

### 5.1.5.1 Approach to Cumulative Impact Analysis

CEQA Guidelines Section 15130(b)(1) provides two approaches to a cumulative impact analysis. Cumulative impacts can be determined based on: (1) a list of past, present, and probable future projects producing related or cumulative impacts, or (2) a summary of projections contained in a general plan or related planning document or in an adopted or certified environmental document that described or evaluated regional or area-wide conditions contributing to the cumulative impact. This cumulative analysis employs the list-based approach. The following factors were used to determine an appropriate list of cumulative projects to be considered:

- **Similar Environmental Impacts.** A relevant project would contribute to effects on resources also affected by the ACRP. A relevant future project is defined as one that is "reasonably foreseeable," such as a proposed project that has approved funding or for which an application has been filed with the approving agency.

- **Geographic Scope and Location.** A relevant project is located within the defined geographic scope for the cumulative effect.
- **Timing and Duration of Implementation.** Effects associated with activities for a relevant project (e.g., short-term construction or demolition, or long-term operations) would likely coincide in timing with the effects of the ACRP.

### *Similar Environmental Impacts*

Projects that are relevant to the cumulative analysis include those that could contribute incremental effects on the same environmental resources and would have similar environmental impacts to those discussed in this EIR. The cumulative impact analyses in Sections 5.2 through 5.19 of this chapter evaluate the cumulative impacts that could occur when the impacts of the ACRP are considered in combination with the impacts of other past, present, and reasonably foreseeable future projects, which have been or are subject to independent environmental review and consideration by the approving agencies. Consequently, it is possible that some of the reasonably foreseeable future projects will not be approved or will be modified prior to approval (e.g., as a result of the CEQA alternatives analysis process or permitting requirements). For the purpose of providing a conservative assessment of cumulative impacts, however, this cumulative impact analysis is premised on the approval and construction of all of the identified reasonably foreseeable projects, described in Section 5.1.5.2, below.

### *Geographic Scope and Location*

The geographic scope for the cumulative projects is described in each topical section of this chapter and is specific to the potentially affected resource. In general, the geographic scope includes the areas within and adjacent to the project area. However, the geographic scope for some resource topics can encompass a larger area, such as the greater Alameda Creek watershed for hydrological impacts, the regional roadway network for transportation impacts, or the regional air basin for air quality impacts.

### *Timing and Duration of Implementation*

Construction of the ACRP would span 18 months and is anticipated to commence in fall 2017 (refer to Section 3.4.11 in Chapter 3, Project Description) and be completed in spring 2019. For temporal impacts such as noise and traffic, cumulative effects from other projects are considered if the planned construction of those projects could overlap with ACRP construction or could occur immediately prior to or after construction of the ACRP and would affect the same environmental resources. Cumulative effects related to project operations are also considered if operation of the ACRP would affect the same resources as operation of other projects within the geographic scope of the cumulative impact.

## 5.1.5.2 List of Relevant Projects

**Table 5.1-6** lists the past, present, and reasonably foreseeable projects and activities within and near the project area and provides a brief description of the projects and their expected schedules. The table also identifies the areas of potential cumulative effects associated with each of the cumulative projects. **Figure 5.1-1** shows the general location of the cumulative projects. A cumulative impact analysis is presented for each resource topic in Sections 5.2 through 5.19. Chapter 6, Section 6.2, provides a summary of the cumulative impacts. The projects listed in Table 5.1-6 include projects proposed by the SFPUC and other entities that would potentially contribute to cumulative impacts when considered together with the ACRP, as well as projects that could change future conditions in the ACRP vicinity.

Cumulative projects that overlap geographically with the ACRP project area are shown in shaded rows in Table 5.1-6; projects that could potentially be constructed concurrently with the ACRP are shown in **bold text**. As indicated in Table 5.1-6, the only foreseeable future project that overlaps geographically with the ACRP project area *and* could potentially be constructed concurrently with the ACRP is the PG&E Line 107 Retirement project (cumulative project 16). In addition, the timing of construction for three other projects (cumulative projects 1, 10, and 15) could also overlap with that of the ACRP; however, these three projects would not overlap geographically. In addition to the PG&E Line 107 Retirement project (cumulative project 16), four completed SFPUC projects (cumulative projects 2, 3, 4, and 5) overlap geographically with the ACRP project area.

Cumulative projects that are expected to alter conditions along Alameda Creek in the vicinity of the ACRP area are discussed in greater detail below. However, of the five projects discussed below, only the CDRP affects the baseline conditions that are used to evaluate impacts to flow-dependent resources (fishery resources, and certain aspects of hydrology and water quality and terrestrial biological resources) in this EIR. The other four projects have an indeterminate implementation date and thus are analyzed under cumulative impacts only.

The list of projects was developed through review of available information on the Alameda County and San Francisco Planning Departments website and review of quarterly SFPUC reports regarding the status of SFPUC WSIP projects in the Sunol Valley. The information reviewed include the following:

- San Francisco Planning Department, 2008. *Alameda Siphons Seismic Reliability Upgrade Project Initial Study/Mitigated Negative Declaration*, San Francisco Planning Department File No. 2006.0776E. May 2008;
- San Francisco Planning Department, 2009. *New Irvington Tunnel Final Environmental Impact Report*, San Francisco Planning Department File No. 2005.0162E, State Clearinghouse No. 2006092085. Certified November 5, 2009;
- San Francisco Planning Department, 2009. *Sunol Valley Water Treatment Plant Expansion and Treated Water Reservoir Final Environmental Impact Report*, San Francisco Planning Department File No. 2006.0137E, State Clearinghouse No. 2007082014. December 3, 2009;
- SFPUC and Oliver De Silva, *Final Quarry Lease between the City and County of San Francisco and Oliver De Silva, Inc*. December 30, 2009), including provisions for the proposed expansion of the Surface Mining Permit 30 (SMP-30) area;
- San Francisco Planning Department, 2011. *Calaveras Dam Replacement Project Final Environmental Impact Report*, San Francisco Planning Department File No. 2005.016E, State Clearinghouse No. 2005102102. Certified January 27, 2011;

## TABLE 5.1-6
## PROJECTS CONSIDERED IN THE CUMULATIVE IMPACT ANALYSIS

| Project No. | Project Name (Jurisdiction) | Project Description | Potential Cumulative Topics | Geographic Overlap / Construction Schedule Overlap with ACRP | Estimated Construction Schedule |
|---|---|---|---|---|---|
| *SFPUC Projects* | | | | | |
| **1** | **Calaveras Dam Replacement Project (CDRP)**<br>**(SFPUC)** | **The project provides for the planning, design, and construction of a replacement dam at Calaveras Reservoir to meet seismic safety requirements. The new dam will restore the reservoir 's storage capacity to its original level (96,850 acre-feet) and has been designed to accommodate a potential enlargement of the dam in the future. The project includes the following improvements:**<br>• **Regrading of the existing dam and construction of a new earth and rockfill dam**<br>• **Replacement of the existing spillway, stilling basin, and intake tower to increase seismic safety and improve operations and maintenance**<br>• **Installation of new outlet valves at the base of the dam for fishery releases and installation of fish screens on the existing adits**<br>• **Construction of a fish screen on the Alameda Creek Diversion Tunnel, and a fish ladder around the Alameda Creek Diversion Dam**<br>• **New or rehabilitated outlet works**<br>• **Electrical distribution line upgrade between Milpitas and Calaveras Dam**<br>• **Long-term implementation of minimum in-stream flow schedules for Alameda Creek below the Alameda Creek Diversion Dam and for Calaveras Creek below Calaveras Dam**<br>• **Habitat creation and restoration actions on City and County of San Francisco (CCSF) lands that are zoned for agricultural uses and/or leased for grazing purposes** | **Construction impacts related to traffic, cultural resources, air quality, and biological resources. (Note: Cumulative operational impacts for hydrology and water quality and fisheries and terrestrial biological resources are accounted for in the project impact analysis, which incorporates with-CDRP conditions.)** | **The construction schedule could overlap with that of the ACRP.** | **Ongoing through spring 2019.**[9] |

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[9] San Francisco Public Utilities Commission (SFPUC), Calaveras Dam Replacement Project (WSIP) Spring 2015 Project Update. Available online at http://sfwater.org/bids/projectDetail.aspx?prj_id=141. Accessed June 11, 2015.

Shaded rows = Projects that overlap geographically with the ACRP project area.
**Bold text** = Projects that could potentially be constructed concurrently with the ACRP.

## TABLE 5.1-6 (Continued)
## PROJECTS CONSIDERED IN THE CUMULATIVE IMPACT ANALYSIS

| Project No. | Project Name (Jurisdiction) | Project Description | Potential Cumulative Impacts | Potentially Affected Project Components/ Areas of Overlap | Estimated Construction Schedule |
|---|---|---|---|---|---|
| ***SFPUC Projects (cont.)*** | | | | | |
| 2 | San Antonio Backup Pipeline<br>(SFPUC) | The San Antonio Backup Pipeline (SABPL) project constructed several new facilities and improvements to provide reliable conveyance capacity for planned and emergency discharges of Hetch Hetchy water out of the SFPUC regional water system under future flow conditions. The SABPL project also provides increased operational flexibility and delivery reliability during emergencies and planned maintenance activities. The SABPL project included the following facility components:<br>• A 7,000-foot-long backup pipeline (the San Antonio Backup Pipeline)<br>• Discharge facility at Pit F3-East, including two submersible high-pressure pumps mounted to the concrete splash pad of the new discharge facility<br>• New chemical facility for dechlorination and pH adjustment<br>• Cutoff wall around Pit F3-East<br>• Dewatering facilities and related equipment<br>• Other improvements including Supervisory Control and Data Acquisition (SCADA) transmitters<br>• Demolition and removal of a residential-style non-historic building and shed located east of Pit F3-East. | Aesthetics, land use, traffic, noise, recreation, cultural resources, air quality, utilities and service systems, biological resources, topsoil, hydrology and water quality, hazardous materials, and energy resources | The SABPL project overlaps geographically with the ACRP project area, including use of the Permanent Spoils Site B as well as some of the same staging areas. | Completed 2015.[10] |

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[10] San Francisco Public Utilities Commission (SFPUC), WSIP Regional Projects Quarterly Report, 3rd Quarter / Fiscal Year 2014-2015. May 5, 2015.

▨ Shaded rows = Projects that overlap geographically with the ACRP project area.
**Bold text** = Projects that could potentially be constructed concurrently with the ACRP.

### TABLE 5.1-6 (Continued)
### PROJECTS CONSIDERED IN THE CUMULATIVE IMPACT ANALYSIS

| Project No. | Project Name (Jurisdiction) | Project Description | Potential Cumulative Impacts | Potentially Affected Project Components/ Areas of Overlap | Estimated Construction Schedule |
|---|---|---|---|---|---|
| ***SFPUC Projects (cont.)*** | | | | | |
| 3 | Alameda Siphons Seismic Reliability Upgrade<br>(SFPUC) | The Alameda Siphons project area extended approximately 3,000 feet from the Alameda East Portal across the Calaveras fault and from Alameda Creek to the Alameda West Portal. The project includes:<br>• A new siphon (Alameda Siphon No. 4) comprised of a 66-inch-diameter welded-steel pipeline placed within a 310-foot-long, seismically designed trench; thicker-walled pipe in the fault rupture zone; and a tunnel crossing under Alameda Creek. Alameda Siphon No. 4 connected with the Coast Range Tunnel near the Alameda East Portal.<br>• Seismic reinforcement of Alameda Siphon No. 2 with 300 feet of engineered foundation treatment at the Calaveras fault crossing<br>• Seismic upgrades and improvements to vaults and valve houses at the Alameda East Portal, and a new connection to the Coast Range Tunnel<br>• Replacement and extension of the Alameda East Portal Overflow Pipeline and installation of a new outlet structure at the southern end of quarry Pit F6 for discharges of water through the Alameda East Portal<br>Straightening of Calaveras Road in the vicinity of the Alameda Siphons, improvements to existing access roads, a new access road along the north side of Alameda Siphon No. 4, and retrofit of the bridges across Alameda Creek near the Alameda West Portal.[11] | Aesthetics, biological resources. | Both projects include the permanent placement of spoils at Permanent Spoils Site B. | Completed December 2011.[12] |

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[11] San Francisco Planning Department, Initial Study/Mitigated Negative Declaration, SFPUC Alameda Siphons Seismic Reliability Upgrade Project, San Francisco Planning Department File No. 2006.0776E. May 2008.

[12] San Francisco Public Utilities Commission (SFPUC), WSIP Regional Projects Quarterly Report, 3rd Quarter / Fiscal Year 2014-2015. May 5, 2015.

Shaded rows = Projects that overlap geographically with the ACRP project area.
**Bold text** = Projects that could potentially be constructed concurrently with the ACRP.

## TABLE 5.1-6 (Continued)
## PROJECTS CONSIDERED IN THE CUMULATIVE IMPACT ANALYSIS

| Project No. | Project Name (Jurisdiction) | Project Description | Potential Cumulative Impacts | Potentially Affected Project Components/ Areas of Overlap | Estimated Construction Schedule |
|---|---|---|---|---|---|
| *SFPUC Projects (cont.)* | | | | | |
| 4 | New Irvington Tunnel<br>(SFPUC) | The New Irvington Tunnel (NIT) project constructed a new tunnel parallel to and just south of the old Irvington Tunnel to convey water from the Hetch Hetchy system and the Sunol Valley Water Treatment Plant (SVWTP) to the Bay Area. The project included the following components:<br>• A new 18,660-foot-long, 8.5-foot-diameter tunnel<br>• A new portal at the east end adjacent to the existing Alameda West Portal in the Sunol Valley with connections to the existing and proposed Alameda Siphons<br>• A new portal in Fremont at the west end of the new tunnel, adjacent to the existing Irvington Portal, with connections to Bay Division Pipeline Nos. 1, 2, 3, 4, and 5.<br>Excess spoils generated during project construction were placed at Permanent Spoils Site A.[13,14] | Aesthetics, biological resources, agricultural resources. | Both projects include the permanent placement of spoils at Permanent Spoils Sites A. | Completed 2015.[15] |
| 5 | SVWTP Expansion and Treated Water Reservoir<br>(SFPUC) | The SVWTP Expansion and Treated Water Reservoir (SVWTP Expansion) project includes the following improvements:<br>• Increased the sustainable capacity of the SVWTP to 160 million gallons per day by adding a new flocculation/sedimentation basin and by retrofitting some of the existing filters. A new 17.5-million-gallon circular treated water reservoir and a new 3.5-million-gallon rectangular chlorine contact tank was constructed in the northern portion of the existing plant site. Roughly 350,000 cubic yards of excavated material was moved and permanently placed in other areas within the property. | Aesthetics, biological resources. | None. | Completed May 2013.[16] |

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[13] San Francisco Planning Department, Final Environmental Impact Report for the San Francisco Public Utilities Commission New Irvington Tunnel Project, San Francisco Planning Department File No. 2005.0162E, State Clearinghouse No. 2006092085. November 5, 2009.

[14] San Francisco Public Utilities Commission (SFPUC), New Irvington Tunnel, Project-At-A-Glance. Available online at http://216.119.104.145/bids/projectDetail.aspx?prj_id=138. Accessed January 7, 2016.

[15] San Francisco Public Utilities Commission (SFPUC), *WSIP Regional Projects Quarterly Report, 3rd Quarter / Fiscal Year 2014-2015*. May 5, 2015.

[16] San Francisco Public Utilities Commission (SFPUC), *WSIP Regional Projects Quarterly Report, 3rd Quarter / Fiscal Year 2014-2015*. May 5, 2015.

Shaded rows = Projects that overlap geographically with the ACRP project area.
**Bold text** = Projects that could potentially be constructed concurrently with the ACRP.

### TABLE 5.1-6 (Continued)
### PROJECTS CONSIDERED IN THE CUMULATIVE IMPACT ANALYSIS

| Project No. | Project Name (Jurisdiction) | Project Description | Potential Cumulative Impacts | Potentially Affected Project Components/ Areas of Overlap | Estimated Construction Schedule |
|---|---|---|---|---|---|
| ***SFPUC Projects (cont.)*** | | | | | |
| 5 (cont.) | | • New chemical storage and feed facilities for disinfection, including sodium hypochlorite and ammonia as well as new fluoride facilities.<br>• Construction of approximately 2,700 feet of 78-inch-diameter pipe to connect the new treated water reservoir to the existing plant discharge pipeline, which required a tunnel crossing beneath Alameda Creek.<br>Miscellaneous plant improvements, including: a new emergency generator and improvements to the plant electrical system and substation; an upgrade of the instrumentation and controls; a new filter washwater recovery basin; improvements to the flow distribution structure and associated facilities; improvements to the influent chemical mixing system; and replacement in-kind of existing chemical tanks.<br>• Habitat creation and restoration actions on CCSF-owned lands zoned for agricultural uses and/or leased for grazing purposes.[17,18] | | | |
| 6 | San Antonio Pump Station Upgrade<br>(SFPUC) | This completed project replaced three corroded electrical pumps with three 1,000-horsepower electrical pumps; installed two 1.5-megawatt standby electrical generators and seismically retrofitted the existing pump station building by extending the foundation and shotcreting the building exterior. Two temporary staging areas were located adjacent to the San Antonio Pump Station and the Sunol Valley Chloramination Facility. No grading or excavation was necessary to accommodate the staging areas.[19] | Biological resources. | None. | Completed June 2011.[20] |

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[17] San Francisco Planning Department, Final Environmental Impact Report for the San Francisco Public Utilities Commission Sunol Valley Water Treatment Plant Expansion and Treated Water Reservoir Project, San Francisco Planning Department File No. 2006.0137E, State Clearinghouse No. 2007082014. December 3, 2009.

[18] San Francisco Public Utilities Commission (SFPUC), Sunol Valley Water Treatment Plant (SVWTP) Expansion and Treated Water Reservoir, Project Update. Available online at http://sfwater.org/bids/projectDetail.aspx?prj_id=244. Accessed June 12, 2015.

[19] San Francisco Planning Department, Final Environmental Impact Report for the San Francisco Public Utilities Commission San Antonio Backup Pipeline Project, San Francisco Planning Department File No. 2007.0039E, State Clearinghouse No. 2007102030. Certified September 20, 2012.

[20] San Francisco Public Utilities Commission (SFPUC), WSIP Regional Projects Quarterly Report, 3rd Quarter / Fiscal Year 2014-2015. May 5, 2015.

Shaded rows = Projects that overlap geographically with the ACRP project area.
**Bold text** = Projects that could potentially be constructed concurrently with the ACRP.

### TABLE 5.1-6 (Continued)
### PROJECTS CONSIDERED IN THE CUMULATIVE IMPACT ANALYSIS

| Project No. | Project Name (Jurisdiction) | Project Description | Potential Cumulative Impacts | Potentially Affected Project Components/ Areas of Overlap | Estimated Construction Schedule |
|---|---|---|---|---|---|
| ***SFPUC Projects (cont.)*** | | | | | |
| 7 | San Antonio Pump Station and SVWTP Emergency Dry Year Reliability Improvements (SFPUC) | This cumulative project involves rehabilitation of existing facilities in the Sunol Valley (specifically, at the San Antonio Pump Station and SVWTP) to reliably treat Cherry Lake water during dry years. At San Antonio Pump Station (Site 7A in Figure 5.1-1) an existing diesel engine would be removed, the associated electrical and mechanical support system for the diesel engine would be demolished, and a 1,000-horsepower electric motor and associated electrical equipment would be installed in its place. At SVWTP (Site 7B), the SFPUC would replace existing chemical piping and valves in the sludge lagoons, complete drainage improvements near an existing electrical building, and install safety hand rails around four existing sedimentation basins.[21] | Air quality, GHGs. | None | Completed in 2015 |
| 8 | San Antonio Reservoir Hypolimnetic Oxygenation System (SFPUC) | This completed project was designed to reduce excessive buildup of nutrients in the deepest layer of water in San Antonio Reservoir, thereby inhibiting future algal blooms; reducing the formation of iron, manganese, and hydrogen sulfide that results from a lack of oxygen in the reservoir; and maintaining necessary oxygen concentrations in the deepest layers of the reservoir to increase the usable habitat for coldwater fish. Project components included concrete pads for facilities, parking, and access roads; tanks; vaporizers; valves; piping and other associated structures; underground electrical supply line; and oxygen lines and diffusers suspended at specified depths within the reservoir. | Biological resources. | None | Completed in late 2009.[22] |
| 9 | Geary Road Bridge Replacement (SFPUC) | This project replaced the old timber bridge at the end of Geary Road with a new steel bridge that crosses Alameda Creek in the Sunol Regional Wilderness on lands owned by the CCSF and operated by the East Bay Regional Park District. | Biological resources. | None | 2014.[23] |

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[21] SFPUC, 2014. *Water Enterprise Capital Improvement Program Quarterly Report July 2014-September 2014*. Published November 4, 2014.

[22] San Francisco Planning Department, 2009. *Final Environmental Impact Report for the San Francisco Public Utilities Commission New Irvington Tunnel Project*, San Francisco Planning Department File No. 2005.0162E, State Clearinghouse No. 2006092085. November 5, 2009a.

[23] San Francisco Planning Department, 2011. *Final Environmental Impact Report for the San Francisco Public Utilities Commission Calaveras Dam Replacement Project*, San Francisco Planning Department File No. 2005.0161E, State Clearinghouse No. 2005102102. Certified January 27, 2011a.

▨ Shaded rows = Projects that overlap geographically with the ACRP project area.
**Bold text** = Projects that could potentially be constructed concurrently with the ACRP.

## TABLE 5.1-6 (Continued)
## PROJECTS CONSIDERED IN THE CUMULATIVE IMPACT ANALYSIS

| Project No. | Project Name (Jurisdiction) | Project Description | Potential Cumulative Impacts | Potentially Affected Project Components/ Areas of Overlap | Estimated Construction Schedule |
|---|---|---|---|---|---|
| *SFPUC Projects (cont.)* | | | | | |
| **10** | **Alameda Creek Watershed Center in Sunol (SFPUC)** | **The SFPUC began planning the Alameda Creek Watershed Center in 2010 as part of the Sunol Yard Long Term Improvements Project. The watershed center is proposed near the Sunol Water Temple. The project will include an interpretive exhibit hall, watershed discovery lab to support public education programs, a community gathering space, staff office space, and a watershed discovery garden and trail.** | **Construction-related traffic and air quality.** | **None** | **Construction scheduled for 2016 through early 2019.**[24] |
| 11 | Town of Sunol Fire Suppression Project (SFPUC) | This project includes installation of two miles of transmission pipelines and 26 new fire hydrants; replacement of four storage tanks that serve the town of Sunol with two new ones; and installation of a booster pump at the Sunol Corporation Yard. | Construction-related traffic and air quality. | None | Completed in Fall 2015.[25] |
| 12 | Bioregional Habitat Restoration Projects (SFPUC) | The Bioregional Habitat Restoration projects provide habitat compensation for endangered species to mitigate for construction impacts related to WSIP projects.[26] The BHR includes the development of 19 separate compensation sites in the SFPUC Alameda and Peninsula watersheds to preserve, enhance, restore or create approximately 1,800 acres of tidal marsh, vernal pools, sycamore and oak riparian woodland, oak woodland and savannah, and serpentine and annual grasslands. It also includes the design, environmental permitting, construction, construction management, maintenance and performance monitoring during a three-year plant establishment period and up to 10 years of performance monitoring. BHR sites in the Alameda watershed include the Sheep Camp Creek (see Site 12A in Figure 5.1-1), San Antonio Creek (Site 12B), and Goldfish Pond (Site 12C).[27] | Biological resources. | None | Implementation schedule is June 2011 through May 2018 but all construction in Alameda watershed has been completed; the Alameda watershed BHR sites are in the long-term plant establishment phase. |

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[24] SFPUC, 2016. Watershed and Environmental Improvement Program 10-Year Report, Fiscal Years 2006 to 2015. Dated February 16, 2016.
[25] SFPUC, 2015. Sunol Valley Regional Projects Fact Sheet. Summer 2015.
[26] SFPUC, 2015. Sunol Valley Regional Projects Fact Sheet. Summer 2015.
[27] SFPUC, 2016. Water System Improvement Program Active Construction Projects, Bioregional Habitat Restoration. Available at: http://sfwater.org/index.aspx?page=978. Accessed on April 11, 2016.

Shaded rows = Projects that overlap geographically with the ACRP project area.
**Bold text** = Projects that could potentially be constructed concurrently with the ACRP.

## TABLE 5.1-6 (Continued)
## PROJECTS CONSIDERED IN THE CUMULATIVE IMPACT ANALYSIS

| Project No. | Project Name (Jurisdiction) | Project Description | Potential Cumulative Impacts | Potentially Affected Project Components/ Areas of Overlap | Estimated Construction Schedule |
|---|---|---|---|---|---|
| ***Non-SFPUC Projects*** | | | | | |
| 13 | SMP-30 Quarry Expansion (Oliver De Silva, Inc.) | This approved project increased the maximum depth of excavation from 140 feet below the ground surface (bgs) to a maximum depth of 400 feet below the ground surface; expanded the active mining area permitted under SMP-30 by 58 acres, for a total of 367 acres; and added a new asphalt batch plant and concrete plant.<br>As part of this project, the project sponsor prepared a Conservation Plan for Sunol Quarry SMP-30 Site to "fund, implement, and monitor the avoidance, mitigation, and restoration measures to best protect and conserve special-status species and their habitats prior to and during the development of quarry operations at the Sunol Quarry, under SMP-30, Revised SMP-30 and Further Revised SMP-30."<br>The SMP-30 slurry cutoff wall and creek restoration improvements (see cumulative project 11, below) were initially included as part of this project; however, those improvements rely on implementation of the PG&E Gas Pipeline Relocation project (cumulative project 15), whose schedule is unknown, and therefore were not included in the approvals for this project. | Aesthetics, cultural resources, air quality, biological resources, hydrology and water quality. | No geographic overlap but this project is immediately adjacent to ACRP project area. SMP-30 quarry operations could potentially have an effect on ACRP operations. | Active mining has been extended for 30 years, from 2021 to 2039.[28] |
| 14 | SMP-30 Cutoff Wall and Creek Restoration (Oliver De Silva, Inc.) | This project, originally included in the SMP-30 Quarry Expansion project (cumulative project 13, above), involves an approximately 7,800-foot-long, 35- to 45-foot-deep cutoff wall along the bank of Alameda Creek to reduce the seepage of water from Alameda Creek into active mining areas. The quarry operator would also restore the same banks of Alameda and San Antonio Creeks by planting native vegetation. This project is an element of Conservation Plan for Sunol Quarry SMP-30 Site, described above.<br>The timing of this project is contingent upon completion of the PG&E Gas Pipeline Relocation project (cumulative project 15, below).[29] | Hydrology and water quality, fisheries and aquatic resources, terrestrial biological resources, cultural resources, air quality, utilities and service systems. | The SMP-30 cutoff wall and creek restoration improvements would be adjacent to the ACRP project area and cannot be constructed until the PG&E Line 303 Gas Pipeline Relocation project (cumulative project 15) is completed. Assuming construction of that project | TBD but assumed to be subsequent to completion of ACRP. |

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[28] Alameda County, 2012. *Final Environmental Impact Report for the SMP-30 Revised Use Permit Sunol Valley Aggregate Quarry Project*. State Clearinghouse No. 2011102051. June 2012.
[29] San Francisco Public Utilities Commission (SFPUC) and Oliver De Silva, *Final Quarry Lease between the City and County of San Francisco and Oliver De Silva, Inc*. December 30, 2009.

▨ Shaded rows = Projects that overlap geographically with the ACRP project area.
**Bold text** = Projects that could potentially be constructed concurrently with the ACRP.

## TABLE 5.1-6 (Continued)
## PROJECTS CONSIDERED IN THE CUMULATIVE IMPACT ANALYSIS

| Project No. | Project Name (Jurisdiction) | Project Description | Potential Cumulative Impacts | Potentially Affected Project Components/ Areas of Overlap | Estimated Construction Schedule |
|---|---|---|---|---|---|
| ***Non-SFPUC Projects (cont.)*** | | | | | |
| 14 (cont.) | | | | would overlap with the ACRP, then this project could not overlap with the timing of construction for ACRP. | |
| **15** | **PG&E Line 303 Alameda Creek Relocation Project (PG&E)** | **This project would remove the concrete mat at a PG&E gas pipeline crossing of Alameda Creek in the Sunol Valley above the confluence of San Antonio Creek, which would eliminate a barrier to fish migration at most creek flow levels. The project involves removing the concrete mat and lowering the pipeline within the creek channel to allow fish passage.**[30,31] | **Hydrology and water quality, fisheries and aquatic resources, cultural resources, air quality, utilities and service systems.** | **Timing of construction could coincide with the timing of construction of ACRP.** | **TBD** |
| **16** | **PG&E Gas Line 107 Retirement Project (PG&E)** | **This project would retire approximately 13 miles of PG&E's 22 to 24-inch diameter natural gas transmission pipeline from Livermore to Fremont. The retirement project includes approximately 12,000 feet of PG&E's 22-inch gas pipeline in the SFPUC's Alameda Watershed lands, near Calabasas Road. The proposal is to abandon in place portions of Line 107 below grade and fill the pipeline segments beneath permanent roadways, water bodies or facilities, and within the CCSF property with slurry to prevent settlement, and the remaining pipeline segments filled with inert gas, after cleaning. About 300 feet of the 12,000-foot long segment in CCSF property traverses the location of the proposed ACRP electrical control building and must be removed before the electrical control building can be constructed, either by PG&E prior to ACRP construction or by the SFPUC as part of the ACRP construction.** | **Hydrology and water quality, fisheries and aquatic resources, cultural resources, air quality, utilities and service systems. (Note: The ACRP project description assumes that removal of the 300-foot segment at the ACRP electrical control building site would be removed as part of the ACRP, and is therefore included as part of the ACRP impact analysis. The remainder of the pipeline is considered under cumulative impacts.)** | **Timing of construction was expected to start in fall 2017, and could coincide with ACRP construction.)** | **TBD** |

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[30] San Francisco Planning Department, Final Environmental Impact Report for the San Francisco Public Utilities Commission Calaveras Dam Replacement Project, San Francisco Planning Department File No. 2005.0161E, State Clearinghouse No. 2005102102. Certified January 27, 2011a.

[31] Alameda Creek Alliance, 2016. Electronic Newsletter of the Alameda Creek Alliance: Alameda Creek Fish Passage Projects Inch Forward. January 13, 2016.

Shaded rows = Projects that overlap geographically with the ACRP project area.
**Bold text** = Projects that could potentially be constructed concurrently with the ACRP.

## TABLE 5.1-6 (Continued)
## PROJECTS CONSIDERED IN THE CUMULATIVE IMPACT ANALYSIS

| Project No. | Project Name (Jurisdiction) | Project Description | Potential Cumulative Impacts | Potentially Affected Project Components/ Areas of Overlap | Estimated Construction Schedule |
|---|---|---|---|---|---|
| *Non-SFPUC Projects (cont.)* | | | | | |
| **17** | **Joint Lower Alameda Creek Fish Passage Improvements (ACWD and Alameda County Flood Control and Water Conservation District)** | **This project is located approximately 8 miles downstream of the ACRP area in Fremont and addresses the need for Central California Coast steelhead and salmon passage through this reach of the Alameda Creek Flood Control Channel while supporting continued ACWD water supply and ACFCD flood control functions. The project includes the following elements:**<br>• **ACWD would modify bypass rates in the reach below Mission Boulevard to enhance flow/depth conditions for anadromous steelhead and other fish species;**<br>• **ACWD would construct and operate a fish passage facility ("fishway") at ACWD's Rubber Dam 3 downstream of Mission Boulevard and the Union Pacific RR Bridge; construction includes modifying the Rubber Dam 3 foundation to incorporate a plunge pool for fish passage;**<br>• **ACWD would replace the existing Rubber Dam 3 inflatable bag with a new bag; construction includes modifying the foundation to anchor the new bag material and make seismic-related structural upgrades;**<br>• **ACWD would construct and operate fish screens at a consolidated diversion site between Rubber Dam 3 and Rubber Dam 1, replacing the existing two Shinn Pond Diversions during or prior to modification to Rubber Dam 1 which would allow steelhead access to lower Alameda Creek. Fish screens would be installed at the Shinn Pond diversions prior to the date that steelhead would be present in the area (no diversions would be made to Shinn Pond from unscreened diversions once steelhead are present in lower Alameda Creek;** | **Fisheries Resources**<br>**Terrestrial Biological Resources** | **Timing of construction could coincide with the timing of construction for ACRP.** | **4-year construction, 2018-2021**[32] |

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[32] Alameda County Water District (ACWD) and Alameda County Flood Control and Water Conservation District (ACFCD), 2016. *Draft Initial Study with Mitigated Negative Declaration/Environmental Assessment with Finding of No Significant Impacts for the Joint Lower Alameda Creek Fish Passage Improvements*. October 2016.

Shaded rows = Projects that overlap geographically with the ACRP project area.
**Bold text** = Projects that could potentially be constructed concurrently with the ACRP.

## TABLE 5.1-6 (Continued)
## PROJECTS CONSIDERED IN THE CUMULATIVE IMPACT ANALYSIS

| Project No. | Project Name (Jurisdiction) | Project Description | Potential Cumulative Impacts | Potentially Affected Project Components/ Areas of Overlap | Estimated Construction Schedule |
|---|---|---|---|---|---|
| *Non-SFPUC Projects (cont.)* | | | | | |
| **17 (cont.)** | | • **ACWD would modify the existing Rubber Dam 1 foundation to replace worn rubber dam piping, equipment and controls, and make seismic-related structural upgrades;**<br>• **ACWD and ACFCD would construct and operate a fishway at ACWD's Rubber Dam 1 and ACFCD's drop structure; construction includes modifying the Rubber Dam 1 foundation to incorporate a plunge pool for fish passage; and renovation of the Rubber Dam 1 control building to accommodate fishway control equipment; and**<br>• **ACWD and ACFCD would jointly develop and implement an Operation and Maintenance plan for the Rubber Dam 1/ ACFCD Drop Structure fishway and associated facilities; and ACWD would develop an Operation and Maintenance plan for the Rubber Dam 3 fishway; ACWD O&M responsibilities include periodic replacement of the rubber dam bags.**[33] | | | |
| 18 | Alameda Creek Watershed Steelhead Restoration (ACWD) | This project involved several improvements to existing structures within Alameda Creek to improve conditions for steelhead migration. The improvements were made within the Alameda Creek Flood Control Channel adjacent to Quarry Lakes Regional Recreation Area in Fremont. The Rubber Dam No. 2 project involved the removal of the fabric portion of the dam and a section of the dam's foundation. The Alameda Creek Pipeline No. 1 Fish Screen project, located upstream adjacent to Rubber Dam No. 3, involved installation of a diversion screen to eliminate potential entrainment of out-migrating juvenile steelhead. The Rubber Dam No. 3 project involved installation of a fish ladder. | Fisheries | None | 2007 to 2011[34] |

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[33] Alameda County Water District (ACWD) and Alameda County Flood Control and Water Conservation District (ACFCD), 2016. *Draft Initial Study with Mitigated Negative Declaration/Environmental Assessment with Finding of No Significant Impacts for the Joint Lower Alameda Creek Fish Passage Improvements*. October 2016.

[34] San Francisco Planning Department, *Final Environmental Impact Report for the San Francisco Public Utilities Commission Calaveras Dam Replacement Project*, San Francisco Planning Department File No. 2005.0161E, State Clearinghouse No. 2005102102. Certified January 27, 2011a.

▨ Shaded rows = Projects that overlap geographically with the ACRP project area.
**Bold text** = Projects that could potentially be constructed concurrently with the ACRP.

## TABLE 5.1-6 (Continued)
## PROJECTS CONSIDERED IN THE CUMULATIVE IMPACT ANALYSIS

| Project No. | Project Name (Jurisdiction) | Project Description | Potential Cumulative Impacts | Potentially Affected Project Components/ Areas of Overlap | Estimated Construction Schedule |
|---|---|---|---|---|---|
| ***Non-SFPUC Projects (cont.)*** | | | | | |
| 19 | Stream Management Master Plan Improvements (Zone 7 Water Agency) | The Stream Management Master Plan includes implementation of 49 projects over the next 20 years throughout the Zone 7 service area in the Tri-Valley Area. Improvements made along Reach 10, the closest improvement reach to the ACRP area, included bank stabilization and protection features, grading and terracing of eroded banks, riparian corridor enhancement for 3,000 feet, and removal of barriers to steelhead fish migration. | Fisheries | None | 2008 to 2030<br>Construction of the projects in Reach 10 completed 2008 to 2010.[35] |

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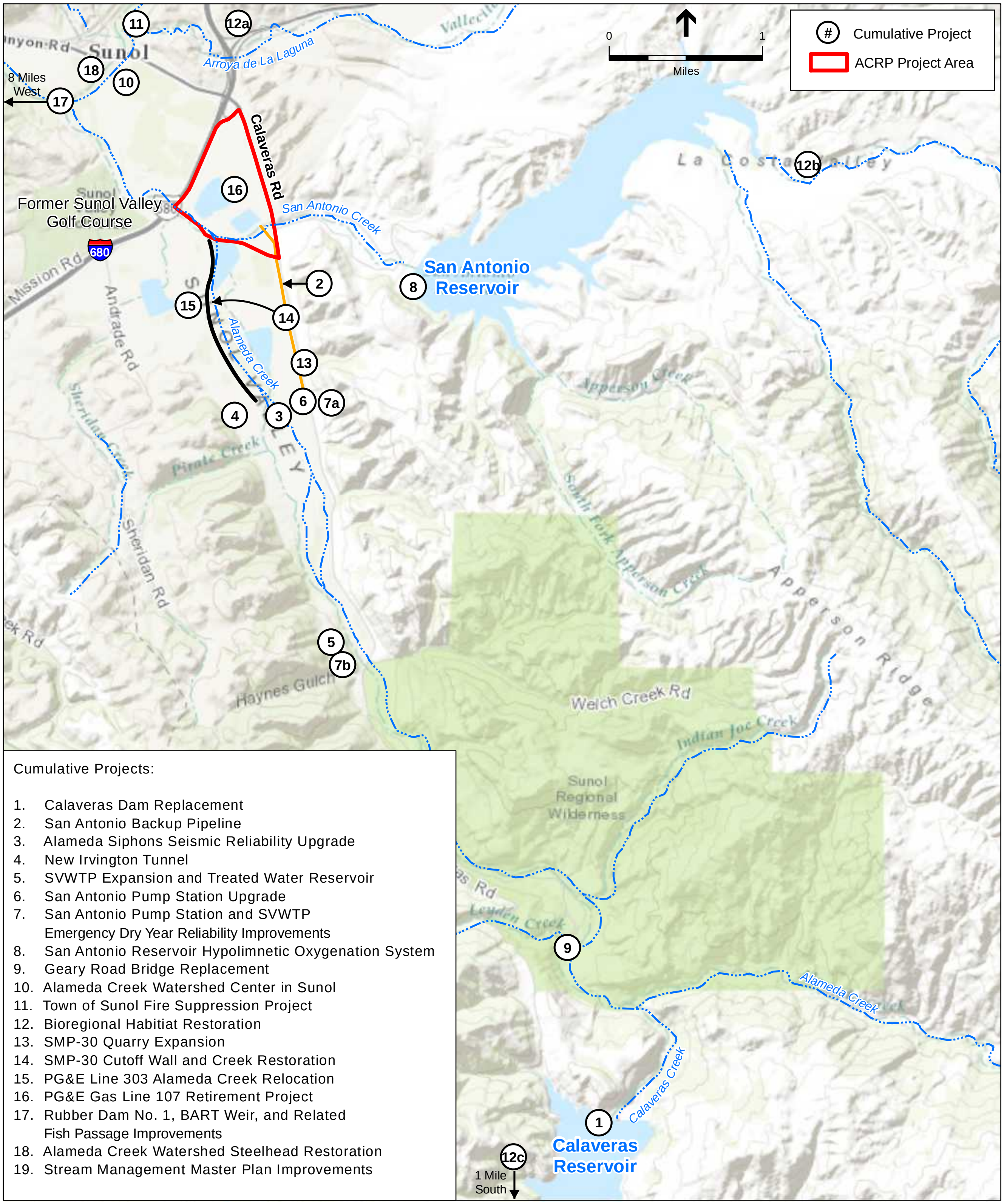
[35] San Francisco Planning Department, *Final Environmental Impact Report for the San Francisco Public Utilities Commission New Irvington Tunnel Project*, San Francisco Planning Department File No. 2005.0162E, State Clearinghouse No. 2006092085. November 5, 2009a.

▨ Shaded rows = Projects that overlap geographically with the ACRP project area.
**Bold text** = Projects that could potentially be constructed concurrently with the ACRP.



Cumulative Projects:

1. Calaveras Dam Replacement
2. San Antonio Backup Pipeline
3. Alameda Siphons Seismic Reliability Upgrade
4. New Irvington Tunnel
5. SVWTP Expansion and Treated Water Reservoir
6. San Antonio Pump Station Upgrade
7. San Antonio Pump Station and SVWTP Emergency Dry Year Reliability Improvements
8. San Antonio Reservoir Hypolimnetic Oxygenation System
9. Geary Road Bridge Replacement
10. Alameda Creek Watershed Center in Sunol
11. Town of Sunol Fire Suppression Project
12. Bioregional Habitiat Restoration
13. SMP-30 Quarry Expansion
14. SMP-30 Cutoff Wall and Creek Restoration
15. PG&E Line 303 Alameda Creek Relocation
16. PG&E Gas Line 107 Retirement Project
17. Rubber Dam No. 1, BART Weir, and Related Fish Passage Improvements
18. Alameda Creek Watershed Steelhead Restoration
19. Stream Management Master Plan Improvements

SOURCE: ESA, 2016

SFPUC Alameda Creek Recapture Project

**Figure 5.1-1**

Cumulative Projects

- Alameda County, 2012. *Draft Environmental Impact Report for the SMP-30 Revised Use Permit Sunol Valley Aggregate Quarry Project*, State Clearinghouse No. 2011102051. April 2012 ;
- San Francisco Planning Department, 2012. *San Antonio Backup Pipeline Project Final Environmental Impact Report*, San Francisco Planning Department File No. 2007.0039E, State Clearinghouse No. 2007102030. Certified September 20, 2012;
- Alameda County Water District (ACWD) and Alameda County Flood Control District (ACFCD), 2013. *Draft Initial Study and CEQA Checklist for the Joint Lower Alameda Creek Fish Passage Improvements*. March 2013;
- SFPUC, 2014. *Water Enterprise Capital Improvement Program Quarterly Report July 2014-September 2014*. Published November 4, 2014; and
- San Francisco Public Utilities Commission (SFPUC), WSIP Regional Projects Quarterly Report, 3rd Quarter / Fiscal Year 2014-2015. May 5, 2015.

### *SFPUC Calaveras Dam Replacement Project (Including ACDD Fish Passage Improvements)*

As described in Chapter 2, Section 2.3, construction of the Calaveras Dam Replacement Project (CDRP) is scheduled for completion in spring 2019. Construction of the proposed project would overlap with the CDRP construction. In addition, future operation of the approved CDRP will affect flow conditions along Alameda Creek and water level elevations in Pit F2. Future operation of the CDRP includes two instream flow schedules for the protection of steelhead along Alameda and Calaveras Creeks below the Calaveras Dam and the Alameda Creek Diversion Dam (ACDD). The instream flow schedules will reduce the amount of water that the SFPUC has historically diverted from Alameda Creek into Calaveras Reservoir as well as the amount of water stored in Calaveras Reservoir, and the flow schedules will increase average annual downstream flow in Alameda Creek, including the reach in the vicinity of the ACRP. Thus, CDRP operations will contribute to cumulative operational effects, if any, on flow-related resources. However, cumulative operational impacts for hydrology and water quality and for fisheries and terrestrial biological resources are accounted for in the ACRP project impact analysis, rather than the cumulative impact analysis, as described above in Section 5.1.2, Baseline Conditions for Evaluation of Project Impacts.

### *ACWD-ACFCD Joint Lower Alameda Creek Fish Passage Improvements)*

This project, located downstream of the ACRP in the City of Fremont, is a joint project by ACFCD and ACWD that will remove large barriers to fish passage and modify ACWD's diversion operations to enhance steelhead and salmon access through the Alameda Creek Flood Control Channel to historical upstream spawning and rearing habitats, while supporting continued ACWD water supply and ACFCD flood control functions. To accomplish this, the ACWD and ACFCD propose to take the following joint actions:

1. ACWD would modify bypass rates in the reach below Mission Boulevard to enhance flow/depth conditions for anadromous steelhead and other fish species;
2. ACWD would construct and operate a fish passage facility ("fishway") at ACWD's Rubber Dam 3 downstream of Mission Boulevard and the Union Pacific RR Bridge; construction

includes modifying the Rubber Dam 3 foundation to incorporate a plunge pool for fish passage;

3. ACWD would replace the existing Rubber Dam 3 inflatable bag with a new bag; construction includes modifying the foundation to anchor the new bag material and make seismic-related structural upgrades;
4. ACWD would construct and operate fish screens at a consolidated diversion site between Rubber Dam 3 and Rubber Dam 1, replacing the existing two Shinn Pond Diversions during or prior to modification to Rubber Dam 1 which would allow steelhead access to lower Alameda Creek. Fish screens would be installed at the Shinn Pond diversions prior to the date that steelhead would be present in the area (no diversions would be made to Shinn Pond from unscreened diversions once steelhead are present in lower Alameda Creek;
5. ACWD would modify the existing Rubber Dam 1 foundation to replace worn rubber dam piping, equipment and controls, and make seismic-related structural upgrades;
6. ACWD and ACFCD would construct and operate a fishway at ACWD's Rubber Dam 1 and ACFCD's drop structure; construction includes modifying the Rubber Dam 1 foundation to incorporate a plunge pool for fish passage; and renovation of the Rubber Dam 1 control building to accommodate fishway control equipment; and
7. ACWD and ACFCD would jointly develop and implement an Operation and Maintenance plan for the Rubber Dam 1/ ACFCD Drop Structure fishway and associated facilities; and ACWD would develop an Operation and Maintenance plan for the Rubber Dam 3 fishway; ACWD O&M responsibilities include periodic replacement of the rubber dam bags.

Implementation of this project would improve opportunities for fish passage in the lower Alameda Creek channel and allow steelhead to migrate upstream to the upper watershed. Construction of this cumulative project is estimated to require four years, from 2018 through 2021,[36] and these improvements may not be in place until *after* the ACRP is implemented. However, the SFPUC is committed to implementing the instream flow schedules for CDRP upon the completion of CDRP construction; implementation of the CDRP instream flow schedules may occur prior to completion of the ACWD/ACFCD joint lower Alameda Creek fish passage improvements. Regardless, the evaluation of the ACRP's potential impacts to fishery resources, including Central California Coast steelhead, during ACRP operations conservatively assumes that this cumulative project and all other projects that would remove downstream fish passage barriers would be completed *prior* to ACRP operations and steelhead have been restored in the watershed *prior* to ACRP operations. Construction of this project could overlap with ACRP construction.

### *PG&E Line 303 Alameda Creek Relocation Project*

This project is located on Alameda Creek in the Sunol Valley, roughly 2,000 feet upstream (south) of the ACRP project area and approximately 4,000 feet downstream (north) of the Alameda Siphons. The project would remove a barrier to steelhead migration, thereby facilitating steelhead

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[36] Alameda County Water District (ACWD) and Alameda County Flood Control and Water Conservation District (ACFCD), 2016. *Draft Initial Study with Mitigated Negative Declaration/Environmental Assessment with Finding of No Significant Impacts for the Joint Lower Alameda Creek Fish Passage Improvements*. October 2016.

movement to the upper Alameda Creek watershed. This project consists of removal of a concrete mat and lowering the pipeline within the creek channel to facilitate fish migration upstream of the pipeline crossing. Implementation of this project would improve flow in Alameda Creek immediately upstream of the ACRP and would improve opportunities for fish passage. The timing of this cumulative project is currently unknown but construction could coincide with ACRP construction. This is considered a reasonably foreseeable project because PG&E (a member of the Alameda Creek Fisheries Restoration Workgroup), special interest groups, and resource agencies have been studying options for modifying this structure since 1999.

### *SMP-30 Cutoff Wall and Creek Restoration Project*

As a condition of the quarry lease for the SMP-30 area between the SFPUC and Oliver De Silva, Inc., a cutoff wall would be constructed along Alameda Creek just upstream of the ACRP project area. The cutoff wall has not yet been designed or approved. Once the implementation schedule for the PG&E Line 303 Alameda Creek Relocation project is known, the SFPUC will notify Oliver De Silva and require that the quarry operator begin design and implementation of the cutoff wall. The cutoff wall would reduce the seepage of water from Alameda Creek to the SMP-30 quarry pits. The timing of this cumulative project is currently unknown but it is considered a reasonably foreseeable project because, as stated above, its implementation is a condition of the SFPUC's lease with Oliver De Silva for the SMP-30 area. This project is included in the Conservation Plan for Sunol Quarry SMP-30 Site/Revised SMP-30 Improvements prepared by Oliver De Silva, Inc. Construction of this project cannot occur until after completion of the PG&E Line 303 Alameda Creek Relocation project.

### *PG&E Line 107 Pipeline Retirement Project*

PG&E's proposed project is to retire approximately 13 miles of PG&E natural gas transmission pipeline (Line 107) from Livermore to Fremont, including approximately 12,000 feet of the pipeline located on the SFPUC's Alameda Watershed land (near Calabasas Road). The existing Line 107 is approximately 22 to 24 inches in diameter. The proposal is to abandon in place portions of Line 107 below grade and fill the pipeline segments beneath permanent roadways, water bodies or facilities, and within the CCSF property, with slurry to prevent settlement, and the remaining pipeline segments filled with inert gas, after cleaning. As described in Chapter 3, Project Description, approximately 300 feet of this pipeline crosses the ACRP project site at the location of the proposed electrical control building. This 300-foot segment must be removed before the electrical control building can be constructed. Removal of this pipeline segment may be done by PG&E prior to ACRP construction, or by SFPUC as part of ACRP construction. For the purposes of this EIR, it is assumed that the SFPUC would demolish and remove the 300-foot segment of the PG&E pipeline at this location, and this portion of the project is considered in the project impact analysis. Construction of the other aspects of this project could coincide with ACRP construction and is considered in the cumulative impact analyses.

# 5.2 Land Use

This section describes existing land uses in the vicinity of the Alameda Creek Recapture Project (ACRP or proposed project) and evaluates the potential land use impacts of the proposed project. Mitigation measures to avoid or reduce adverse impacts are identified, as appropriate. It is noted that impacts specific to recreational land uses are evaluated in Section 5.11, Recreation and impacts on agricultural resources are evaluated in Section 5.19, Agriculture and Forest Resources.

## 5.2.1 Setting

The project area[1] is located on Alameda watershed lands owned by the City and County of San Francisco (CCSF) and managed by the SFPUC as part of the regional water system. The project area is located within the Sunol Valley in unincorporated Alameda County, east of Interstate 680 (I-680) and south of the junction of I-680 and State Route 84 (SR 84). In the East County Area Plan of the Alameda County General Plan, SFPUC Alameda watershed lands are zoned as Resource Management, Water Management, and Parklands. The ACRP area is designated as Water Management.[2]

Existing SFPUC facilities within the Sunol Valley include water storage facilities (Calaveras and San Antonio Reservoirs); numerous transmission facilities (including the Alameda Siphons, Coast Range and Irvington Tunnels, Calaveras Pipeline, San Antonio Pipeline, San Antonio Backup Pipeline, and San Antonio Pump Station Pipeline); water treatment facilities (Sunol Valley Water Treatment Plant, Sunol Valley Chloramination Facility, a fluoride facility, and an existing chemical facility), and emergency discharge facilities (outfall structure at Pit F3-East) (see **Figure 3-2** in Chapter 3, Project Description).

The project area intersects a commercial gravel quarry that is operated by Hanson Aggregates under Surface Mining Permit 24 (SMP-24). A second gravel quarry operated by Hanson Aggregates—Surface Mining Permit 32 (SMP-32)—is located north of I-680, on the west side of Alameda Creek. A third gravel quarry operated by Oliver de Silva, Inc. under Surface Mining Permit 30 (SMP-30) is located immediately south of the project area. All of the SMP-30 and SMP-32 areas and a portion of the SMP-24 area are located on SFPUC Alameda watershed[3] lands that the quarry operators lease from the CCSF. A commercial nursery—Calaveras Nursery—is located within the project area just south of the PG&E Sunol Substation near the I-680 / SR 84 interchange.

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[1] Project area refers to the area within which all construction-related disturbance would occur.

[2] Alameda County, 2002 *East County Area Plan, A Portion of the Alameda County General Plan, Volume I: Goals, Policies, and Programs*. May 2002.

[3] The SFPUC Alameda watershed refers to lands that are owned by the CCSF and managed by the SFPUC as part of the Hetch Hetchy regional water system.

There are five private residences in the project vicinity: two residences on Athenour Way, located approximately 1,400 feet (0.25 mile) west of the project area; an SFPUC watershed keeper's residence located west of Alameda Creek, approximately 1 mile to the southwest; an SFPUC watershed keeper's residence located east of Calaveras Road, approximately 1 mile to the south; and a private residence located approximately 1.3 miles to the south of the project area, about 800 feet south of the Alameda West Portal. Existing land uses in the project area include a gravel quarry, transmission towers, overhead powerlines, and SFPUC water supply facilities.

The East Bay Regional Park District (EBRPD) operates three public parks and open space areas within 5 miles of the project area: the Sunol Regional Wilderness (located approximately 3 miles southeast from the southernmost portion of the project area), Ohlone Regional Wilderness (located east of and adjacent to the Sunol Regional Wilderness), and Mission Peak Regional Preserve (located approximately 3.5 miles southwest of the project area).

The nearest urban areas are the unincorporated town of Sunol, approximately 1 mile northwest of the project area, and the city of Fremont, approximately 4 miles to the west.

## 5.2.2 Regulatory Framework

### 5.2.2.1 Federal and State Regulations

No federal or state land use regulations directly apply to the proposed project.

### 5.2.2.2 Local Regulations

Under California Government Code Section 53090 et seq., the SFPUC receives intergovernmental immunity from city and county zoning and building ordinances. Refer to Chapter 4, Plans and Policies, for a discussion of the regulatory setting related to land use plans and policies and more detailed information concerning intergovernmental immunity.

## 5.2.3 Impacts and Mitigation Measures

### 5.2.3.1 Significance Criteria

The project would have a significant impact related to land use if the project were to:

- Physically divide an established community;
- Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect; or
- Have a substantial impact on the existing character of the vicinity.

For the reasons described below, due to the nature of the proposed project, there would be no impacts related to the first significance criterion; therefore, no further impact discussion is provided for this topic.

- ***Physically Divide an Established Community.*** The project area is located in a largely undeveloped portion of the Sunol Valley and is not within an established community. The nearest urban areas to the project area are the unincorporated town of Sunol, approximately one mile to the northwest, and the city of Fremont, approximately four miles to the west. All facilities would be constructed on CCSF-owned land, adjacent to existing SFPUC facilities and quarry operations. Thus, the criterion related to dividing an established community is not applicable to the proposed project and is not discussed further.

### 5.2.3.2 Approach to Analysis

This analysis considers the proposed project's potential to adversely affect the existing character of the vicinity. It evaluates the potential for temporary, indirect impacts on land use during construction as well as long-term impacts on the existing character of the vicinity resulting from project siting and operations. Construction activities could generate a combination of short-term effects, including emissions of criteria air pollutants, increased noise levels, traffic safety hazards, and impeded access related to traffic congestion and detours. These effects could indirectly disturb or disrupt land uses in the vicinity of the project area in a way that substantially alters the land use character. The direct physical impacts related to each of these topics are discussed separately in Sections 5.6, Transportation and Circulation; 5.7, Noise and Vibration; and 5.8, Air Quality. Long-term effects on the existing land use character in the project vicinity could occur if the project resulted in a long-term change in land use that was incompatible or conflicted with established land uses.

Regarding potential conflicts with land use plans and policies, the analysis compares potential long-term operation of the proposed project to plans and policies applicable to the ACRP, as described in Chapter 4, Plans and Policies, of this EIR. The analysis does not identify policy conflicts in and of themselves as significant effects on the physical environment, but rather if inconsistencies are identified, any implications on the effects of the physical environment are addressed under that specific resource area in Chapter 5 of this EIR.

As described in Section 5.1.2 regarding baseline conditions for evaluation of project impacts, construction-related impacts in this section are evaluated against the existing conditions. The current construction schedule for the proposed project is from fall 2017 to spring 2019 (18 months), and construction of the Calaveras Dam Replacement Project (CDRP) is also anticipated to be completed in spring 2019. Thus, it is possible that operation of the CDRP will commence prior to completion of ACRP construction, and that with-CDRP conditions could occur while ACRP is still under construction. However, operation of the CDRP is not expected to change any of the baseline land use conditions analyzed in this section. Therefore, no change in the approach to this impact analysis is necessary to account for the with-CDRP conditions. More specifically, the construction-related impacts of the ACRP presented in this section would be the same regardless of the implementation of bypass flows at the Alameda Creek Diversion Dam and instream flow releases from Calaveras Reservoir, and all other aspects of CDRP operations that characterize the with-CDRP conditions.

### 5.2.3.3 Construction Impacts and Mitigation Measures

**Impact LU-1: Project construction would not have a substantial impact on the existing character of the vicinity. (Less than Significant)**

Temporary adverse impacts on the character of the project area could occur if the project substantially changed land uses and altered existing character of the project area during construction. Project construction would take place over an approximately 18-month period. Construction activities would involve the operation of diesel-powered construction equipment and vehicles and would increase noise, traffic, and emissions of criteria air pollutants in the project vicinity. However, these disruptions would be temporary, and the types of construction equipment and vehicles would not be substantially different from the heavy equipment being used for existing operations at the adjacent aggregate mining quarries. Thus, the land use character of the project vicinity during construction of the ACRP would be similar to, and consistent with, the existing land use character of the vicinity.

The closest sensitive residential receptors, the two residences on Athenour Way, are approximately 1,500 feet (0.3 mile) west of the project area. Project construction activities would result in short-term noise increases and emissions of criteria pollutants (refer to the discussions under Impact NO-1 in Section 5.7, Noise and Vibration, and under Impact AQ-1 in Section 5.8, Air Quality); however, due to the distance between project activities and sensitive receptors, the intermittent nature of construction activities, and because the types of equipment used for ACRP construction would be similar to the equipment used for operations at the adjacent quarries, these indirect noise and air quality impacts would not substantially alter the land use character of the project vicinity.

Construction vehicles would travel to and from the project area along Calaveras Road during project construction. Construction traffic could result in increased traffic safety hazards for motorists, bicyclists, and pedestrians on Calaveras Road, as well as temporary traffic delays associated with construction vehicles (which have a wider turning radius than automobiles) as they turn west into the quarry access roads, but implementation of SFPUC standard construction measures related to traffic control measures as part of the proposed project would reduce potential transportation-related impacts to less than significant levels. As discussed under Impact TR-1 in Section 5.6, Transportation and Circulation, short-term increases in traffic volumes on Calaveras Road during construction of the ACRP would not substantially affect existing traffic levels or roadway capacity), and this effect would not substantially change the land use character of the vicinity. Therefore, the indirect effects of project-related construction noise, emissions of criteria pollutants, traffic safety hazards, and construction traffic would not substantially alter the existing character of the project vicinity.

For the reasons discussed above, this land use impact would be *less than significant*, and no mitigation is required.

**Mitigation:** None required.

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### 5.2.3.4 Operational Impacts and Mitigation Measures

**Impact LU-2: The project operations would not conflict with land use plans and policies adopted for the purpose of avoiding or mitigating an environmental effect. (Less than Significant)**

As described in Chapter 4, Plans and Policies, the project is located entirely on extraterritorial lands owned by the CCSF in unincorporated Alameda County, and the following CCSF plans may apply to the ACRP: San Francisco General Plan, San Francisco Accountable Planning Initiative, San Francisco Floodplain Management Ordinance, and San Francisco Greenhouse Gas Reduction Ordinance. The proposed project would not obviously or substantially conflict with any General Plan goals, policies, or objectives with respect to any of its ten issue-oriented plan elements (Air Quality, Arts, Commerce and Industry, Community Facilities, Community Safety, Environmental Protection, Housing, Recreation and Open Space, Transportation, and Urban Design), which relate primarily to development within the City. The only Priority Policy under the Accountable Planning Initiative applicable to the ACRP is policy number 7 regarding historic resources, and as discussed in Section 5.5, Cultural Resources, no historical resources are documented or were identified within the area of potential effect, so the ACRP would not be inconsistent with this policy. The ACRP would not be inconsistent with the San Francisco Floodplain Management Ordinance because the only structure that would be located within a flood zone would be constructed at an elevation above the designated flood elevation. An analysis of potential project effects on global warming and greenhouse gases (GHGs) emissions is presented in Section 5.9, Greenhouse Gas Emissions, which indicates that the project's annual GHG emissions would be below applicable thresholds and further describes how the project would not conflict with the San Francisco Greenhouse Gas Reduction Ordinance.

Chapter 4 also describes three SFPUC plans and policies relevant to the ACRP: Alameda Watershed Management Plan (WMP), Water Enterprise Environmental Stewardship Policy, and Right-of-Way Integrated Vegetation Management Policy. As required by the Alameda WMP, the SFPUC would review all plans, projects, and activities that occur within the Alameda watershed for conformity with the management plan and for compliance with environmental codes and regulations, thus ensuring that the ACRP would not conflict with this plan. Similarly, the implementation strategies of the Water Enterprise Environmental Stewardship Policy specifically require the integration of the policy into individual WSIP facility improvement projects such as the ACRP, so that the proposed project would not be inconsistent with this policy. Implementation of the ACRP would not result in vegetation removal along an existing SFPUC right-of-way, nor result in the future need for other entities to maintain vegetation within a SFPUC right-of-way, so the proposed project would not conflict with the Right-of-Way Integrated Vegetation Management Policy.

As described above and in Chapter 4, the project is located entirely on extraterritorial lands owned by the CCSF in unincorporated Alameda County, and the SFPUC is not legally bound by the land use plans and policies of Alameda County. However, for the purposes of CEQA environmental review, the following local land use policies of Alameda County are considered: Alameda County General Plan and East County Area Plan (ECAP), and Reclamation Plan for Surface Mining Permit-24. The ECAP is the relevant portion of the Alameda County General Plan and designates land uses on SFPUC Alameda watershed lands as Resource Management, Water Management, and Parklands; the project area is designated as Water Management land, and as further detailed in Chapter 4, the ACRP would not be inconsistent with the objectives and policies of the Alameda County General Plan and ECAP. The Reclamation Plan for Surface Mining Permit-24 identifies the long term use of the project area for water storage, and therefore the proposed project would not be inconsistent with this plan.

Therefore, impacts related to conflicts with land use plans and policies adopted for the purpose of avoiding or mitigating an environmental effect would be *less than significant*.

**Mitigation:** None required.

**Impact LU-3: Project operations would not result in substantial long-term or permanent impacts on the existing character of the vicinity. (Less than Significant)**

Impacts on the existing land use character in the project vicinity could occur if operation of the ACRP would result in a long-term change in land use that would be incompatible or conflict with established land uses.

The proposed ACRP would be constructed on lands owned by the CCSF. Project components, namely the vertical turbine and mooring system, and the pipelines, would be installed at or below grade, would not be visible and would not substantially alter the existing character of the project area. All of the aboveground project elements would be relatively small in scale when compared to existing features in the area including the large quarry pits and associated equipment and the SFPUC water supply facilities in the southern Sunol Valley (e.g., Sunol Valley Chloramination Facility, the fluoride facility, the San Antonio Pump Station, the chemical facility). Thus, the land use character of the vicinity following implementation of the proposed project would be similar to and consistent with the existing land use character of the immediate vicinity. Therefore, the proposed project would not substantially affect the character of the vicinity; permanent impacts on the existing character of the project area would be *less than significant.*

**Mitigation:** None required.

### 5.2.3.5 Cumulative Impacts and Mitigation Measures

**Impact C-LU: The project, in combination with past, present, and probable future projects, would not substantially affect land use. (Less than Significant)**

The geographic scope for potential cumulative land use impacts encompasses land uses in the vicinity of the ACRP area. This area generally includes the SFPUC Alameda watershed lands east of I-680 and south of the I-680/SR 84 junction. Many of the cumulative projects listed in **Table 5.1-6** and shown in **Figure 5.1-1** of Section 5.1, Overview, located in the immediate project vicinity have been completed. These completed projects include the SFPUC San Antonio Backup Pipeline (SABPL) project, SFPUC Alameda Siphons Seismic Reliability Upgrade (Alameda Siphons) project, SFPUC New Irvington Tunnel (NIT) project, and SFPUC Sunol Valley Water Treatment Plant Expansion and Treated Water Reservoir (SVWTP Expansion) project. However, construction activities associated with present and future cumulative projects in the vicinity—Calaveras Dam Replacement Project (CDRP), SMP-30 Cutoff Wall and Creek Restoration, PG&E Line 303 Alameda Creek Relocation project, and PG&E Gas Line 107 Retirement Project—could affect existing land uses. The construction schedules of these projects could overlap with the construction schedule for the proposed project.

#### *Construction-Related Effects on Existing Land Use Character of the Vicinity*

Cumulative impacts on the existing character of the project vicinity resulting from increases in construction-related noise, traffic congestion, traffic safety hazards, and emissions of criteria air pollutants could be significant if the construction schedule for the proposed project overlapped with the schedules for other projects in the same vicinity. As described above in Impact LU-1, the ACRP would not substantially alter the existing character of the project vicinity during construction because of the temporary nature of construction and because the heavy construction equipment and vehicles would be similar to those being used for current operations at the adjacent SMP-24 and SMP-30 aggregate quarries. Construction of the CDRP, located approximately six miles south of the project area, is anticipated to overlap with construction of the proposed project. In addition, although the construction schedules for the PG&E Line 303 Alameda Creek Relocation project, and PG&E Gas Line 107 Retirement Project are unknown at this time, the construction schedules for these projects could also overlap with construction of the ACRP. However, even if construction of the above listed projects were to overlap with construction of the ACRP, cumulative impacts related to the existing character of the project vicinity would remain less than significant because, as with the proposed project, the construction activities would be temporary and the types of construction equipment and vehicles would be similar to those used for existing operations at the adjacent aggregate quarries. Thus, cumulative land use impacts related to the existing character of the project vicinity during construction would be *less than significant*. No mitigation is required.

#### *Long-Term Effects on the Existing Land Use Character of the Vicinity*

Long-term or permanent cumulative impacts on the existing character of the project vicinity could occur if the proposed project and cumulative projects in the Sunol Valley involved the construction of permanent aboveground facilities or altered the landscape in the same area that together would substantially affect the existing land use character of the vicinity. As described under Impact LU-2, above, the ACRP would not result in long-term adverse effects on the existing character of the project vicinity because all of the proposed aboveground structures would be of similar size and appearance as adjacent mining facilities and other SFPUC water supply facilities in the southern Sunol Valley. The SABPL project, NIT project, Alameda Siphons project, and San Antonio Pump Station Upgrade project all resulted in the construction of new, or alteration of existing, water supply facilities along the Quarry Reach of Alameda Creek that are publicly visible from certain vantage points. These aboveground improvements, all of which have been completed, are located in proximity to other SFPUC water supply facilities and are comparable in scale and use. Thus, the existing land use character of the project vicinity would not be substantially altered by implementation of the proposed ACRP in combination with other cumulative projects, and the impact would be *less than significant*.

**Mitigation:** None required.

# 5.3 Aesthetics

This section addresses the potential aesthetic and visual quality impacts associated with implementation of the Alameda Creek Recapture Project (ACRP or proposed project). Aesthetic resources, commonly referred to as visual resources, are defined as the visible natural and built landscape features that surround a project site. This section describes the existing visual setting in the project vicinity and evaluates the potential effects of the proposed project on visual resources, including views from designated scenic roads, scenic areas, and public view corridors.

## 5.3.1 Setting

The discussion below defines the terms used in the aesthetics evaluation and identifies scenic resources, scenic routes, scenic vistas, and public view corridors in the project vicinity. For the purpose of the aesthetics evaluation, the physical setting includes any area in the project vicinity from which there are views that could be affected by implementation of the ACRP.

### 5.3.1.1 Definitions

Visual character, visual quality, and visual sensitivity are three terms used throughout this section. *Visual character* is the unique set of landscape features that combine to make a view, including native landforms, water, and vegetation patterns as well as built features such as buildings, roads, and other structures. *Visual quality* is the intrinsic appeal of a landscape or scene due to the combination of natural and built features in the landscape. Natural and built features combine to form unique perspectives with varying degrees of visual quality; in this analysis, visual quality is rated as high, medium, or low. *Visual sensitivity* reflects the viewer's level of interest in or concern for a particular visual resource. Visual sensitivity is a measure of how noticeable proposed changes might be in a particular setting and is determined based on the distance from a viewer, the proposed changes, and the duration that a particular view would be available to the viewer. Areas such as scenic vistas, parks, trails, and scenic roadways typically have high visual quality and sensitivity because these locales appear natural, view durations are typically long, and close-up views are more commonly available.

### 5.3.1.2 Regional Setting

The ACRP is located in the Sunol Valley in unincorporated Alameda County, within Alameda watershed[1] lands owned by the City and County of San Francisco (CCSF) and managed by the SFPUC. The Alameda watershed encompasses approximately 36,000 acres of rolling grassland and native oak woodland within the much larger hydrologic boundary of the Alameda Creek watershed, which lies east of the westernmost ridgeline of the Diablo Range. Regional and local access to the project area is provided by Calaveras Road, which runs in a north-south direction through the Sunol Valley and forms the eastern boundary of the project area. Interstate 680

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[1] The SFPUC Alameda watershed is located within the much larger hydrologic boundary of the Alameda Creek watershed. Refer to Section 5.16, Hydrology and Water Quality, for more information.

(I-680) borders the project area to the northwest. Other major roadways in the project vicinity include Niles Canyon Road,[2] which is northwest of the project area, and State Route 84 (SR 84), which is to the north. Alameda County has designated Calaveras Road and Niles Canyon Road as scenic roads, and the portion of I-680 nearest the project area is a state-designated scenic highway.[3] The East Bay Regional Park District's Sunol Regional Wilderness is approximately 3 miles southeast of the project area. The nearest urban areas are the unincorporated town of Sunol, approximately 1 mile northwest of the project area, and the city of Fremont, approximately 4 miles to the west. Alameda Creek flows in a northerly direction through the Sunol Valley and forms the western project area boundary.

#### 5.3.1.3 Existing Land Uses Affecting the Visual Character of the Project Vicinity

The CCSF leases land in the Sunol Valley to quarries and commercial nurseries, as well as for livestock grazing. Land uses within and immediately adjacent to the project area include two commercial gravel quarries operated by Hanson Aggregates and Oliver De Silva under Surface Mining Permit 24 (SMP-24) and Surface Mining Permit 30 (SMP-30), respectively. The project area encompasses a portion of the SMP-24 area; SMP-30 is located immediately south of the project area. The Calaveras Nursery and the Pacific Gas & Electric Company (PG&E) Sunol Substation are located at the north end of the project area. Another commercial nursery—the Lisa Arnold Nursery—is located outside of and immediately north of the project area boundary, north of the PG&E Sunol Substation. The Hetch Hetchy Water & Power (HHWP) Calaveras Substation is located in the southeastern portion of the project area, south of San Antonio Creek and west of Calaveras Road.

Existing structures in the northern portion of the project area include the PG&E Sunol Substation and buildings associated with the Calaveras Nursery. Existing structures in the southern portion of the project area include the HHWP Calaveras Substation building and a discharge vault and electrical control building associated with the San Antonio Backup Pipeline project. Several high-voltage transmission towers and overhead powerlines traverse the project area, and overhead powerlines parallel Calaveras Road. To the south of the project area there is a small office building, several sheds, and aggregate processing facilities associated with SMP-30. Approximately 1.2 miles south of the project area near the Alameda Siphons are several buildings and appurtenant structures associated with SFPUC regional water system operations (see Figure 3-2 in Chapter 3, Project Description). With the exception of the Sunol Valley Chloramination Facility, aboveground structures in the project area and surrounding vicinity are generally small, widely spaced, single-story buildings surrounded by gravel access roads and grassland. Due to the height of these aboveground structures, visual character in the project area are largely unaffected by development. CCSF-owned land east of the project area is largely undeveloped and consists of grass-covered hills interspersed with native trees such as oaks and sycamores. A

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[2] Calaveras Road becomes Niles Canyon Road after it crosses Interstate 680.

[3] Alameda County, East County Area Plan, A Portion of the Alameda County General Plan, Volume I: Goals, Policies, and Programs. May 2002.

portion of the land between Calaveras Road and San Antonio Reservoir is currently used for livestock grazing.

The Sunol Valley Golf Course is southwest of the I-680 / SR 84 junction; approximately 0.25 mile west of the project area on the north side of I-680. There are five private residences in the project vicinity: two residences on Athenour Way, located approximately 1,400 feet (1/4 mile) west of the project area; an SFPUC watershed keeper's residence located west of Alameda Creek, approximately 1 mile southwest of the southern portion of the project area; an SFPUC watershed keeper's residence located east of Calaveras Road, approximately 1 mile southeast of the project area; and a private residence located approximately 1.3 miles to the south of the project area, roughly 800 feet south of the Alameda East Portal. While land uses in the project area are comprised of gravel quarries, transmission towers, overhead powerlines, and SFPUC water supply facilities, the visual quality in the Sunol Valley is considered high because long-range views of hills and native vegetation are available from Calaveras Road.

## 5.3.1.4 Public Views of the Project Area

Motorists traveling on I-680 past the northwestern project area boundary have partial views of the quarries, commercial nurseries, and overhead transmission lines along the valley floor. These views predominantly consist of rolling, grass-covered hills and intervening vegetation. The Alameda Creek Pump Station site is not visible from I-680. Because views from I-680 are partial and fleeting, the viewer sensitivity from this highway is considered low. Views of the project area from the Sunol Valley Golf Course are very distant and indistinct.

As previously mentioned, Calaveras Road is a county scenic road that provides primary access through the project area and is heavily used by motorists and bicyclists. On the eastern side of Calaveras Road, motorists and cyclists are afforded scenic views of rolling grasslands. Views to the west of Calaveras Road primarily consist of multiple transmission lines, aggregate quarries, and SFPUC water supply facilities. Motorists have intermittent views of Staging Area 1 and the Permanent Spoils Site B, respectively. However, views of these areas are predominantly obscured by the presence of mature trees along the southbound side of Calaveras Road. Transmission lines, trees, and shrubs block views of the ACRP site from Calaveras Road (see **Figure 5.3-1**). The project area is not visible from Niles Canyon Road.

The Maguire Peaks Loop Trail, located approximately 2.5 miles southeast of the project area within the Sunol Regional Wilderness, is the nearest recreational trail to the project area. The trail offers limited views of the Sunol Valley; the ACRP project area cannot be seen from this trail because of intervening topography. Views from nearby quarries or nurseries are not considered in this analysis since viewers from these sites are accustomed to the industrial visual character of the ongoing quarry operations.

**Photo 1** - View looking west towards Permanent Spoils Site B from Calaveras Road.

**Photo 2** - View looking west towards the northern access road, just north of the San Antonio Creek crossing, from Calaveras Road.

SOURCE: ESA, 2015

SFPUC Alameda Creek Recapture Project

**Figure 5.3-1**
Views from Calaveras Road

### 5.3.1.5 Private Views of the Project Area

The five private residences mentioned above have long-range views of the project area. No other private residences have views of the project area. Views of the project area from the two Athenour Way residences, which are located approximately 1,400 feet to the west, consist primarily of the SMP-24 aggregate processing facility. Although the residences on Athenour Way are relatively close to the project area, these surrounding residences are already accustomed to ongoing quarry operations and the surrounding setting is already disturbed. Therefore, the viewer sensitivity is considered low. Views from the SFPUC watershed keeper's residence located west of Alameda Creek (approximately 1 mile southwest of the project area) includes distant views of aggregate quarries and nurseries. Because views are distant and the watershed keeper is accustomed to the ongoing quarry operations, viewer sensitivity is considered low. Views of the project area from the private resident located 1.3 mile south of the project area and the other SFPUC watershed keeper's residence east of Calaveras Road are very distant. Given the distance between these residences and the project area, viewer sensitivity is considered low.

## 5.3.2 Regulatory Framework

### 5.3.2.1 Federal Regulations

No federal regulations related to aesthetics apply to the proposed project.

### 5.3.2.2 State Regulations

In 1963, the state legislature established the California Scenic Highway Program, a provision of the Streets and Highways Code, to preserve and enhance the natural beauty of California.[4] The State Highway System includes highways that are either eligible for designation as scenic highways or have been designated as such. I-680, which borders the northwest project area boundary, is the only state-designated scenic highway in the project vicinity.[5]

### 5.3.2.3 Local Policies

#### *Alameda Watershed Management Plan*

The *Alameda Watershed Management Plan* (Alameda WMP)[6] adopted by the SFPUC,[7] guides the management of land in the SFPUC Alameda watershed. The Alameda WMP contains design guidelines for construction activities as well as policies aimed at protecting and restoring the vegetation of the watershed. The following guidelines and policies relate to visual resources and are applicable to the ACRP:

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[4] California Department of Transportation (Caltrans), Scenic Highway Guidelines. 2008.

[5] California Department of Transportation (Caltrans), Officially Designated Scenic Highways, October 14, 2013. Available online: http://www.dot.ca.gov/hq/LandArch/scenic/schwy.htm; accessed May 29, 2015.

[6] San Francisco Public Utilities Commission (SFPUC), Alameda Watershed Management Plan. April 2001.

[7] Per SFPUC Resolution No. 00-0229 dated September 26, 2000.

- ***Action des 5A*****:** Where grading is necessary, contour slopes and landforms to mimic the surrounding environment as much as possible.

- ***Action des 5B:*** Design and site new roads and trails to minimize grading and the visibility of cut banks and fill slopes.

- ***Action des 5D:*** Incorporate architectural siting/design elements that are compatible with the applicable surroundings (i.e., style, scale, form, texture, color).

- ***Action des 5E:*** Eliminate, wherever possible, the use of unpainted metallic surfaces and other sources that may cause increased levels of reflectivity.

- ***Action des 5F:*** Exterior lighting shall be directed downward and sited and shielded such that it is not highly visible or obtrusive.

- ***Action des 5G:*** The silhouette of new structures shall remain below the skyline of bluffs, cliffs, and ridges.

- ***Action veg 4:*** Prior to initiation of any construction project involving grading, a grading plan shall be prepared by the project proponent and approved by appropriate SFPUC staff. Revegetation of all graded areas shall be required to the maximum extent practicable.

### *Alameda County General Plan*

The Scenic Route Element of the Alameda County General Plan designates both Calaveras Road and Niles Canyon Road (State Route 84) as scenic roads.[8] The East County Area Plan of the Alameda County General Plan provides land use goals and policies relevant to sensitive viewsheds, which are considered "special land uses" within the eastern portion of Alameda County. Relevant East County Area Plan policies include:

- ***Policy 110:*** Requiring that developments be sited to avoid or minimize disturbance of large stands of mature, healthy trees and/or healthy individual trees of notable size and age.

- ***Policy 114:*** Requiring the use of landscaping to enhance scenic quality and to screen undesirable views; avoiding the alteration of natural topography and vegetation.

- ***Policy 166:*** Requiring landscaping to reduce the visibility of mining activity and ancillary uses during all phases of quarry operations. Such landscaping should approximate as closely as possible the pre-existing natural conditions.

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[8] Alameda County, Scenic Route Element of the General Plan. Amended May 5, 1994.
Alameda County, East County Area Plan, A Portion of the Alameda County General Plan, Volume I: Goals, Policies, and Programs. May 2002.

## 5.3.3 Impacts and Mitigation Measures

### 5.3.3.1 Significance Criteria

The project would have a significant impact related to visual resources if the project were to:

- Have a substantial adverse effect on a scenic vista;
- Substantially damage scenic resources, including but not limited to trees, rock outcroppings, and other features of the built or natural environment that contribute to a scenic public setting;
- Substantially degrade the existing visual character or quality of the site and its surroundings; or
- Create a new source of substantial light or glare that would adversely affect day or nighttime views in the area or substantially affect other people or properties.

### 5.3.3.2 Approach to Analysis

Due to the nature of the proposed project, there would be no temporary construction-related impacts associated with light and glare during construction for the reasons described below:

- ***Project construction would not create a temporary source of substantial light or glare.*** As indicated in Section 3.4.11, Construction Schedule, of Chapter 3, Project Description, construction activities would generally occur Monday through Saturday between 7:00 a.m. and 7:00 p.m. Since nighttime construction is not proposed, no lighting would be used at night within the construction work areas. Thus, no impact related to creating a temporary source of light or glare would result.

This section evaluates potential impacts on visual resources that could occur during project construction and operations or as a result of facility siting. For the purpose of the analysis, the visual setting is generally defined by the natural and built landscape features that can be seen from public and private vantage points. The overall visual character of a given area results from the unique combination of natural landscape features, including landform, water, and vegetation patterns, as well as built features such as buildings, roads, and other structures.

The visual analysis is based on: field observations of the project area and surrounding vicinity; review of preliminary engineering plans and drawings; review of existing CEQA documentation for related SFPUC projects in the Sunol Valley; evaluations of aerial and ground-level photographs of the project area; and review of relevant planning documents. The evaluation of temporary or short-term visual impacts considers whether construction activities could substantially degrade the existing visual character or quality of the site or surrounding area, as well as the duration over which any such changes would take place. Construction activities occurring in an area for less than one year are typically considered temporary and thus have a less-than-significant impact on visual quality. However, construction activities occurring in an area for over one year could result in significant visual impacts, particularly if scenic vistas are adversely affected.

Permanent visual impacts were assessed based on the project's potential to substantially alter scenic vistas and scenic resources (through such actions as removing trees, introducing new sources of light and glare, or permanently altering the landscape) in a manner that would adversely affect the visual character or quality of the area. The visual sensitivity of the project area was also a factor in determining impact potential.

As described in Section 5.1.2 regarding baseline conditions for evaluation of project impacts, construction-related impacts in this section are evaluated against the existing conditions. The current construction schedule for the proposed project is from fall 2017 to spring 2019 (18 months), and construction of the Calaveras Dam Replacement Project (CDRP) is also anticipated to be completed in spring 2019. Thus, it is possible that operation of the CDRP will commence prior to completion of ACRP construction and that with-CDRP conditions could occur while ACRP is still under construction. However, operation of the CDRP is not expected to change any of the baseline aesthetic conditions analyzed in this section. Therefore, no change in the approach to impact analysis is necessary to account for the with-CDRP conditions. More specifically, the construction-related impacts of the ACRP presented in this section would be the same regardless of the implementation of bypass flows at the Alameda Creek Diversion Dam and instream flow releases from Calaveras Reservoir, and all other aspects of CDRP operations that characterize the with-CDRP conditions.

### 5.3.3.3 Construction Impacts and Mitigation Measures

**Impact AE-1: Project construction would not result in a substantial adverse effect on scenic vistas or temporarily degrade the visual character of the site and its surroundings. (Less than Significant)**

The ACRP could result in temporary construction-related impacts on scenic vistas and the visual character of the project area and vicinity. Before construction mobilization, the contractor would clear and grade the construction work area (including staging areas) by removing vegetation and debris from approximately 13 acres. The barges, vertical turbine pumps, and motors would be delivered to the ACRP site and assembled on-site by the construction contractor. A mobile crane would be required to lift the barges and pumps off the delivery truck and to lower the assembled barges into the quarry pit. Construction workers would use a drill rig to excavate borings for the concrete piers used to support the mooring anchors for the barges. Installation of the underground segment of the HDPE discharge pipelines and powerline, the pipeline connection to the existing 36-inch Sunol Pump Station Pipeline, the pipe manifold, the throttle valve vault, and flow meter would involve: clearing and grading the ground surface along the pipeline alignments; excavating the trench; preparing and installing pipeline sections; installing the pipe manifold, throttle valve vault, and flow meter; backfilling the trench; regrading the ground surface; and revegetating or paving the alignment, as appropriate. For construction of the overhead powerlines, the contractor would remove vegetation within an approximately 50-by-50-foot area for laydown and assembly of each power pole. The contractor would use a utility truck or double-axle trailer to install and tension the overhead powerline.

Distant views of construction activities could be available from nearby residences (the SFPUC watershed keeper's residence located west of Alameda Creek, the SFPUC watershed keeper's residence located east of Calaveras Road, and the private residence located 1.3 miles south of the project area, near the Alameda West Portal). However, although the visual quality is considered high, private views would be greatly limited due to distance and partially obscured by vegetation and topography. Further, because this views would be seen by only a few individuals in a private setting, the visual impact on these residences would not be considered significant throughout the construction phase. Therefore, project construction activities would not substantially degrade views from nearby residences, and the impact to these private residences would be less than significant.

Construction activities would not be visible from nearby recreational trails (i.e., the Maguire Peaks Trail) due to distance from the project area as well as the screening effects provided by vegetation and topography.

From I-680, a state-designated scenic highway, motorists could potentially see tall pieces of construction equipment during certain phases of construction (i.e., the drill rigs that would be used to drill the borings for the mooring piers and the mobile crane that would be used to move the barges). The proposed construction work areas and staging areas, however, are not visible from I-680. The highway borders the northwestern project area boundary where views from I-680 are dominated by rolling, grass-covered hills, transmission lines, and intervening vegetation and topography. Given the limited ability to view construction activities from I-680, the impact to visual vistas along I-680 would be less than significant.

From Calaveras Road, a county-designated highway, project construction activities would be partially obscured due to intervening vegetation and topography. Of the five primary staging areas, Staging Areas 1, 2, and 3 are adjacent to, and potentially visible from, Calaveras Road. These staging areas would provide a combined total of 9 acres for vehicle and equipment parking, construction offices, and storage of construction materials throughout the 18-month construction period. Permanent Spoils Sites A and B are also adjacent to, and potentially visible from, Calaveras Road. As discussed in Section 3.5.2 in Chapter 3, Project Description, up to an estimated 2,012 cubic yards of excess spoils generated during construction would be spread out over 2.5 acres at one of the two permanent spoils sites. Although a row of mature trees along this section of Calaveras Road largely obscures these staging areas and permanent spoils sites from direct view, earthwork activities and equipment would be intermittently visible. Views of construction activities associated with the overhead powerline could also be visible from some vantage points along Calaveras Road. However, because views of construction activities from Calaveras Road would be fleeting, partially obscured, and set against a backdrop of quarry pits, aggregate processing facilities, and SFPUC water supply infrastructure, neither visual character nor scenic vistas would be substantially degraded. The impact would be a less than significant. There are no other designated scenic roadways or scenic viewpoints from which the project area could be seen.

**Mitigation**: None required.

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### 5.3.3.4 Operational Impacts and Mitigation Measures

**Impact AE-2: The proposed project would not result in long-term adverse effects on scenic vistas and scenic resources or degrade the visual character of the site and its surroundings. (Less than Significant)**

The concrete piers for the mooring system would extend four feet above the ground surface; these 30-inch-diameter structures would not be noticeable from public vantage points. Similarly, the assembled barges would be at grade with the water surface of Pit F2 and would not be visible from public vantage points. Therefore, the barges and mooring system would have no impact on scenic vistas or the visual character of the area.

Project implementation could have long-term effects on scenic resources as a result of the aboveground facilities (electrical control building, electrical transformer, and overhead powerlines) and the permanent placement of construction spoils at the Permanent Spoils Sites A and B. Project-related effects on scenic resources could, in turn, affect scenic vistas and visual character. Potential impacts on scenic resources and associated effects on scenic vistas and visual character associated with the proposed aboveground facilities are described below.

#### *Electrical Control Building and Electrical Transformer*

The proposed electrical control building and electrical transformer would be constructed south of Pit F2 at the western corner of Pit F3-West. The building would be approximately 28 feet wide, 66 feet long, and 28 feet tall and would be enclosed by an 8-foot-high chain-link and barbed wire security fence. Chain-link security fencing would enclose an approximately 16,700-square-foot area around the electrical control building and transformer. The fencing would be 8 feet tall. Exterior lighting fixtures would be either compact fluorescent or LED light controlled by a time clock/photocell and light switch. Exterior lights would face downward and would be shielded.[9] Six madrone trees would be planted around the building: five on the south side for shading and one on the north side. The new electrical transformer would be approximately 9 feet long, 7 feet wide, and is estimated to be approximately 10 feet tall. These facilities would be similar in size and height to other SFPUC buildings and electrical substations in the area.

Because these facilities would be sited approximately 0.25 miles from I-680 and approximately 0.4 miles from Calaveras Road, public views from these designated scenic roadways would be relatively distant and largely obscured by distance, intervening trees, and vegetation. Thus, the long-term impact on scenic vistas and visual character resulting from these project components would be less than significant.

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[9] San Francisco Public Utilities Commission (SFPUC), 2014a, *Final Conceptual Engineering Report for Alameda Creek Recapture Project*, Prepared by SFPUC Engineering Management Bureau. November 21, 2014.

### *Overhead Powerline*

Either the HHWP Calaveras Substation or the PG&E Sunol Substation would provide electrical power for ACRP components. Thus, depending on the power source selected by the SFPUC, a new overhead powerline would extend either between the HHWP Calaveras Substation and the electrical control building or between the PG&E Sunol Substation and the electrical control building. The powerline would be similar to existing overhead powerlines that traverse the Sunol Valley (see Figure 5.3-1, Photo 2). Because the new overhead powerline would be consistent with the visual setting of the area, it would not substantially degrade scenic vistas or the visual character of the area. This impact would be less than significant.

### *Earthen Berms at Permanent Spoils Sites A and B*

Excess spoils generated during project construction would be placed in a permanent earthen berm at one of two spoils placement sites along Calaveras Road. Construction spoils from ACRP would be spread out over 2.5 acres at one of the spoils sites. The site would be revegetated after spoils placement.

Permanent Spoils Site A covers 3.4 acres and is located south of I-680 adjacent to the west side of Calaveras Road (see **Figure 3-3** in Chapter 3, Project Description). This site has also been used for the permanent placement of spoils generated by the New Irvington Tunnel (NIT) project, another SFPUC WSIP facility improvement project in the Sunol Valley. If spoils generated during construction of the ACRP are placed at Permanent Spoils Site A, the maximum height of Permanent Spoils Site A would not exceed 20 feet above the elevation of Calaveras Road with 2:1 (horizontal: vertical) slopes. The permanent berm would have a 20-foot setback from Calaveras Road. The west side of Calaveras Road is bordered by an almost continuous line of mature trees that screen the adjacent quarries and long-range views of the hills to the west, except for brief gaps. Through these gaps, brief views of quarry activities, overhead power lines, and I-680 in the distance can be seen by motorists and bicyclists along Calaveras Road. Trees along this section of Calaveras Road would remain in place as part of the project.

Excess spoils could also be placed in a permanent berm at the Permanent Spoils Site B. The berm at this site would cover approximately 5.5 acres immediately east of Pit F3-East and west of Calaveras Road (see Figure 3-3). If spoils generated during construction of the ACRP are placed at Permanent Spoils Site B, the maximum height of Permanent Spoils Site B would not exceed 25 feet and with 2:1 (horizontal: vertical) slopes. This site has also been used for the permanent placement of spoils generated by other SFPUC WSIP facility improvements projects in the Sunol Valley, including the San Antonio Backup Pipeline project and Alameda Siphons Seismic Reliability Upgrade project. Similar to views of Permanent Spoils Site A, the west side of Calaveras Road along Permanent Spoils Site B is bordered by shrubs and mature trees that screen the adjacent quarry pits and long-range views of the hills to the west. However, due to a large gap in vegetation near the gated access road located just north of the San Antonio Creek crossing, motorists and bicyclists traveling north on Calaveras Road would have a brief view of the southern end of the berm. Because views of this spoils site from Calaveras Road are limited and relatively fleeting, the berm would be set back 200 to 400 feet from the road, and the berm would help obscure gravel mining activities to the west of the berm, the impact related to this earthen berm on scenic resources and the associated effects on scenic vistas and the visual character surrounding the site would also be less than significant.

Although direct public views of the project area, including views of Permanent Spoils Sites A and B, are available from Calaveras Road, views from the roadway are partial, impeded by existing vegetation and topography, and fleeting as vehicles move along the roadway. The impact to visual vistas along Calaveras Road would be less than significant. Spoils disposal is consistent with the existing industrial nature of the current land uses in the project area and immediate vicinity, which include active gravel mining operations, and would not represent a substantial change in visual conditions.

Views of the permanent spoils sites from Calaveras Road are limited and relatively fleeting. Even when the spoils from the ACRP are added to the berms, the height of the berms would not tower over the road. Further, the berms would help obscure gravel mining activities to the west of the berm. Therefore, the impact on scenic resources and the associated effects on scenic vistas and the visual character surrounding the site related to the placement of construction spoils in earthen berms at the Permanent Spoils Sites A and B would be less than significant.

Neither berm is visible from I-680 due to topography and intervening vegetation; thus, no permanent impact to scenic vistas along I-680 would result.

### *Vegetation Removal*

As part of construction mobilization activities for the proposed project, construction work areas and staging areas would be cleared of vegetation and debris and then graded, as necessary, to provide a relatively level surface for the movement of construction equipment. One tree that exists near the proposed electrical control building and electrical control building would be removed to accommodate construction activities. In addition, some trees and/or vegetation on the side wall of Pit F2 would be trimming and possibly removed. As described in Chapter 3, Section 3.5.10, Site Cleanup and Restoration, with the exception of the earthen berms at the Permanent Spoils Sites A and B (the impact of which is discussed above), upon the completion of construction activities, the SFPUC's contractor(s) would generally restore staging areas and construction work areas to their preconstruction conditions. Such restoration activities would generally include reestablishing preconstruction contours and drainage patterns, revegetating disturbed areas, and installing permanent erosion and sedimentation controls to minimize post-construction erosion. Six madrone trees would be planted around the electrical control building and electrical transformer to provide shade and visual screening. Although tree replacement is not planned on the side slope of Pit F2, the contractor would revegetate all disturbed areas, including the quarry pit sidewalls. The contractor would also revegetate the earthen berms and install permanent erosion and sedimentation controls to minimize post-construction erosion at the permanent spoils sites. Given that trees would be planted around the aboveground facilities and all disturbed areas would be revegetated upon project completion, vegetation removal would not substantially degrade scenic vistas or the visual character of the area. The impact would be less than significant.

**Mitigation**: None required.

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**Impact AE-3: The proposed project would not create a new permanent source of substantial light or glare. (Less than Significant)**

The SFPUC would install exterior nighttime lighting at the proposed electrical control building. Exterior nighttime lighting could be visible from the nearest sensitive receptors (the two residences at Athenour Way) as well as from other private residences in the Sunol Valley. Alameda WMP *Action des 5F* requires SFPUC projects with exterior lighting in the Alameda Watershed to have the exterior lighting directed downward and sited and shielded in such a way that it is not highly visible or obtrusive. The SFPUC would equip permanent lighting at these facilities with timeclock and motion-sensors, direct the lighting downward, and site and shield the lighting to ensure that it is not highly visible or obtrusive to nearby residences. As a result, the permanent nighttime lighting would not be a constant source of light and glare, and this impact associated with new sources of light and glare would be less than significant.

**Mitigation**: None required.

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### 5.3.3.5 Cumulative Impacts and Mitigation Measures

**Impact C-AE: The project, in combination with past, present, and probable future projects, would not substantially affect aesthetics. (Less than Significant)**

The geographic scope for potential cumulative impacts on aesthetic resources encompasses the ACRP construction work areas and immediate vicinity. For the purpose of this analysis, this area is the area along the lower valley floor between the Alameda Siphons and I-680. It should be noted that the aesthetic and visual quality of the project area (the portion of the Sunol Valley between the Alameda Siphons and I-680) has already been substantially affected by past and ongoing activities, including gravel mining operations and roadway development, and as such the visual quality of the area has already been degraded.

#### *Temporary Construction-Related Impacts on Scenic Resources or the Visual Character of the Site and its Surroundings*

Construction of the ACRP would occur over 18 months, with construction anticipated to begin in 2017. As described under Impact AE-1, above, the project-level impact to scenic resources and visual character associated with ACRP construction activities would be less than significant due to distance and because the ACRP construction work area is partially obscured from public and private vantage points by vegetation and topography. Cumulative projects in the lower Sunol Valley with construction schedules that could potentially overlap with construction of the ACRP are the PG&E Gas Line 107 Retirement Project and the PG&E Gas Line 303 Alameda Creek

Relocation project.[10] Construction associated with these two cumulative projects would occur primarily in the Alameda and San Antonio Creek channels at elevations lower than the surrounding ground surface and are expected to be obscured by topography and vegetation. Because of this, even if all three projects were to occur simultaneously, the combined temporary effect on scenic resources and visual character would not be substantial and the cumulative impact would be less than significant.

### *Long-Term Impacts on Scenic Resources or the Visual Character of the Site and its Surroundings*

Permanent aboveground facilities proposed as part of the ACRP are the electrical control building, electrical transformer, and overhead powerlines. The cumulative projects in Table 5.1-6 that also involve permanent aboveground structures in the lower Sunol Valley are the SFPUC SABPL project, SFPUC Alameda Siphons Seismic Reliability Upgrade project, SFPUC San Antonio Pump Station Upgrade project, and the SMP-30 Expansion project. These cumulative projects have already been completed and, like the structures associated with the ACRP, the few structures that were constructed under the cumulative projects are similar in size and height to other buildings and overhead powerlines in the area. The aboveground structures that would be constructed under the ACRP, when combined with other existing aboveground structures in the lower Sunol Valley, would be spaced out and would blend in with the existing built environment. In addition, the existing and proposed aboveground structures are located relatively distant from scenic resources and obscured from public views by vegetation and topography in the valley. Thus, the cumulative, long-term impact on visual character and scenic resources associated with aboveground structures would be less than significant.

As described above under Impact AE-2, excess spoils generated during construction of the ACRP as well as other SFPUC projects in the Sunol Valley would be permanently placed in an earthen berm at the Permanent Spoils Sites A and B, both of which are located along the west side of Calaveras Road. The completed SABPL project, Alameda Siphons Seismic Reliability Upgrade project, Sunol Valley Water Treatment Plant Expansion and Treated Water Reservoir project, and NIT project also placed excess spoils at these permanent spoils sites. Although both of the permanent earthen berms would be partially visible from Calaveras Road, the long-term cumulative impact on scenic resources and/or the visual character of the site and its surroundings would not be significant. Accounting for the spoils generated during construction of the other cumulative projects along with the ACRP, the Permanent Spoils Site A would be no higher than 20 feet above the height of Calaveras Road, and the Permanent Spoils Site B would be no higher than 25 feet above the adjacent ground surface. Furthermore, existing trees and vegetation would screen most views of the earthen berms from Calaveras Road, except for brief glimpses through gaps in the trees. Because the earthen berms would not tower over Calaveras Road and would be minimally visible from

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[10] Because the construction schedules for the SMP-30 Cutoff Wall and Creek Restoration project, the PG&E Gas Line 107 Retirement Project, and the PG&E Line 303 Alameda Creek Relocation project are unknown, this analysis conservatively assumes they could overlap with ACRP construction activities.

Calaveras Road, there would be no substantial change in the visual character of this portion of the Sunol Valley and the cumulative impact would be less than significant.

### *Permanent Sources of Light or Glare*

Like the permanent exterior lighting that has been installed as part of other SFPUC projects in the lower Sunol Valley, the exterior lighting at the proposed electrical control building would be designed in accordance with Alameda WMP *Action des 5f*, which requires SFPUC projects with exterior lighting in the Alameda Watershed to have the exterior lighting directed downward and sited and shielded it in such a way that it is not highly visible or obtrusive. The SFPUC would equip permanent lighting at all facilities with timeclock and motion-sensors, direct the lighting downward, and site and shield the lighting to ensure that it is not highly visible or obtrusive to nearby residences. As a result, the permanent nighttime lighting would not be a constant source of light and glare and would not be highly visible or obtrusive to nearby residences. Thus, the cumulative long-term impact on visual light or glare associated with permanent exterior lighting would be less than significant.

**Mitigation**: None required.

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# 5.4 Population and Housing

This section discusses the potential for the proposed Alameda Creek Recapture Project (ACRP or proposed project) to induce substantial population growth, displace housing, or create a substantial demand for additional housing in the project area, or necessitate the construction of housing outside of the project area. The growth-inducement effects of the ACRP within the context of the SFPUC's Water System Improvement Program (WSIP) and the overall regional water system, as well as the indirect effects of that growth, are analyzed in the Program Environmental Impact Report (PEIR) on the WSIP, which is incorporated into this Environmental Impact Report (EIR) by reference.[1] The WSIP is summarized in Chapter 2, Section 2.2.2, SFPUC Water System Improvement Program, and its analysis of growth-inducement effects are summarized in Chapter 6, Section 6.1, Growth-Inducing Impacts.

## 5.4.1 Setting

The proposed project is located in the Sunol Valley of unincorporated Alameda County, south of the Interstate 680 / State Route 84 interchange. The proposed project would be located in the Alameda watershed, which is comprised of land owned by the City and County of San Francisco (CCSF) and managed by the SFPUC as part of the regional water system. The Alameda watershed[2] encompasses 56 square miles (36,000 acres) of largely undeveloped, rolling grassland and scattered oak woodlands that drain to San Antonio Reservoir, Calaveras Reservoir, and Alameda Creek.

Existing land uses in the vicinity of the proposed project include commercial gravel mining operations, commercial nurseries, grazing, regional open space, SFPUC water supply facilities, and private residences. There are five private residences in the project vicinity: two residences on Athenour Way, located approximately 1,400 feet (1/4 mile) west of the project area; an SFPUC watershed keeper's residence located west of Alameda Creek, approximately 1 mile southwest of the southern portion of the project area; an SFPUC watershed keeper's residence located east of Calaveras Road, approximately 1 mile southeast of the project area; and a private residence located approximately 1.3 miles to the south of the project area, roughly 800 feet south of the Alameda East Portal. The nearest urban areas are the unincorporated town of Sunol, approximately 1 mile northwest of the project area, and the city of Fremont, approximately 4 miles to the west. (See Section 5.2, Land Use, for additional information regarding land uses in the project vicinity.)

Provisional housing estimates developed by the State of California in May 2015 indicate that Alameda County is home to approximately 1,594,569 residents and has approximately 591,235

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[1] San Francisco Planning Department, *Final Program Environmental Impact Report for the San Francisco Public Utilities Commission's Water System Improvement Program*, File No. 2005.0159E, State Clearinghouse No. 2005092026. October 30, 2008.

[2] The SFPUC Alameda watershed is located within the much larger hydrologic boundary of the Alameda Creek watershed. Refer to Section 5.16, Hydrology and Water Quality, for more information.

housing units.[3] Between January 2014 and January 2015, the total population of Alameda County increased by approximately 1.3 percent.[4]

## 5.4.2 Regulatory Framework

### 5.4.2.1 Federal and State Regulations

There are no federal or state regulations governing population and housing that apply to the proposed project.

### 5.4.2.2 Local Policies

There are no local policies governing population and housing that apply to the proposed project.

## 5.4.3 Impacts and Mitigation Measures

### 5.4.3.1 Significance Criteria

The project would have a significant impact related to population and housing if the project were to:

- Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure);
- Displace substantial numbers of existing housing units or create demand for additional housing, necessitating the construction of replacement housing; or
- Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere.

### 5.4.3.2 Approach to Analysis

Due to the nature of the proposed project, there would be no impacts related to population and housing, regardless of the baseline conditions, for the reasons described below

- ***Induce Substantial Population Growth in an Area, Either Directly or Indirectly.*** During the approximately 18-month construction period, up to 34 construction workers would be employed (see **Table 3-4** in Chapter 3, Project Description). It is expected that regional Bay Area labor could meet the construction workforce requirements. While some workers might temporarily relocate from other areas, the increase would be minor (fewer than 10 workers) and temporary (approximately 18 months). Existing SFPUC staff would conduct long-term operation and maintenance of the project, and additional personnel would not be hired. The proposed project would not result in the construction of new

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[3] State of California, Department of Finance, *E-5 Population and Housing Estimates for Cities, Counties and the State — January 1, 2011- 2015*. Sacramento, California, May 2015.

[4] State of California, Department of Finance, *E-1 Population Estimates for Cities, Counties and the State with Annual Percent Change — January 1, 2014 and 2015.* Sacramento, California, May 2015.

homes or businesses in the area or extend new roads or other infrastructure into undeveloped areas. Therefore, construction and operational activities associated with the proposed project would not in themselves result in a substantial increase in the local population, and there would be no growth-inducement impacts associated with the project.

As a WSIP facility improvement project, designed to increase delivery reliability and aid in meeting customer water supply requests, the ACRP would be a contributing factor in the growth-inducement potential of the overall WSIP. Growth inducement under the proposed project within the context of the WSIP and the regional water system is discussed in Chapter 6, Section 6.1, Growth-Inducing Impacts. Indirect effects on population and housing due to the project's growth-inducement potential, as well as the secondary effects of growth, are also discussed in Section 6.1.

- ***Displace Substantial Numbers of Housing Units or Create Demand for Additional Housing.*** The proposed project would improve the SFPUC's water supply infrastructure in the Sunol Valley and would not displace any housing units. Up to 34 construction workers organized in crews ranging from 4 to 10 workers would be employed as part of the proposed project (see Table 3-4 in Chapter 3, Project Description); however, it is expected that local laborers could meet the construction workforce requirements and would not create a long-term demand for additional housing. Therefore, this significance criterion is not applicable to the proposed project and is not discussed further.

- ***Displace Substantial Numbers of People.*** The proposed project would improve the SFPUC's water supply infrastructure in the Sunol Valley, and project construction and operation would not displace housing units or people or necessitate the construction of replacement housing elsewhere. Therefore, this significance criterion is not applicable and is not discussed further.

### 5.4.3.3 Impacts and Mitigation Measures

As described above, there would be no growth-inducement impacts due solely to the proposed project, and implementation of the project would not result in impacts related to housing. Therefore, there would be no impacts related to this resource topic. No mitigation measures are required.

As discussed in Chapter 6, Section 6.1, Growth-Inducing Impacts, the ACRP—as a WSIP facility improvement project designed to increase delivery reliability and aid in meeting customer water supply requests,—would contribute to the WSIP's growth-inducement potential and the associated significant and unavoidable indirect effects of growth. The indirect effects of the growth anticipated in the general plans of jurisdictions in the SFPUC service area have been identified in the EIRs prepared for those general plans, and the mitigation measures specified in the general plan EIRs to reduce the impacts of growth also address the growth impacts of the WSIP. No mitigation measures are required for project-specific effects related to growth inducement and housing. (For additional information on this topic, refer to the WSIP PEIR, Chapter 7 and Appendix E, which are incorporated into this EIR by reference.)

### 5.4.3.4 Cumulative Impacts and Mitigation Measures

Because the proposed project would not result in any project-specific impacts related to growth inducement and housing, implementation of the project would not result in cumulative impacts beyond the secondary and indirect impacts of growth associated with the proposed project within the context of the WSIP, as described in this EIR in Chapter 6, Section 6.1, Growth-Inducing Impacts.

# 5.5 Cultural Resources

Cultural resources include historical resources, unique archaeological resources, and human remains. This section describes the existing cultural resources in the project area, evaluates the potential for implementation of the proposed Alameda Creek Recapture Project (ACRP or proposed project) to result in adverse effects on significant historic-period architectural, historic or prehistoric archaeological, and other cultural resources. Mitigation measures to reduce impacts to a less-than-significant level are identified, where appropriate. Impacts on paleontological resources are described in Section 5.15, Geology and Soils, of this EIR.

## 5.5.1 Setting

### 5.5.1.1 CEQA Area of Potential Effects

The definition of the CEQA Area of Potential Effects (C-APE) is modeled after the federal Area of Potential Effects (APE), as defined in Title 36 of the Code of Federal Regulations (CFR), Section 800.16(d): the C-APE is the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historical resources (i.e., resources that meet the criteria for listing in the California Register of Historical Resources [California Register]), if any such resources exist. The C-APE is influenced by the scale and nature of an undertaking and may be delineated differently for different kinds of effects potentially caused by the undertaking.

#### *Architectural C-APE*

The architectural C-APE encompasses all areas where ground-disturbing activities are proposed and, in the case of the ACRP, is identical to the project area boundary (an approximately 220-acre area; see project area boundary on Figure 1-2). Access routes, work areas, and staging areas are included in the C-APE. Another consideration in determining the architectural C-APE involves the potential for construction equipment or methodologies to generate vibration, such as open-trenching, directional drilling, and vibratory rollers or compactors, as vibration levels above certain criteria can cause damage to historical architectural resources. If construction-related vibration would extend beyond the anticipated ground disturbance area, then the horizontal extent of the architectural C-APE would be expanded to include all areas that could be subject to significant construction-related vibration. However, in the case of the ACRP, all construction-related vibration that could exceed potential damage thresholds for historical architectural resources would not extend beyond the project footprint as delineated in Figure 1-2.

As discussed in Section 5.3 Aesthetics, the ACRP does not have the potential to result in significant effects to the viewshed including features of the built environment that contribute to a scenic public setting.

#### *Archaeological C-APE*

Like the ACRP architectural C-APE, the lateral extent of the archaeological C-APE is identical to the project area boundary and includes construction access routes, work areas, and staging areas.

However, the archaeological C-APE is three-dimensional; it extends below the ground surface to reflect the estimated length, width, and depth of excavations associated with each project component (see **Table 5.5-1**, below).

**TABLE 5.5-1**
**ANTICIPATED SUBSURFACE EXCAVATION DURING CONSTRUCTION**

| Project Component | Area (square feet) | Area (acres) | Maximum Depth (feet) |
|---|---|---|---|
| Mooring anchors for floating barges | 30 | <0.1 | 30 |
| Power poles (based on 50- by 50-foot area around each power pole) | 37,500 | 0.9 | 6 |
| 36-inch pipeline connection | 560 | <0.1 | 10 |
| 16-inch pipeline | 1,020 | <0.1 | 7 |
| Electrical control building and electrical transformer[a] | 14,200 | 0.3 | 3 |
| Throttle valve vault | 555 | <0.1 | 13 |
| Spoils placement at Permanent Spoils Site A or B[b] | 108,900 | 2.5 | 3 |
| Staging Area 1 | 104,550 | 2.4 | 3 |
| Staging Area 2 | 108,900 | 2.5 | 3 |
| Staging Area 3 | 91,500 | 2.1 | 3 |
| Staging Area 4 | 26,136 | 0.6 | 3 |
| Staging Area 5 | 52,272 | 1.2 | 3 |
| **Total Disturbance Area =** | **546,123** | **13** | |

NOTES:

[a] The total work area at the electrical control building and transformer site includes the enclosed paved driveway and parking area, where ground disturbance would not occur.

[b] Excess spoils generated during construction would be placed in permanent berms at these two sites.

[c] It is assumed that ground disturbance of up to 3 feet in depth could occur at the proposed staging areas and permanent spoils disposal sites.

SOURCES: SFPUC, 2014a. *Alameda Creek Recapture Project 10% Design Drawings for Conceptual Engineering Report*. November 2014. SFPUC, 2014b. *Final Conceptual Engineering Report for Alameda Creek Recapture Project*, Prepared by SFPUC Engineering Management Bureau. November 21, 2014.

## 5.5.1.2 Prehistoric Setting

### *Geologic Context*

The San Francisco Bay Area has undergone dramatic landscape changes since humans began to inhabit the region more than 10,000 years ago. Rising sea levels and increased sedimentation into streams and rivers are among some of the changes.[1] In many places, the interface between older land surfaces and alluvial fans is marked by a well-developed buried soil profile, or a paleosol. Paleosols preserve the composition and character of the earth's surface prior to subsequent

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[1] Ibid.

sediment deposition; thus, paleosols have the potential to preserve archaeological resources if the area was occupied or settled by humans.[2] Because human populations have grown since the arrival of the area's first inhabitants, younger paleosols (late Holocene) are more likely to yield archaeological resources than older paleosols (early Holocene or Pleistocene).

The majority of the construction-related ground-disturbing activities for the proposed project would occur in areas mapped as modern gravel quarries and artificial fill. These landforms do not have the potential to contain deeply buried cultural resources. The northern and southeastern corner of the archaeological C-APE are mapped as Holocene stream fan alluvial deposits.[3] While this type of landform generally has a high potential to contain buried archaeological deposits,[4] the majority of the land areas of this kind within the C-APE have been highly disturbed by mining activities. The results of exploratory trenching conducted for the San Antonio Backup Pipeline (SABPL) project along the south side of San Antonio Creek near the Hetch Hetchy Water & Power (HHWP) Calaveras Substation indicates there is a low potential for buried archaeological deposits to have been preserved in the Holocene stream-fan alluvial deposits in the project area.[5]

The SABPL project also examined the northeastern and northwestern walls of Quarry Pit F3-East for buried soils and artifacts for.[6] Where they were covered by grassy vegetation, the quarry pit walls were cleared using hand tools in seven locations in the uppermost 16 feet of the slope. Sixteen-foot-wide areas were cleared, which provided broad exposures of sediment. Two other areas, at the western and eastern corners of the pit, were more accessible and open, and 33-foot-wide exposures were examined there. Quarry pit walls examined invariably showed deep beds of Pleistocene-age gravels and cobbles at depths of 13 to 16 feet below the ground surface. Above the cobbles, the reddish brown silt loams in the exposures showed no evidence of midden, artifacts, or fire-altered rock typical of archaeological sites in the region, and also lacked darkened layers typical of buried soils. Based on this sample, it is concluded that the buried prehistoric deposits are unlikely to be present.

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[2] Meyer, Jack, and Jeffrey Rosenthal, Geoarchaeological Overview of the Nine Bay Area Counties in Caltrans District 4. Prepared for Caltrans District 4. 2007.

[3] Helley E.J., and Graymer R.W., *Quaternary Geology of Alameda County, and Parts of Contra Costa, Santa Clara, San Mateo, San Francisco, Stanislaus, and San Joaquin Counties, California: a Digital Database*. U.S. Geological Survey Open File Report 97-97. 1997.

[4] Meyer, Jack, and Jeffrey Rosenthal, Geoarchaeological Overview of the Nine Bay Area Counties in Caltrans District 4. Prepared for Caltrans District 4. 2007.

[5] Wohlgemuth, Eric, and Phillip Kaijankoski, *Historic Context and Archaeological Survey Report for the San Antonio Backup Pipeline Project, Alameda County, California.* Prepared by Far Western Anthropological Research Group, Inc. for the San Francisco Public Utilities Commission. On file (S-36480) at the Northwest Information Center of the California Historical Resources Information System, Sonoma State University. 2009.

[6] Wohlgemuth, Eric, and Phil Kaijankoski, *Addendum to the Historic Context and Archaeological Survey Report for the Proposed San Antonio Backup Pipeline, Alameda County, California.* Prepared for the San Francisco Public Utilities Commission. April 2011.

### *Prehistoric Context*

Categorizing the prehistoric period into cultural stages allows researchers to describe a broad range of archaeological resources with similar cultural patterns and components during a given timeframe, thereby creating a regional chronology. This section provides a brief discussion of the chronology for the archaeological C-APE.

Milliken et al. (2007)[7] provide a framework for interpreting human history in the San Francisco Bay Area by dividing it into four broad periods: the *Paleoindian Period* (11,500 to 8000 B.C.), the *Early Period* (8000 to 500 B.C.), the *Middle Period* (500 B.C. to A.D. 1050), and the *Late Period* (A.D. 1050 to 1550). Economic patterns, stylistic aspects, and regional phases further subdivide cultural patterns into shorter periods. This scheme uses economic and technological types, sociopolitics, trade networks, population density, and variations of artifact types to differentiate between cultural periods.

The *Paleoindian Period* (11,500 to 8000 B.C.) was characterized by big-game hunters occupying broad geographic areas. Evidence of human habitation during the *Paleoindian Period* has not yet been discovered in the San Francisco Bay Area. During the *Early Holocene* (*Lower Archaic*; 8000 to 3500 B.C.), geographic mobility continued from the *Paleoindian Period* and is characterized by use of the millingslab and handstone as well as large, wide-stemmed and leaf-shaped projectile points. The first cut shell beads and the mortar and pestle are first documented in burials during the *Early Period* (*Middle Archaic*; 3500 to 500 B.C.), indicating the beginning of a shift to sedentism. During the *Middle Period*, which includes the *Lower Middle Period* (*Initial Upper Archaic*; 500 B.C. to A.D. 430) and *Upper Middle Period* (*Late Upper Archaic*; A.D. 430 to 1050), geographic mobility likely continued, although groups began to establish longer-term base camps in localities from which a more diverse range of resources could be exploited. The first rich black middens are recorded from this period. The addition of milling tools as well as obsidian and chert concave-base projectile points, and the occurrence of sites in a wider range of environments suggest that the economic base for humans during this period was more diverse. By the *Upper Middle Period*, mobility was being replaced by the development of numerous small semi-sedentary villages. Around A.D. 430 a “dramatic cultural disruption” occurred, as evidenced by the sudden collapse of the *Olivella* saucer bead trade network.[8] During the *Initial Late Period* (*Lower Emergent*; A.D. 1050 to 1550), social complexity developed toward lifeways of large, central sedentary or semi-sedentary villages with resident political leaders and specialized activity sites. Artifacts associated with the period include the bow and arrow, small corner-notched projectile points, and a diversity of beads and ornaments.

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[7] Milliken, Randall, Richard T. Fitzgerald, Mark G. Hylkema, Randy Groza, Tom Origer, David G. Bieling, Alan Leventhal, Randy S. Wiberg, Andrew Gottsfield, Donna Gillette, Viviana Bellifemine, Eric Strother, Robert Cartier, and David A. Fredrickson, Punctuated Cultural Change in the San Francisco Bay Area. In *California Prehistory: Colonization, Culture, and Complexity*. Jones, Terry L., and Klar, Kathryn A., eds., AltaMira Press, Maryland. 2007.

[8] Ibid

### *Ethnographic Context*

The archaeological C-APE is located within the traditional territory of the Costanoan or Ohlone people.[9] These people have been collectively referred to by ethnographers as Costanoan, but were actually distinct sociopolitical groups that spoke at least eight languages of the same Penutian language group. The Ohlone occupied a large territory from San Francisco Bay in the north to the Big Sur and Salinas rivers in the south. The primary sociopolitical unit was the tribelet, or village community, which was overseen by one or more chiefs.

Economically, the Ohlone engaged in hunting and gathering. Their territory encompassed both coastal and open valley environments that contained a wide variety of resources, including grass seeds, acorns, bulbs and tubers, bear, deer, elk, antelope, a variety of bird species, and rabbit and other small mammals. The Ohlone acknowledged private ownership of goods and songs, and village ownership of rights to land and/or natural resources. They appear to have aggressively protected their village territories, requiring monetary payment for access rights in the form of clamshell beads, and even shooting trespassers if caught. After European contact, Ohlone society was severely disrupted by missionization, disease, and displacement. People of Ohlone descent still live in the San Francisco Bay Area.

## 5.5.1.3 Historic-Period Setting

Pedro Fages first recorded passing through the Sunol Valley in 1770. The land later came under the control of Mission San Jose following its establishment in 1797. During the Mexican Period (the 1820s through 1840s), the town of Sunol and the adjacent valley were named after Antonio Sunol who, in 1839, became part owner of the 48,000-acre Rancho El Valle de San Jose. Sunol used 14,000 acres for grazing at least 10,000 head of cattle, 500 horses, and 5,000 sheep between 1839 and 1849. Wheat production began in the Sunol Valley in the 1850s, but the valley largely remained a ranching area.[10]

Most of the former rancho passed into the hands of Charles Hadsell in the 1860s, and, like many farmers in southern Alameda County, Hasdell grew wheat. As Alameda County farmers learned that orchard farming—particularly specialty crops such as walnuts and apricots—was much more lucrative than grain farming, Hadsell began transitioning to orchard farming in the 1870s. The California Nursery Company moved operations to Niles in 1865 following an infestation of scale on fruit trees in San Jose's orchards and nurseries, which gave a boost to the Niles area's fruit and nursery industry. Nearby Alameda Creek provided the necessary water for irrigation of the orchards. Hadsell constructed a ditch to irrigate the orchards with water from the creek.[11]

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[9] Levy, Richard S., Costanoan. In *Handbook of North American Indians Volume 8: California*, R. F. Heizer, ed., pp. 485–495. Washington, Smithsonian Institution. 1978.

[10] Environmental Science Associates (ESA), *Final Historic Resources Inventory Report for the Upper Alameda Creek Filter Gallery Project*. Prepared for the San Francisco Public Utilities Commission. 2011.

[11] JRP Historical Consulting Services, *Historic Resources Inventory and Evaluation Spring Valley Water Company's Alameda Creek System*. 2003.

Rancho Arroyo de la Alameda, located near the mouth of Niles Canyon, which encompassed some 17,705 acres, was granted to Don Jose Vallejo in 1842, one year after he established a flour mill on Alameda Creek. Vallejo also constructed a dam and aqueduct at the base of Niles Canyon to power his mill. In 1856, Vallejo constructed a second, larger mill of redwood and stone and then used the former adobe mill as a storage shed. A settlement known as Vallejo Mills grew up around the mill in Niles Canyon after the construction of this second mill.[12]

By 1848 the Mexican Period had come to an end, yet many of the area's new settlers continued the agricultural tradition with small family farms. Farmers grew wheat and barley in what is now southern Alameda County and throughout the Santa Clara Valley. Due to the mild climate and fertile soil, grains soon became the dominant agricultural crop in the state, remaining prominent in the region until the 1890s, when farmers in the Midwest started to grow wheat in great quantities.[13]

Between 1865 and 1869, the Central Pacific Railroad laid tracks through Niles Canyon, building the Niles railroad station a mere 1,200 feet west of Vallejo's mills. The town of Niles, named for an executive of the Central Pacific Railroad, was established in 1877 and gradually overtook the nearby settlement of Vallejo Mills. The mills continued to play a vital role in the valley's agricultural development until the 1880s, when fruit production began to supplant wheat growing. As mentioned above, the fruit industry expanded in Alameda County with the arrival of the California Nursery Company in Niles.[14]

At the same time fruit orchards began to dominate agricultural crops in Alameda County, the Spring Valley Water Company (SVWC) started buying property and water rights along Alameda Creek to provide a reliable water source for San Francisco. The history of the SVWC is well-documented elsewhere; for the purpose of this analysis, this historic-period setting focuses primarily on the development of the Alameda Creek properties and SFPUC regional water facilities. As early as 1865, the SVWC's chief engineer, Herman Schussler, recommended development of the Alameda Creek watershed as a water source for San Francisco. However, various financial troubles prevented the SVWC from fully developing the Alameda Creek watershed until the late 19th and early 20th centuries.[15]

The SVWC purchased the Washington and Murray Township Water Company in 1885, and with it came 1,915 acres in the Sunol and Calaveras valleys. The SVWC began to develop the Alameda Creek regional water facilities shortly after this purchase to meet San Francisco's growing need for a reliable water supply; at this time, the city had only one year of water supply left in its peninsula reservoirs. Beginning in 1887, the SVWC reconstructed the 3,131-foot-long redwood flume (originally built by Vallejo) and connected it to the aqueduct. Instead of carrying the water to the mill, it conveyed water to San Francisco through a 36-inch-diameter pipe beginning 1.75 miles above Vallejo Mills and running through Centerville and Newark to Dumbarton Point. The pipeline traversed the salt marsh at Dumbarton Point, crossed the bottom of the narrow point of

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[12] Ibid.
[13] Ibid.
[14] Ibid.
[15] Ibid.

San Francisco Bay, and delivered the water to the Crystal Springs Reservoir on the San Francisco peninsula, which then supplied the city with water. Depending on the seasonal flow of Alameda Creek, the 28.5-mile pipeline and aqueduct supplied 8 to 10 million gallons per day.[16]

The SVWC began a new phase of development in 1898, which included construction of a new water conveyance system and a headquarters complex in Sunol. Construction of the new water delivery system started with the Sunol Dam, located at the upper end of the canyon. Constructed in 1900, the dam was 75 feet higher in elevation than the earlier Niles Dam.[17]

### *Sunol Filter Galleries*

The Sunol Valley gravel beds are a natural, gravel-filled depression upstream of Niles Canyon. Schussler recommended construction of the Sunol Dam to take advantage of these gravel beds; the completed dam impounded subsurface creek flow in the gravel beds where it could be collected in an underground filter gallery.

In 1900, the SVWC installed an 8,985-foot-long reinforced-concrete tunnel, called a filter gallery, above the bedrock at the bottom of the gravel beds. The Sunol Filter Galleries, which extend into the valley parallel to Alameda Creek, were constructed with several thousand screened brass pipes that pierced the walls of the galleries. The 1.25- and 1.5-inch-diameter brass pipes were installed to drain the water from the gravel. Water flowed into the filter galleries, which connected to an aqueduct leading 25,900 feet to Niles Dam. The Sunol Filter Galleries were designed to produce approximately 5 million gallons of water daily; in flood conditions the filter galleries could produce up to 20 million gallons per day.[18]

The water-filled gravel beds of Pleasanton in the Livermore Valley, 5 miles north of the town of Sunol, were added to the system in 1903. In 1909, the SVWC installed a 28,000-foot-long, 30-inch-diameter pipe to deliver water from the Pleasanton Wells to the Sunol Filter Galleries, and, in 1917, the Sunol Filter Galleries were extended. At this time the company built several new buildings at the Sunol Headquarters (now the SFPUC Sunol Yard), including a superintendent's cottage, a new barn, a separate water system for the caretaker's cottage, chicken coop, and an agricultural department. The SWVC also began to plant crops on the lands adjacent to Alameda Creek. The walnuts and peaches produced in 1909 were sold to company employees, and, by 1910, the SWVC began to sell its produce in San Francisco.[19]

The Sunol Water Temple, designed in 1910 by Willis Polk, was erected at the juncture of the three East Bay components of the company: Alameda Creek system, the existing Sunol Filter Galleries, and the Pleasanton Wells. Construction of the City and County of San Francisco's (CCSF) Hetch Hetchy project, which delivers water to the Bay Area from the Tuolumne River in the Sierra

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[16] Ibid.

[17] Ibid.

[18] Hansen, W.D., *San Francisco Water and Power: A History of the Municipal Water Department and Hetch Hetchy System*. Prepared for the San Francisco Public Utilities Commission. 2005.

[19] JRP Historical Consulting Services, *Historic Resources Inventory and Evaluation Spring Valley Water Company's Alameda Creek System*. 2003.

Nevada, began in 1914 and was completed in 1934. The CCSF acquired the SVWC in 1930, including the Sunol Valley facilities. Several facilities in the Sunol Valley, including the Alameda West Portal, the Alameda East Portal, and the Alameda Siphons, serve to connect the Coast Range Tunnel to the east of the project area to the Irvington Tunnel to the west of the project area.[20]

Since acquiring the SVWC and the Sunol Valley facilities, the CCSF has constructed several additional water supply facilities and infrastructure improvements as part of the SFPUC regional water system. Since completion of the Hetch Hetchy project, the original SVWD water system has mainly been used to supply water to Sunol Valley residents, and the Sunol Water Temple has been opened to the public.[21]

A review of historical topographic maps and aerials of the project area and vicinity show that, until approximately 1955, the area was largely agricultural, with numerous orchards dotting the landscape. The naturally braided channels of Alameda and San Antonio creeks and a small-scale gravel mining pit to the west of Alameda Creek were also evident at this time. Topographic maps and aerials show that, by the late 1950s, large-scale open-pit gravel mining had begun within the Alameda and San Antonio Creek channels, and, by 1968, Interstate 680 (I-680) had been constructed through the northern portion of the project area. Much of the land in the project area was leased by the SFPUC to gravel mining companies that expanded and enlarged their operations from the late 1950s onward. Aerial maps from the late 1950s to the late 1990s depict a rapidly changing landscape as the quarry pits expanded, merged, and were reformed, generally from south to north. Some of the prior agricultural uses in the area remained, however, as the gravel companies sublet portions of their property to various nursery growers along Calaveras Road beginning in the mid-1960s. With the exception of Calaveras Nursery in the northernmost portion of the project area, all other nurseries in the project area were vacated by 2011.

Other changes to the project area occurred in the mid-to-late 1960s when various utilities were constructed, including a Pacific Gas and Electric Company (PG&E) gas pipeline and associated protective concrete structure, the PG&E Sunol Substation and associated overhead powerlines, as well as the Department of Water Resources' South Bay Aqueduct. The HHWP Calaveras Substation was constructed in 1992.

Hanson Aggregates began aggregate mining operations in the Sunol Valley in 2005, taking over the previous operations of Mission Valley Rock, under Surface Mining Permit 24 (SMP-24), which overlaps with the project area. The Surface Mining Permit 30 (SMP-30) area is located immediately south of the project area on CCSF-owned land that is leased to Oliver De Silva, Inc. The C-APE does not include the SMP-30 area. Prior to Oliver De Silva, the SFPUC leased the SMP-30 area to the gravel mining companies CEMEX, RMC Pacific Materials, and RMC Lonestar.[22]

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[20] Hansen, W.D., *San Francisco Water and Power: A History of the Municipal Water Department and Hetch Hetchy System*. Prepared for the San Francisco Public Utilities Commission. 2005.

[21] Ibid.

[22] San Francisco Planning Department, *Final Environmental Impact Report for the San Francisco Public Utilities Commission Alameda Watershed Management Plan*. File No. 96.223E, State Clearinghouse No. 98082031. August 2000.

### 5.5.1.4 Archaeological Methods, Survey, and Results

#### *Records Search and Literature Review*

A records search was conducted for archaeological resources at the Northwest Information Center (NWIC) of the California Historical Resources Information System on June 15, 2010 (File No. 09-1580). The purpose of the records search was to: (1) determine whether known archaeological resources have been recorded within or adjacent to the archaeological C-APE; (2) assess the likelihood for unrecorded archaeological resources to be present based on historical references and the distribution of nearby sites; and (3) develop a context for the identification and preliminary evaluation of archaeological resources. The records search consisted of an examination of the following documents:

- **NWIC base maps** (USGS Niles and La Costa Valley, California 7.5-minute topographic maps), to identify recorded archaeological sites and studies within a 0.5-mile radius of the C-APE.

- **Resource Inventories:** California Department of Parks and Recreation (1976), *California Inventory of Historical Resources*; California Office of Historic Preservation (2010), *Historic Properties Directory Listing for Alameda County* (through February 2010).

- **Prehistoric Archaeology:** T.L. Jones and K.A. Klar (2007) *Prehistoric California: Colonization, Culture, and Complexity.* pp. 99–124, AltaMira Press.

- **Ethnographic Sources:** Richard Levy (1978), Costanoan. In *California, Handbook of North American Indians, Vol. 8*, edited by Robert F. Heizer, pp. 485–495; William C. Sturtevant, general editor. Smithsonian Institution, Washington, D.C.; L. Kroeber (1925), *Handbook of the Indians of California.* Bureau of American Ethnology Bulletin 78. Smithsonian Institution, Washington, D.C.

- **Historic Background Sources:** M.B. Hoover, H.E. Rensch, E.G. Rensch, W.N. Abeloe (2002), *Historic Spots in California.* Revised by Douglas E. Kyle. Palo Alto, CA: Stanford University Press; W.D. Hansen (2005), *San Francisco Water and Power: A History of the Municipal Water Department and Hetch Hetchy System.* Prepared for the San Francisco Public Utilities Commission; ESA (2001), *Alameda Creek Watershed Management Plan.* Prepared for the San Francisco Public Utilities Commission.

- **Historic Maps:** An extensive online historic map collection with more than 300 maps and views of the San Francisco Bay Area, available online at http://davidrumsey.com; General Land Office/Rancho plats of Rancho El Valle de San Jose.

- **Environment:** Keith L. Knudsen, Janet M. Sowers, Robert C. Witter, Carl M. Wentworth, and Edward J. Helley (2000), Preliminary Maps of Quaternary Deposits and Liquefaction Susceptibility, Nine-County San Francisco Bay Region, California: A Digital Database. *U.S. Geological Survey Open-File Report 00-444*, Online Version 1.0, Menlo Park, California. Available online at http://pubs.usgs.gov/of/2000/of00-444/; U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS) (2008), Web Soil Survey. Available online at http://websoilsurvey.nrcs.usda.gov; Jack Meyer and Jeffery Rosenthal (2007), *Geoarchaeological Overview of the Nine Bay Area Counties*. Prepared for the California Department of Transportation (Caltrans) District 4, Oakland.

The records search found 13 cultural resources studies prepared for projects within a 0.5-mile radius of the ACRP archaeological C-APE. Two of these studies pertain to archaeological resources and were conducted for the SFPUC SABPL project and the SFPUC New Irvington Tunnel project.[23,24,25] No cultural resources were found in the ACRP C-APE during intensive survey efforts for the original SABPL C-APE inventory, which included the excavation of seven exploratory trenches on the south side of San Antonio Creek within the project C-APE to determine whether cultural constituents of CA-ALA-633 extended into the SABPL project area.[26] Trenches were excavated with a tractor-mounted backhoe and, on average, were 3.3 feet wide, 10 feet long, and approximately 11.5 feet deep. The testing uncovered potential Holocene-age buried soils; however, the soil was weakly developed, indicating that it had not been located at the surface for a substantial period of time. Additionally, no archaeological materials were identified in the trenches.

Two archaeological resources have been recorded previously within 0.5 mile of the ACRP C-APE, including one prehistoric site (CA-ALA-633) and one site containing both historic-period and prehistoric components (CA-ALA-565/H). Site CA-ALA-633 was found during the intensive survey effort for the SABPL project, outside of the ACRP C-APE ½ mile to the northwest.[27] The site consists of a low-density concentration of heat-affected rock, lithic debitage, and human remains. Seventeen shovel test pits were excavated for the SABPL project to define site boundaries, including four within the current ACRP C-APE on the west side of Calaveras Road. No cultural materials were found in the shovel test pits within the ACRP C-APE.

Also reviewed were the 19th-century General Land Office plats and historical USGS topographic quadrangles. One structure is shown within the ACRP C-APE on the 1953 La Costa Valley USGS 7.5-minute map, but is absent from the 1960 and 1968 quadrangles. The structure is shown approximately where the west end of Pit F2 is now located.

### *Native American Contacts*

ESA contacted the Native American Heritage Commission requesting a search of Sacred Lands files and information regarding any local Native Americans who might have knowledge of cultural resources in the project area. The Commission indicated that no sacred lands are recorded on the Sacred Lands files within or near the project area. The Commission also provided a list of Native American individuals and organizations in Alameda County that might have additional

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[23] ICF Jones & Stokes, *Historic Context and Archaeological Survey Report for the New Irvington Tunnel Project, Alameda County, California.* Prepared for the San Francisco Public Utilities Commission. On file at the Northwest Information Center of the California Historical Resources Information System, Sonoma State University. 2009.

[24] Wohlgemuth, Eric, and Phil Kaijankoski, *Addendum to the Historic Context and Archaeological Survey Report for the Proposed San Antonio Backup Pipeline, Alameda County, California.* Prepared for the San Francisco Public Utilities Commission. April 2011.

[25] Wohlgemuth, Eric, and Phillip Kaijankoski, *Historic Context and Archaeological Survey Report for the San Antonio Backup Pipeline Project, Alameda County, California.* Prepared by Far Western Anthropological Research Group, Inc. for the San Francisco Public Utilities Commission. On file (S-36480) at the Northwest Information Center of the California Historical Resources Information System, Sonoma State University. 2009.

[26] Ibid.

[27] Wohlgemuth, Eric, and Phil Kaijankoski, *Historic Context and Archaeological Survey Report for the Proposed San Antonio Backup Pipeline, Alameda County, California*. Prepared for the San Francisco Public Utilities Commission. October 2009.

information or concerns about the proposed project. ESA sent a letter that described the project and requested information to each Native American individual/organization on the contact list as well as to the Alameda County Historical Society. No responses have been received to date.

### Archaeological Field Survey Methods

ESA archaeologists conducted an intensive surface survey of the C-APE on November 18, 2010 in portions of the project area that had not been previously surveyed by a qualified archaeologist. Narrow transects spaced no greater than 65 feet apart across all relatively undisturbed ground surfaces. Creek banks and exposed native soils were thoroughly inspected in areas proposed for ground disturbance, including staging areas, the spoils disposal site, and access areas. Previously surveyed areas, including the Permanent Spoils Site A[28] and the SABPL C-APE,[29,30] were not resurveyed.

Ground visibility was generally fair to good in the survey areas. However, dense vegetation hampered survey efforts in Staging Area 1. Much of the C-APE has been affected by aggregate mining activities, which have resulted in extensive disturbance at depth, and relatively low potential for survival of archaeological deposits or features. As a result of quarrying, surface topography is marked by numerous areas of cut and fill. Quarry pits created by aggregate mining were not inspected for cultural resources. Plant nursery operations also have resulted in ground disturbance, but to relatively shallow depths.

### Field Survey Results

No archaeological resources were previously identified or found in the current survey of the ACRP C-APE.

### Geoarchaeological Assessment

Based on the assessment of geologic landforms in the C-APE and the results of the extended subsurface investigations in the ACRP C-APE for the SABPL project,[31] which indicate that the potential for buried resources to be present or to have survived development in the C-APE is low, an extended subsurface survey does not appear to be warranted for the proposed project.

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[28] ICF Jones & Stokes, *Historic Context and Archaeological Survey Report for the New Irvington Tunnel Project, Alameda County, California.* Prepared for the San Francisco Public Utilities Commission. On file at the Northwest Information Center of the California Historical Resources Information System, Sonoma State University. 2009.

[29] Wohlgemuth, Eric, and Phil Kaijankoski, *Addendum to the Historic Context and Archaeological Survey Report for the Proposed San Antonio Backup Pipeline, Alameda County, California.* Prepared for the San Francisco Public Utilities Commission. April 2011.

[30] Wohlgemuth, Eric, and Phillip Kaijankoski, *Historic Context and Archaeological Survey Report for the San Antonio Backup Pipeline Project, Alameda County, California.* Prepared by Far Western Anthropological Research Group, Inc. for the San Francisco Public Utilities Commission. On file (S-36480) at the Northwest Information Center of the California Historical Resources Information System, Sonoma State University. 2009.

[31] Ibid.

### 5.5.1.5 Architectural Methods, Survey, and Results

#### *Records Search and Literature Review*

ESA conducted a records search for architectural resources at the NWIC on June 15, 2010 (File No. 09-1580). The purpose of the records search was to: (1) determine whether known historical resources have been recorded within or adjacent to the architectural C-APE; and (2) develop a context for the identification and preliminary evaluation of historical resources. The records search consisted of an examination of the following documents:

- **NWIC base maps:** USGS Niles and La Costa Valley, California 7.5-minute topographic maps to identify recorded historical sites and studies within a 0.5-mile radius of the C-APE.

- **Historical Resource Inventories:** California Department of Parks and Recreation, *California Inventory of Historical Resources*; California Office of Historic Preservation (1976), *Historic Properties Directory Listing for Alameda County* (2010) (through February 2010).

- **Historical Background Sources:** W.D. Hansen' s *San Francisco Water and Power: A History of the Municipal Water Department and Hetch Hetchy System*. Prepared for the San Francisco Public Utilities Commission (2005); JRP Historical Consulting Services, *Historic Resources Inventory and Evaluation for the Spring Valley Water Company's Alameda Creek System* (2003); Jones & Stokes and Carey & Company, *Inventory and Evaluation Report for the Alameda Siphons Seismic Reliability Upgrade Project* (2008); Carey & Company, *Historic Resources Inventory and Evaluation Report for the New Irvington Tunnel Project* (2009); Circa: Historic Property Development, *Historic Resources Inventory and Evaluation Report for the San Antonio Backup Pipeline Project* (2009); Caltrans, *Historic Bridge Inventory, Alameda County* (2005), and Hope, Andrew, *Historical Context for Concrete T-Beam Bridges* (2008). Other repositories consulted during the research process included the archives of the SFPUC, the California Historical Society in San Francisco, and the History Center at the San Francisco Public Library.

- **Historical Maps:** Historical USGS topographic maps as well as historical aerial photographs of the C-APE prepared by Environmental Data Resources (EDR) for the New Irvington Tunnel project and the Alameda Siphons Seismic Reliability Upgrade (Alameda Siphons) project (EDR, 2006). An extensive online historical map collection with over 300 maps and views of the San Francisco Bay Area, consulted online at http://davidrumsey.com; General Land Office/Rancho plats of Rancho El Valle de San Jose (2010).

The records search found 13 prior cultural resources studies performed for projects within a 0.5-mile radius of the ACRP architectural C-APE. Two of these studies pertain to historical resources and were conducted for the SFPUC SABPL project and the SFPUC Alameda Siphons project. The historical resource inventory and evaluation report for the SABPL project identified only two historical resources—Alameda Siphons Nos. 1 and 2, built in 1934 and 1953, respectively—both of which are located outside of the ACRP C-APE.[32] The historical resource inventory and evaluation report for the Alameda Siphons project determined Alameda Siphons No. 1 and No. 2 to be eligible for listing in the National Register of Historic Places (National Register) and California Register

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[32] Circa: Historic Property Development (Circa), *Historic Resources Inventory and Evaluation Report for the San Antonio Backup Pipeline Project*, Report prepared for the San Francisco Public Utilities Commission. June 2009.

under Criterion A/1 (events) and Criterion C/3 (architecture/workmanship).[33] These resources are about 1 mile south of the C-APE for the proposed project.

A number of historical resources have been identified in the SFPUC Alameda watershed. However, none of these previously identified resources is located within the ACRP C-APE. These resources include various Alameda Creek water conveyance buildings and structures developed by the SVWC from 1877 to 1930, such as the 1910 Sunol Water Temple, the Sunol Aqueduct, the Sunol and Niles Dams (both of which were demolished in 2006), the Sunol Filter Galleries, the Niles Regulating Reservoir, the Artesian Wells, and the complex of caretakers' houses, offices, barns, maintenance buildings, and landscaped grounds at the SVWC's Alameda County headquarters in Sunol. These structures have been recommended as eligible for listing as a district, as well as individually, in the National Register.[34] These historical resources are located 1,000 feet to over 4 miles northwest of the C-APE.

The Coast Range Tunnel, which consists of 25 miles of tunnels, is recognized as a Historic Civil Engineering Landmark of San Francisco and Northern California. The Coast Range Tunnel is located about 1 mile south and outside of the C-APE for the proposed project.

### *Historical Organization Contacts*

In November 2011, ESA contacted four local historical organizations to identify any concerns relative to historical resources within the project area. The following organizations were contacted:

- Alameda County Historical Society, Oakland
- Save Our Sunol, Sunol
- Museum of Local History, Fremont
- Pacific Locomotive Association, Sunol

### *Field Survey Methods*

A qualified ESA architectural historian conducted an intensive surface survey of the ACRP C-APE on December 30, 2010.[35] All buildings and structures in the C-APE were recorded through digital photography and field notes. Areas that had been previously surveyed for the adjacent and partially overlapping SABPL project C-APE[36] were not resurveyed. The buildings and structures identified within the C-APE during pre-field research were examined and all were determined to be of modern age (i.e., less than 45 years old). These include two prefabricated buildings and three smaller greenhouses associated with Calaveras Nursery; the PG&E Sunol

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[33] Jones & Stokes and Carey & Company, *Inventory and Evaluation Report, Alameda Siphons Seismic Reliability Upgrade Project, Alameda County, California.* Prepared for the San Francisco Public Utilities Commission. On file at the Northwest Information Center of the California Historical Resources Information System, Sonoma State University. 2008

[34] JRP Historical Consulting Services, *Historic Resources Inventory and Evaluation Spring Valley Water Company's Alameda Creek System*. 2003.

[35] Environmental Science Associates (ESA), *Final Historic Resources Inventory Report for the Upper Alameda Creek Filter Gallery Project*. Prepared for the San Francisco Public Utilities Commission. 2011.

[36] Circa: Historic Property Development (Circa), *Historic Resources Inventory and Evaluation Report for the San Antonio Backup Pipeline Project*, Report prepared for the San Francisco Public Utilities Commission. June 2009.

Substation at the north end of the C-APE; and the HHWP Calaveras Substation in the southeast corner of the C-APE. For all buildings and structures identified in the field survey and through archival research as being less than 45 years old, ESA assessed their potential for exceptional importance (which could make them eligible under National Register Criteria Consideration G). However, no such resources of exceptional significance were identified in the C-APE.

### *Survey Results*

No built environment historical resources were found in the ACRP C-APE. The majority of the buildings and structures identified within the C-APE during the field survey were examined and determined to be less than 45 years old. The survey delineated the following three groupings of architectural/ structural properties in the ACRP C-APE: (1) a collection of prefabricated wood-frame and corrugated fiberglass nursery buildings in the northern portion of the C-APE; (2) the 1932 La Costa Road Bridge along Calaveras Road over San Antonio Creek in the central portion of the C-APE; and (3) two electrical substations (PG&E Sunol Substation in the northern portion of the C-APE, and the HHWP Calaveras Substation in the southeastern corner of the C-APE). The La Costa Bridge was recorded on California Department of Parks and Recreation forms. These architectural/ structural properties, none of which appears to meet the criteria of eligibility to the California Register, are described below.

#### Calaveras Nursery Structures

The field survey identified a grouping of three structures associated with Calaveras Nursery, located at 1000 Calaveras Road near the intersection of I-680 at the northernmost corner of the C-APE. Two of these structures are identical, single-story nursery buildings; one is a sales building and the other a warehouse, separated by about 100 feet. These structures are gambrel-roofed sheds set on concrete slabs, with plywood cladding over wood framing and corrugated fiberglass-clad roofs. Screened roof vents run the length of the unenclosed eaves. Fenestration is limited to wood-frame double doors (one set on each side) and elongated window openings with plywood awnings (one on each end). The sales building has a small shed-roofed porch entrance, while the storage building has a wood-framed greenhouse addition covered with plastic screens and a corrugated fiberglass roof. A third building on the site consists of a small, single-story wood-frame storage shed with T-111 siding and an asphalt shingle-clad gable roof.

The sales and storage structures on the site were prefabricated in San Leandro and erected at the present site in 1972. The small storage shed with T-111 siding appears to date from this period as well. None of these structures are shown on the 1968 La Costa Valley 7.5-minute quadrangle map for the area, which indicates that they were constructed outside of the historical period (after 1965). This collection of utilitarian buildings is less than 45 years old, does not appear to display the exceptional significance required for a recently constructed resource under National Register Criteria Consideration G, and does not meet the standards for significance under the California Register's special consideration for resources that have achieved significance within the past 50 years. Thus, the Calaveras Nursery buildings would not be considered historical resources and are not recommended for further evaluation.

### La Costa Bridge over San Antonio Creek

Calaveras Road runs atop the La Costa Bridge, which crosses over the San Antonio Creek bed approximately 1 mile southeast of the I-680 / Calaveras Road junction. The bridge is outside of CCSF property but is directly adjacent to the project area, where the access road on CCSF property would be realigned at the intersection with Calaveras Road. This reinforced-concrete, T-beam, three-span bridge is approximately 25 feet wide and 125 feet long and accommodates two lanes of traffic. Two sets of central pillars support the road deck, which is approximately 15 feet above the creek bed at its deepest point. The concrete parapets (side railings) are about 4 feet tall and have regularly spaced, pointed arch openings with a capped and shaped coping. Interrupting the railing on either side are two piers with low beveled caps that mark the locations of the vertical piers below. The parapets also have expressed end caps that flare outward on both ends of the bridge. The southeastern and northwestern ends of the bridge contain identical bronze plaques that identify the date of construction (1932), the name of the bridge (La Costa Bridge), and its builders (Alameda County Board of Supervisors with County Engineer George Wilhelm). The roadway deck is built-up asphalt. Although the roadway decking has been repaved and restriped numerous times since the original construction of the bridge, and the concrete railings have been recently painted (white), the bridge maintains a high level of structural and material integrity. A steel, 8-inch-diameter water pipe was attached to the western side of the bridge at some point after its original construction.

A 2005 Caltrans Historical Bridge Survey[37] determined that the La Costa Bridge (Caltrans Bridge No. 33C0126) was ineligible for listing in the National Register. However, because this evaluation is over six years old, ESA reevaluated the structure under National Register/California Register Criteria A/1 through D/4, as described below.

**Criterion A/1: Historic Events.** The La Costa Bridge is associated with the suburban growth of Alameda County during the first decades of the 20th century. The bridge was constructed to span San Antonio Creek, which allowed access to farms as well as to the growing suburban areas near Pleasanton and Sunol; it also supported the increased use of automobiles for personal transportation as well as heavier trucks to transport agricultural products. These types of events were common throughout the region and the state, and the La Costa Bridge is not individually or uniquely significant for these associations. Due to a lack of historical associations with important events, the La Costa Bridge does not meet National Register Criterion A or California Register Criterion 1.

**Criterion B/2: Important People.** Research did not reveal that the bridge is associated with important people, and, as such, it does not meet National Register Criterion B or California Register Criterion 2.

**Criterion C/3: Construction Type.** Concrete T-beam bridges of this era, including the La Costa Bridge, were built using modern construction techniques that were commonly employed throughout the region and the state. This Alameda County Board of Supervisors bridge was

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[37] California Department of Transportation (Caltrans), *Historic Bridge Inventory*, District 4 (Alameda County), 2005.

designed by George Wilhelm and built by the contractor E.T. Lesure in 1932. The La Costa Bridge is typical of the numerous concrete T-beam bridges constructed throughout California from approximately 1910 to 1950 to replace earlier wooden spans that were unable to accommodate the strain of increasing vehicular traffic. According to Andrew Hope, an architectural historian with Caltrans, there are approximately 1,800 pre-1960 concrete T-beam bridges in California, of which approximately 353 were built in the 1930s. The T-beam bridges that have been deemed potentially eligible for the National Register under Criterion C were usually constructed before 1914, are more than 984 feet in length or have more than 25 spans, and the spans are greater than 65 feet (the La Costa Bridge was built in 1932 and has none of these features). Hope also notes that the pioneering period for concrete bridges extends through 1913 for T-beams, after which concrete bridges of this type are sufficiently common that standard designs were used and the bridges would not be significant based on age alone.[38] The La Costa Bridge does not embody a unique construction style, type, or method, as similar bridges can be found throughout the region and state. Research has not revealed that George Wilhelm, who designed the La Costa Bridge, is considered a "master engineer." As such, the bridge does not meet National Register Criterion C or California Register Criterion 3.

**Criterion D/4: Likely to Yield Important Information.** As the La Costa Bridge is a standard concrete T-beam bridge that is commonplace throughout the region and the state, it does not have the ability to yield important information about history. As such, this bridge does not meet National Register Criterion D or California Register Criterion 4.

**Integrity:** The La Costa Bridge appears to be unaltered (with the exception of the water pipe added to its western side, and routine repaving/restriping/repainting), and, as such, it generally retains its integrity (e.g., integrity of location, design, setting, materials, workmanship, feeling, and association). Therefore, the bridge retains a high degree of physical integrity. However, because the La Costa Bridge does not meet any of the criteria for listing in the National Register or California Register, it is not deemed eligible for listing as a historical resource.

#### Electrical Substations

The field survey identified two electrical substations in the C-APE. The HHWP Calaveras Substation is located west of Calaveras Road and north of Pit F5 in the southeast corner of the C-APE. This substation was constructed in 1992.[39] The PG&E Sunol Substation is located at the north end of the APE near Calaveras Road and I-680. The exact date of construction of this substation is unknown. Neither substation is shown on the 1968 La Costa Valley 7.5-minute quadrangle map for the area, which indicates that they were constructed outside of the historical period (after 1965). Furthermore, they do not appear to display the exceptional significance required for a recently constructed resource under National Register Criteria Consideration G, and do not meet the standards for significance under the California Register special consideration

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[38] Hope, Andrew, *Historical Context for Concrete T-beam Bridges*, email and attachments from Andrew Hope (Caltrans) to Sarah Hahn (Circa: Historic Property Development). April 17, 2008.

[39] Carey & Company, *Historic Resources Inventory and Evaluation Report, New Irvington Tunnel Project*. 2009.

for resources that have achieved significance within the past 50 years. Neither substation is recommended for further evaluation.

## 5.5.2 Regulatory Framework

### 5.5.2.1 Federal Regulations

No federal regulations are applicable to the proposed project.

### 5.5.2.2 State Regulations

#### *California Office of Historic Preservation*

The State of California implements the National Historic Preservation Act (NHPA) of 1966, as amended (54 U.S.C. 307103) through its statewide comprehensive cultural resource surveys and preservation programs. The NHPA requires federal agencies to consider the effects of the undertaking on historic properties. Under the NHPA, a property is considered significant if it meets the National Register of Historic Places (National Register) listing criteria at 36 Code of Federal Regulations (CFR) 60.4. The California Office of Historic Preservation (OHP) is an office of the California Department of Parks and Recreation, and implements the policies of the NHPA on a statewide level. The Office of Historic Preservation also maintains the California Historical Resources Inventory System (CHRIS), which includes the State Historic Resources Inventory as well as statewide cultural resources data and literature.

#### *California Environmental Quality Act*

CEQA, as codified in California Public Resources Code (PRC) Section 21000 et seq., is the principal statute governing the environmental review of projects in the state. CEQA requires lead agencies to determine if a proposed project would have a significant effect on historical resources and unique archaeological resources. The CEQA Guidelines define a historical resource as: (1) a resource in the California Register of Historical Resources; (2) a resource included in a local register of historical resources, as defined in PRC Section 5020.1(k), or identified as significant in a historical resource survey meeting the requirements of PRC Section 5024.1(g); or (3) any object, building, structure, site, area, place, record, or manuscript that a lead agency determines to be historically significant or significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California, provided the lead agency's determination is supported by substantial evidence in light of the whole record.

If a lead agency determines that an archaeological site is a historical resource, the provisions of PRC Section 21084.1 and CEQA Guidelines Section 15064.5 would apply. If an archaeological site does not meet the CEQA Guidelines criteria for a historical resource, then the site may meet the threshold of PRC Section 21083 regarding unique archaeological resources. A unique archaeological resource is an archaeological artifact, object, or site about which it can be clearly demonstrated that, without merely adding to the current body of knowledge, there is a high probability that it meets any of the following criteria:

- Contains information needed to answer important scientific research questions and that there is a demonstrable public interest in that information;
- Has a special and particular quality such as being the oldest of its type or the best available example of its type; or
- Is directly associated with a scientifically recognized important prehistoric or historic event or person (PRC Section 21083.2 [g]).

The CEQA Guidelines note that if a resource is neither a unique archaeological resource nor a historical resource, the effects of the project on that resource shall not be considered a significant effect on the environment (CEQA Guidelines Section 15064[c][4]).

### *California Register of Historical Resources*

The California Register is "an authoritative listing and guide to be used by state and local agencies, private groups, and citizens in identifying the existing historical resources of the state and to indicate which resources deserve to be protected, to the extent prudent and feasible, from substantial adverse change" (PRC Section 5024.1[a]). The criteria for eligibility to the California Register are based on National Register criteria (PRC Section 5024.1[b]). Certain resources are determined by the statute to be automatically included in the California Register, including California properties formally determined eligible for or listed in the National Register.

To be eligible for the California Register as a historical resource, a prehistoric or historic-period resource must be significant under one or more of the following criteria:

1. Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;
2. Is associated with the lives of persons important in our past;
3. Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values; or
4. Has yielded, or may be likely to yield, information important in prehistory or history (CEQA Guidelines Section 15064.5 [a][3]).

For a resource to be eligible for the California Register, it must also retain enough integrity to be recognizable as a historical resource and to convey its significance. A resource that does not retain sufficient integrity to meet the National Register criteria may still be eligible for listing in the California Register.

### *California Public Resources Code*

As part of the determination made pursuant to PRC Section 21080.1, the lead agency must determine whether the project would have a significant effect on archaeological resources.

Several sections of the PRC protect cultural resources. Under Section 5097.5, no person shall knowingly and willfully excavate upon, or remove, destroy, injure, or deface, any historic or prehistoric ruins, burial grounds, archaeological or vertebrate paleontological site (including fossilized footprints), inscriptions made by human agency, rock art, or any other archaeological, paleontological, or historical feature situated on public lands, except with the express permission of the public agency that has jurisdiction over the lands. Violation of this section is a misdemeanor. Section 5097.98 states that if Native American remains are identified within a project area, the landowner should with the appropriate Native Americans as identified by the NAHC and may develop a plan for the treatment or disposition of, with appropriate dignity, the human remains and associated grave goods. These procedures are also addressed in Section 15046.5 of the CEQA Guidelines. California Health and Safety Code Section 7050.5 prohibits disinterring, disturbing, or removing human remains from a location other than a dedicated cemetery. Section 30244 of the PRC requires reasonable mitigation for impacts on paleontological and archaeological resources that occur as a result of development on public lands.

In September of 2014, the California Legislature passed Assembly Bill (AB) 52, which added provisions to the Public Resources Code regarding the evaluation of impacts on tribal cultural resources under CEQA, and consultation requirements with California Native American tribes.

The provisions of AB 52 only apply to projects that have a Notice of Preparation (NOP) filed on or after July 1, 2015, and therefore the Bill’s requirements are not applicable to the proposed project (which published the NOP on June 24, 2015).

### 5.5.2.3 Local Regulations

#### *San Francisco Historic Preservation Commission and Planning Code Articles 10 and 11*

The San Francisco Historic Preservation Commission is a seven-member body that makes recommendations on the designation of landmark buildings, historic districts, and significant buildings. The Historic Preservation Commission replaces and retains most of the responsibilities of the Landmarks Preservation Advisory Board (Landmarks Board). The Landmarks Board was a nine-member body appointed by the Mayor that served as an advisory board to the San Francisco Planning Commission and San Francisco Planning Department. The Landmarks Board was established in 1967 with the adoption of Article 10 of the Planning Code. The work of the Landmarks Board, San Francisco Planning Department, and San Francisco Planning Commission has increased public awareness about the need to protect the CCSF’s architectural, historical, and cultural heritage.

The Historic Preservation Commission makes recommendations to the San Francisco Board of Supervisors on landmark designations, historic district designations, and individual resource designations within historic districts. The Historic Preservation Commission may also review and comment on projects affecting historical resources that are subject to environmental review under CEQA, or projects subject to review under Section 106 of the NHPA. The Historic Preservation Commission also approves Certificates of Appropriateness for Landmarks and properties within Article 10 Historic Districts.

The State Office of Historic Preservation has included the CCSF on its list of Certified Local Governments, which means that San Francisco has an approved historic preservation ordinance, Historic Preservation Commission, and other formal processes related to historic preservation and cultural resources management. The CCSF reviews the historical resources designated under Articles 10 and 11 of the San Francisco Planning Code when it evaluates potential project impacts on historical resources. Article 10 describes procedures regarding the preservation of sites and areas of special character or special historical, architectural, or aesthetic interest or value, such as officially designated city landmarks and buildings included within locally designated historic districts. Article 11 of the Planning Code designated six downtown conservation districts. There are no CCSF-designated landmarks or properties that contribute to designated historic districts in the project C-APE.

## 5.5.3 Impacts and Mitigation Measures

### 5.5.3.1 Significance Criteria

The project would have a significant impact related to cultural resources if the project were to:

- Cause a substantial adverse change in the significance of a historical resource as defined in CEQA Guidelines Section 15064.5, including those resources listed in Article 10 or Article 11 of the San Francisco Planning Code;

- Cause a substantial adverse change in the significance of a historical or unique archaeological resource pursuant to Section 15064.5;

- Disturb any human remains, including those interred outside of formal cemeteries, pursuant to California Health and Safety Code Section 7050.5.

### 5.5.3.2 Approach to Analysis

Ground disturbance and excavation during project construction could disturb or destroy known and previously unrecorded buried cultural resources, including archaeological resources and human remains. However, operation of the proposed project would have no effect on cultural resources, because project operations would not cause additional ground disturbance or generate strong vibrations and all operational impacts would be considered *no impact*. Thus, the impact analysis below focuses only on construction-related impacts on cultural resources.

As described in Section 5.1.2 regarding baseline conditions for evaluation of project impacts, construction-related impacts in this section are evaluated against the existing conditions. The current construction schedule for the proposed project is from fall 2017 to spring 2019 (18 months), and construction of the Calaveras Dam Replacement Project (CDRP) is also anticipated to be completed in spring 2019. It is possible that operation of the CDRP will commence prior to completion of ACRP construction, and that with-CDRP conditions could occur while ACRP is still under construction. However, operation of the CDRP is not expected to change any of the baseline cultural resource conditions analyzed in this section. Therefore, no change in the approach to the impact analysis is necessary to account for the with-CDRP conditions. More specifically, the construction-related impacts of the ACRP presented in this section would be the same regardless of the implementation of bypass flows at the Alameda Creek Diversion Dam and instream flow releases from Calaveras Reservoir, and all other aspects of CDRP operations that characterize the with-CDRP conditions.

### *Architectural Resources*

Due to the nature of the proposed project, there would be no construction impacts related to the following criteria; therefore, no impact discussion is provided for the reasons described below:

> ***Cause a substantial adverse change in the significance of a historical resource as defined in CEQA Guidelines Section 15064.5, including those resources listed in Article 10 or Article 11 of the San Francisco Planning Code.*** There are no documented historical resources within the ACRP C-APE. No significant historical resources were identified in the ACRP C-APE during pedestrian surveys conducted by Circa[40] (2009) and ESA (2011).[41]
>
> The proposed project would have no effect on the historical Alameda Creek water conveyance system developed by the SVWC from 1877 to 1930, including the Sunol Water Temple, Sunol Aqueduct, Sunol Filter Galleries, Niles Regulating Reservoir, Artesan Wells, or the complex of caretakers' houses, offices, barns, maintenance buildings, and landscaped grounds at the company's Alameda County headquarters in Sunol, as these resources are located well outside of the C-APE (from about 1,000 feet north to over 4 miles northwest). Similarly, the project would have no direct or indirect effect on the Alameda Siphons Nos. 1 and 2, as these historical resources are located over 1 mile to the south of the C-APE. ESA surveyed and evaluated the 1932 La Costa Bridge over San Antonio Creek in 2010 and found it to be ineligible for listing in the National and California Registers. As such, the proposed project would have no direct or indirect effect on historical resources. No impact would result.

### *Archaeological Resources*

The significance of most prehistoric and historic-period archaeological sites is generally determined based on California Register Criterion 4, presented above in Section 5.5.2.2. This criterion stresses the importance of the information potential contained within the site rather than its significance as a surviving example of a type or its association with an important person or event. Although it is less common, archaeological resources may also be assessed under California Register Criteria 1, 2, and/or 3. A prehistoric or historic-period archaeological resource that meets one or more criteria of eligibility to the California Register is termed a "historical resource". Archaeological resources may also qualify as unique archaeological resources, defined as archaeological artifacts, objects, or sites that contain information needed to answer important scientific research questions.

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[40] Circa conducted pedestrian surveys for the SABPL project C-APE, which is partially within the Filter Gallery project C-APE. The results were documented in "Circa: Historic Property Development (Circa), *Historic Resources Inventory and Evaluation Report for the San Antonio Backup Pipeline Project*, Report prepared for the San Francisco Public Utilities Commission. June 2009."

[41] Environmental Science Associates (ESA), *Final Historic Context and Archaeological Survey Report for the Upper Alameda Creek Filter Gallery Project*. Prepared for the San Francisco Public Utilities Commission. February 15, 2011.

### *Human Remains*

Human remains, including those buried outside of formal cemeteries, are protected under several state laws, including PRC Section 5097.98 and Health and Safety Code Section 7050.5. Potential impacts related to human remains include disturbance, mutilation, or removal of interred human remains.

## 5.5.3.3 Construction Impacts and Mitigation Measures

**Impact CUL-1: Project construction could cause a substantial adverse change in the significance of an archaeological resource that qualifies as a historical or unique archaeological resource. (Less than Significant with Mitigation)**

The records search conducted at the NWIC revealed no previously documented archaeological resources within the ACRP C-APE. The intensive surface surveys conducted by ESA (2011) and Far Western[42] found no indication of archaeological resources or other evidence of past human use and occupation in the ACRP C-APE. Further, based on the review of geological maps and previous subsurface investigations, it does not appear likely that deeply buried archaeological resources are present in the ACRP C-APE.

While there thus appears to be a low potential for uncovering archaeological resources during project construction activities, accidental discovery of archaeological resources during construction excavations cannot be entirely discounted. Thus, the potential for project-related construction activities to affect archaeological resources is considered significant. However, implementation of Mitigation Measure M-CUL-1 would address impacts on any previously unrecorded and buried (or otherwise obscured) archaeological deposits by requiring the SFPUC and its contractors to adhere to the appropriate procedures and protocols to identify and appropriately treat possible archaeological resources discovered during ACRP construction activities. Therefore, this impact would be less than significant with mitigation.

> **Mitigation Measure M-CUL-1: Accidental Discovery of Archaeological Resources.**
>
> The following mitigation measure is required to avoid any potential adverse effect from the proposed project on accidentally discovered buried or submerged historical resources as defined in *CEQA Guidelines* Section 15064.5(a) and (c). The project sponsor shall distribute the Planning Department archeological resource "ALERT" sheet to the project prime contractor; to any project subcontractor (including demolition, excavation, grading, foundation, pile driving, etc. firms); or utilities firm involved in soils disturbing activities within the project site. Prior to any soils disturbing activities being undertaken each contractor is responsible for ensuring that the "ALERT" sheet is circulated to all field personnel including, machine operators, field crew, pile drivers, supervisory personnel, etc. The project sponsor shall provide the Environmental Review Officer (ERO) with a signed affidavit from the

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[42] Wohlgemuth, Eric, and Phillip Kaijankoski, *Historic Context and Archaeological Survey Report for the San Antonio Backup Pipeline Project, Alameda County, California.* Prepared by Far Western Anthropological Research Group, Inc. for the San Francisco Public Utilities Commission. On file (S-36480) at the Northwest Information Center of the California Historical Resources Information System, Sonoma State University. 2009.

responsible parties (prime contractor, subcontractor(s), and utilities firm) to the ERO confirming that all field personnel have received copies of the Alert Sheet.

Should any indication of an archeological resource be encountered during any soils disturbing activity of the project, the project Head Foreman and/or project sponsor shall immediately notify the ERO and shall immediately suspend any soils disturbing activities in the vicinity of the discovery until the ERO has determined what additional measures should be undertaken.

If the ERO determines that an archeological resource may be present within the project site, the project sponsor shall retain the services of an archaeological consultant from the pool of qualified archaeological consultants maintained by the Planning Department archaeologist. The archeological consultant shall advise the ERO as to whether the discovery is an archeological resource, retains sufficient integrity, and is of potential scientific/historical/ cultural significance. If an archeological resource is present, the archeological consultant shall identify and evaluate the archeological resource. The archeological consultant shall make a recommendation as to what action, if any, is warranted. Based on this information, the ERO may require, if warranted, specific additional measures to be implemented by the project sponsor.

Measures might include: preservation in situ of the archeological resource; an archaeological monitoring program; or an archeological testing program. If an archeological monitoring program or archeological testing program is required, it shall be consistent with the Environmental Planning (EP) division guidelines for such programs. The ERO may also require that the project sponsor immediately implement a site security program if the archeological resource is at risk from vandalism, looting, or other damaging actions.

The project archeological consultant shall submit a Final Archeological Resources Report (FARR) to the ERO that evaluates the historical significance of any discovered archeological resource and describes the archeological and historical research methods employed in the archeological monitoring/data recovery program(s) undertaken. Information that may put at risk any archeological resource shall be provided in a separate removable insert within the final report.

Copies of the Draft FARR shall be sent to the ERO for review and approval. Once approved by the ERO, copies of the FARR shall be distributed as follows: California Archaeological Site Survey Northwest Information Center (NWIC) shall receive one (1) copy and the ERO shall receive a copy of the transmittal of the FARR to the NWIC. The Environmental Planning division of the Planning Department shall receive one bound copy, one unbound copy and one unlocked, searchable PDF copy on CD three copies of the FARR along with copies of any formal site recordation forms (CA DPR 523 series) and/or documentation for nomination to the National Register of Historic Places/California Register of Historical Resources. In instances of high public interest or interpretive value, the ERO may require a different final report content, format, and distribution than that presented above.

**Impact CUL-2: Project construction could result in a substantial adverse effect related to the disturbance of human remains. (Less than Significant with Mitigation)**

Although no known human burial locations have been identified within the proposed project C-APE, the possibility cannot be entirely discounted. Although unlikely, earthmoving activities associated with project construction could result in direct impacts on previously undiscovered human remains. Although earthmoving associated with construction would be a comparatively short-term activity, impacts on human remains, if present, would constitute a long-term impact. The potential impact related to the disturbance of human remains during construction is considered significant. However, implementation of Mitigation Measure M-CUL-2 would address impacts on any buried human remains and associated or unassociated funerary objects that are accidentally discovered during project construction activities by requiring the SFPUC to solicit the MLD's recommendations and adhere to appropriate excavation, removal, recordation, analysis, custodianship, curation, and final disposition protocols. Therefore, this impact would be less than significant with mitigation.

> **Mitigation Measure M-CUL-2: Accidental Discovery of Human Remains.**
>
> The treatment of human remains and of associated or unassociated funerary objects discovered during any soils disturbing activity shall comply with applicable State and Federal laws. This shall include immediate notification of the Coroner of Alameda County and in the event of the Coroner's determination that the human remains are Native American remains, notification of the California State Native American Heritage Commission (NAHC) who shall appoint a Most Likely Descendant (MLD) (PRC Section 5097.98). The archeological consultant, project sponsor, ERO, and MLD shall have up to but not beyond six days of discovery to make all reasonable efforts to develop an agreement for the treatment of human remains and associated or unassociated funerary objects with appropriate dignity (CEQA Guidelines. Sec. 15064.5(d)). The agreement should take into consideration the appropriate excavation, removal, recordation, analysis, custodianship, curation, and final disposition of the human remains and associated or unassociated funerary objects. Nothing in existing State regulations or in this mitigation measure compels the SFPUC and the ERO to accept recommendations of an MLD. The archeological consultant shall retain possession of any Native American human remains and associated or unassociated burial objects until completion of any scientific analyses of the human remains or objects as specified in the treatment agreement if such as agreement has been made or, otherwise, as determined by the archeological consultant and the ERO.

## 5.5.3.4 Cumulative Impacts and Mitigation Measures

**Impact C-CUL: The project, in combination with past, present, and probable future projects, could substantially affect cultural resources. (Less than Significant with Mitigation)**

The geographic scope for cumulative impacts on cultural resources includes the cultural resources C-APE for the project and the Sunol Valley region. The proposed project would contribute to cumulative impacts on cultural resources, including archaeological resources, if the proposed project in combination with other projects listed in **Table 5.1-6** were to adversely affect the same cultural resources or would cause impacts on other cultural resources in the project vicinity.

### *Archaeological Resources and Human Remains*

As discussed in Impacts CUL-1 and CUL-2, excavation associated with the proposed project would have a potentially significant impact related to the potential to encounter previously unrecorded archaeological resources and/or human remains interred outside of a formal cemetery. Cumulative projects in the proposed project vicinity that also involve excavation include the completed SFPUC New Irvington Tunnel (NIT), SFPUC SABPL, SFPUC Alameda Siphons Seismic Reliability Upgrade, and SMP-30 Quarry Expansion projects, as well as the planned SMP-30 Cutoff Wall and Creek Restoration, PG&E Gas Line 303 Alameda Creek Relocation, and the PG&E Line 107 Retirement projects. These cumulative projects also have the potential to encounter previously unrecorded archaeological resources or human remains, which would be a potentially significant cumulative impact, and the proposed project's contribution to this impact would be cumulatively considerable.

However, as discussed in Impacts CUL-1 and CUL-2, the proposed project's potential to result in significant impacts to previously unrecorded archaeological resources and human remains would be reduced to a less-than-significant level with implementation of **Mitigation Measures M-CUL-1 (Accidental Discovery of Archaeological Resources)** (see Impact CUL-1, above, for description) and **M-CUL-2 (Accidental Discovery of Human Remains)** (see Impact CUL-2, above, for description). These measures require the SFPUC to distribute the San Francisco Planning Department's archaeological resource "ALERT" sheet to the project prime contractor, subcontractors, and/or any utilities firm involved in soil-disturbing activities within the project area. If the ERO determines that an archaeological resource may be present within the project area, the SFPUC is required to retain the services of a qualified archaeological consultant to assist in evaluating the find and treating it appropriately. With regard to the accidental discovery of human remains, in particular, the Alameda County coroner must be notified immediately, and, in the event the coroner determined that the remains were Native American, the NAHC must be notified. Implementation of these measures would ensure that, upon discovery, the resource is preserved while appropriate measures for data recovery or other treatment are developed and carried out. With implementation of these mitigation measures, the project's contribution to this cumulative impact would not be cumulatively considerable (less than significant).

**Mitigation Measure M-CUL-1: Accidental Discovery of Archaeological Resources**.

(See Impact CUL-1.)

**Mitigation Measure M-CUL-2: Accidental Discovery of Human Remains.**

(See Impact CUL-2.)

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# 5.6 Transportation and Circulation

This section provides an overview of existing transportation conditions in the vicinity of the Alameda Creek Recapture Project (ACRP or proposed project); evaluates the potential traffic, transportation, and circulation impacts associated with project construction and operations; and identifies mitigation measures to reduce significant impacts to a less-than-significant level.

## 5.6.1 Setting

The proposed ACRP is located in the Sunol Valley, in an unincorporated area of Alameda County. The study area for this impact analysis encompasses the network of regional highways and local roadways that would be used by construction workers and vehicles to access the project area. **Figure 5.6-1** shows the regional and local roadways that provide access to the project area.

### 5.6.1.1 Regional and Local Roadways

Interstate 680 (I-680) provides regional access to the project area. I-680 is a four- to eight-lane freeway that extends between I-280 and U.S. Highway 101 in San Jose and I-80 in Fairfield. I-680 serves as a primary north-south regional route, connecting the Livermore–Amador Valley with Contra Costa County in the north and the Santa Clara Valley in the south. I-680 in the project vicinity is accessed via on-ramps at the junction of Calaveras Road and State Route 84 (SR 84) (also Paloma Road) located just north of the project area.

Calaveras Road provides the primary access to the project area. Calaveras Road is a two-lane roadway (one lane in each direction); the vicinity of the proposed project, Calaveras Road has relatively flat grades and a straight alignment. The posted speed limit on this roadway is 50 miles per hour (mph).

Weekday traffic on I-680 consists primarily of commuter traffic during peak periods (generally between the hours of 7 a.m. and 9 a.m., and 4 p.m. and 6 p.m.), and a mix of residential, commercial, and industrial traffic throughout the day. Recent data published by the California Department of Transportation (Caltrans) indicate that the average daily traffic volume on I-680 at the junction with SR 84 at Calaveras Road, in the vicinity of the project area, is about 142,000 vehicles per day with peak-hour volumes of about 11,700 vehicles per hour.[1] Trucks represent about 9.2 percent of the total daily traffic volume.[2] Caltrans data also indicate that the average daily traffic volume on SR 84 at the junction with I-680 is about 7,400 vehicles per day, with peak-hour volumes of about 800 vehicles per hour.[3] Trucks represent about 2.3 percent of

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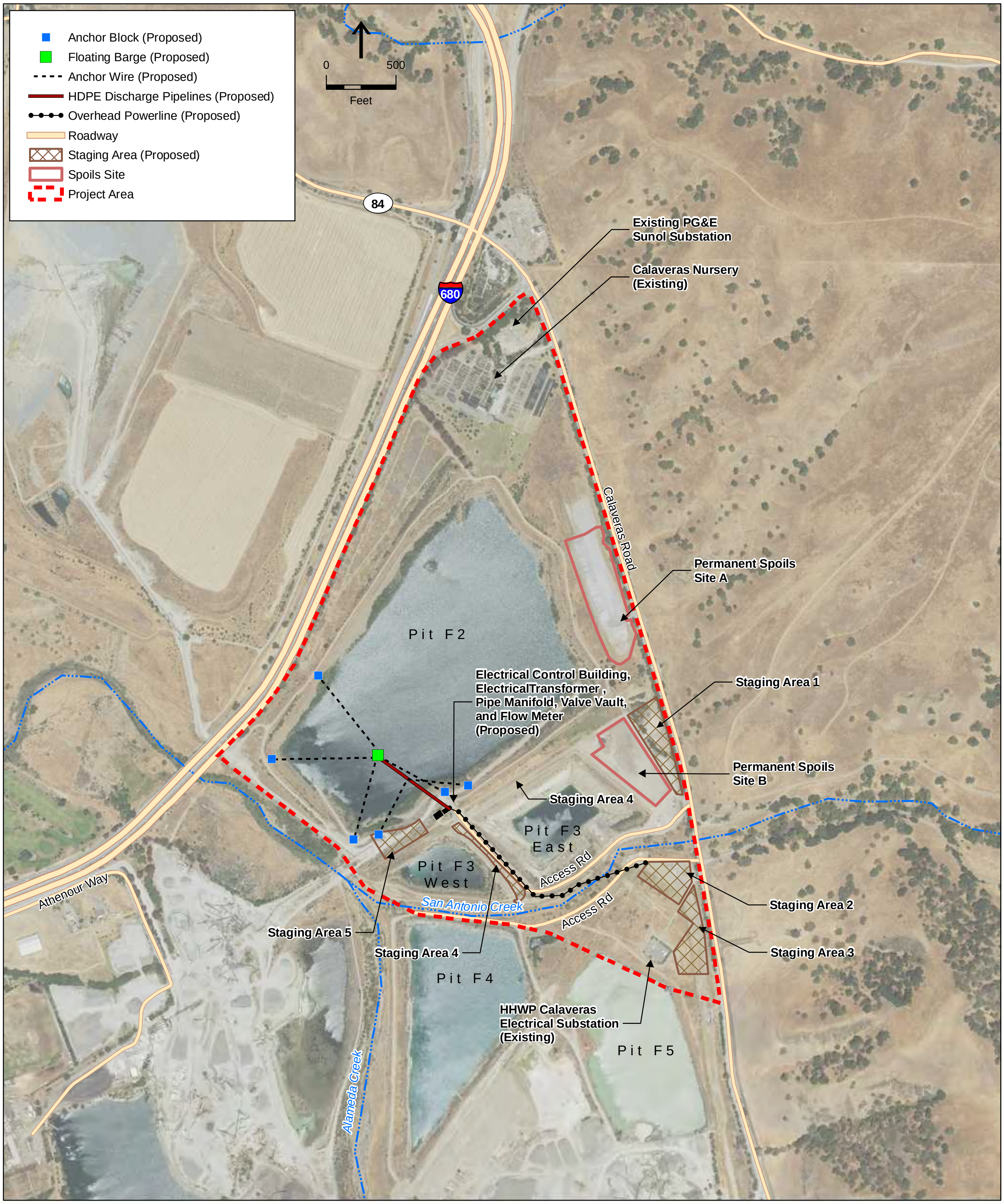
[1] California Department of Transportation (Caltrans), *2014 Traffic Volumes for California State Highways*. 2015.

[2] California Department of Transportation (Caltrans), *2014 Annual Average Daily Truck Traffic on the California State Highway System*. 2015.

[3] California Department of Transportation (Caltrans), *2014 Traffic Volumes for California State Highways*. 2015.



SOURCE: ESRI, 2015

SFPUC Alameda Creek Recapture Project

**Figure 5.6-1**

Local and Regional Roadways

the total daily traffic volume.[4] The segment of Calaveras Road in the project vicinity serves as a haul route for the aggregate sand and gravel quarries in the area.

### 5.6.1.2 Transit Service

The Alameda-Contra Costa Transit District (AC Transit) is the principal bus service provider in Alameda County. There is no AC Transit bus service along Calaveras Road.[5]

### 5.6.1.3 Bicycle and Pedestrian Network

Bikeways are typically classified as Class I, Class II, or Class III facilities. Class I bikeways are bike paths with exclusive right-of-way for use by bicyclists and pedestrians. Class II bikeways are bike lanes striped within the paved areas of roadways and established for the preferential use of bicycles, while Class III bikeways are signed bike routes that allow bicycles to share streets or sidewalks with vehicles or pedestrians. Calaveras Road south of I-680 is not part of the designated Alameda Countywide Bicycle Network.[6] However, Calaveras Road experiences considerable recreational bicycle use on weekends; bicycle volumes on Calaveras Road are generally low on weekdays.

There are no sidewalks or designated pedestrian facilities on Calaveras Road. Pedestrian volumes are very low throughout the day, as the predominant mode of travel in the area is by automobile.

## 5.6.2 Regulatory Framework

### 5.6.2.1 Federal Regulations

There are no federal regulations pertaining to transportation impacts that are applicable to the proposed project.

### 5.6.2.2 State and Local Regulations

Transportation analysis in California is guided by policies and standards set at the state level by Caltrans and at the local level by jurisdictional agencies such as the Alameda County Congestion Management Agency (CMA). Local jurisdictions regulate speed limits and other driving standards on local roadways. Caltrans and local jurisdictions generally assess the impacts of long-term (not short-term) traffic conditions. The goal of state and local plans and policies related to transportation is to prepare for future growth and the vehicular, transit, pedestrian, and bicycle travel demand associated with that growth.

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[4] California Department of Transportation (Caltrans), *2014 Annual Average Daily Truck Traffic on the California State Highway System*. 2015.

[5] AC Transit, *Maps and Schedule*, 2015.

[6] Alameda County Transportation Commission (ACTC), *Alameda Countywide Bicycle Plan*. October 25, 2012.

## 5.6.3 Impacts and Mitigation Measures

### 5.6.3.1 Significance Criteria

The project would have a significant impact related to transportation and circulation if the project were to:

- Conflict with an applicable plan, ordinance, or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation, including mass transit, non-motorized travel, and relevant components of the circulation system (including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit);
- Conflict with an applicable congestion management program, including but not limited to level of service standards, and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways;
- Result in a change in air traffic patterns, including either an increase in traffic levels, obstructions to flight, or a change in location, that results in substantial safety risks;
- Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment);
- Result in inadequate emergency access; or
- Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities.

As part of implementing California Environmental Quality Act (CEQA) requirements, the City and County of San Francisco has established additional criteria relevant to the project location, as shown below. These criteria are organized by mode of travel to facilitate analysis; however, the transportation significance thresholds are essentially the same as those in Appendix G of the CEQA Guidelines, as listed above:

- The project would have a significant adverse impact if it would cause major traffic hazards.
- The project would have a significant effect on the environment if it would cause substantial additional Vehicle Miles Travelled (VMT).
- The project would have a significant effect on the environment if it would substantially induce additional automobile travel by increasing physical roadway capacity in congested areas (i.e., by adding new mixed-flow travel lanes) or by adding new roadways to the network.
- The project would have a significant effect on the environment if it would cause a substantial increase in transit demand that could not be accommodated by adjacent transit capacity, resulting in unacceptable levels of transit service, or cause a substantial increase in delays or operating costs such that significant adverse impacts in transit service levels could result.
- The project would have a significant effect on the environment if it would create potentially hazardous conditions for pedestrians, or otherwise interfere with pedestrian accessibility to the site and adjoining areas.

- The project would have a significant effect on the environment if it would create potentially hazardous conditions for bicyclists or otherwise substantially interfere with bicycle accessibility to the site and adjoining areas.
- The project would have a significant effect on the environment if it would result in inadequate emergency access.
- Construction-related impacts generally would not be considered significant due to their temporary and limited duration.

### 5.6.3.2 Approach to Analysis

Due to the nature of the proposed project, there would be no construction and/or operational impacts related to the following criteria; therefore, no impact discussion is provided for the reasons described below:

- ***Conflict with an Applicable Plan, Ordinance, or Policy Establishing Measures of Effectiveness for the Performance of the Circulation System during Project Operations.*** The proposed facilities would be operated remotely, with only periodic visits from SFPUC staff for operations review and routine maintenance. SFPUC operations and maintenance vehicle trips associate with the proposed project are expected to be similar to existing SFPUC vehicle trips in the SFPUC Alameda watershed system and would not result in increased traffic volumes, reduced roadway capacities, or increased transit demand. Thus, project operations would not affect alternative modes of transportation, including bicycle and pedestrian facilities. This significance criterion is not relevant for project operations and is discussed below under Impact TR-1 only as it applies to project construction activities.
- ***Conflict with an Applicable Congestion Management Program.*** The Alameda County congestion management program that establishes measures of effectiveness for the performance of the vehicular circulation system (i.e., roadways and highways) is intended to address potential long-term and permanent effects on the circulation system resulting from a project and do not apply to temporary construction projects. Therefore, this significance criterion is not applicable to project construction activities. As stated in the bullet above, the proposed facilities would be operated remotely, with only periodic visits from SFPUC staff. The number of SFPUC operations and maintenance vehicle trips would be similar to existing SFPUC vehicle trips in the SFPUC Alameda watershed system. Project operations would not increase traffic volumes on local or regional roadways. Therefore, no impact would result with respect to either construction or operation, and this significance criterion is not discussed further.
- ***Result in a Change in Air Traffic Patterns.*** The nearest airports are over 8 miles and 15 miles, respectively. Implementation of the ACRP would not change air traffic patterns. In addition, the project would not involve the installation of structures that could interfere with air space. Therefore, this significance criterion is not applicable to the proposed project and is not discussed further.
- ***Substantially Increase Hazards due to a Design Feature.*** Implementation of the ACRP would not permanently change the existing or planned transportation network and would not include any design features that would permanently increase the potential for traffic safety hazards. Therefore, this significance criterion is not applicable to the proposed project and is not discussed further.

- ***Result in Inadequate Emergency Access during Project Operations.*** Operation of the ACRP would not permanently change the existing or planned transportation network and would not permanently affect emergency access on Calaveras Road. Therefore, this significance criterion is not applicable to proposed operations and is only discussed below (see Impact TR-2) as it applies to project construction activities.
- ***Conflict with Adopted Policies, Plans, or Programs Regarding Public Transit, Bicycle, or Pedestrian Facilities during Project Operations.*** Implementation of the ACRP would not permanently change the existing or planned alternative transportation network in Alameda County and therefore would not conflict with policies, plans, or programs related to transit, bicycle, or pedestrian travel. Upon completion of the proposed project, operations and maintenance activities are expected to be similar to those occurring under existing conditions and would not result in long-term increases in traffic safety hazards or transit demand such that alternative transportation would be affected. Therefore, this significance criterion is not applicable to proposed operations and is discussed below (see Impact TR-3) only as it applies to project construction activities.

As indicated in the significance criteria above, construction-related transportation impacts are not generally considered significant because of their temporary duration and limited scope. Nevertheless, the analysis considers the potential short-term effects of construction—including those on transit, pedestrian and bicycle facilities, and emergency vehicle access. The construction-related information used for the analysis is based on current project specifications, including construction durations.

Project construction activities would result in a temporary increase in vehicle trips in the Sunol Valley and the surrounding area over the 18-month ACRP construction period (currently anticipated to be fall 2017 through spring 2019). Project construction would generally occur on weekdays and Saturdays between 7 a.m. and 7 p.m. Trucks deliveries and spoils hauling would not occur on weekends (Saturdays and Sundays) or during nighttime hours. Because multiple project components could be constructed simultaneously, the total number of construction-related vehicle trips along common construction access routes (i.e., I-680 and Calaveras Road) could be higher than the maximum number of daily vehicle trips associated with a single project component. The analysis of construction-related traffic impacts below considers the estimated number of daily commute, deliveries, and haul trips for each construction activity and a worst case scenario that assumes all components could be constructed simultaneously. The proposed staging areas would provide sufficient capacity to accommodate the anticipated parking demand for construction-worker vehicles, estimated to be a maximum of approximately 34 vehicles per day (under a conservative analytical assumption that all construction activities for the project would occur concurrently).

The analysis also considers the potential long-term effects of project operations and maintenance activities, including those on VMT, transit, pedestrian and bicycle facilities, and emergency vehicle access. Following construction, the number of SFPUC operations and maintenance vehicle trips associated with the proposed project are expected to be substantially the same as existing SFPUC vehicle trips in the SFPUC Alameda watershed, and project operations would not result in increased traffic volumes. Therefore, there would be no project-related operational impacts on transportation and circulation.

As described in Section 5.1.2 regarding baseline conditions for evaluation of project impacts, all construction-related impacts in this section were evaluated against the existing conditions. The current construction schedule for the proposed project is from fall 2017 through spring 2019 (18 months), and construction of the Calaveras Dam Replacement Project (CDRP) is also anticipated to be completed in spring 2019. It is possible that operation of the CDRP will commence prior to completion of ACRP construction, and that with-CDRP conditions could occur while ACRP is still under construction. However, operation of the CDRP is not expected to change any of the baseline transportation conditions analyzed in this section. Therefore, no change in the approach to the impact analysis is necessary to account for the with-CDRP conditions. More specifically, the construction-related impacts of the ACRP presented in this section would be the same regardless of the implementation of bypass flows at the Alameda Creek Diversion Dam and instream flow releases from Calaveras Reservoir, and all other aspects of CDRP operations that characterize the with-CDRP conditions.

## 5.6.3.3 Construction Impacts and Mitigation Measures

**Impact TR-1: Construction of the proposed project would not substantially conflict with an applicable plan, ordinance, or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of travel. (Less than Significant)**

The plans, ordinances, and policies of local jurisdictions and county agencies that establish measures of effectiveness for the performance of the circulation system are intended to address potential long-term and permanent project effects on the circulation system (e.g., roadways, sidewalks, and bicycle and transit facilities). Due to the nature of the ACRP (i.e., facility improvements to an existing water supply system), the project would not permanently affect the transportation and circulation system; therefore, this analysis assesses potential temporary construction-related impacts on the overall transportation and circulation system, including roadways, public transit, bicycle facilities, and pedestrian facilities.

The ACRP would not conflict with established plans, ordinances, or policies pertaining to the performance of the circulation system because, as described below, most construction activities would occur within the SFPUC right-of-way; the project would not permanently change the circulation system; the project would be limited in duration; and construction activities would not result in a substantial increase in vehicles traveling along local roadways.

### *Impact on Roadways*

#### Travel Lane Closures

Calaveras Road would provide the primary construction access to the project area. The contractor would maintain two-way traffic along Calaveras Road for the majority of the construction phase; however, the SFPUC has indicated that temporary (up to 10 minutes) closure of a single traffic lane and one-way traffic controls could be required periodically throughout construction to accommodate large construction vehicles accessing the site. Secondary access to the project area would occur via two existing quarry access roads that run east-to-west along either side of

San Antonio Creek within the project area (see Figure 5.6-1). The quarry access roads are located in the area operated by Hanson Aggregates under Surface Mining Permit 24 (SMP-24) and are not publicly accessible. These access roads are unpaved dirt and gravel roads utilized by quarry vehicles and other heavy equipment. The SFPUC would not construct any new access roads. Therefore, impacts related to a temporary reduction in the capacity of a public roadway would be less than significant.

### Construction Traffic

Construction traffic would result in short-term increases in traffic volumes on Calaveras Road and I-680. The addition of project-related construction vehicle traffic to existing roadway volumes without a corresponding increase in the capacity of the roadway could result in increased congestion and delay for vehicles. The presence of construction truck traffic could temporarily reduce roadway capacities due to the slower travel speeds and larger turning radii of trucks. The impacts of construction traffic would be most noticeable in the immediate vicinity of the project area and less noticeable farther away and on regional transportation facilities.

Construction-related vehicle trips would include construction-worker commute trips to and from the ACRP area, truck trips associated with material and equipment deliveries, and haul truck trips for offsite disposal of excavated soil and rock material. The number of construction-related vehicles traveling to and from the project area could vary daily depending on the construction phase and materials needed for the construction activities at that time. For example, the number of truck trips on Calaveras Road associated with excess spoils hauling would depend on the selected method(s) of spoils management and disposal (to be determined during construction based on the quality of the excavated materials) and the quantities that would be disposed of using each method. Options for managing the excess spoils generated during construction include: (a) temporarily placing the spoils at the SMP-24 or SMP-30 aggregate processing facilities for subsequent processing, resale, and reuse; (b) permanently placing the spoils in an earthen berm parallel to and west of Calaveras Road at Permanent Spoils Site A (south of the I-680/SR 84 interchange) or Permanent Spoils Site B (in an earthen berm at the former nursery site located immediately east of Pit F3-East); or (c) hauling the spoils offsite to an appropriate landfill. The total volume of excess spoils generated by project construction activities is estimated at 2,236 cubic yards. Assuming 10 percent of the excess spoils generated during construction would require offsite disposal and a 10-cubic yard dump truck capacity, roughly 23 truckloads or 46 one-way truck trips would haul spoils offsite over a one-month period. Therefore, it is estimated that up to 2 truckloads per day (4 one-way daily trips) would occur over the one-month period of spoils disposal.[7] Project related-truck trips are summarized in **Table 5.6-1**.

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[7] The estimated number of daily haul trips is based on the assumption that excess spoils disposal would occur over a one-month period (see Table 3-4 in Chapter 3, Project Description). If the duration of excess spoils hauling were to be spread out over a longer time period, then the number of daily haul trips would be lower than the estimated number of trips used for this analysis.

### TABLE 5.6-1
### ESTIMATED DAILY VEHICLE TRIPS DURING PROJECT CONSTRUCTION

| Construction Activity | Duration | Daily Construction Worker Trips (Commutes)[a] | Daily Construction Truck Trips (Deliveries)[b] | Daily Offsite Haul Trips (Excess Spoils)[c] |
|---|---|---|---|---|
| Turbine Pumps and Barge Floatation System | 3 months | 20 | 4 | – |
| Mooring System | 0.5 month | 12 | | |
| Electrical Control Building, Electrical Transformer, and Overhead Powerlines | 7 months | 12 | | |
| HDPE Discharge Pipelines, New Pipeline Connection to Sunol Pump Station Pipeline, Pipe Manifold, and Throttle Valve Vault | 6 months | 16 | | |
| Offsite Spoils Disposal | 1 month | 8 | – | 4 |
| *Totals* | *18 months* | *68* | *4* | *4* |
| **Maximum Daily Vehicle Trips During Construction =** | | | | **76 trips** |
| **Maximum Duration of Peak Construction Activities =** | | | | **1 month** |

NOTES:

[a] Total one-way (inbound and outbound) construction worker vehicle trips. Based on number of construction workers needed for each project component (see Table 3-4 in Chapter 3, Project Description).

[b] Total one-way (inbound and outbound) truck trips for materials and equipment deliveries.

[c] Assumes 10 percent of excess spoils would require offsite disposal. Based on a truckload capacity of 10 cubic yards.

Construction-related truck trips to and from the project work area would be distributed throughout the day. Trucks delivering equipment and materials to the project area from offsite locations and hauling excavated materials from the project area to landfills would travel on weekdays between 7 a.m. and 7 p.m.; truck deliveries and hauling to and from the site would not occur on weekends or during nighttime hours. The low number of daily truck trips spread over a work day would have an insubstantial effect on traffic flow on area roads.

Because work on the project would occur from 7 a.m. to 7 p.m., it is reasonable to expect that the project construction workers (up to 34 workers per day) would travel on weekdays to and from the project area via Calaveras Road outside of the a.m. and p.m. peak traffic hours (generally between the hours of 7 a.m. and 9 a.m., and 4 p.m. and 6 p.m.). In addition, the estimated 4 one-way daily truck trips would occur over the course of the 12-hour day, and it is reasonable to expect that no more than one truck trip would be generated to and from the project area during the a.m. and p.m. peak hours, respectively. Based on the information in Table 5.6-1, and assuming all construction activities listed occur concurrently, the maximum number of project-related construction vehicle trips on Calaveras Road and I-680 per day would be up to 76 one-way trips per day. The actual number of construction trips would vary depending on the phase of construction, and whether all construction activities are concurrent, but the above-described trip generation represents a reasonable basis for judging maximum potential project impacts. As a result, project construction could result in a temporary daily increase of up to 76 vehicle trips, and a peak-hour increase of no more than one vehicle trip (i.e., no more than one of the four truck trips spread over the 12-hour work day). The addition of up to 76 construction-generated vehicle trips per day, and no more than one vehicle trip during each of the a.m. and p.m. peak hours, would not substantially affect baseline traffic levels on Calaveras Road. Roadway operating conditions would remain substantially similar to current conditions. Therefore, the impact on Calaveras Road from short-term increases in traffic volumes during construction of the ACRP would be less than significant.

As described above, the average daily traffic volume on the I-680 freeway at the junction with SR 84 at Calaveras Road, in the vicinity of the project area, is about 142,000 vehicles per day with peak-hour volumes of about 11,700 vehicles per hour. The addition of up to 76 vehicle trips per day and no more than one vehicle during the a.m. and p.m. peak hours on I-680 would represent a minimal increase in daily and peak-hour traffic volumes (less than 0.05 percent). Also, the average daily traffic volume on SR 84 at the junction with I-680 is about 7,400 vehicles per day, with peak-hour volumes of about 800 vehicles per hour. The addition of up to 76 vehicle trips per day and no more than one vehicle during the a.m. and p.m. peak hours on SR 84 would represent a minimal increase in daily (one percent) and peak-hour (0.1 percent) traffic volumes. Therefore, impacts related to short-term traffic increases on I-680 and SR 84 during construction would be less than significant.

### *Impacts on Public Transit*

Because there are no public transit routes on Calaveras Road, project construction activities and vehicles would not affect transit operations. Thus, no impact on public transit would occur.

### *Impacts on Pedestrian Travel*

There are no pedestrian facilities on Calaveras Road, and pedestrian volumes are very low throughout the day. Therefore, construction traffic would not substantially affect pedestrian travel on Calaveras Road, and construction-related impacts on pedestrian travel along Calaveras Road would be less than significant. Potential impacts related to pedestrian safety are addressed below under Impact TR-3.

### *Impacts on Bicycle Facilities*

There are no designated bicycle lanes on Calaveras Road; rather, bicyclists share the roadway with vehicles. Throughout the construction period, bicycle travel on Calaveras Road would be maintained. For this reason, and because the number of construction vehicles generated on an hourly basis would not be substantial (a maximum of about 34 vehicles per hour), when construction workers are commuting to and from the project area (under a conservative analytical assumption that all construction activities would occur concurrently), and no more than one truck per hour, project-related impacts on bicycle travel along Calaveras Road would be less than significant. Potential impacts related to bicycle safety are addressed below under Impact TR-3.

**Mitigation**: None required.

**Impact TR-2: Project construction activities would not result in inadequate emergency access. (Less than Significant)**

Project construction activities would be conducted west of Calaveras Road and not within the travel lanes of Calaveras Road. Construction-related traffic increases associated with project activities would not be substantial (maximum of 76 one-way trips per day) and would not pose an obstacle to emergency-response vehicles along Calaveras Road. Project activities would not require full street closures, and emergency vehicles would have continuous access to all public roadways. In some instances, traffic flow on Calaveras Road could be temporarily interrupted for short periods of time (up to 10 minutes) to accommodate large construction vehicles accessing the project area; however, travel lanes would be reopened and construction vehicles would move to the side of the road to accommodate any passing emergency vehicles. Therefore, impacts on emergency access would be less than significant.

During project construction, access roads leading to project areas would remain open at all times, including the quarry access roads located west of the project area. Therefore, impacts on emergency access to adjacent roadways would be less than significant.

**Mitigation**: None required.

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**Impact TR-3: Project construction activities could decrease the safety of public roadways for vehicles, bicyclists, and pedestrians. (Less than Significant)**

Construction vehicles traveling to and from the project area would share the roadway with other vehicles as well as with bicyclists and pedestrians. The use of Calaveras Road to access the project area during construction could increase traffic safety hazards due to potential conflicts between construction vehicles (with slower speeds and wider turning radii than autos) and automobiles, bicyclists, and pedestrians.

The greatest increase in the number of project-related construction vehicles using Calaveras Road to access the site would occur on weekdays, when there would be no more than one truck trip per hour to and from the site; construction-related vehicle trips could increase by approximately 34 one-way trips per hour, when construction workers would be traveling to or from the site (under a conservative analytical assumption that all construction activities would occur concurrently). Haul trips to transport excavated spoils would occur Monday through Friday, so there would be no construction-related vehicles on weekends.

Because the number of project-generated vehicle trips would be highest on weekdays (when there are few pedestrians and bicyclists on Calaveras Road), the potential for conflicts and increased traffic safety hazards would be limited. Further, any potential increase in construction traffic on weekends would not create substantial safety hazards due to the limited number of construction workers and associated truck trips. In addition, the SFPUC Standard Construction Measures (traffic control measures) would be applicable to construction of the ACRP; this measure requires that all projects implement traffic control measures sufficient to maintain traffic and pedestrian circulation on streets affected by construction, including measures such as flaggers, construction warning signs, scheduling truck trips during non-peak hours, and coordinating with local emergency responder to maintain emergency access. Therefore, this impact would be less than significant.

**Mitigation**: None required.

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**Impact TR-4: Project operations and maintenance activities would not substantially alter transportation conditions, increase vehicle miles travelled (VMT), and would not cause conflicts with emergency vehicle, transit, bicycle, and pedestrian travel. (Less than Significant)**

After completion of project construction activities, the proposed facilities would be operated remotely, with only periodic visits from SFPUC staff for operations review and routine maintenance. SFPUC operations and maintenance vehicle trips associate with the proposed project are expected to be similar to existing SFPUC vehicle trips in the SFPUC Alameda watershed system. There would be a minor increase in vehicle trip generation to/from project areas due to the proposed project after construction activities are completed, and minimal increase in corresponding VMT. Therefore, this impact would be less than significant, and no mitigation is required.

**Mitigation**: None required.

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### 5.6.3.4 Cumulative Impact

**Impact C-TR: The project, in combination with past, present, and probable future projects, would not substantially affect transportation and circulation. (Less than Significant)**

The geographic scope for potential cumulative impacts related to transportation and circulation encompasses roadways in the Sunol Valley (Calaveras Road between the project area and I-680, the I-680 on- and off-ramps at the junction of Calaveras Road and SR 84, and I-680 in the vicinity of the Calaveras Road crossing). Existing land uses, including the SMP-30 and SMP-24 quarry areas, the nursery at the Calaveras Road / I-680 interchange, and recreational park facilities in the southern Sunol Valley, as well as on-going construction activities associated with several SFPUC projects in the Sunol Valley, account for current traffic conditions along Calaveras Road. I-680 is a major interstate highway; general growth and development within the region has contributed to traffic on this roadway. Because ACRP effects on traffic and transportation would be limited to the construction period, this scope is limited to other projects that could be constructed concurrently with the proposed project—particularly the Calaveras Dam Replacement Project and the associated work at the Alameda Creek Diversion Dam. Recently completed projects in the Sunol Valley that have not affected land use and associated traffic patterns, for example the other infrastructure projects in Table 5.1-6 in Section 5.1, Overview, are not considered relative to potential cumulative effects.

As described above in Section 5.6.3.2, construction of the ACRP would result in a temporary (approximately 18-month) increase in vehicle trips on Calaveras Road between the project area and I-680, and on I-680 (see Impact TR-1). Of the cumulative projects listed in Table 5.1-6 in Section 5.1, Overview, only those that would be accessed via Calaveras Road and that have overlapping construction schedules could contribute to cumulative traffic impacts on this roadway. No residential or commercial projects are currently being developed in the immediate project vicinity that would increase traffic.

The SFPUC San Antonio Backup Pipeline (SABPL) project, SFPUC New Irvington Tunnel (NIT) project, Sunol Valley Water Treatment Plant (SVWTP) Expansion and Treated Water Reservoir project, SFPUC Geary Road Bridge Replacement project, SFPUC Alameda Siphons Seismic Reliability Upgrade project, SFPUC San Antonio Pump Station Upgrade project, SFPUC San Antonio Reservoir Hypolimnetic Oxygenation project, and the Alameda County State Route 84 Expressway Widening project are either already completed or would be completed prior to construction of the ACRP, and therefore would not contribute to cumulative traffic volumes and various SFPUC pipeline inspection projects.

Certain future cumulative projects (i.e., the Rubber Dam No. 1 and BART Weir Fish Passage project) are sufficiently distant from the project site such that they would not affect, or be affected by, traffic on Calaveras Road and, for this reason, were not included in the cumulative traffic analysis.

The PG&E Line 303 Alameda Creek Relocation project, the PG&E Line 107 Retirement project, and SFPUC Calaveras Dam Replacement project (CDRP) are all projects sited in the Sunol Valley with construction schedules that could overlap with that of the ACRP. The PG&E Line 303 Alameda Creek Relocation project, and the PG&E Line 107 Retirement project, could also have construction-related traffic along Calaveras Road associated with construction deliveries, haul trucks, and worker commutes concurrently with ACRP construction. The CDRP is currently under construction, with completion anticipated in 2019. As part of the CDRP construction, an 18-month closure of Calaveras Road started in July 2016 to haul materials to build the dam. During the closure, Calaveras Road will be fully closed to vehicle, pedestrian, and bicycle traffic between Geary Road to the Alameda/Santa Clara County boundary, weekdays only. However, the lower portion of Calaveras Road along the Quarry Reach would remain open and accessible to construction traffic for ACRP and other planned cumulative projects during the 18-month road closure for CDRP. As discussed in Impact TR-1, construction of the proposed ACRP could include a maximum of 76 construction-related vehicle trips per day (and no more than one truck trip during the a.m. and p.m. peak hours), which is less than significant at the project-level. However, in combination with construction vehicles associated with cumulative projects and a full road closure of Calaveras Road south of Alameda Siphons due to the CDRP, there could be a significant cumulative effect. While the possible overlap in cumulative project construction schedules in the Sunol Valley region would result in increased traffic and a potentially significant cumulative impact, the ACRP's limited contribution (a maximum of 76 trips per day and no more than one trip during the peak hours) would not be cumulatively considerable (i.e., would be less than significant).

The cumulative projects noted above have the potential to result in significant cumulative impacts related to traffic and safety hazards during construction. However, as discussed above in Impact TR-3, the project-level impact associated with increased traffic and safety hazards during construction would be less than significant, and the SFPUC Standard Construction Measures (traffic control measures) would be applicable to construction of the ACRP. Similarly, the limited number of truck trips (no more than one truck trip per hour) and construction worker vehicle trips (maximum of 68 per day) would not result in a substantial or cumulatively considerable contribution to potential cumulative traffic safety hazard impacts (i.e., would be less than significant).

After ACRP construction is completed, the new facilities would require periodic inspection and maintenance (similar to existing operations) and would not generate a substantial number of new operational trips. In addition, the combined number of vehicle trips associated with operation and maintenance of other cumulative SFPUC projects in the Sunol Valley (i.e., the Alameda Siphons Seismic Reliability Upgrade, San Antonio Pump Station, and San Antonio Hypolimnetic Oxygenation Facility projects) would be minimal, if any, and would not result in a noticeable increase in traffic on Calaveras Road. Therefore, cumulative traffic impacts would be less than significant.

**Mitigation**: None required.

# 5.7 Noise and Vibration

This section analyzes the potential for the Alameda Creek Recapture Project (ACRP or proposed project) to adversely affect the noise environment and impact noise-sensitive receptors in and around the project vicinity. It describes the existing noise environment, identifies sensitive noise receptors that could be affected by the proposed project, presents relevant noise regulations and standards, and evaluates the potential effects of project construction and operation on these receptors.

## 5.7.1 Setting

### 5.7.1.1 Noise Descriptors

Sound is a phenomenon occurring in a medium (such as air or water), and the manner in which sound travels through this medium is influenced by the physical properties of the medium (such as temperature, density, humidity, etc.). The amount of energy in the sound is proportional to the pressure generated in the medium. The sound pressure level has become the most common descriptor used to characterize the loudness of an ambient sound, and the decibel (dB) scale is used to quantify sound intensity. Because sound can vary in intensity by over 1 million times within the range of human hearing, a logarithmic scale is used to keep sound pressure measurements within a convenient and manageable range. Since the human ear is not equally sensitive to all sound frequencies within the entire spectrum, human response is factored into sound descriptions in a process called “A-weighting,” expressed as “dBA.” The dBA, or A-weighted decibel, refers to a scale of noise measurement that approximates the range of sensitivity of the human ear to sounds of different frequencies. On this scale, the normal range of human hearing extends from about 0 dBA to about 140 dBA. A 10-dBA increase in the level of a continuous noise represents a perceived doubling of loudness. The noise levels presented in this section are expressed in terms of dBA, unless otherwise indicated. Traffic noise increases of less than 3 dBA are barely perceptible to most people, while a 5-dBA increase is readily noticeable.[1] **Table 5.7-1** shows some representative noise sources and their corresponding noise levels.

Planning for acceptable noise exposure must take into account the types of activities and corresponding noise sensitivity in a specified location for a generalized land use type. Some general guidelines[2] are as follows: sleep disturbance may occur at levels above 35 dBA; interference with human speech begins at around 60 dBA; and hearing damage may result from prolonged exposure to noise levels in excess of 85 to 90 dBA.

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[1] California Department of Transportation, Division of Environmental Analysis, 2013. “Technical Noise Supplement,” September 2013, pp. 2-44 – 2-46. Available online at http://www.dot.ca.gov/hq/env/noise/pub/TeNS_Sept_2013A.pdf.

[2] U.S. Environmental Protection Agency (U.S. EPA), 1974. *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety (Condensed Version),* EPA/ONAC 550/9-74-004, Washington D.C., March 1974.

## TABLE 5.7-1
## TYPICAL SOUND LEVELS MEASURED IN THE ENVIRONMENT

| Examples of Common, Easily Recognized Sounds | Decibels (dBA) | Subjective Evaluations |
|---|---|---|
| Near Jet Engine | 140 | Deafening |
| Threshold of Pain | 130 | |
| Threshold of Feeling – Hard Rock Band | 120 | |
| Accelerating Motorcycle (at a few feet away) | 110 | |
| Loud Horn (at 10 feet away) | 100 | Very Loud |
| Noisy Urban Street | 90 | |
| Noisy Factory | 85[a] | |
| School Cafeteria with Untreated Surfaces | 80 | Loud |
| Lawnmower | 70[b] | |
| Near Freeway Auto Traffic | 60[b] | Moderate |
| Average Office | 50[b] | |
| Soft Radio Music in Apartment | 40 | Faint |
| Average Residence without Stereo Playing | 30 | |
| Average Whisper | 20 | Very Faint |
| Rustle of Leaves in Wind | 10 | |
| Human Breathing | 5 | |
| Threshold of Audibility | 0 | |

[a] Continuous exposure above 85 dBA is likely to degrade the hearing of most people.
[b] For comparison purposes, the range for a person speaking is typically 50 to 70 dBA.

SOURCE: U.S. Department of Housing and Urban Development, no date. *The Noise Guidebook.* Available online at http://portal.hud.gov/hudportal/documents/huddoc?id=DOC_16414.pdf. Accessed September 1, 2015.

Time variations in noise exposure are typically expressed in terms of a steady-state energy level (called Leq) that represents the acoustical energy of a given measurement. Leq (24) is the steady-state energy level measured over a 24-hour period. Because community receptors, such as residences and hospitals, are more sensitive to unwanted noise intrusion during the evening and at night, state law requires that, for planning purposes, an artificial dBA increment be added to "quiet time" noise levels to form a 24-hour noise descriptor called the Community Noise Equivalent Level (CNEL). CNEL adds a 5-dBA "penalty" during the evening hours (7 p.m. to 10 p.m.) and a 10-dBA penalty during the night hours (10 p.m. to 7 a.m.). Another 24-hour noise descriptor, called the day-night noise level (Ldn), is similar to CNEL. Both CNEL and Ldn add a 10-dBA penalty to all nighttime noise events between 10 p.m. and 7 a.m., but Ldn does not add the evening 5-dBA penalty. In practice, Ldn and CNEL usually differ by less than 1 dBA at any given location for transportation noise sources. Lmax is the maximum, instantaneous noise level taken during the measurement period.

### 5.7.1.2 Vibration Descriptors

Vibrations caused by construction activities can be interpreted as energy transmitted in waves through the ground. These energy waves generally dissipate with distance from the vibration source (e.g., pile driving or sheetpile driving). Because energy is lost during the transfer of energy from one particle to another, vibration is less perceptible with distance from the source. As discussed above for noise, vibration attenuates as a function of the distance between the source and receptor. For sources of vibration emanating from a single location (i.e., point sources), vibration attenuates at a rate of approximately 50 percent for each doubling of distance from the source (termed the "inverse square law"). This approach tends to underestimate attenuation and therefore provides a worst-case estimate of vibration at the receptor.

Vibration is an oscillatory motion that can be described in terms of displacement, velocity, or acceleration. Peak particle velocity (PPV) is defined as the maximum instantaneous positive or negative peak of the vibration signal. PPV is used to assess the potential for damage to buildings and structures and is expressed in inches per second (in/sec).

The responses of human receptors and structures to vibration are influenced by a combination of factors, including soil/rock type, distance from the source, duration, and the number of perceived events. Energy transmitted through the ground as vibration can reach levels that cause structural damage; however, humans are very sensitive, and the vibration amplitudes that can be perceived by humans are well below the levels that cause architectural or structural damage. A freight train passing at 100 feet can result in vibrations of 0.1 in/sec PPV, while a strong earthquake can produce vibration in the range of 10 in/sec PPV.

In general, cosmetic or threshold damage to residential buildings can occur at vibrations over 0.5 in/sec PPV. The Federal Transit Administration (FTA) recommends a vibration threshold criterion of 0.2 in/sec for fragile buildings.[3] Much lower vibration levels (exceeding 0.012 in/sec PPV) can cause disturbance or annoyance, and this threshold is typically applied to construction activities during the more sensitive nighttime hours. Exceedance of the annoyance threshold at night could result in sleep disturbance, depending on the receptors' proximity to construction activities.

### 5.7.1.3 Existing Noise Environment

The Sunol Valley is located in unincorporated Alameda County. Existing land uses in the vicinity of the proposed project include commercial gravel mining operations, commercial nurseries, grazing, regional open space, SFPUC water supply facilities, and private residences. The primary sources of noise in the project vicinity are quarry operations and local traffic on Interstate 680 (I-680) and Calaveras Road. I-680 borders the northern boundary of the project area. Calaveras Road borders the eastern boundary of the project area. Quarry mining and aggregate processing

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[3] U.S. Department of Transportation, Federal Transit Administration (FTA), 2006. *Transit Noise and Vibration Impact Assessment*, DTA-VA-90-1003-06, May 2006. Available online at www.fta.dot.gov/documents/FTA_Noise_and_Vibration_Manual.pdf. Accessed September 1, 2015.

associated with Surface Mining Permit 24 (SMP-24) occur within and immediately west of the project area. Quarry mining and aggregate processing associated with Surface Mining Permit 30 (SMP-30) occurs immediately south of the project area, on the south side of San Antonio Creek. Noise-sensitive receptors in the vicinity of the project area are described in the following paragraph as they relate to the locations of the noise measurements used in this analysis. Additional information on these receptors is provided in Section 5.7.1.4, below.

The noise environment in the project area can be characterized based on noise measurements collected at two locations in the project vicinity as part of the environmental analyses previously conducted for other SFPUC projects.[4] Measurement Location No. 1 is near the intersection of I-680 and Vargas Road, approximately 2.65 miles southwest of the residences on Athenour Way, and about 2.8 miles from the project area. Measurement Location No. 1 is intended to characterize noise levels associated with I-680 at the two private residences on Athenour Way because the measurement location and residences are located along the same freeway section and same side of the freeway. However, the Athenour Way residences are located about 100 feet closer to the freeway and are also exposed to noise associated with SMP-24 quarry operations, including noise from trucks entering and leaving the SMP-24 aggregate processing facility via Athenour Way, which is located as close as 175 feet from these two residences (see Section 5.7.1.4, below, for additional discussion).

There are a number of residences located to the west of the project area on Andrade Road, and these residences are subject to noise from the I-680 freeway as well as the SMP-24 quarry operations. However, they are set back farther from these noise sources (0.1 to 0.6 mile south of I-680 and 500 to 1,000 feet from quarry operations) than the residences on Athenour Way. Measurement Location No. 2 is located approximately 1.2 miles south of the project area near the Alameda Siphons. Measurement Location No. 2 is roughly 1,500 feet from the SFPUC watershed keeper's residence located at Alameda East Portal, on the east side of Calaveras Road, and 1,800 feet from the private residence located near Alameda West Portal. This measurement is intended to characterize noise levels near these two residences since they are both located away from the I-680 freeway but adjacent to local access roads. **Figure 5.7-1** shows the measurement locations, and **Table 5.7-2** presents the measurement results.

Residential uses are the most noise-sensitive uses in the project area. The noise measurements are used to characterize the ambient noise environment at the residential receptors located closest to the project-related construction activities.

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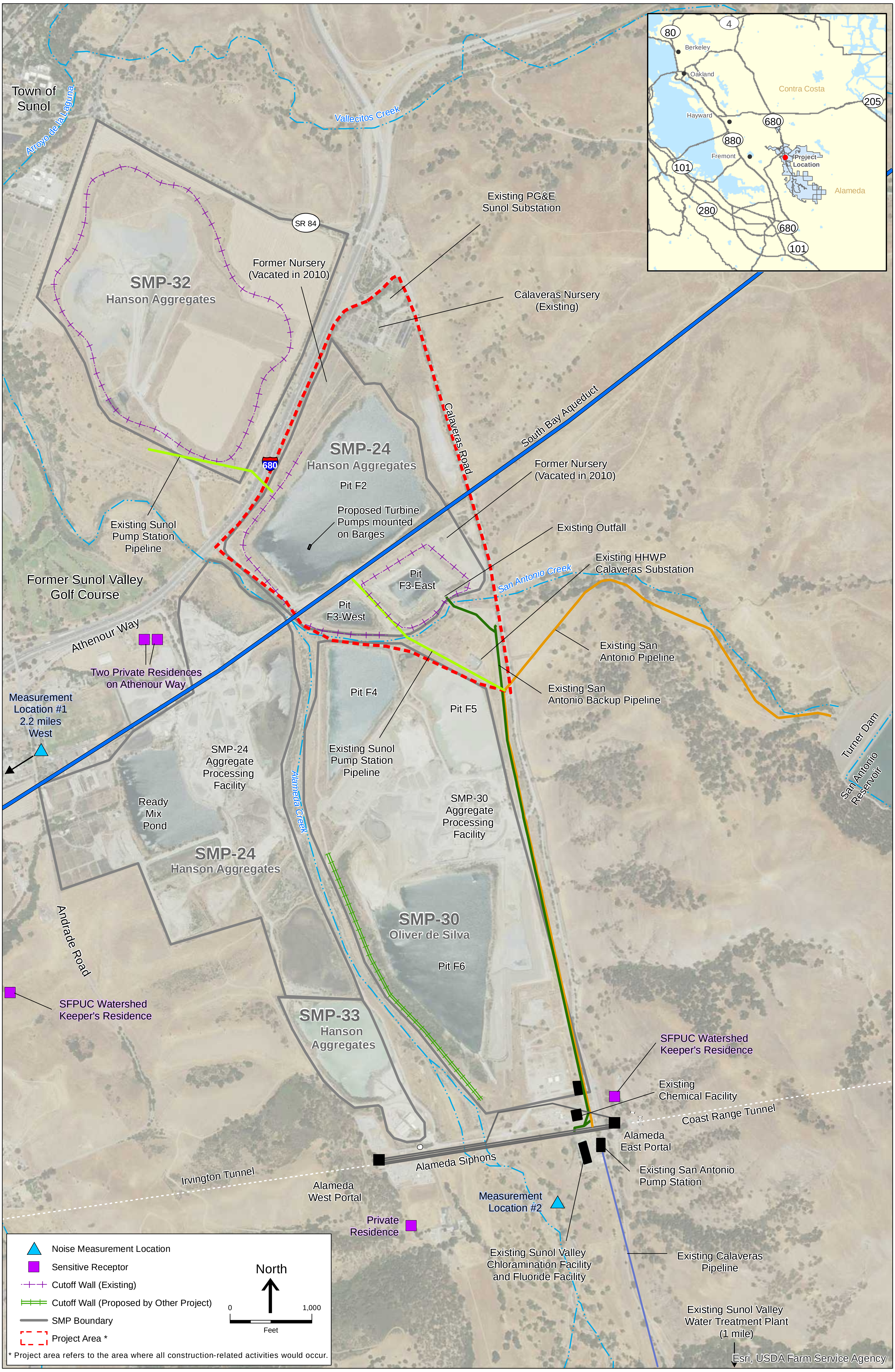
[4] The noise measurements were collected in 2007 and 2008 prior to the onset of WSIP-related construction projects in area. These projects have since been completed. Since there have been no major changes in the project area since the measurements were taken, the existing noise environment is substantially similar to conditions that occurred when the noise measurements were collected (i.e., prior to the WSIP construction projects).



SOURCE: ESA, 2015; Date of aerial photo is 2014.

SFPUC Alameda Creek Recapture Project

**Figure 5.7-1**
Noise Measurement Locations and Sensitive Receptors

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**TABLE 5.7-2
SUMMARY OF NOISE MEASUREMENT RESULTS**

| Time | Measurement Location No. 1 Noise Levels South of I-680 Freeway[a] (dBA) Leq Noise Level Range | Measurement Location No. 2 Noise Levels West of San Antonio Pump Station[b] (dBA) Leq Noise Level Range |
|---|---|---|
| Daytime Leq (7 a.m. – 10 p.m.) | 64 – 68 | 44 – 53 |
| Nighttime Leq (10 p.m. – 7 a.m.) | 60 – 68[c] | 41 – 49 |
| Ldn | 70 – 71 | 53 |

NOTES: Noise levels at Measurement Location No. 1 were taken approximately 450 feet southeast of the I-680 freeway centerline at Vargas Road from Wednesday, September 24, 2008 to Sunday, September 28, 2008. This measurement location is approximately 2.65 miles southwest of the Athenour Way residences. Noise levels at Measurement Location No. 2 were taken approximately 1,000 feet west of the Calaveras Road centerline from Thursday, January 18, 2007 to Friday, January 19, 2007. This measurement location is less than 0.3 mile from both the private residence located near Alameda West Portal and the SFPUC watershed keeper's residence located east of Calaveras Road near Alameda East Portal.

[a] The range of speech is 50 to 70 dBA.
[b] Continuous exposure above 85 dBA is likely to degrade the hearing of most people.
[c] Nighttime ambient noise levels measured at this location do not reflect periodic nighttime noise increases that occur at the two Athenour Way residences when trucks from the Hanson Aggregates SMP-24 processing facility use the adjacent access road during the nighttime hours.

SOURCES: Measurement Location No. 1 → San Francisco Planning Department, 2009. *Final Environmental Impact Report for the San Francisco Public Utilities Commission New Irvington Tunnel Project, Noise Section*. San Francisco Planning Department File No. 2005.0162E, State Clearinghouse No. 2006092085. Certified November 5, 2009.

Measurement Location No. 2 → EDAW & Turnstone Joint Venture (ETJV), 2007. Noise measurements collected by Orion Environmental Associates on Thursday, January 18, 2007 and Friday, January 19, 2007.

### 5.7.1.4 Sensitive Receptors

For the purpose of this analysis, sensitive receptors are considered to be land uses that are more sensitive or vulnerable to the effects of noise (including groundborne noise or vibration). People in residences, motels and hotels, schools, libraries, churches, hospitals, nursing homes, auditoriums, natural areas, parks, and some outdoor recreation areas are generally more sensitive to noise than people at commercial and industrial establishments. Consequently, the noise standards for these sensitive land uses are more stringent than those for less sensitive uses. In general, residences and schools are among the land uses considered most sensitive to noise.

There are no schools, childcare centers, churches, hospitals, or nursing homes located in the project vicinity. However, two private residences are located at Athenour Way, approximately ¼ mile (1,400 feet) west of the project area boundary. A private residence located near Alameda West Portal is located approximately 1.3 miles (8,000 feet) south of the southern project boundary. The SFPUC watershed keeper's residence on Andrade Road is located approximately 1 mile southwest of the project area. There is a second SFPUC watershed keeper's residence on the east side of Calaveras Road near the Alameda East Portal, approximately 1 mile south of the project area boundary. These residences are the closest sensitive receptors to the project area; their locations are shown on Figure 5.7-1, and they are further described below in Section 5.7.3

relative to the maximum daytime and nighttime noise levels likely to be generated during construction of the proposed project.

In addition to freeway noise, the two residences on Athenour Way and the SFPUC watershed keeper's residence on Andrade Road are subject to noise from the Hanson Aggregates SMP-24 aggregate processing facility. Athenour Way serves as the main access road to this facility. The facility includes a gravel/aggregate processing facility, which is open from 6:00 a.m. to 3:30 p.m., Monday through Saturday, and an asphalt processing facility, which operates on demand for up to 24 hours per day, 7 days per week.[5] The primary source of existing ambient noise at the residence located near Alameda West Portal and the SFPUC watershed keeper's residence located near Alameda East Portal is traffic on Calaveras Road.

In addition to the above-described land uses, natural areas typically require some degree of quiet for passive recreational uses and are often considered noise-sensitive. While there are a number of regional preserves south of the project area, the Sunol Regional Wilderness is the closest to the project area, with the closest trail (Maguire Peaks Trail) located approximately 2.5 miles south of the project area.

## 5.7.2 Regulatory Framework

### 5.7.2.1 Federal Regulations

Federal regulations establish noise limits for medium and heavy trucks (more than 4.5 tons, gross vehicle weight rating) under Title 40 of the Code of Federal Regulations, Part 205, Subpart B. The federal truck passby noise standard is 80 dBA at 50 feet from the vehicle pathway centerline, under specified test procedures. These controls are implemented through regulatory controls on truck manufacturers.

The Federal Noise Control Act of 1972 established, by statutory mandate, a national policy "to promote an environment for all Americans free from noise that jeopardizes their public health and welfare." The act provides for a division of powers between the federal government and state and local governments that affords primary responsibility for noise source emission control to the federal government. State and local governments retain rights, authorities, and primary responsibility for controlling the use of noise sources and the levels of noise to be permitted within their jurisdictions.[6] The Alameda County Planning Department, Code Enforcement Division, is the applicable regulatory agency for noise within the project area.

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[5] Jackson, Tom, 2011. Telephone communication between Valerie Geier of Orion Environmental Associates and Tom Jackson, Plant Manager at Hanson Aggregates, on January 25, 2011.

[6] U.S. Environmental Protection Agency (U.S. EPA), 1974. *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety (Condensed Version)*, EPA/ONAC 550/9-74-004, Washington D.C., March 1974.

### 5.7.2.2 State Regulations

The California Vehicle Code, Section 27204, sets limits for the noise generated by on-road trucks manufactured since 1987. Noise levels must not exceed 80 dBA when measured at 50 feet from the line of travel for any operating condition.

The California Occupational Safety and Health Administration (Cal/OSHA) requires backup warning alarms for all vehicles that are used to haul dirt and have a haulage capacity of 2.5 cubic yards or more (Title 8, California Code of Regulations). Backup alarms must activate immediately upon reverse movement and must be audible above the surrounding ambient noise level at a distance of 200 feet.

### 5.7.2.3 Local Regulations

#### *Alameda County*

The Sunol Valley is located within the Alameda watershed, and the project area is in an unincorporated area of Alameda County. The noise policies of the East County Area Plan of the Alameda County General Plan promote the compatibility of land uses with respect to noise generation by legislatively protecting sensitive land uses from noise sources. The East County Area Plan (Policy 289) indicates that a noise environment of less than 60 dBA CNEL is considered to be compatible with residential uses.[7] The East County Area Plan does not have specific provisions that apply to construction noise.

The Alameda County Noise Ordinance regulates noise sources, such as mechanical equipment and amplified sounds, and prescribes hours of heavy equipment operation and construction activities. In most cases, local noise ordinances are part of local building and zoning ordinances that do not apply to SFPUC projects (pursuant to California Government Code Section 53090 et seq.). However, the time and noise limits in local noise ordinances are taken into consideration in determining whether the project would have a significant noise effect under CEQA.

Table 6.60.040A in Section 6.60.040 of the Alameda County General Code (Title 6, Health and Safety, Chapter 6.60) specifies exterior noise level standards at receiving single- or multiple-family residential, school, hospital, church, and public library uses. **Table 5.7-3** presents the Alameda County General Code's exterior noise standards, which are categorized based on the duration of exposure to a given noise level (i.e., the "cumulative number of minutes in any one-hour time period").

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[7] Alameda County, 2000. *East County Area Plan* (as revised by Initiative Nov. 2000), p. 70. Available online at http://www.acgov.org/cda/planning/generalplans/documents/EastCountyAreaPlancombined.pdf. Accessed on September 1, 2015.

TABLE 5.7-3
ALAMEDA COUNTY EXTERIOR NOISE LEVEL STANDARDS FOR SENSITIVE RECEPTORS

| Category | Cumulative Number of Minutes in any One-Hour Time Period | Daytime 7 a.m. to 10 p.m. | Nighttime 10 p.m. to 7 a.m. |
|---|---|---|---|
| 1 | 30 | 50 dBA | 45 dBA |
| 2 | 15 | 55 dBA | 50 dBA |
| 3 | 5 | 60 dBA | 55 dBA |
| 4 | 1 | 65 dBA | 60 dBA |
| 5 | 0 | 70 dBA | 65 dBA |

Based on these noise and duration limits, the maximum theoretical noise limit for any one-hour time period equates to 58 dBA (Leq) during the day and evening (7 a.m. to 10 p.m.) and 53 dBA (Leq) at night (10 p.m. to 7 a.m.). This section of the code also specifies that the applicable standard must be adjusted to equal the existing ambient noise level if the measured ambient noise level exceeds the applicable noise level standard. As indicated in Table 5.7-2, based on the noise measurement results from Measurement Location No. 1, ambient noise levels in the vicinity of the Athenour Way residences exceed the ordinance noise limits; therefore, the applicable ordinance noise limits applied in this analysis at this location are the minimum ambient noise levels measured, which were 64 dBA (Leq) during the day and evening and 60 dBA (Leq) during the night. In addition, the above-listed noise level standards must be reduced by 5 dBA for recurring impulsive noises such as pile driving.

Section 6.60.070(E) specifies the following hourly limits for construction: 7 a.m. to 7 p.m. on weekdays, and 8 a.m. to 5 p.m. on Saturdays and Sundays. Construction activities conducted outside of these hours (between 7 p.m. and 7 a.m. on weekdays and 5 p.m. and 8 a.m. on weekends) would be subject to the noise level standards listed in Table 5.7-3.

## 5.7.3 Impacts and Mitigation Measures

### 5.7.3.1 Significance Criteria

The proposed project would have a significant impact related noise and vibration if the project were to:

- Result in exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies;
- Result in exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels;
- Result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project;
- Result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project;

- For a project located within an airport land use plan area, or, where such a plan has not been adopted, in an area within 2 miles of a public airport or public use airport, expose people residing or working in the area to excessive noise levels;
- For a project located in the vicinity of a private airstrip, expose people residing or working in the project area to excessive noise levels; or

### 5.7.3.2 Approach to Analysis

The proposed project would not result in construction or operational impacts related to the significance criteria involving airports); therefore, no impact discussion is provided for these criteria for the reasons described below. In addition, as described below, there would be no operational impacts related to groundborne vibration; therefore, the impact discussion for this criterion focuses on the potential effects of project construction only.

- ***Result in Excessive Groundborne Vibration or Groundborne Noise Levels During Project Operations.*** With implementation of the proposed project, routine maintenance and operations of the proposed facilities would not include activities that would generate excessive groundborne vibration or groundborne noise levels. The closest sensitive receptors to proposed facilities are the two private residences at Athenour Way, approximately ¼ mile (1,400 feet) west of the project area. Given this distance, any groundborne noise generated by the proposed pumps and adjacent facilities would have no impact on these receptors. Thus, the criterion related to groundborne vibration and groundborne noise levels is not applicable to project operations, and is discussed below only as it relates to project construction (see Impact NO-3).
- ***Be Located Within 2 Miles of a Public Airport or Within an Airport Land Use Plan Area and Expose People to Excessive Noise Levels.*** There are no public airports in the project vicinity, and the project area is not located in an area covered by airport land use plan. The nearest public airport to the project area is the San Jose International Airport, which is approximately 14 miles to the southwest in San Jose. Therefore, the proposed project would not result in the long-term exposure of workers to excessive airport-related noise levels. The significance criterion related to noise levels within an airport land use plan area is not applicable to the proposed project, and no further discussion is provided.
- ***Be Located Near a Private Airstrip and Expose People to Excessive Noise Levels.*** There are no private airstrips in the project vicinity. The nearest private airstrips are the First Interstate Bank Operations Center Heliport and the Washington Hospital Heliport in Fremont, both of which are approximately 6 miles to the west. Therefore, the proposed project would not result in the long-term exposure of SFPUC facility operators to excessive airport-related noise levels. The significance criterion related to noise levels near private airstrips is not applicable to the proposed project, and no further discussion is provided.

The noise impact assessment evaluates short-term (temporary) impacts associated with the construction of project facilities as well as long-term (permanent) impacts resulting from project operations. For construction noise, the potential for impacts is assessed by considering several factors, including: the proximity of construction-related noise sources to sensitive receptors; typical noise levels associated with different types of construction equipment; the potential for construction noise levels to interfere with daytime and nighttime activities; the duration that sensitive receptors would be affected; and whether proposed activities would occur outside of the construction time limits prescribed in local ordinances. For operational noise, the impact evaluation determines the noise generation potential of project facilities; if the proposed project would introduce a new source of noise into the area, the potential for impacts is assessed by considering the proximity to sensitive receptors and whether the operational noise would remain within the local noise level standards applicable at the nearest receptors.

To address the CEQA significance criterion regarding "substantial temporary or periodic noise increases in ambient noise levels" for construction noise, a substantial noise increase is defined as an increase in noise to a level that causes interference with land use activities at nearby sensitive receptors during the day and/or night. An indicator that construction noise could interfere with daytime activities is speech interference, and an indicator that construction noise could interfere with nighttime activities is sleep interference.

To address the CEQA significance criterion regarding "noise levels in excess of standards established in the local general plan or noise ordinance," this Environmental Impact Report (EIR) applies the construction time limits (for construction impacts) and noise level standards (for both construction and operational impacts) of the Alameda County Noise Ordinance as the threshold for a "substantial" noise increase. In accordance with the Alameda County Noise Ordinance, the applicable noise level standard requires adjustment when the existing ambient noise levels exceed the noise level standards presented in Table 5.7-3, above. For construction impacts, this analysis considers whether construction would occur within the construction time limits, which are 7 a.m. to 7 p.m. on weekdays, and 8 a.m. to 5 p.m. on Saturdays and Sundays. For construction occurring outside of these hours, this analysis considers whether exterior noise levels at the closest sensitive receptors (the two private residences on Athenour Way) would remain at or below the calculated equivalent noise limit of 64 dBA (Leq) after 7 p.m. on weekdays and 5 p.m. on Saturdays, and at or below 60 dBA (Leq) between 10 p.m. and 7 a.m. (weekdays and weekends). For operational impacts, this analysis considers whether exterior noise levels at the Athenour Way residences would remain at or below 64 dBA (Leq) between 7 a.m. and 10 p.m., and 60 dBA (Leq) between 10 p.m. and 7 a.m. during project operations.

For the residences to the south (private residence located near Alameda West Portal), southeast (SFPUC watershed keeper's residence at Alameda East Portal), and southwest (SFPUC watershed keeper's residence on Andrade Road) of the project area, where ambient noise levels are lower, the equivalent ordinance noise level standards are also lower: construction-related noise levels occurring outside of construction time limits must remain at or below 58 dBA (Leq) after 7 p.m. on weekdays and 5 p.m. on Saturdays, and at or below 53 dBA (Leq) between 10 p.m. and 7 a.m. on weekdays and weekends. For operational impacts at these residences, exterior noise levels must remain at or below 58 dBA (Leq) between 7 a.m. and 10 p.m., and 53 dBA (Leq) between 10 p.m. and 7 a.m.

To assess potential construction-related vibration impacts on engineered (i.e., modern) aboveground buildings and structures during construction of other SFPUC projects in Sunol Valley, the San Francisco Planning Department has applied the following thresholds:[8]

| | |
|---|---|
| 0.012 in/sec PPV: | Human disturbance or annoyance during nighttime construction if vibration exceeds this level. |
| 0.2 in/sec PPV: | Cosmetic damage to non-engineered buildings or aboveground structures (i.e., fragile or historic buildings) could occur if vibration exceeds this level. |
| 0.4 in/sec PPV: | Cosmetic damage to engineered buildings or aboveground structures could occur from continuous vibration (i.e., vibration associated with vibratory equipment such as vibratory compactors and vibratory pile drivers) if vibration exceeds this level, |
| 0.5 in/sec PPV | Cosmetic damage to engineered buildings or aboveground structures could occur from for transient vibration (i.e., vibration associated with impact pile driving) if vibration exceeds this level. |
| 4.0 in/sec PPV: | Damage to underground pipelines could occur if vibration exceeds this level.[9,10] |

The above significance thresholds of 0.012 in/sec PPV and 0.2 in/sec PPV are not used in this analysis since there are no non-engineered (fragile) buildings or structures in the project vicinity and no nighttime construction is proposed. The assessment of vibration impacts focuses on whether construction would result in excessive groundborne vibration that could damage nearby aboveground structures and underground pipelines.

As described in Section 5.1.2 regarding baseline conditions for evaluation of project impacts, construction-related impacts in this section are evaluated against the existing conditions. The current construction schedule for the proposed project is from fall 2017 to spring 2019 (18 months), and construction of the Calaveras Dam Replacement Project (CDRP) is also anticipated to be completed in spring 2019. It is possible that operation of the CDRP will commence prior to completion of ACRP construction, and that with-CDRP conditions could occur while ACRP is still under construction. However, operation of the CDRP is not expected to change any of the baseline noise conditions analyzed in this section. Therefore, no change in the

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[8] Wilson, Ihrig & Associates, Inc., 2008. Letter dated December 12, 2008 from Deborah A. Jue at WIA to Baseline Environmental – Jones & Stokes Regarding Vibration Criteria – New Irvington Tunnel.

[9] The 2004 AASHTO guidelines include references for underground utility criteria, citing studies indicating that vibration under the ground surface is lower than that measured at the ground surface. One major utility has adopted a threshold of 4.0 in/sec (100 mm/s) PPV for underground optical-fiber cables. Underground or restrained concrete structures can withstand vibration of 10.0 in/sec (254 mm/s) PPV before the appearance of threshold cracks. Thus, underground utilities are less sensitive than surface structures (San Francisco Planning Department, 2010).

[10] San Francisco Planning Department, 2010. *Final Environmental Impact Report for the San Francisco Public Utilities Commission Crystal Springs Pipeline No. 2 Replacement Project*, Noise Section San Francisco Planning Department File No. 2005.0963E, State Clearinghouse No. 2008112050. Certified September 30, 2010.

approach to impact analysis is necessary to account for the with-CDRP conditions. More specifically, the construction-related impacts of the ACRP presented in this section would be the same regardless of the implementation of bypass flows at the Alameda Creek Diversion Dam and instream flow releases from Calaveras Reservoir and all other aspects of CDRP operations that characterize the with-CDRP conditions.

## 5.7.3.3 Construction Impacts and Mitigation Measures

**Impact NO-1: Construction of the project would not result in a substantial temporary increase in ambient noise levels at the closest residential receptors, and would not expose persons to substantial noise levels in excess of standards established in the Alameda County Noise Ordinance. (Less than Significant)**

Project-related construction activities would result in temporary noise increases at sensitive residential receptors located near the project area. Construction noise levels would vary at any given receptor depending on the construction activity, equipment type, duration of use, distance between the noise source and receptor, and the presence or absence of barriers between the noise source and receptor.

For construction noise, a substantial noise increase is defined as short-term interference with daytime or nighttime activities. As indicated in Section 3.5.12 in Chapter 3, Project Description, project construction would generally occur Monday through Saturday from 7 a.m. to 7 p.m. Because no nighttime construction is proposed, the significance of construction noise impacts was determined by comparing construction-related noise levels against the Alameda County Ordinance's daytime noise level standards.

### *Construction Equipment Noise*

The types of construction equipment that would be used for the proposed project are listed in **Table 3-4** in Chapter 3, Project Description. These equipment types typically generate maximum noise levels ranging from about 45 to 85 dBA at a distance of 50 feet from the source. The rate of attenuation (i.e., reduction) is about 6 dBA for every doubling of distance from a point source. **Table 5.7-4** indicates noise levels that could be expected at 50 feet from the noise source for typical construction equipment and provides estimates of daytime construction-related noise levels at the closest sensitive receptors.

In order to estimate project-related construction noise levels at sensitive receptor locations, the noise levels generated by project construction equipment were estimated as shown in Table 5.7-4 at the two closest receptor locations, the two residences on Athenour Way (one-quarter mile away) and the SFPUC watershed keeper's residence on Andrade Road (one mile away). The estimated noise levels shown in the table are the highest levels that could occur at these receptors. All other residential and recreational receptors are located farther away, and project-related construction noise levels would be less as distance increases. Thus, noise levels at the two closest sensitive receptors represent the maximum impact. The levels presented are for equipment that is being operated in the portions of the project area located closest to these receptors.

### TABLE 5.7-4
### TYPICAL NOISE LEVELS FROM CONSTRUCTION ACTIVITIES AND EQUIPMENT

| | Noise Level, dBA | | |
|---|---|---|---|
| **Construction Equipment** | **Leq at 50 feet** | **Leq at ¼ Mile Away (Athenour Way Residences)** | **Leq at 1 Mile Away (Both SFPUC Watershed Keeper's Residences)** |
| Loader, Backhoe | 79 | 50 | 32 |
| Dozer | 82 | 53 | 35 |
| Excavator | 81 | 52 | 34 |
| Grader | 85 | 44 | 44 |
| Compactor | 83 | 54 | 36 |
| Truck (Haul, Dump, Tank, Delivery, Water) | 76 | 47 | 29 |
| Flatbed Truck | 74 | 45 | 27 |
| Concrete Truck | 81 | 52 | 34 |
| Generator | 81 | 52 | 36 |
| Pipe Cutting/Welding | 78 | 49 | 35 |
| Compressor | 78 | 49 | 34 |
| Dewatering Pumps | 45 | 44 | 31 |
| Crane | 81 | 52 | 31 |
| Drill Rig[a] | 84 | 55 | 44 |
| Minimum Daytime Ambient Noise Level | - - | 64 | 44 |
| Exceeds Ambient? | - - | No | No |
| Alameda County Daytime and Evening Noise Ordinance Limit | - - | 64 | 58 |
| Exceeds Ordinance Limit? | - - | No | No |

[a] Exempt from the ordinance requirement of 80 dBA at 100 feet.

SOURCES: U.S. Department of Transportation, Federal Highway Administration, 2016. *Construction Noise Handbook, 9.0 Construction Equipment Noise Levels and Ranges, Table 9.1, RCNM Default Noise Emission Reference Levels and Usage Factors.* Accessed March 9, 2016.

U.S. Department of Transportation, Federal Transit Administration, 2006. *Transit Noise and Vibration Impact Assessment*, May 2006. Available online at: *http://www.fta.dot.gov/documents/FTA_Noise_and_Vibration_Manual.pdf.* Accessed September 1, 2015.

Limited surface grading would be necessary to construct the proposed mooring system, electrical control building, and electrical transformer and for spoils placement at the two permanent spoils sites. In addition, the pipeline connection, pipe manifold, throttle valve vault, would be installed using open-trench construction methods and subsequent restoration of the ground surface. Construction activities would take place over approximately 18 months.

As indicated in Table 5.7-4, noise resulting from general daytime construction activities and equipment would not exceed minimum daytime ambient noise levels of 64 dBA at the closest residential receptors (the two residences on Athenour Way located 1,400 feet away), or 44 dBA at both SFPUC watershed keeper's residences located 1 mile away). Since the private residence located near Alameda West Portal and the closest recreational trail in the Sunol Regional

Wilderness are located farther away from project construction activities, construction-related noise levels would be even lower than those listed in Table 5.7-4.

Project construction would occur during daytime hours (7 a.m. to 7 p.m.), Monday through Saturday, for approximately 18 months. The Alameda County Noise Ordinance time limits for construction are 7 a.m. to 7 p.m. on weekdays and 8 a.m. to 5 p.m. on Saturdays and Sundays. Therefore, construction activities would occur within the ordinance time limits on weekdays, but would begin one hour earlier and extend two hours later than the ordinance time limit for Saturday work.

The Alameda County Noise Ordinance specifies exterior noise standards, which would be applied for construction activities occurring outside of the ordinance time limits on Saturdays. The ordinance's equivalent Leq noise level standard is calculated to be 64 dBA at the two Athenour Way residences and 58 dBA at both SFPUC watershed keepers' residences for any equipment operating between 7 a.m. and 8 a.m. or between 5 p.m. and 7 p.m. Estimated construction noise levels would not exceed either ordinance noise level standard, resulting in a less-than-significant noise impact on the closest sensitive receptors.

Construction-related haul and delivery trucks and worker vehicles would use Calaveras Road to access the site. The associated construction traffic increases would temporarily contribute incremental increases to traffic noise along the section of Calaveras Road, which extends along the eastern project boundary—generally between I-680 and the SMP-30 aggregate processing facility. There are no sensitive receptors along this section of Calaveras Road; therefore, construction-related traffic noise increases on Calaveras Road would not significantly affect any sensitive receptors, and this impact would be less-than-significant.

**Mitigation:** None required.

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**Impact NO-2: Construction activities would not result in excessive groundborne vibration. (Less than Significant)**

This analysis evaluates the potential for the proposed construction activities to cause vibration that could damage nearby buried pipelines or aboveground structures. Damage to fragile buildings and structures would not occur because there are none in the project vicinity. Human annoyance from groundborne vibration is not anticipated because construction activities would not occur during nighttime hours.

As described above in Section 5.7.3.2, this analysis applies significance thresholds of 0.4 in/sec PPV for impacts to aboveground structures from continuous vibration, 0.5 in/sec PPV for impacts to aboveground structures from impact pile driving, and 4.0 in/sec PPV for buried pipelines. This analysis only considers potential vibration impacts to aboveground structures and underground infrastructure that are owned and operated by entities other than SFPUC; SFPUC-owned facilities are not considered in this analysis.

Vibration levels generated by large bulldozers and loaded trucks are estimated at approximately 0.013 to 0.015 in/sec PPV at 100 feet and 0.039 in/sec PPV at 100 feet from vibratory rollers/compactors, which are well below the 0.4 in/sec PPV threshold for continuous vibration. Aboveground structures that would be closest to vibratory construction equipment during project construction are the two residences on Athenour Way, structures at Calaveras Nursery, and the Pacific Gas & Electric Company (PG&E) Sunol Substation, which are located ¼ mile or more away from project construction activities. There are also PG&E overhead lines located just south of I-680 and north of Pit F4. Project construction activities would be located over 500 feet from these facilities. Since vibration levels generated by this equipment do not exceed the 0.4 in/sec PPV threshold for continuous vibration at 100 feet, the project's construction-related vibration levels at these most distant structures also would not exceed the 0.4 in/sec PPV significance threshold for impacts to aboveground structures from continuous vibration, thus resulting in a less-than-significant impact on these aboveground structures.

There are several pipelines in the project area vicinity: (1) the 84-inch-diameter South Bay Aqueduct (SBA) that runs roughly in an east-west direction, traversing the center of the project area between Pits F2 and Pits F3-East and F3-West; (2) a 24-inch-diameter PG&E high-pressure natural gas pipeline located along the northwest side of Pit F2; and (3) a 36-inch-diameter PG&E high-pressure natural gas pipeline located south of Pits F3-East, F3-West, and F4. The SBA is located at least 25 feet or more from the proposed electrical control building, electrical transformer, pipeline connection, pipe manifold, and throttle valve vault, but the proposed Staging Areas 4 and 5 would be located directly over the SBA. The 24-inch gas pipeline is located as close as approximately 50 feet west of westernmost proposed anchor block, while the 36-inch gas pipeline is located approximately 25 feet from proposed Staging Area 2. Operation of a vibratory rollers/compactor would generate vibration levels of 0.21 in/sec PPV at 25 feet, while operation of other heavy equipment, such as bulldozers and loaded trucks, would generate vibrations levels of 0.003 to 0.089 in/sec PPV at 25 feet. Such vibration levels are so far below the 4.0 in/sec PPV threshold for underground facilities, that the project's construction-related vibration levels are expected to remain well below this threshold, resulting in a less-than-significant impact on these pipelines.

**Mitigation**: None required.

## 5.7.3.4 Operational Impacts and Mitigation Measures

**Impact NO-3: Project operations would not result in a substantial increase in ambient noise levels in the project vicinity or significant impacts related to the exposure of people to noise levels in excess of standards established by the Alameda County Noise Ordinance. (Less than Significant)**

The proposed project would construct new facilities that could generate noise during project operations. The primary sources of operational noise would be the four 400-horsepower pumps on floating barges in Pit F2, generating approximately 81 dBA (Leq) at 50 feet. The proposed

21 kV electrical transformer adjacent to the pump station facility would also be a new source of noise, generating approximately 50 dBA immediately adjacent to the transformer.[11]

The closest sensitive receptors to the project area are the two residences on Athenour Way, which are 1,400 feet away from the project area boundary, but approximately 2,300 feet west of the proposed location of the floating barges in Pit F2 where the pumps would be located, and approximately 2,700 feet west of the proposed electrical transformer. The four 400-horsepower pumps and electrical transformer are estimated to generate noise levels of approximately 81 dBA (Leq) at 50 feet. At 2,300 to 2,700 feet, these facilities (primarily the pumps) would generate noise levels of approximately 47 dBA (Leq) at these receptors—well below the lowest measured ambient noise levels near these residences of 64 dBA (Leq) during the day and 60 dBA (Leq) during the night (see Table 5.7-2), and below the adjusted Alameda County daytime (64 dBA) and nighttime (60 dBA) exterior noise level standards (as noted in Section 5.7.2.3, above, the ordinance noise level standards for these residences equate to the existing ambient noise levels).[12] The top of the embankment on the southwest side of Pit F2 would also interrupt the line-of-sight between proposed pumps and these residences, further reducing pump noise. Therefore, the proposed project's operational noise impact on the two residences on Athenour Way (and all other more distant residential receptors in the project vicinity) would be less than significant.

**Mitigation**: None required.

## 5.7.3.5 Cumulative Impacts and Mitigation Measures

**Impact C-NO: The project, in combination with past, present, and probable future projects, would not substantially affect noise and vibration. (Less than Significant)**

For cumulative construction-related noise and vibration impacts, the geographic scope encompasses the sensitive residential and recreational receptors in the vicinity of the project area. These sensitive receptors are: the two private residences on Athenour Way, located approximately ¼ mile southwest of the western project boundary; the SFPUC watershed keeper's residence located on Andrade Road, approximately 1 mile southwest of the project area; the SFPUC watershed keeper's residence near the Alameda East Portal, located 1 mile south of the project area; the private residence near Alameda West Portal, located approximately 1.3 miles south of the project area; and the Sunol Regional Wilderness, with the closest trail (Maguire Peaks Trail) located approximately 2.5 miles south of the project area. The proposed project would result in noise increases in the project vicinity from limited short-term surface grading and construction activities, as well as from long-term operation of project facilities in the vicinity of Pit F2.

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[11] National Electric Manufacturers Association, 1994. *Transformers Regulators and Reactors,* NEMA Standards Publication No. TR 1. 1994.

[12] Even if the standard ordinance limits of 58 dBA (Leq) during the day and 53 dBA (Leq) during the night were applied, the project's operational noise increases of 47 dBA (Leq) at the closest receptors would still not exceed this lower threshold.

### *Exposure of People to Noise Levels in Excess of Standards Established by the Alameda County Noise Ordinance*

As discussed above under Impact NO-1, noise generated by project-related construction activities would not exceed ambient noise levels or ordinance noise level standards at the Athenour Way residences. As indicated in Table 5.1-6, project construction would overlap with construction of the SFPUC Calaveras Dam Replacement project (CDRP), and there is a possibility that construction of the PG&E Gas Line 107 Retirement Project and PG&E Line 303 Alameda Creek Relocation project could overlap with construction of the ACRP. These projects are located farther from the Athenour Way residences (½ mile or more to the south) than the ACRP facilities. With these cumulative projects located at more distant locations and the proposed project's construction noise levels estimated to be well below the lowest daytime noise levels and the ordinance noise level standard, cumulative noise increases at these two residences would not be expected to exceed these thresholds levels if construction of all these projects were to occur at the same time. Noise resulting from general daytime construction activities and equipment associated with the ACRP would not exceed minimum daytime ambient noise levels at the closest residential receptors (the two residences on Athenour Way located 1,400 feet away), or at both SFPUC watershed keeper's residences located 1 mile away). Since the private residence located near Alameda West Portal and the closest recreational trail in the Sunol Regional Wilderness are located farther away from project construction activities, construction-related noise levels would be even lower. Construction noise from the proposed project in combination with cumulative project construction is not expected to exceed to ambient daytime noise levels or ordinance standards at the nearest sensitive receptor. The SFPUC watershed keeper's residence on Andrade Road would be closer to the SMP-30 and PG&E Line 303 projects, but the ACRP construction activities would be farther from this residence when compared to the Athenour Way residences (about 1 mile vs ¼ mile for Athenour Way residences), reducing cumulative noise increases from these projects. Therefore, cumulative impacts related to construction noise would be less than significant.

### *Temporary Noise Disturbance Along Construction Access Routes*

During construction activities associated with the proposed project, construction vehicles would use Calaveras Road (between I-680 and the SMP-30 aggregate processing facility). Construction-related trucks would not operate along Calaveras Road during the evening or nighttime hours (7 p.m. to 7 a.m.). As discussed above under Impact NO-1, there are no sensitive receptors adjacent to or near the section of Calaveras Road that would be used by project-related construction traffic therefore; construction-related traffic noise increases on Calaveras Road would not significantly affect any sensitive receptors. While the project's construction-related vehicle noise on Calaveras Road could contribute to increased traffic noise in combination with other cumulative projects to the south in the Sunol Valley, including the Calaveras Dam Replacement Project, the proposed project's contribution would only affect the northern section of Calaveras Road (between I-680 and the SMP-30 facility) where there are no nearby sensitive receptors. Therefore, the cumulative traffic noise increases along the northern section of Calaveras Road would be less than significant.

Construction traffic noise from the proposed project in combination with cumulative project traffic is not expected to significantly alter existing noise levels on I-680. The ambient noise levels along this roadway are already high, and the small amount of additional traffic from the cumulative projects would not substantially raise existing freeway noise levels. Therefore, cumulative impacts related to noise increases on I-680 would be less than significant.

### *Construction-Related Vibration*

As discussed in Impact NO-2, the operation of heavy equipment and vibratory compactors in the proposed project area would generate vibration levels well below the thresholds of 0.4 in/sec PPV for continuous vibration for aboveground structures and 4.0 in/sec PPV for underground pipelines, resulting in less-than-significant impacts to both aboveground structures and underground pipelines in the project vicinity.

Simultaneous construction of the proposed project with the PG&E Line 303 Alameda Creek Relocation project is not expected to result in cumulative vibration levels that exceed threshold levels at aboveground structures (Athenour Way residences, structures at Calaveras Nursery, the PG&E Sunol Substation, and PG&E overhead lines) because these projects are located farther from all identified aboveground structures (½ mile or more to the south) than the proposed project facilities. Therefore, any groundborne vibration generated by those projects would be even less than the vibration that would be generated during construction of proposed project and the combined vibration levels are expected to remain well below the 0.4 in/sec PPV threshold for continuous vibration. As such, the potential for a cumulative impact at these aboveground structures is less than significant.

With respect to underground pipelines, there would be a potential for cumulative vibration impacts on the SBA because the 300-foot-long PG&E gas pipeline to be removed is located immediately adjacent to the SBA and the proposed project's Staging Areas 4 and 5 are located over the SBA. The proposed project's electrical control building, electrical transformer, permanent spoils area Site B, and Staging Area 1 would also be located within 30 to 50 feet of the SBA. Although they are both located in proximity to the SBA, construction activities would not coincide since the pipeline section under the project's electrical control building would have to be removed prior to construction of project facilities in this area. The PG&E Line 303 Alameda Creek Relocation project is located in the Alameda Creek channel and even if construction activities coincided with project construction, they would not occur in the same area and in proximity to the SBA. Therefore, the potential for a cumulative vibration impact on the SBA is less than significant.

### *Operational Noise*

Of the cumulative projects listed in Table 5.1-6, only the SFPUC San Antonio Backup Pipeline project (SABPL) has facilities in the immediate vicinity of the proposed project. SABPL facilities with noise-generating potential are two submersible high-pressure pumps, located at the concrete splash pad in Pit F3-East, approximately 0.7 mile from the Athenour Way residences. Simultaneous operation of pump facilities for both projects could result in long-term cumulative noise increases. As discussed in Impact NO-3, operation of ACRP pumps would generate noise levels of up to

47 dBA (Leq) at the two Athenour Way residences. Operation of the two additional SABPL pumps would increase noise levels at these residences by less than 1 dB, an increase that is generally considered inaudible. Even with simultaneous operation of all six pumps, cumulative noise increases would still not cause ambient noise levels to exceed the minimum nighttime ambient noise level and ordinance noise level standard of 60 dBA (Leq) at these residences (i.e., a less-than-significant noise impact). Therefore, no cumulative impacts related to operational noise increases would occur from pumping operations associated with both of these projects.

**Mitigation**: None required.

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# 5.8 Air Quality

This section addresses the air quality impacts that would result from implementation of the proposed Alameda Creek Recapture Project (ACRP or proposed project), including increases in emissions of criteria air pollutants and exposure of sensitive receptors to substantial pollutant concentrations. It describes the existing air environment, identifies sensitive air pollutant receptors that could be affected by the proposed project, presents relevant air quality regulations and standards, and evaluates the potential air quality effects of project construction and operation. The principal air emissions generated by the proposed project would be short term in nature and associated with the construction of project facilities. Impacts specific to greenhouse gas (GHG) emissions and climate change are evaluated in Section 5.9, Greenhouse Gas Emissions.

## 5.8.1 Setting

### 5.8.1.1 Background

The project area is located in unincorporated Alameda County in the Sunol Valley within the San Francisco Bay Area Air Basin (SFBAAB), which comprises all of Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, and Santa Clara Counties, as well as the southern portion of Sonoma County and the southwest portion of Solano County. Ambient concentrations of air pollutants in the project area are a product of the quantity of pollutants emitted by local sources and the atmosphere's ability to transport and dilute such emissions. Natural factors that affect air quality and pollutant transport and dilution include terrain, wind, atmospheric stability, and the presence of sunlight.

### 5.8.1.2 Meteorology

On an annual basis, temperatures in the Sunol Valley average 60 degrees Fahrenheit, with summer highs in the upper 70s and winter lows in the low 40s. August and September are the warmest months; December and January are the coldest. January and February are the wettest months, with a monthly average of 2.3 inches. Although average annual precipitation in the project area is 14 inches, precipitation can vary markedly from year to year.[1] The total rainfall in one month of a heavy-precipitation year may exceed the total annual rainfall during a drought year.

Wind is an important element in characterizing the air quality setting of any project. Winds control the microscale dispersion of any locally generated air emissions as well as their regional trajectory. Winds during warmer months typically originate from the west and northwest, averaging nearly 10 miles per hour. During the day, localized emissions from the project area vicinity are carried in a southeastward direction toward the Sunol Regional Wilderness. At night, emissions are less readily ventilated and travel in more random directions. During the day, there is usually little potential for large-scale stagnation. At night, winds are often less than 2 to 3 miles per hour. Local radiation

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[1] Western Regional Climate Center (WRCC), 2015. Period of Record Monthly Climate Summary for Newark Gauge No. 046144, Period of Record 7/1/1948 to 12/31/2005. Available online at: http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?canewa+sfo. Accessed February 3, 2016.

temperature inversions during the night (when the ground is cooler than the air) can combine with these light winds to create localized air stagnation near major air pollution emission sources (e.g., freeways). The low density of development in the project area vicinity helps to minimize the potential for adverse health effects associated with nocturnal inversions.

### 5.8.1.3 Ambient Air Quality

The Bay Area Air Quality Management District (BAAQMD) operates a regional monitoring network that measures the ambient concentrations of six criteria air pollutants: ozone, carbon monoxide (CO), particulate matter ($PM_{10}$ and $PM_{2.5}$), nitrogen dioxide ($NO_2$), and sulfur dioxide ($SO_2$). Existing air quality in the project area can best be inferred from examining ambient air quality measurements taken by the BAAQMD at monitoring stations in the vicinity of the project area. The BAAQMD monitoring station nearest to the project area is the Livermore station located at 793 Rincon Avenue in Livermore, approximately 9 miles northeast of the project area. **Table 5.8-1** presents a 5-year summary of monitoring data (2011–2015) from the Livermore station. The table also compares measured maximum pollutant concentrations against the most stringent applicable ambient air quality standards (both state and federal standards are described below in Section 5.8.2). However, it should be noted that due to the low density of development in the project area, there are fewer air pollution sources in Sunol Valley when compared to Livermore. Data for $PM_{10}$, CO, and $SO_2$ is not included in the table because these pollutants are not monitored at the Livermore station.

#### *Ozone*

Ozone is a secondary air pollutant produced in the atmosphere through a complex series of photochemical reactions involving reactive organic gases (ROG) and nitrogen oxides ($NO_X$). Significant ozone production generally requires ozone precursors to be present in a stable atmosphere with strong sunlight for approximately 3 hours. The main sources of $NO_X$ and ROG, often referred to as ozone precursors, are combustion processes (including motor vehicle engines) and the evaporation of solvents, paints, and fuels. Automobiles are the single largest source of ozone precursors in the Bay Area. Ozone is a regional air pollutant because its precursors are transported and diffused by wind concurrently with ozone production through the photochemical reaction process, resulting in the regional dispersion of ozone. Ozone concentrations tend to be higher in the late spring, summer, and fall, when the long sunny days combine with regional subsidence inversions to create conditions conducive to the formation and accumulation of secondary photochemical compounds like ozone. Atmospheric subsidence occurs when normal upward flow of air in the atmosphere, known as atmospheric convection is disturbed. A subsidence inversion develops when a widespread layer of air descends. The layer is compressed and heated by the resulting increase in atmospheric pressure, and as a result the lapse rate of temperature (average rate at which the temperature decreases with increase in altitude) is reduced. Such conditions are conducive to ozone formation. Ozone causes eye irritation, airway constriction, and shortness of breath and can aggravate existing respiratory diseases such as asthma, bronchitis, and emphysema.[2]

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[2] Bay Area Air Quality Management District (BAAQMD), 2011a. *California Environmental Quality Act Air Quality Guidelines*. Updated May 2011.

**TABLE 5.8-1**
**LIVERMORE MONITORING STATION – AMBIENT AIR QUALITY SUMMARY (2010–2014)**

| Pollutant | Standard | Year | | | | |
|---|---|---|---|---|---|---|
| | | **2011** | **2012** | **2013** | **2014** | **2015** |
| ***Ozone*** | | | | | | |
| Highest 1-Hour Average (ppm) | 0.09 ppm | 0.115 | 0.102 | 0.096 | 0.093 | 0.093 |
| Days over State Standard | | 3 | 2 | 3 | 0 | 0 |
| Highest 8-Hour Average (ppm) | 0.070 ppm | 0.084 | 0.090 | 0.077 | 0.080 | 0.081 |
| Days over State Standard | | 9 | 4 | 2 | 7 | 7 |
| Days over National Standard | 0.075 ppm | 2 | 3 | 1 | 4 | 1 |
| ***Fine Particulate Matter ($PM_{2.5}$)*** | | | | | | |
| Highest 24-Hour Average ($\mu g/m^3$) | 35 $\mu g/m^3$ | 45.4 | 31.1 | 40.1 | 42.9 | 31.1 |
| Measured Days over National Standard | | 2 | 0 | 4 | 1 | 0 |
| State Annual Average ($\mu g/m^3$) | 12 $\mu g/m^3$ | 8.5 | 6.6 | -- | -- | 8.8 |
| National Annual Average ($\mu g/m^3$) | 12.0 $\mu g/m^3$ | 7.8 | 6.6 | 8.4 | 7.6 | 8.8 |
| ***Nitrogen Dioxide ($NO_2$)*** | | | | | | |
| Highest Hourly Average (ppm) | 0.18 ppm | 0.057 | 0.052 | 0.051 | 0.048 | 0.049 |
| Measured Days over State Standard | | 0 | 0 | 0 | 0 | 0 |

NOTES: --- indicates that data are not available; ppm = Parts per million; $\mu g/m^3$ = Micrograms per cubic meter

* On October 1, 2015, the national 8-hour ozone primary and secondary standards were lowered from 0.075 to 0.070 ppm. However, the Days over Standard shown reflect violations of the old 0.075 ppm standard.

SOURCE: CARB, 2016a. iADAM Air Quality Data Statistics, http://www.arb.ca.gov/adam/index.html, obtained online on July 27, 2016.

### *Nitrogen Dioxide*

Nitrogen dioxide ($NO_2$) is an air quality pollutant of concern because it acts as a respiratory irritant. $NO_2$ is a major component of the group of gaseous nitrogen compounds commonly referred to as $NO_X$. A precursor to ozone formation, $NO_X$ is produced by fuel combustion in motor vehicles, industrial stationary sources (such as refineries, power plants, and chemical manufacturing facilities), ships, aircraft, and rail transit. Typically, $NO_X$ emitted from fuel combustion is in the form of nitric oxide (NO) and $NO_2$, with the vast majority (95 percent) of the $NO_X$ emissions being comprised of NO. NO is converted to $NO_2$ in the atmosphere when it reacts with ozone or undergoes photochemical reactions.

### *Carbon Monoxide*

Carbon monoxide (CO) is an odorless, colorless gas usually formed as the result of the incomplete combustion of fuels and is mostly associated with motor vehicle traffic. High CO concentrations develop primarily during winter when periods of light winds combine with the formation of ground-level temperature inversions (typically from the evening through early morning). These conditions result in reduced dispersion of vehicle emissions. Motor vehicles also exhibit increased CO emission rates at low air temperatures. When inhaled at high concentrations, CO combines with hemoglobin in the blood and reduces the oxygen-carrying capacity of the blood. This reduces the amount of oxygen reaching the brain, heart, and other body tissues. This condition is especially critical for people with cardiovascular diseases, chronic lung disease, and anemia.

### *Suspended and Inhalable Particulate Matter*

Particulate matter is a class of air pollutants that consists of solid and liquid airborne particles in an extremely small size range. Particulate matter is measured in two size ranges: $PM_{10}$ for particles less than 10 microns in diameter, and $PM_{2.5}$ for particles less than 2.5 microns in diameter. $PM_{10}$ and $PM_{2.5}$ represent fractions of particulate matter that can be inhaled into air passages and the lungs and can cause adverse health effects. Particulate matter in the atmosphere results from many kinds of dust- and fume-producing industrial and agricultural operations, fuel combustion, and atmospheric photochemical reactions. Some sources of particulate matter, such as demolition and construction activities, are more local in nature, while others, such as vehicular traffic, have a more regional effect.

Fine particulates small enough to be inhaled into the deepest parts of the human lung can cause adverse health effects. Very small particles of certain substances (e.g., sulfates and nitrates) can cause lung damage directly, or can contain adsorbed gases (e.g., chlorides or ammonium) that may be injurious to health. Extended exposure to particulate matter can increase the risk of chronic respiratory disease. $PM_{2.5}$ poses an increased health risk because the particles can deposit deep in the lungs and contain substances that are particularly harmful to human health.[3] According to a study prepared by the California Air Resources Board (CARB), exposure to ambient $PM_{2.5}$, particularly diesel particulate matter (DPM), can be associated with approximately 9,000 premature annual deaths statewide.[4] Particulate matter also can damage materials and reduce visibility.

## 5.8.1.4 Toxic Air Contaminants

Toxic air contaminants (TACs) are a defined set of airborne air pollutants that are capable of causing short-term (acute) and/or long-term (chronic or carcinogenic, i.e., cancer-causing) adverse human health effects (i.e., injury or illness). TACs include both organic and inorganic chemical substances. There are two categories of the most common sources of TACs: stationary sources such as back up diesel generators, dry cleaners, and gasoline stations; and on-road mobile sources from cars and trucks on high traffic volume roadways and off-road mobile sources such as construction equipment, ships, and trains. Like $PM_{2.5}$, TACs can be emitted directly and can also be formed in the atmosphere through reactions with different pollutants. The health effects associated with TACs are quite diverse and generally are assessed locally, rather than regionally. TACs can cause long-term health effects such as cancer, birth defects, neurological damage, asthma, bronchitis, or genetic damage; or short-term acute effects such as eye watering, respiratory irritation (cough, runny nose, throat pain), and headaches.

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[3] Bay Area Air Quality Management District (BAAQMD), 2011a. *California Environmental Quality Act Air Quality Guidelines*. Updated May 2011.

[4] California Air Resources Board (CARB), 2010. Estimate of Premature Deaths Associated with Fine Particulate Pollution ($PM_{2.5}$) in California Using a U.S. Environmental Protection Agency Methodology, August 31, 2010.

The current California list of TACs includes approximately 200 compounds, including DPM emissions, which was identified as a TAC and a human carcinogen by CARB in 1998.[5] DPM, a component of $PM_{2.5}$, accounts for over 80 percent of the inhalation cancer risk from TACs in the Bay Area and is one of the TACs of greatest concern in the Bay Area and throughout California. The exhaust from diesel engines includes hundreds of different gaseous and particulate components, many of which are toxic. Many of these toxic compounds adhere to the diesel soot particles, which are very small and can penetrate deep into the lungs. Several medical research studies have linked near-road pollution exposure to a variety of adverse health outcomes impacting children and adults, including significant allergic response and elevated production of specific antibodies.[6]

In the Bay Area, there are a number of areas where the exposure of sensitive populations to TACs is relatively high. These areas are identified by the BAAQMD as Impacted Communities. The Sunol Valley is not located within any Impacted Community boundaries.

### 5.8.1.5 Sensitive Receptors

Land uses such as schools, children’s daycare centers, hospitals, and convalescent homes are considered to be more sensitive than the general population to poor air quality because the population groups associated with these uses have increased susceptibility to respiratory distress. People engaged in strenuous work or exercise are also more sensitive to poor air quality. Residential areas are considered more sensitive to air quality conditions than commercial and industrial areas, because people generally spend longer periods of time at their residences, resulting in greater exposure to ambient air quality conditions. Recreational uses or parks are considered sensitive due to the greater exposure to ambient air quality conditions, and because the presence of pollution detracts from the recreational experience.

There are no schools, childcare centers, churches, hospitals, or nursing homes located in the project vicinity. However, two private residences are located at Athenour Way, approximately ¼ mile (1,400 feet) west of the project area boundary. A private residence located near Alameda West Portal is located approximately 1.3 miles (8,000 feet) south of the southern project boundary. The SFPUC watershed keeper’s residence on Andrade Road is located approximately 1 mile southwest of the project area. There is a second SFPUC watershed keeper’s residence on the east side of Calaveras Road near the Alameda East Portal, approximately 1 mile south of the project area boundary. These residences are the closest sensitive receptors to the project area and their locations are shown on **Figure 5.7-1** of Section 5.7, Noise and Vibration.

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[5] CARB, 2015. Toxic Air Contaminant Identification List. Available at: http://www.arb.ca.gov/toxics/id/taclist.htm Accessed February 2016.

[6] Bay Area Air Quality Management District (BAAQMD), 2011a. *California Environmental Quality Act Air Quality Guidelines*. Updated May 2011.

## 5.8.2 Regulatory Framework

Established federal, state, and regional regulations provide the framework for analyzing and controlling air pollutant emissions and thus general air quality. The U.S. Environmental Protection Agency (U.S. EPA) is responsible for implementing the programs established under the federal Clean Air Act (CAA), such as establishing and reviewing the federal ambient air quality standards and reviewing State Implementation Plans (SIPs), described further below. However, the U.S. EPA has delegated the authority to implement many of the federal programs to the states while retaining an oversight role to ensure that the programs continue to be implemented. In California, the CARB is responsible for establishing and reviewing the state ambient air quality standards, developing and managing the California SIP, securing approval of this plan from the U.S. EPA, and identifying TACs. CARB also regulates mobile emissions sources in California, such as construction equipment, trucks, and automobiles, and oversees the activities of air quality management districts, which are organized at the county or regional level. An air quality management district is primarily responsible for regulating stationary emission sources at facilities within its geographic areas and for preparing the air quality plans that are required under the federal CAA and 1988 California CAA. The BAAQMD is the regional agency with regulatory authority over emission sources in the nine county San Francisco Bay Area.

### 5.8.2.1 Federal and State Regulations

Regulation of criteria air pollutants is achieved through both national and state ambient air quality standards and emissions limits for individual sources. Regulations implementing the federal CAA and its subsequent amendments established national ambient air quality standards for six criteria pollutants: ozone, $NO_2$, $SO_2$, $PM_{10}$, $PM_{2.5}$, and lead. California has adopted more stringent state ambient air quality standards for some of the criteria air pollutants. In addition, California has established state ambient air quality standards for sulfates, hydrogen sulfide, vinyl chloride, and visibility-reducing particles, as shown in **Table 5.8-2**.

The ambient air quality standards are intended to protect public health and welfare, and they incorporate a margin of safety. They are designed to protect those segments of the public most susceptible to respiratory distress, known as sensitive receptors, including people with asthma, the very young, elderly, people weak from other illness or disease, or persons engaged in strenuous work or exercise. Healthy adults can tolerate occasional exposure to air pollution levels somewhat above the ambient air quality standards before adverse health effects are observed.

#### *Attainment Status*

Under amendments to the federal CAA, U.S. EPA has classified air basins or portions thereof as either "attainment" or "non-attainment" for each criteria air pollutant, based on whether or not the national standards have been achieved. The California CAA, which is patterned after the federal CAA, also requires areas to be designated as "attainment" or "non-attainment" for the state standards. Thus, areas in California have two sets of attainment/non-attainment designations: one set with respect to the national standards and one set with respect to the state standards. Table 5.8-2 shows the attainment status of the San Francisco Air Basin with respect to the national and state ambient air quality standards for different criteria pollutants.

**TABLE 5.8-2**
**AMBIENT AIR QUALITY STANDARDS AND SAN FRANCISCO AIR BASIN ATTAINMENT STATUS**

| Pollutant | Averaging Time | State Standard | SF Air Basin Attainment Status for California Standard | Federal Primary Standard | SF Air Basin Attainment Status for Federal Standard |
|---|---|---|---|---|---|
| Ozone | 8 Hour | 0.070 ppm | Non-Attainment | 0.070 ppm | Non-Attainment |
| | 1 Hour | 0.09 ppm | Non-Attainment | N/A | N/A |
| Carbon Monoxide | 8 Hour | 9.0 ppm | Attainment | 9 ppm | Attainment |
| | 1 Hour | 20 ppm | Attainment | 35 ppm | Attainment |
| Nitrogen Dioxide | Annual Average | 0.030 ppm | N/A | 0.053 ppm | Attainment |
| | 1 Hour | 0.18 ppm | Attainment | 0.100 ppm | Unclassified |
| Sulfur Dioxide | Annual Average | N/A | N/A | 0.030 ppm | Attainment |
| | 24 Hour | 0.04 ppm | Attainment | 0.14 ppm | Attainment |
| | 1 Hour | 0.25 ppm | Attainment | 0.075 ppm | Attainment |
| Respirable Particulate Matter ($PM_{10}$) | Annual Arithmetic Mean | 20 µg/$m^3$ | Non-Attainment | N/A | N/A |
| | 24 Hour | 50 µg/$m^3$ | Non-Attainment | 150 µg/$m^3$ | Unclassified |
| Fine Particulate Matter ($PM_{2.5}$) | Annual Arithmetic Mean | 12 µg/$m^3$ | Non-Attainment | 12.0 µg/$m^3$ | Attainment |
| | 24 Hour | N/A | N/A | 35 µg/$m^3$ | Non-Attainment |
| Sulfates | 24 Hour | 25 µg/$m^3$ | Attainment | N/A | N/A |
| Lead | Calendar Quarter | N/A | N/A | 1.5 µg/$m^3$ | Attainment |
| | 30-Day Average | 1.5 µg/$m^3$ | Attainment | N/A | N/A |
| | 3-Month Rolling Average | N/A | N/A | 0.15 µg/$m^3$ | Unclassified |
| Hydrogen Sulfide | 1 Hour | 0.03 ppm | Unclassified | No Federal Standard | N/A |
| Vinyl Chloride | 24 Hour | 0.010 ppm | No information available | N/A | N/A |
| Visibility Reducing Particles | 8 Hour | Extinction of 0.23/km; visibility of 10 miles or more | Unclassified | No Federal Standard | N/A |

NOTES: ppm = parts per million; µg/$m^3$ = micrograms per cubic meter; N/A = Not Applicable; Unclassified = Not classified as attainment or non-attainment

SOURCE: BAAQMD, 2016. Air Quality Standards and Attainment Status. Accessed February 3, 2016. Available: http://hank.baaqmd.gov/pln/air_quality/ambient_air_quality.htm.

## *Federal Regulations*

The U.S. EPA is responsible for implementing programs established by the federal CAA, such as establishing and reviewing the NAAQS for the following air pollutants: CO, ozone, $NO_2$, $SO_2$, $PM_{10}$, $PM_{2.5}$, and lead. The federal CAA also requires the U.S. EPA to designate areas (counties or air basins) as attainment or non-attainment with respect to each criteria pollutant, depending on whether the area meets the NAAQS. If an area is designated as non-attainment, it does not meet the NAAQS and is required to create and maintain a SIP for achieving compliance with the NAAQS. Conformity to the SIP is defined under the 1990 CAA amendments as conformity with the plan's purpose in eliminating or reducing the severity and number of violations of the NAAQS and achieving expeditious attainment of these standards. Air quality within the San Francisco Air Basin does not attain the federal standards for ozone and $PM_{2.5}$.

### *California Clean Air Act*

In 1988, California passed the California Clean Air Act (California Health and Safety Code Section 39600 et seq.), which, like its federal counterpart, called for the designation of areas as attainment or nonattainment, but based on the state ambient air quality standards rather than the federal standards. As shown in Table 5.8-3, the Bay Area is nonattainment of state standards for ozone, $PM_{10}$, and $PM_{2.5}$ because these standards are exceeded periodically. The California Clean Air Act requires that air districts in which state air quality standards are exceeded must prepare a plan that documents reasonable progress towards attainment. In the Bay Area, this planning process is incorporated into the Clean Air Plan (CAP). The BAAQMD adopted the most recent version of the CAP in 2010 (see discussion below under *Bay Area Air Quality Management District*).

### *California Air Resources Board*

The California Air Resources Board (CARB) is the state agency responsible for regulating air quality. Its responsibilities include establishing state ambient air quality standards, emissions standards, and regulations for mobile emissions sources (e.g., autos, trucks), in addition to overseeing the efforts of countywide and multi-county air pollution control districts, which have primary responsibility over stationary sources. The emission standards most relevant to the proposed project are those related to on- and off-road heavy-duty diesel engines. The CARB also regulates vehicle fuels with the intent of reducing emissions; it has set emission reduction performance requirements for gasoline (California reformulated gasoline) and limited the sulfur and aromatic content of diesel fuel to make it burn cleaner. The CARB also sets the standards used to pass or fail vehicles in smog-check and heavy-duty truck inspection programs.

## 5.8.2.2 Local Regulations

### *Bay Area Air Quality Management District*

The BAAQMD is the regional agency responsible for air quality regulation within the SFBAAB, regulating air quality through planning and review activities. The BAAQMD has permit authority over most types of stationary emission sources and can require stationary sources to obtain permits, impose emission limits, set fuel or material specifications, or establish operational limits to reduce air emissions. The BAAQMD regulates new or expanding stationary sources of toxic air contaminants.

In September 2010, the BAAQMD adopted the *Bay Area 2010 Clean Air Plan,*[7] which updates the *Bay Area 2005 Ozone Strategy* and complies with state air quality planning requirements as codified in the California Health and Safety Code. While steady progress in reducing ozone levels in the SFBAAB has been achieved, the region is designated non-attainment for both the 1- and 8-hour state ozone standards. In addition, emissions of ozone precursors in the SFBAAB contribute to air quality problems in neighboring air basins. Under these circumstances, state law requires the CAP to include all feasible measures to reduce emissions of ozone precursors and to reduce the transport of ozone precursors to neighboring air basins. The 2010 CAP addressed four categories of pollutants: ozone and ozone precursors (ROG and $NO_X$); particulate matter (primarily $PM_{2.5}$), air toxics, and GHGs. The CAP contains 55 control strategies that can be grouped into the following categories:

- 18 stationary source measures;
- 10 mobile source measures;
- 17 transportation control measures;
- 6 land use and local impact measures; and
- 4 energy and climate measures.

In response to Senate Bill 636, the BAAQMD completed the *Particulate Matter Implementation Schedule* in November 2005. The implementation schedule evaluates the applicability of the 103 particulate matter (PM) control measures on CARB's list and discusses how applicable measures are implemented by the BAAQMD. The BAAQMD implements a number of regulations and programs to reduce PM emissions, such as controlling dust from earthmoving and construction/ demolition operations, limiting emissions from various combustion sources such as cement kilns and furnaces, and reducing PM emissions from composting and chipping activities. In addition to limiting stationary sources, the BAAQMD implements a variety mobile source incentive programs to encourage fleet operators and the public to purchase low-emission vehicles, re-power old polluting heavy duty diesel engines, and install after-market emissions control devices to reduce particulates and $NO_X$ emissions.

### Odors

The BAAQMD is responsible for investigating odor complaints in the SFBAAB. Upon receipt of a complaint, BAAQMD sends an investigator to interview the complainant and to locate the odor source if possible. BAAQMD Regulation 1, Rule 301 is the nuisance provision that states sources cannot emit air contaminants that cause nuisance to a considerable number of persons or the public. BAAQMD enforces odor control by helping the public document a public nuisance. BAAQMD typically brings a public nuisance court action when there are a significant number of confirmed odor events within a 24-hour period. A finding of public nuisance is punishable by fine. California Health and Safety Code Section 41700 also prohibits emissions that cause odors, health problems, property damage, or other nuisance.

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[7] Bay Area Air Quality Management District (BAAQMD), 2010. *Bay Area 2010 Clean Air Plan*. Adopted September 15, 2010.

## 5.8.3 Impacts and Mitigation Measures

### 5.8.3.1 Significance Criteria

The project would have a significant impact related to air quality if the project were to:

- Conflict with or obstruct implementation of the applicable air quality plan;
- Violate any air quality standard or contribute substantially to an existing or projected air quality violation;
- Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in non-attainment under an applicable federal, state, or regional ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors);
- Expose sensitive receptors to substantial pollutant concentrations; or
- Create objectionable odors affecting a substantial number of people.

### 5.8.3.2 Approach to Analysis

Proposed project operations and/or construction would not result in impacts related to three of the significance criteria listed above for the reasons described below.

- ***Violate Any Air Quality Standard or Contribute Substantially to an Existing or Projected Air Quality Violation during Operations.*** SFPUC facility operators would use the four pumps on floating barges to pump water from Pit F2 directly to San Antonio Reservoir or Sunol Valley Water Treatment Plant (SVWTP). There would be no direct sources of emissions located at the project facilities as all project equipment would be powered by electricity generated off-site. Under the preferred power option, the ACRP's electricity demand would be provided by Hetch Hetchy Water and Power's (HHWP) Calaveras Substation located to the east of the project area. However, if the HHWP Calaveras Substation is not capable of supporting the electrical loads of the ACRP, power would be provided by the PG&E Sunol Substation (backup option). Neither source of power would generate direct emissions on-site. Use of HHWP to meet the proposed project's needs would not generate off-site emissions either because the primary source of HHWP is hydroelectricity, which does not require the combustion of fossil fuels to be generated. While the proposed project's electricity use from the PG&E grid would generate off-site emissions at the source(s) of generation, it is not possible to track where the emissions are generated and it cannot be assumed that they are generated within the Bay Area. These emissions have therefore not been included in the ACRP's air pollutant emission inventory. As a result, there would be no regional increase in combustion-related criteria air pollutants due to increased electricity use associated with project operations. The ACRP would be operated remotely. Existing SFPUC staff would periodically visit the ACRP facilities to conduct routine inspections and perform scheduled maintenance. Project implementation is not anticipated to result in an increase in SFPUC staffing requirements. Thus, the project would not result in any operational impacts from the generation of criteria pollutant emissions that would violate air quality standards or contribute to an existing or projected air quality violation. This criterion is discussed below only as it relates to project construction (see Impact AQ-1).

- ***Project Construction and Operations Would Not Expose Sensitive Receptors to Substantial Pollutant Concentrations.*** **C**onstruction emissions sources would be separated from the nearest sensitive receptors by a distance of 1,400 feet, which is greater than the 1,000-foot screening distance used by the BAAQMD for the application of its quantitative health risk thresholds. Exposure to TAC emissions over a relatively short exposure period of the 18-month construction duration with a buffer distance of at least 1,400 feet separating the emissions sources and nearest sensitive receptors would not expose nearby sensitive receptors to substantial pollutant concentrations. Operation of the ACRP would not generate any TAC emissions to which nearby sensitive receptors would be exposed. Therefore, there would be no impact related to exposure to substantial pollutant concentrations during project construction or operations, and the project emissions would not contribute to cumulative impacts related to exposure of sensitive receptors to substantial pollutant concentrations. This significance criterion is not discussed further.

- ***Project Operations Would Not Create Objectionable Odors Affecting a Substantial Number of People.*** The ACRP would not create new sources of odor. Operation of the proposed ACRP facilities would not create odor nuisance problems because these facilities would run on electrical power and produce no direct emissions. The proposed project does not include a backup generator; in the event of a power outage, SFPUC would temporarily cease operations. Under the ACRP, the SFPUC would recapture Alameda Creek water from quarry Pit F2 and pump it using the four proposed pumps on barges directly to San Antonio Reservoir or SVWTP. The project would not introduce any new quality-impaired water to the site that could pose odor problems and would not draw down water elevations in Pit F2 low enough for the water to stagnate. For these reasons, there would be no impact related to objectionable odors during project operations, and no further discussion is provided. This criterion is discussed below only as it relates to project construction (see Impact AQ-2).

This air quality impact analysis considers construction and operational impacts associated with the proposed project.

Construction-related and operational impacts are evaluated in accordance with the *BAAQMD CEQA Air Quality Guidelines* for assessing and mitigating air quality impacts.[8] In June 2010, the BAAQMD adopted new recommended CEQA Guidelines for assessing air quality impacts, with revisions adopted in May 2011. These thresholds include quantitative CEQA significance thresholds for emissions of criteria pollutants, ozone precursors, and TACs during project construction and operations.[9] The guidelines were the subject of litigation, with the Alameda County Superior Court striking down the guidelines, the Court of Appeal upholding the guidelines, and the California Supreme Court ultimately concluding that with a few specific statutory exceptions, agencies subject to CEQA generally are not required to analyze the impact of existing environmental conditions on a project's future users or residents, reversing the Court of Appeal's judgment on that issue. Although the BAAQMD has not reinstated its guidelines, which it withdrew after the Superior Court decision, or revised its guidelines to reflect the California Supreme Court decision, the Supreme Court decision does not appear to be directly applicable to

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[8] Bay Area Air Quality Management District (BAAQMD), 2011a. *California Environmental Quality Act Air Quality Guidelines*. Updated May 2011.

[9] Bay Area Air Quality Management District (BAAQMD), 2011a. *California Environmental Quality Act Air Quality Guidelines*. Updated May 2011.

the environmental review of the ACRP, which would not include new future sensitive receptors. As the Court of Appeal has upheld the guidelines in all other respects, a ruling which stands, the San Francisco Planning Department has determined that significance thresholds provided in the BAAQMD's *CEQA Air Quality Guidelines*, updated in 2011 are considered adequate for use in this analysis.

Equipment, trucks, worker vehicles, and ground-disturbing activities associated with construction of the ACRP would generate emissions of criteria air pollutants and precursors. The construction-related exhaust emissions were quantified and compared to the daily criteria pollutant emissions significance thresholds. The daily criteria pollutant emissions significance thresholds for construction activities are presented in **Table 5.8-3**.

**TABLE 5.8-3
CRITERIA POLLUTANT EMISSIONS
SIGNIFICANCE THRESHOLDS FOR CONSTRUCTION ACTIVITIES**

| Pollutant | Significance Thresholds for Average Daily Emissions |
|---|---|
| ROG | 54 pounds per day (lbs/day) |
| $NO_X$ | 54 lbs/day |
| $PM_{10}$ (exhaust) | 82 lbs/day |
| $PM_{2.5}$ (exhaust) | 54 lbs/day |
| $PM_{10}/PM_{2.5}$ (fugitive) | Best Management Practices |

SOURCE: BAAQMD, CEQA Air Quality Guidelines. June 2011. Available at www.baaqmd.gov

The significance thresholds for criteria pollutant and precursor emissions associated with project operations are shown in **Table 5.8-4**. These represent the levels at which the BAAQMD has determined that a project's individual emissions of criteria air pollutants would substantially contribute to the SFBAAB's existing air quality violations. If daily average or annual operational emissions would exceed any applicable thresholds of significance shown in Table 5.8-4, the proposed project would result in a significant impact.

**TABLE 5.8-4
SIGNIFICANCE THRESHOLDS FOR EMISSIONS OF CRITERIA AIR POLLUTANTS
AND PRECURSORS GENERATED DURING PROJECT OPERATIONS**

| Pollutant/Precursor | Daily Average Emissions (lbs per day) | Maximum Annual Emissions (tons per year) |
|---|---|---|
| ROG | 54 | 10 |
| $NO_X$ | 54 | 10 |
| $PM_{10}$ | 82 | 15 |
| $PM_{2.5}$ | 54 | 10 |

SOURCE: BAAQMD, CEQA Air Quality Guidelines. June 2011. Available at www.baaqmd.gov

This air quality analysis estimates criteria pollutant emissions associated with project operations and compares them to the average and annual significance thresholds. The significance of the ACRP's criteria pollutant contributions to cumulative operational emissions in the SFBAAB are also evaluated.

As noted above, consistent with the *BAAQMD CEQA Guidelines* this analysis assumes potential health risk and hazard impacts could occur at sensitive receptors located within 1,000 feet from emission sources. As the closest sensitive receptor is located about 1,400 feet from the project boundary, human health risks and hazards associated with the project are not further discussed.

As described in Section 5.1.2 regarding baseline conditions for evaluation of project impacts, construction-related impacts in this section are evaluated against the existing conditions. The current construction schedule for the proposed project is from fall 2017 to spring 2019 (18 months), and construction of the Calaveras Dam Replacement Project (CDRP) is also anticipated to be completed in spring 2019. It is possible that operation of the CDRP will commence prior to completion of ACRP construction, and that with-CDRP conditions could occur while ACRP is still under construction. However, operation of the CDRP is not expected to change any of the baseline air quality conditions analyzed in this section. Therefore, no change in the approach to impact analysis is necessary to account for the with-CDRP conditions. More specifically, the construction-related impacts of the ACRP presented in this section would be the same regardless of the implementation of bypass flows at the Alameda Creek Diversion Dam and instream flow releases from Calaveras Reservoir and any other aspects of CDRP operations that characterize the with-CDRP conditions.

### 5.8.3.3 Construction Impacts and Mitigation Measures

**Impact AQ-1: Emissions generated during project construction activities could violate air quality standards and contribute substantially to an existing air quality violation. (Less than Significant with Mitigation)**

Construction activities for the ACRP would involve: (1) assembly and installation of the turbine pumps and barge flotation system, (2) drilling concrete piers and installation of the mooring system, (3) construction of the electrical control building and transformer, (4) pipeline installation, and (5) spoils placement and disposal. Criteria pollutants and precursors would be emitted during construction of all project components. Construction is expected to occur intermittently over a period of approximately 18 months, with construction of the project components occurring mostly sequentially (with some overlap). Construction activities would generate fugitive dust (including $PM_{10}$ and $PM_{2.5}$) during excavation, grading, spoils placement, and vehicle travel on both paved and unpaved surfaces. Other criteria pollutants would also be generated from the exhaust emissions of construction equipment and vehicles. Without controls, emissions of these criteria pollutants could contribute to the SFBAAB's non-attainment status relative to state and federal air quality standards.

Emissions from the project's construction equipment and vehicles would be generated from multiple sources, including heavy mobile equipment and delivery/haul trucks, worker vehicles, and semi-stationary sources such as air compressors and generators. Construction-related criteria pollutant emissions were calculated for the ACRP as a function of construction activity, construction duration, average haul truck mileage, and worker trips (auto/light-truck mileage). Emissions from construction equipment were estimated using CalEEMod and preliminary construction information such as number and types of construction equipment and their activity levels provided by the SFPUC for the project (see **Appendix AQ**). As CalEEMod uses now outdated EMFAC2011 emission factors for mobile sources, emissions from onroad sources such as worker commute trips and material haul truck trips were estimated separately using EMFAC2014 emission factors and workforce estimates presented in **Table 3-4** in Chapter 3, Project Description (also shown in Appendix AQ). The actual number of workdays (284 days) during which construction is expected to occur over the 18 month period was also provided by SFPUC. **Table 5.8-5** summarizes the project's estimated average daily construction emissions. The table shows that average daily emissions of all criteria pollutants associated with project construction would be below significance thresholds. This would therefore constitute a less than significant impact.

**TABLE 5.8-5**
**AVERAGE DAILY EMISSIONS OF CRITERIA POLLUTANTS DURING CONSTRUCTION**

| Construction Emissions | ROG | $NO_X$ | $PM_{10}$ Exhaust | $PM_{2.5}$ Exhaust |
|---|---|---|---|---|
| **Project Average Daily Emissions[a] (lbs/day)** | | | | |
| Off-road construction equipment | 4.5 | 46.2 | 1.9 | 1.8 |
| On-road worker commute, material delivery and offsite haul trips | <0.1 | 1.5 | <0.1 | <0.1 |
| Project total emissions | 4.6 | 47.7 | 1.9 | 1.8 |
| Significance Thresholds | 54 | 54 | 82 | 54 |
| Exceeds Thresholds? | No | No | No | No |

[a] Average daily emissions include construction equipment emissions as well as emissions from both on-road and on-site truck activities.

SOURCE: See Appendix AQ.

In addition to exhaust emissions, construction activities would also generate emissions of fugitive dust, associated with grading and earth disturbance and travel on paved and unpaved roads. With regard to fugitive dust emissions, the BAAQMD Guidelines focus on implementation of recommended dust control measures rather than a quantitative comparison of estimated emissions to a significance threshold. For all projects, the BAAQMD recommends implementation of its Basic Construction Measures whether or not construction-related exhaust emissions exceed the applicable significance thresholds.

Therefore, with implementation of **Mitigation Measure M-AQ-1 (BAAQMD Basic Construction Measures),** this impact from fugitive dust during ACRP construction would be *less than significant with mitigation*.

**Mitigation Measure M-AQ-1: BAAQMD Basic Construction Measures.**

To limit dust, criteria pollutants, and precursor emissions associated with project construction, the following BAAQMD-recommended Basic Construction Measures shall be included in all construction contract specifications for the proposed project:

- All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered two times per day.
- All haul trucks transporting soil, sand, or other loose material off-site shall be covered.
- All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited.
- All vehicle speeds on unpaved roads shall be limited to 15 mph.
- All paving shall be completed as soon as possible. Building pads shall be laid as soon as possible after grading unless seeding or soil binders are used.
- Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to 5 minutes (as required by the California airborne toxics control measure Title 13, Section 2485 of California Code of Regulations [CCR]). Clear signage shall be provided for construction workers at all access points.
- All construction equipment shall be maintained and properly tuned in accordance with manufacturer's specifications. All equipment shall be checked by a certified visible emissions evaluator.
- Post a publicly visible sign with the telephone number and person to contact at the SFPUC regarding dust complaints. This person shall respond and take corrective action within 48 hours. The BAAQMD's phone number shall also be visible to ensure compliance with applicable regulations.

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**Impact AQ-2: Project construction activities would not create objectionable odors affecting a substantial number of people. (Less than Significant)**

ACRP construction would not involve any activities that could cause water to stagnate and create potential odors. Combustion emissions from the use of diesel fuel in construction equipment, as well as tar or asphalt used for access road improvements, could generate localized objectionable odors, but this would not affect sensitive receptors due to the distance between the source and the receptors.

Although odors from vehicle diesel exhaust could be perceivable by bicyclists and motorists traveling on Calaveras Road during certain phases of construction, these effects would be limited in duration as the cyclists and motorists pass the project area, and would be less noticeable on weekends when cycling along Calaveras Road is most popular (hauling and deliveries would not occur on Saturdays or Sundays). Therefore, any objectionable odors generated by project construction activities would not be substantially noticeable to bicyclists or motorists traveling along Calaveras Road compared to existing conditions. Due to the distance between the closest residences and the project area, odor problems at the nearest residences are not expected. This impact is considered less than significant.

Although this impact is less than significant and no mitigation is necessary, the California Code of Regulations Section 2485 requirements, with more stringent BAAQMD idling-time limitations, have been incorporated into Mitigation Measure M-AQ-1 (BAAQMD Basic Construction Measures) (see Impact AQ-1, above, for description), which would further limit the less-than-significant diesel odors generated by construction vehicles. Even if odors were temporarily perceivable by bicyclists and motorists traveling along Calaveras Road or, although highly unlikely, at the two closest residences, a substantial number of people would not be affected. Therefore, the project's construction impacts related to objectionable odors would be *less than significant*.

**Mitigation**: None required.

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**Impact AQ-3: Implementation of the proposed project could conflict with or obstruct implementation of the 2010 Clean Air Plan. (Less than Significant with Mitigation)**

The most recently adopted air quality plan for the SFBAAB is the BAAQMD's *2010 Clean Air Plan* (CAP), which is a comprehensive plan aimed at improving Bay Area air quality and protecting public health. The CAP defines a control strategy for implementation by the BAAQMD to reduce emissions and decrease ambient concentrations of harmful pollutants (ground-level ozone and its key precursors, ROG and $NO_X$), as well as to safeguard public health by reducing exposure to the air pollutants that pose the greatest health risks (particulate matter, primarily $PM_{2.5}$ and precursors to secondary $PM_{2.5}$).

As indicated above in Section 5.8.2.2, the CAP contains 55 control measures under the following categories: stationary-source measures, mobile-source measures, transportation control measures, land use and local impact measures, and energy and climate measures. The project would be consistent with applicable CAP control measures and would not hinder implementation of the CAP. With implementation of **Mitigation Measure M-AQ-1 (BAAQMD Basic Construction Measures),** which would reduce construction-related pollutant emission to a less-than-significant level, the project would be consistent with the CAP. Therefore, this impact would be *less than significant with mitigation*.

**Mitigation Measure M-AQ-1: BAAQMD Basic Construction Measures.**

(See Impact AQ-1, above, for description.)

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### 5.8.3.4 Cumulative Impacts and Mitigation Measures

**Impact C-AQ: The project, in combination with past, present, and probable future projects, could substantially affect air quality. (Less than Significant with Mitigation)**

#### *Construction-Related Criteria Pollutant Emissions*

Regional air pollution is by its very nature a cumulative impact. Emissions from past, present, and future projects contribute to the region's adverse air quality on a cumulative basis. No single project by itself would be sufficient in size to result in regional nonattainment of ambient air quality standards. Instead, a project's individual emissions contribute to existing cumulative adverse air quality impacts. The project-level thresholds for criteria air pollutants are based on levels by which new sources are not anticipated to contribute to an air quality violation or result in a considerable net increase in criteria air pollutants.

As indicated in Table 5.8-6 and Impact AQ-1, above, the proposed project's construction-related criteria pollutant and precursor emissions associated with the ACRP would not exceed the significance thresholds. Implementation of Mitigation Measure M-AQ-1 (BAAQMD Basic Construction Measures) would reduce fugitive dust emissions by requiring construction contractors to implement best management practices to limit dust. Implementation of this measure would reduce the project's fugitive dust emissions to less than significant levels. Therefore, with mitigation, the ACRP's contribution to cumulative air quality impacts related to criteria pollutants and precursor emissions during construction would not be cumulatively considerable.

**Mitigation Measure M-AQ-1: BAAQMD Basic Construction Measures.**

(See Impact AQ-1, above, for description.)

#### *Operations-Related Criteria Pollutant Emissions*

The thresholds of significance for operational criteria pollutants and precursor emissions represent the levels at which a project's individual emissions of criteria pollutants and precursors would result in a cumulatively considerable contribution to the SFBAAB's existing air quality violations. If average daily or annual emissions were to exceed these thresholds, the project would result in a significant cumulative impact. As discussed under Section 5.8.3.2, Approach to Analysis, above, the proposed project would not generate operational criteria pollutant and precursor emissions, and operational emissions would not be cumulatively considerable. Therefore, operations of the ACRP would not contribute to cumulative air quality impacts and the impact would be less than significant.

**Mitigation**: None required.

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# 5.9 Greenhouse Gas Emissions

This section addresses greenhouse gas (GHG) emissions that could result from implementation of the proposed Alameda Creek Recapture Project (ACRP or proposed project). Construction-related and operational GHG emissions are evaluated quantitatively and the impacts are assessed using guidelines recommended by the Bay Area Air Quality Management District (BAAQMD). This analysis also qualitatively assesses the project's consistency with local and statewide GHG reduction plans and policies.

## 5.9.1 Environmental Setting

### 5.9.1.1 GHGs and Climate Change

Gases that trap heat in the atmosphere are referred to as greenhouse gases (GHGs) because they capture heat radiated from the sun as it is reflected back into the atmosphere, much like a greenhouse does. The accumulation of GHGs contributes to global climate change. The primary GHGs, or climate pollutants, are carbon dioxide ($CO_2$), black carbon, methane ($CH_4$), nitrous oxide ($N_2O$), ozone, and water vapor.

Individual projects contribute to the cumulative effects of climate change by emitting GHGs during demolition, construction, and operational phases. While the presence of some of the primary GHGs in the atmosphere is naturally occurring, $CO_2$, $CH_4$, and $N_2O$ are also emitted from human activities, accelerating the rate at which these compounds occur within earth's atmosphere. Emissions of $CO_2$ are largely by-products of fossil fuel combustion, whereas $CH_4$ results from off-gassing associated with agricultural practices and landfills. Black carbon has emerged as a major contributor to global climate change, possibly second only to $CO_2$. Black carbon is produced naturally and by human activities as a result of the incomplete combustion of fossil fuels, biofuels and biomass.[1] $N_2O$ is a by-product of various industrial processes. Other GHGs include hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride, and are generated in certain industrial processes. GHGs are typically reported in "carbon dioxide-equivalent" measures ($CO_2E$).[2]

There is international scientific consensus that human-caused increases in GHGs contribute to global warming and, thus, climate change. Many impacts resulting from climate change, including sea level rise, increased fires, floods, severe storms and heat waves, already occur and will only become more severe and costly.[3] Secondary effects of climate change likely include impacts to agriculture, the state's electricity system, and native freshwater fish ecosystems, an

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[1] Center for Climate and Energy Solutions, *What is Black Carbon?,* April 2010. Available at http://www.c2es.org/docUploads/what-is-black-carbon.pdf.

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

[3] Intergovernmental Panel on Climate Change, *Climate Change 2013: The Physical Science Basis, Working Group I Contribution to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change,* 2013. Available at http://www.climatechange2013.org/images/report/WG1AR5_ALL_FINAL.pdf.

increase in the vulnerability of levees such as in the Sacramento-San Joaquin Delta, changes in disease vectors, and changes in habitat and biodiversity.[4,5]

### 5.9.1.2 Greenhouse Gas Emission Estimates and Energy Providers in California

The California Air Resources Board (CARB or ARB) estimated that in 2010 California produced about 451.6 million gross metric tons of $CO_2E$ (million $MTCO_2E$).[6] The ARB found that transportation is the source of 38 percent of the State's GHG emissions, followed by electricity generation (both in-state generation and imported electricity) at 21 percent and industrial sources at 19 percent. Commercial and residential fuel use (primarily for heating) accounted for 10 percent of GHG emissions.[7] In San Francisco, motorized transportation and natural gas sectors were the two largest sources of GHG emissions, accounting for approximately 42 percent (2.0 million $MTCO_2E$) and 31 percent (1.5 million $MTCO_2E$), respectively, of San Francisco's 4.75 million $MTCO_2E$ emitted in 2012.[8] Electricity consumption (building operations and transit) accounts for approximately 22 percent (1.0 million $MTCO_2E$) of San Francisco's GHG emissions.[9]

Electricity in San Francisco is primarily provided by Pacific Gas & Electric (PG&E) and the San Francisco Public Utilities Commission (SFPUC). In 2012, electricity consumption in San Francisco was approximately 6.0 million megawatt-hours (MWh). Of this total, PG&E produced approximately 71 percent of electricity distributed (4.2 million MWh; about 81 percent of San Francisco's electricity-driven GHG emissions), and the SFPUC produced approximately 16 percent of electricity distributed (0.9 million MWh; 0 percent of San Francisco's electricity-driven GHG emissions).[10]

PG&E's 2015 power mix was as follows: 25 percent natural gas, 23 percent nuclear, 30 percent eligible renewables (described below), 6 percent large hydroelectric, and 17 percent unspecified power.[11]

The SFPUC, which operates three hydroelectric power plants in association with San Francisco's Hetch Hetchy water supply system, provides electrical power to Muni, city buildings, and a limited number of other commercial accounts in San Francisco. Electricity generated by the Hetch Hetchy system achieved net zero GHG emissions for year 2012.[12]

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[4] Ibid.

[5] California Climate Change Center. *Our Changing Climate 2012: Vulnerability and Adaptation to the Increasing Risks from Climate Change in California*, July 2012. Available at http://www.energy.ca.gov/2012publications/CEC-500-2012-007/CEC-500-2012-007.pdf.

[6] California Air Resources Board, *California Greenhouse Gas Inventory for 2000-2010— by Category as Defined in the Scoping Plan*. Available at http://www.arb.ca.gov/cc/inventory/pubs/reports/2000_2010/ghg_inventory_scopingplan_00-10_2013-02-19.pdf, updated February 19, 2013.

[7] Ibid.

[8] San Francisco Department of the Environment, *Community GHG Inventory-1990-2012*.

[9] Ibid.

[10] Ibid.

[11] Pacific Gas & Electric, *PG&E's 2015 Electric Delivery Mix*. Available at: http://www.pge.com/en/about/environment/pge/cleanenergy/index.page.

[12] San Francisco Department of the Environment, *Community GHG Inventory-1990-2012*.

# 5.9.2 Regulatory Setting

## 5.9.2.1 Federal Regulations

There are no federal regulations or requirements pertaining to GHG emissions that would apply to the ACRP project.

## 5.9.2.2 State Regulations

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

Executive Order (EO) S-3-05[13] sets forth a series of target dates by which statewide emissions of GHGs need to be progressively reduced, as follows: by 2010, reduce GHG emissions to 2000 levels (approximately 457 million $MTCO_2E$); by 2020, reduce emissions to 1990 levels (approximately 427 million $MTCO_2E$); and by 2050 reduce emissions to 80 percent below 1990 levels (approximately 85 million $MTCO_2E$). As discussed in the Environmental Setting section above, California produced about 452 million $MTCO_2E$ in 2010, thereby meeting the 2010 target date to reduce GHG emissions to 2000 levels.

EO B-30-15 set an additional, interim statewide GHG reduction target of 40 percent below 1990 levels to be achieved by 2030. The purpose of this interim target is to ensure California meets its target of reducing GHG emissions to 80 percent below 1990 levels by 2050.[14] EO B-30-15 also requires all state agencies with jurisdiction over sources of GHG emissions to implement measures within their statutory authority to achieve reductions of GHG emissions to meet the 2030 and 2050 GHG emissions reductions targets.

### *Assembly Bill 32 and California Climate Change Scoping Plan*

In 2006, the California legislature passed Assembly Bill 32 (California Health and Safety Code Division 25.5, Sections 38500, et seq., or AB 32), also known as the California Global Warming Solutions Act. AB 32 requires ARB to design and implement emission limits, regulations, and other measures, such that feasible and cost-effective statewide GHG emissions are reduced to 1990 levels by 2020.

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[13] Office of the Governor, Executive Order S-3-05, June 1, 2005. Available at https://www.gov.ca.gov/news.php?id=1861. Executive Order S-3-05 sets forth a series of target dates by which statewide emissions of GHGs need to be progressively reduced, as follows: by 2010, reduce GHG emissions to 2000 levels (approximately 457 million metric tons of carbon dioxide equivalents ($MTCO_2E$)); by 2020, reduce emissions to 1990 levels (approximately 427 million $MTCO_2E$); and by 2050 reduce emissions to 80 percent below 1990 levels (approximately 85 million $MTCO_2E$). Because of the differential heat absorption potential of various GHGs, GHG emissions are frequently measured in "carbon dioxide-equivalents," which present a weighted average based on each gas's heat absorption (or "global warming") potential.

[14] Office of the Governor, *Executive Order B-30-15, April 29, 2015.* Available at https://www.gov.ca.gov/news.php?id=18938.

Pursuant to AB 32, ARB adopted the *Climate Change Scoping Plan* (*Scoping Plan*) in December 2008 outlining measures to meet the 2020 GHG reduction limits. In order to meet the goals of AB 32, California must reduce its GHG emissions by 30 percent below projected 2020 business-as-usual emissions levels (approximately 15 percent below 2008 levels).[15] The *Scoping Plan* estimates a reduction of 174 million MTCO$_2$E from transportation, energy, agriculture, forestry, and other high global warming sectors (see **Table 5.9-1**: GHG Reductions from the AB 32 *Scoping Plan* Categories).[16]

**TABLE 5.9-1**
**GHG REDUCTIONS FROM THE AB 32 *SCOPING PLAN* CATEGORIES**[17,18]

| Scoping Plan Category | GHG Reduction (MMT CO$_2$e) |
|---|---|
| Transportation Sector | 62.3 |
| Electricity and Natural Gas | 49.7 |
| Industry | 1.4 |
| Landfill Methane Control Measure (Discrete Early Action) | 1 |
| Forestry | 5 |
| High Climate-Change-Potential GHGs | 20.2 |
| Additional Reductions Needed to Achieve the GHG Cap | 34.4 |
| **Other Recommended Measures** | |
| Government Operations | 1–2 |
| Agriculture – Methane Capture at Large Dairies | 1 |
| Water | 4.8 |
| Green Buildings | 26 |
| High Recycling / Zero Waste | 9 |
| Commercial Recycling | |
| Composting | |
| Anaerobic Digestion | |
| Extended Producer Responsibility | |
| Environmentally Preferable Purchasing | |
| **Total Reductions Counted Towards 2020 Target** | **216.8-217.8** |

SOURCE: California Air Resources Board (CARB), 2008. *Climate Change Scoping Plan: A Framework for Change*. Amended version, including errata and Board requested modifications. December 2008.

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[15] California Air Resources Board, *California's Climate Plan: Fact Sheet*. Available at http://www.arb.ca.gov/cc/facts/scoping_plan_fs.pdf, updated January 27, 2010.

[16] Ibid.

[17] California Air Resources Board, *Climate Change Scoping Plan*, December 2008. Available at http://www.arb.ca.gov/cc/scopingplan/document/adopted_scoping_plan.pdf.

[18] California Air Resources Board, *California's Climate Plan: Fact Sheet*. Available at http://www.arb.ca.gov/cc/facts/scoping_plan_fs.pdf, updated January 27, 2010.

The AB 32 *Scoping Plan* also anticipates that actions by local governments will result in reduced GHG emissions because local governments have the primary authority to plan, zone, approve, and permit development to accommodate population growth and the changing needs of their jurisdictions.[19] The *Scoping Plan* also relies on the requirements of Senate Bill (SB) 375 (discussed below) to align local land use and transportation planning to achieve GHG reductions.

The *Scoping Plan* must be updated every five years to evaluate AB 32 policies and ensure that California is on track to achieve the 2020 GHG reduction goal. In 2014, ARB released the *First Update to the Climate Change Scoping Plan* (*First Update*), which builds upon the initial scoping plan with new strategies and recommendations. The *First Update* identifies opportunities to leverage existing and new funds to further drive GHG emission reductions through strategic planning and targeted low carbon investments. This update defines ARB's climate change priorities for the next five years and sets the groundwork to reach long-term goals set forth in EO S-3-05. The *First Update* highlights California's progress toward meeting the near-term 2020 GHG emission reduction goals in the initial scoping plan. It also evaluates how to align the state's longer-term GHG reduction strategies with other state policy priorities for water, waste, natural resources, clean energy, transportation, and land use.[20]

### *Senate Bill 32 and Assembly Bill 197*

In August 2016, the California state legislature passed Senate Bill 32 (SB 32) which establishes a new target for GHG emissions reductions in the state. This bill requires the CARB to ensure that statewide GHG emissions are reduced to 40 percent below the 1990 level by the year 2030. The bill would augment AB 32 (described above), the California Global Warming Solutions Act of 2006, which calls for California to reduce greenhouse gases to 1990 levels by 2020 a target the state is expected to reach. The Legislature paired SB 32 with Assembly Bill (AB 197), which directs the CARB to prioritize disadvantaged communities in its climate change regulations and to evaluate the cost-effectiveness of the measures it considers. SB 32 and AB 197 have been enacted[21] and take effect on January 1, 2017.

### *Senate Bill 375*

The *Scoping Plan* also relies on the requirements of SB 375 (Chapter 728, Statutes of 2008), also known as the Sustainable Communities and Climate Protection Act of 2008, to reduce carbon emissions from land use decisions. SB 375 requires regional transportation plans developed by each of the State's 18 metropolitan planning organizations (MPOs) to incorporate a "sustainable communities strategy" (SCS) in each regional transportation plan that will then achieve GHG emission reduction targets set by ARB. For the Bay Area, the per-capita GHG emission reduction

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[19] California Agency Air Resources Board, *Climate Change Scoping Plan*, December 2008. Available at http://www.arb.ca.gov/cc/scopingplan/document/adopted_scoping_plan.pdf.

[20] California Air Resources Board, *First Update to the Climate Change Scoping Plan*, May 2014. Available at http://www.arb.ca.gov/cc/scopingplan/2013_update/first_update_climate_change_scoping_plan.pdf.

[21] Chapters 249 and 250, Statutes of 2016 (chaptered September 8, 2016).

target is a 7 percent reduction by 2020 and a 15 percent reduction by 2035 from 2005 levels.[22] *Plan Bay Area*, the Metropolitan Transportation Commission's regional transportation plan, adopted in July 2013, is the region's first plan subject to SB 375 requirements.[23]

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

California established aggressive renewable portfolio standards under SB 1078 (Chapter 516, Statutes of 2002) and SB 107 (Chapter 464, Statutes of 2006), which require retail sellers of electricity to provide at least 20 percent of their electricity supply from renewable sources by 2010. EO S-14-08 (November 2008) expanded the state's renewable portfolio standard from 20 percent to 33 percent of electricity from renewable sources by 2020. In 2009, Governor Schwarzenegger continued California's commitment to the renewable portfolio standard by signing EO S-21-09, which directed ARB to enact regulations to help California meet the renewable portfolio standard goal of 33 percent renewable energy by 2020.[24]

In April 2011, Governor Brown signed SB X1-2 (Chapter 1, Statutes of 2011) codifying the GHG reduction goal of 33 percent by 2020 for energy suppliers. This renewable portfolio standard preempts the ARB's 33 percent from renewable sources electricity standard and applies to all electricity suppliers (not just retail sellers) in the state including publicly owned utilities, investor-owned utilities, electricity service providers, and community choice aggregators. Under SB X1-2, all of these entities must adopt the new renewable portfolio standard goals of 20 percent of retail sales from renewable sources by the end of 2013, 25 percent by the end of 2016, and 33 percent by the end of 2020.[25] Eligible renewable sources include geothermal, ocean wave, solar photovoltaic, and wind, but exclude large hydroelectric (30 MW or more). Therefore, because the SFPUC receives more than 67 percent of its electricity from large hydroelectric facilities, the remaining electricity provided by the SFPUC is required to be 100 percent renewable.[26] SB 350 (Chapter 547, Statutes of 2015), signed by Governor Brown in October 2015, dramatically increased the stringency of the renewable portfolio standard. SB 350 establishes a renewable portfolio standard target of 50 percent by 2030, along with interim targets of 40 percent by 2024 and 45 percent by 2027.

### *Senate Bill 97 – Update to State CEQA Guidelines*

Senate Bill 97 required the Governor's Office of Planning and Research (OPR) to amend the state CEQA guidelines to address the feasible mitigation of GHG emissions or the effects of GHGs. In response, OPR amended the CEQA guidelines by adding Section 15183.5 to provide guidance for analyzing GHG emissions, along with other amendments to the CEQA guidelines, including

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[22] California Air Resources Board, *Executive Order No. G-11-024, Relating to Adoption of Regional Greenhouse Gas Emission Reduction Targets for Automobiles and Light Trucks Pursuant to Senate Bill 375*, February 2011. Available at http://www.arb.ca.gov/cc/sb375/executive_order_g11024.pdf.

[23] Association of Bay Area Governments and Metropolitan Transportation Commission, *Plan Bay Area*, adopted July 18, 2013. Available at http://planbayarea.org/plan-bay-area.html.

[24] Office of the Governor, *Executive Order S-21-09*, September 15, 2009. Available at https://www.gov.ca.gov/news.php?id=13259.

[25] Ibid.

[26] San Francisco Public Utilities Commission, *Approval of the Enforcement Program for the California Renewable Energy Resources Act*, December 13, 2011. Available at https://infrastructure.sfwater.org/fds/fds.aspx?lib=SFPUC&doc=741114&data=285328890.

adding a new section to the CEQA Checklist (CEQA Guidelines Appendix G) to address questions regarding the project's potential to emit GHGs.

### 5.9.2.3 Local Regulations

#### *Bay Area Air Quality Management District (BAAQMD)*

The BAAQMD is responsible for attaining and maintaining federal and state air quality standards in the SFBAAB, as established by the federal Clean Air Act (CAA) and the California Clean Air Act (CCAA), respectively. The CAA and the CCAA require plans to be developed for areas that do not meet air quality standards, generally. The most recent air quality plan, the *Bay Area 2010 Clean Air Plan*, includes a goal of reducing GHG emission to 1990 levels by 2020, 40 percent below 1990 levels by 2035, and 80 percent below 1990 levels by 2050.[27]

In addition, BAAQMD established a climate protection program to reduce pollutants that contribute to global climate change and affect air quality in the SFBAAB; the program includes GHG-reduction measures that promote energy efficiency, reduce vehicle miles traveled, and develop alternative energy sources.[28]

The BAAQMD CEQA Air Quality Guidelines also assist lead agencies in complying with the requirements of CEQA regarding potentially adverse impacts on air quality. The BAAQMD advises lead agencies to consider adopting a greenhouse gas reduction strategy capable of meeting AB 32 goals and then reviewing projects for compliance with the greenhouse gas reduction strategy as a CEQA threshold of significance.[29] This is consistent with the approach to analyzing GHG emissions described in CEQA Guidelines Section 15183.5.

#### *City and County of San Francisco*

**San Francisco Greenhouse Gas Reduction Ordinance**

In May 2008, the City adopted Ordinance No. 81-08 amending the San Francisco Environment Code to establish GHG emissions targets and require departmental action plans and to authorize the San Francisco Department of the Environment to coordinate efforts to meet these targets. The City ordinance establishes the following GHG emissions reduction limits and target dates by which to achieve them: determine 1990 citywide GHG emissions by 2008, the baseline level, with reference to which target reductions are set; reduce GHG emissions by 25 percent below 1990 levels by 2017; reduce GHG emissions by 40 percent below 1990 levels by 2025; and reduce GHG emissions by

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[27] Bay Area Air Quality Management District, *Clean Air Plan*, September 2010. Available at http://www.baaqmd.gov/plans-and-climate/air-quality-plans/current-plans.

[28] Bay Area Air Quality Management District, *Climate Protection Strategy*, April 2015. Available at http://www.baaqmd.gov/~/media/files/planning-and-research/plans/clean-air-plan-update/rcsp-flyer-2-pdf.pdf?la=en.

[29] Bay Area Air Quality Management District, *California Environmental Quality Act Air Quality Guidelines*, May 2012. Available at http://www.baaqmd.gov/~/media/Files/Planning%20and%20Research/CEQA/BAAQMD%20CEQA%20Guidelines_Final_May%202012.ashx?la=en.

80 percent below 1990 levels by 2050.[30] The City's GHG reduction targets are consistent with—in fact, are more ambitious than—those set forth in Governor Brown's EO B-30-15 and SB 32 by targeting a 40 percent reduction of GHGs by 2025 rather than a 40 percent reduction by 2030.

### 2004 Climate Action Plan for San Francisco

The Climate Action Plan for San Francisco identifies local and citywide actions to reduce GHG emissions in the energy, transportation, and solid waste sectors. The plan includes GHG reduction strategies such as targeting emissions from fossil-fuel use in cars, power plants, and commercial buildings; developing renewable energy technologies like solar, wind, fuel cells, and tidal power; and expanding residential and commercial recycling programs. The plan identifies implementing agencies for GHG reduction strategies in the various sectors. The Climate Action Plan describes actions the SFPUC was taking and intended to take to reduce GHGs at that time. This plan was updated in 2013, as described below.

### 2010 San Francisco Greenhouse Gas Reduction Strategies

San Francisco has developed a number of plans and programs to reduce the City's contribution to global climate change and meet the goals of the Greenhouse Gas Reduction Ordinance. San Francisco's *Strategies to Address Greenhouse Gas Emissions*[31] examines the degree to which programs in the 2004 Climate Action Plan have been implemented as well as other programs that were not originally conceived under the Climate Action Plan. The document provides an update on the energy efficiency and renewable energy programs that would help reduce GHG emissions. For instance, the City has implemented mandatory requirements and incentives that have measurably reduced GHG emissions including, but not limited to, increasing the energy efficiency of new and existing buildings, installation of solar panels on building roofs, implementation of a green building strategy, adoption of a zero waste strategy, adoption of a construction and demolition debris recovery ordinance, creation of a solar energy generation subsidy, incorporation of alternative fuel vehicles in the City's transportation fleet (including buses), and adoption of a mandatory recycling and composting ordinance. The strategy also includes 30 specific regulations for new development that would reduce a project's GHG emissions. These GHG reduction actions have resulted in a 23.3 percent reduction in GHG emissions in 2012 compared to 1990 levels,[32] exceeding the year 2020 reduction goals in the BAAQMD's *Bay Area 2010 Clean Air Plan*, EOs S-3-05 and B-30-15, and AB 32.2013.

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[30] City and County of San Francisco, *Greenhouse Gas Emissions Targets and Departmental Action Plans*, May 13, 2008. Available at http://library.amlegal.com/nxt/gateway.dll/California/environment/chapter9greenhousegasemissionstargetsand?f=templates&fn=default.htm&3_0=&vid=amlegal%3Asanfrancisco_ca.

[31] San Francisco Planning Department, *Strategies to Address Greenhouse Gas Emissions in San Francisco*, November 2010. Available at http://sfmea.sfplanning.org/GHG_Reduction_Strategy.pdf.

[32] ICF International, *Technical Review of the 2012 Community-wide GHG Inventory for the City and County of San Francisco*, January 21, 2015. Available at http://sfenvironment.org/sites/default/files/fliers/files/icf_verificationmemo_2012sfecommunityinventory_2015-01-21.pdf.

### San Francisco Climate Action Strategy

In 2013, the San Francisco Department of the Environment published the 2013 San Francisco Climate Action Strategy[33] as an update to the 2004 Climate Action Plan. This report provides a summary of progress and examples of successful policies and programs, and outlines a set of actions that can be taken by citizens, businesses, and government. In the energy sector, the document includes a number of areas where the SFPUC has taken action, including moving toward 100 percent GHG-free and renewable electricity in buildings, implementing energy efficiency programs, and implementing the GoSolarSF incentive program. The strategy also reported on progress in GHG emissions reductions in the municipal sector, due in part to the SFPUC's carbon-free Hetch Hetchy power and reductions in natural gas use in municipal buildings, a focus of the SFPUC's energy efficiency program.

### SFPUC Climate Action Plan and Annual Reports

Ordinance 81-08 also required each City department to report annually on its own departmental emissions and emissions reductions. SFPUC prepared annual reports to the Climate Action Plan in 2009, 2010, 2011, 2012, 2013, and 2014. The most recent annual report (Climate Action Annual Report Fiscal Year 2012 – 2013) was prepared in 2014.[34] Each annual report summarizes GHG emissions associated with electricity, natural gas and fleet fuels consumed by the SFPUC for the previous fiscal year for its own operations, and highlights the SFPUC's activities to reduce GHG emissions. According to the 2014 report, total GHG emissions from facility energy use (natural gas and electricity) decreased 76 metric tons (2.9 percent) in Fiscal Year 2012-2013 compared to the previous year.

### SFPUC Actions to Address Climate Change

Current SFPUC actions to reduce GHG emissions include the following:

- The SFPUC's Renewable Generation program has installed 21 solar photovoltaic projects on municipal facilities, with 8 megawatts (MW) of solar capacity, and continues to plan for additional projects to increase local renewable energy generation. In addition, the SFPUC operates cogeneration plants at its Southeast and Oceanside Wastewater Treatment Plants that generate both electricity and process heat, and are primarily fueled by digester biogas, a by-product of wastewater treatment operations. These facilities generate 2 MW and 1 MW at their peak capacity, respectively.

- The SFPUC's GoSolarSF program continues to provide incentives to San Francisco residents, businesses, and nonprofits. In Fiscal Year 2014-2015, $1.9 million in incentives resulted in the installation of 2.2 MW of new local solar generation at over 570 locations in the city.

- The SFPUC's energy efficiency program continues to reduce electricity use and natural gas consumption in municipal buildings, and is expanding its focus in the coming year with new program offerings for the private sector.

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[33] San Francisco Department of the Environment. 2013. San Francisco Climate Action Strategy, 2013 Update. October.

[34] SFPUC. 2014. San Francisco Public Utilities Commission Climate Action Annual Report Fiscal Year 2012 – 2013. March 18.

- Expanding existing GHG-free electricity programs to serve more customers in San Francisco. In spring 2015, residents at the Hunters Point Shipyard became San Francisco's newest green power neighborhood, receiving Hetch Hetchy Power for 100 percent of their electric needs. May 2016 marked the launch of the CleanPowerSF program, which is now delivering cleaner energy to San Francisco residents and business through the Green (35 percent renewable) and SuperGreen (100 percent renewable) enrollment options.

- The SFPUC recently opened the College Hill Learning Garden, in Bernal Heights. This educational site features kid-friendly interactive features such as solar panels, rain gardens, a mini-green roof and a composting toilet, all designed to teach children about how they can be stewards of our water, energy, food, and waste systems.

- The SFPUC continues to encourage the use of sustainable transportation in all forms, including changing its diesel purchases from petroleum-based diesel and biodiesel to renewable diesel.

### San Francisco's 2011 Updated Electricity Resource Plan

The SFPUC's GHG reduction efforts in the electricity sector are guided by the *2011 Updated Electricity Resource Plan,* a City-wide plan that identifies strategies to help San Francisco achieve its goal of a 100 percent GHG-free electric system city-wide by 2030.[35] In Ordinance 81-08, the City and County of San Francisco endorsed a goal for the City to have a GHG-free electric system by 2030, generating, deploying and procuring all of its energy needs from renewable and zero-GHG electric energy sources. The purpose of the 2011 Update of San Francisco's 2002 Electricity Resource Plan (2002 ERP) is to identify the next steps that San Francisco must take in order to achieve this goal. It identifies recommendations that promote zero GHG energy, influence procurement of electric resources at the wholesale level, and expands reliable, reasonably-priced, and environmentally sensitive electric service. The most recent annual update prepared for the SFPUC Commission in 2015[36] highlighted the past year's activities, which included: working toward implementation of the CleanPower SF program, offering San Francisco residents and businesses a cleaner electricity supply; completing the Power Enterprise Business Plan, identifying strategies to increase delivery of clean energy supplies in San Francisco; successful certification of the SFPUC's Kirkwood generating units as eligible renewable energy resources under California's Renewables Portfolio Standard (RPS); and initiating GHG-free SFPUC electric service to residents of the Hunters Point Shipyard.

The SFPUC is also committed to meeting its requirements under California's Renewable Portfolio Standard (RPS) rules, which require the SFPUC to meet 100 percent of its retail customer electricity needs with a combination of zero-GHG hydroelectric supplies from its Hetch Hetchy regional water supply system and RPS-eligible renewable energy supplies.

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[35] SFPUC, 2011. *San Francisco's 2011 Updated Electricity Resource Plan: Achieving San Francisco's Vision for Greenhouse Gas Free Electricity*. March 2011. Available at http://sfwater.org/Modules/ShowDocument.aspx?documentID=40

[36] SFPUC. 2015. Implementation of Electricity Resource Plan. August 28.

## 5.9.3 Impacts and Mitigation Measures

### 5.9.3.1 Significance Criteria

The project would have a significant impact related to GHG emissions if the project were to:

- Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment; or
- Conflict with any applicable plan, policy, or regulation adopted for the purpose of reducing emissions of GHGs.

### 5.9.3.2 Approach to Analysis

GHG emissions and global climate change represent cumulative impacts. GHG emissions cumulatively contribute to the significant adverse environmental impacts of global climate change. No single project could generate enough GHG emissions to noticeably change the global average temperature; instead, the combination of GHG emissions from past, present, and future projects and activities have contributed and will contribute to global climate change and its associated environmental impacts.

Thus, the impact analysis that follows focuses on the project's contribution to cumulatively significant GHG emissions. Because no individual project could emit GHGs at a level that could result in a significant impact on the global climate, this analysis is in a cumulative context, and this section does not include an individual project-specific impact statement. The BAAQMD has prepared guidelines and methodologies for analyzing GHGs. These guidelines are consistent with CEQA Guidelines Sections 15064.4 and 15183.5 which address the analysis and determination of significant impacts from a proposed project's GHG emissions. CEQA Guidelines Section 15064.4 allows lead agencies to rely on a quantitative or qualitative analysis to assess GHG emissions resulting from a project. CEQA Guidelines Section 15183.5 allows for public agencies to analyze and mitigate GHG emissions as part of a larger plan for the reduction of greenhouse gases and describes the required contents of such a plan. Accordingly, San Francisco has prepared its own greenhouse gas reduction strategy (described above), which the BAAQMD has reviewed and concluded that "Aggressive GHG reduction targets and comprehensive strategies like San Francisco's help the Bay Area move toward reaching the State's AB 32 goals, and also serve as a model from which other communities can learn."[37] The analysis below evaluates the project compared to the City's GHG reduction strategy and also the SFPUC GHG reduction efforts.

In addition, because the City's GHG reduction strategies are focused on residential, commercial, and other more typical land use development projects within the boundaries of San Francisco, most of the City's identified GHG reduction strategies do not directly apply to the proposed ACRP project. Therefore, for purposes of this analysis, the project's annual GHG emissions are

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[37] San Francisco Planning Department, *Letter Regarding Draft GHG Reduction Strategy*, October 28, 2010. Available at http://www.sf-planning.org/ftp/files/MEA/GHG-Reduction_Letter.pdf.

compared to a threshold of 1,100 metrics tons of CO2e per year. This threshold is based on the BAAQMD *Options and Justifications Report*,[38] which provides a threshold for land use projects that includes public land uses and facilities. The analysis in this BAAQMD report determined that "building each individual project in accordance with the proposed thresholds will achieve that individual project's respective portion of the emission reductions needed to implement the AB 32 solution." Thus, a project with GHG emissions below 1,100 metric tons of CO2e per year would not result in cumulatively considerable contribution to climate change, would not conflict with AB 32, and the impact would not be significant. Furthermore, while the BAAQMD hasn't published thresholds to meet the requirements of recently approved SB 32, which sets a target of reducing GHG emissions to 40 percent below 1990 levels by year 2030, this analysis estimates whether, based on available information, the proposed project would be expected to substantially conflict with the recently approved SB 32.

As described in Section 5.1.2 regarding baseline conditions for evaluation of project impacts, impacts in this section are evaluated against the existing conditions. The current construction schedule for the proposed project is from fall 2017 to spring 2019 (18 months), and construction of the Calaveras Dam Replacement Project (CDRP) is also anticipated to be completed in spring 2019. It is possible that operation of the CDRP will commence prior to completion of ACRP construction, and that with-CDRP conditions could occur while ACRP is still under construction. However, operation of the CDRP is not expected to change any of the baseline GHG conditions analyzed in this section. More specifically, the impacts of the ACRP presented in this section would be the same regardless of the implementation of bypass flows at the Alameda Creek Diversion Dam and instream flow releases from Calaveras Reservoir and any other aspects of CDRP operations that characterize the with-CDRP conditions.

### 5.9.3.3 Impacts and Mitigation Measures

**Impact C-GG-1: Project construction and operation would not generate GHG emissions that could have a significant impact on the environment, or conflict with any applicable plan, policy, or regulation adopted for the purpose of reducing GHG emissions. (Less than Significant)**

As noted previously, the proposed project consists of specialized water infrastructure facilities with unique operational characteristics and is located outside the boundaries of the City and County of San Francisco (CCSF). Accordingly, the ACRP is not subject to most of the recommendations and requirements of San Francisco's *Strategies to Address Greenhouse Gas Emissions*; many of these strategies apply to structures developed for human occupancy and/or to activities that occur within the CCSF boundaries (e.g., Clean Construction Ordinance). Regardless, the 2008 Green Building Ordinance requires that all City departments prepare an annual department-specific climate action plan. In 2009, the SFPUC completed a departmental climate action plan focused on energy efficiency and renewable energy programs to reduce GHG emissions. Per the SFPUC Departmental

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[38] Bay Area Air Quality Management District, *Revised Draft Options and Justification Report – California Environmental Quality Act Thresholds of Significance*, October 2009. Available at http://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/revised-draft-ceqa-thresholds-justification-report-oct-2009.pdf?la=en.

Climate Action annual report for Fiscal Year 2012-2013,[39] SFPUC has implemented an aggressive alternative fuel program, installed numerous electrical vehicle (EV) charging stations, and has completed various energy efficiency and solar generation projects. The project would not hamper the SFPUC's ability to carry out its departmental climate action programs.

Moreover, the proposed ACRP is a component of the SFPUC's Hetch Hetchy water system which, due to a predominantly gravity-driven water transmission system, results in very low GHG emissions, and furthermore is complimented by the generation of carbon-free power from the system's hydroelectric facilities. The power generated by the hydroelectric facilities far exceeds the power demand of the water system, allowing for the distribution of surplus (carbon-free) power to San Francisco, which constitutes approximately 16 percent of the City's total electric supply.[40] Correspondingly, as documented in the SFPUC's Annual Report, while the Water Enterprise of the SFPUC accounts for about 46 percent of total revenue, the associated activities constitute just six percent of SFPUC's total GHG emissions. Therefore, as a component of the Water Enterprise system, the additional GHG emissions associated with project implementation, discussed in detail below, would not substantially or obviously conflict with implementation of the GHG reduction strategies and the broader GHG reduction goals of the CCSF.

The project would generate GHG emissions during construction and operation. Project construction activities are estimated to occur over approximately 18 months (between fall 2017 and spring 2019). Sources of GHG emissions during construction would include exhaust emissions from off-road equipment, on-road trucking, and construction worker commute traffic. GHG emissions from project construction were estimated using CalEEMod and construction equipment fleet and activity data provided by SFPUC for each project component. CalEEMod uses OFFROAD2011 emission factors for estimating GHG emissions from construction equipment. GHG emissions from on road sources such as worker commute trips, material delivery trips and spoils off haul trips were estimated using EMFAC2014 emission factors for $CO_2$. EMFAC2014 does not provide emission factors for $CH_4$ and $N_2O$. Therefore, 2015 factors from The Climate Registry[41] were used to estimate $CH_4$ and $N_2O$ emissions from on road sources. **Table 5.9-2** presents the ACRP's estimated total construction-related GHG emissions during the 18-month construction period. As indicated in the table, construction activities associated with the ACRP would generate up to an estimated 1,029 metric tons of $CO_2e$ over the entire duration of construction. When averaged over a conservative 30-year lifespan for the ACRP project, the average annual GHG emissions associated with all project construction activities would equate to approximately 34 metric tons of $CO_2e$ emissions per year.

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[39] San Francisco Public Utilities Commission (SFPUC), 2014. *Departmental Climate Action: Annual Report for Fiscal Year 2012-13*. Dated March 18, 2014. Available at: http://sfwater.org/modules/showdocument.aspx?documentid=4138

[40] San Francisco Water Power sewer, *San Francisco Public Utilities Commission Departmental Climate Action Annual Report, Fiscal Year 2012-2013,* March 18, 2014. Available at http://sfwater.org/modules/showdocument.aspx?documentid=4138.

[41] The Climate Registry, 2015 Climate Registry Emission Factors, released April 2015. Available at https://www.theclimateregistry.org/wp-content/uploads/2016/03/2015-TCR-Default-EFs.pdf

### TABLE 5.9-2
### ESTIMATED TOTAL GHG EMISSIONS DURING CONSTRUCTION

| | Estimated Total Emissions (MT) | |
|---|---|---|
| | $CO_2$ | $CO_2e$ |
| Construction of Turbine Pumps and Barge Flotation System | 200 | 201 |
| Construction of Mooring System | 45 | 46 |
| Construction of Electrical Control Building and Transformer | 301 | 303 |
| Pipeline Construction Work | 446 | 448 |
| Construction Spoils Disposal | 31 | 31 |
| **Total Project GHG Emissions** | 1023 | 1029 |

SOURCE: See Appendix AQ

Following construction, SFPUC facility operators would use the four pumps on floating barges to pump water from Pit F2 directly to San Antonio Reservoir or Sunol Valley Water Treatment Plant (SVWTP), primarily between the months of April and October. Once operational, the proposed project would not include any direct sources of GHG emissions located at the project facilities. Operation of the ACRP is estimated to result in an increase in electricity use of approximately 1.3 MW beginning in 2019 primarily from the operation of the four pumps and the general power requirements of the electrical control building. The preferred power source for the proposed project is the Hetch Hetchy Water & Power (HHWP) Electrical substation (preferred option). This would not result in any indirect air emissions as the source of Hetch Hetchy power is GHG emissions-free hydroelectricity.

Alternately, if the ACRP's electricity needs are met by PG&E (backup option), there would be an increase in indirect GHG emissions associated with the project. Indirect GHG emissions that would be generated by the ACRP's use of electricity from PG&E's electrical grid were estimated using an emission factor of 307 pounds (or 0.139 metric tons) of $CO_2$ per MWh. PG&E developed this emission factor for its energy production portfolio in 2019 based on its GHG Calculator, which provides an independent forecast of PG&E's emission factors as part of a model on how the electricity sector would reduce emissions as required by AB 32. PG&E does not provide emissions from $CH_4$ or $N_2O$ from electricity generation. Therefore, the regional power pool emission factors supplied by US EPA eGRID that represent the average emissions rate of electric generators supplying power to the grid in the region were used to estimate $CH_4$ and $N_2O$ emissions. Total GHG emissions in the form of $CO_2e$ were calculated by multiplying the $N_2O$ and $CH_4$ emissions by their respective global warming potential, and then adding the $CO_2$, $N_2O$, and $CH_4$ emissions. Indirect emissions resulting from the project-related electricity demand from PG&E's power grid of approximately 3,785,740 kWh per year is estimated to be 558 metric tons of $CO_2e$.

The ACRP would require periodic operational review and maintenance activities, but these activities would be accommodated within the existing maintenance trips being made to the facility. Therefore, the ACRP would result in a negligible increase in maintenance vehicle trips, if any. Due to the nature of the proposed project and the proposed facilities, deliveries of materials and supplies are not anticipated as part of regular operations. The number of maintenance and operations trips for the proposed project is not expected to change when compared to existing trips by SFPUC facility operators in the area. Therefore, the project would not generate any new operational GHG emissions associated with worker vehicle and material delivery trips.

For purposes of this analysis, the project's annual $CO_2e$ emissions are compared to a threshold of 1,100 MT $CO_2e$ per year. As noted above, the electrical demand from the project would result in 558 MT $CO_2e$ per year if the project is connected to the PG&E substation. When combined with the annualized construction emissions of 34 MT $CO_2e$ per year, a total of 592 MT $CO_2e$ per year would result from implementation of the ACRP. This is below the significance threshold of 1,100 MT $CO_2e$ per year required to meet AB 32 GHG reduction targets. Should the ACRP project be powered by electricity from PG&E, it is expected that the project's indirect GHG emissions would be progressively reduced in future years because PG&E is subject to the renewable portfolio requirements described above, which would require PG&E to procure 50 percent of its electricity from renewable sources by year 2030, with interim targets established for years 2024 and 2027. Therefore, it is expected that the proposed project would similarly not conflict with the GHG reduction targets set forth in the recently approved SB 32.[42] The project's GHG emissions would be closer to 33 MT $CO_2e$ per year if the preferred option of connecting to the Hetch Hetchy Water & Power Electrical Substation is implemented, since the associated hydroelectric power has zero GHG's. Therefore, implementation of the proposed project would not generate GHG emissions that could have a significant impact on the environment, or conflict with applicable plans, policies, or regulations adopted for the purpose of reducing GHG emissions and this impact would be *less-than-significant*.

**Mitigation**: None required.

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[42] No agency has identified a GHG threshold for CEQA purposes that is designed to meet the recently approved SB 32 targets. The 1,100 MT $CO_2e$ threshold used in this EIR is based on reducing GHG emissions to 1990 levels by year 2020 as mandated by AB 32. SB 32 sets a target for reducing GHG emissions to 40 percent below 1990 levels by year 2030. Assuming a direct and proportional correlation between the 1,100 MT $CO_2e$ threshold and the updated targets in SB 32, a threshold of 660 MT $CO_2e$ may be required to meet the targets in SB 32. However, any thresholds developed to meet SB 32 targets would also need to consider new regulations that will be required to meet the SB 32 targets, which to date are unknown.

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# 5.10 Wind and Shadow

This section analyzes the potential for the Alameda Creek Recapture Project (ACRP or proposed project) to adversely affect existing wind and shadow patterns.

## 5.10.1 Setting

The ACRP would be located in the Alameda watershed on land owned by the City and County of San Francisco (CCSF) that is managed by the SFPUC as part of the Hetch Hetchy regional water system. The Alameda watershed encompasses 56 square miles (36,000 acres) of largely undeveloped, rolling grassland and scattered oak woodlands.

Existing land uses in the project vicinity include SFPUC water supply facilities, commercial gravel quarries, commercial nurseries, cattle grazing, regional open space, and private residences. Two commercial gravel quarries, operated by Hanson Aggregates and Oliver de Silva, are located within and adjacent to the project area. Other existing land uses in the project area boundary include the Calaveras Nursery located at the north end of the project area; the PG&E Sunol Substation, also located at the north end of the project area, near the I-680 / SR 84 interchange; the Hetch Hetchy Water & Power Calaveras Substation located on the west side of Calaveras Road, immediately south of San Antonio Creek; and various SFPUC facilities and pipelines. Due to the height (less than 24 feet tall) and relative density of the existing above ground structures in the project area and immediate vicinity, wind and shadow patterns in the project area are largely unaffected by development.

## 5.10.2 Regulatory Framework

There are no federal, state, or local regulations pertaining to wind or shadow that apply to the ACRP. Although CCSF regulations govern wind and shadow effects within the boundaries of San Francisco, these local regulations do not apply to the ACRP because the project is not located in San Francisco. Nevertheless, an overview of CCSF wind and shadow regulations is provided for informational purposes.

### 5.10.2.1 Wind

The San Francisco Planning Code establishes wind comfort and wind hazard criteria for use in evaluating new development in four areas of the city: the C-3 Downtown Commercial Districts (Section 148); the Van Ness Avenue Special Use District (Section 243[c][9]); the Folsom–Main Residential/Commercial Special Use District (Section 249.1); and the Downtown Residential District (Section 825). As the proposed project would not be located in any of these areas, the wind comfort and wind hazard criteria established in the Planning Code do not apply to the project.

### 5.10.2.2 Shadow

#### *San Francisco General Plan*

The Recreation and Open Space Element of the San Francisco General Plan[1] includes the following policy related to potential solar access or shading impacts:

> ***Policy 1.9***: Preserve sunlight in public open spaces.

The policy promotes access to sunlight and avoidance of shade to maintain the usability of public open spaces. It states that the requirements of Planning Code Section 295 apply to projects that could shade San Francisco Recreation and Park Department property. Since number of other open spaces designated in this Element or elsewhere in the General Plan are under the jurisdiction of other public agencies, or are privately owned and therefore not protected by the Planning Code amendments, Policy 1.9 further states that these spaces should be given other forms of protection to maintain sunlight in these spaces during the hours of their most intensive use while balancing this with the need for new development to accommodate a growing population in the City.

The proposed project is not located on San Francisco Recreation and Park Department property, and none of the project components would affect areas accessible to the public. Therefore, these policies do not apply to the proposed project.

#### *San Francisco Planning Code*

Planning Code Section 295, adopted in 1984 following voter approval of Proposition K (also known as the Sunlight Ordinance), prohibits the issuance of building permits for structures over 40 feet in height that would cast shade or shadow on property under the jurisdiction of, or designated to be acquired by, the Recreation and Park Commission. The statute applies to the time of day beginning one hour after sunrise and ending one hour before sunset at any time of year, unless the Planning Commission determines that the shade or shadow would have an insignificant adverse impact on the use of the subject property.

The project area is located in the SFPUC Alameda watershed, outside of San Francisco, and there are no parks or open spaces within the project area or vicinity that are under the jurisdiction of the San Francisco Recreation and Park Department. Therefore, the ACRP would not be subject to review under Planning Code Section 295.

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[1] City and County of San Francisco (CCSF), 2014. *San Francisco General Plan, Recreation and Open Space Element*, April 2014.

## 5.10.3 Impacts and Mitigation Measures

### 5.10.3.1 Significance Criteria

The project would have a significant impact related to wind and shadow if the project were to:

- Alter wind in a manner that substantially affects public areas; or
- Create new shadow in a manner that substantially affects outdoor recreation facilities or other public areas.

### 5.10.3.2 Approach to Analysis

Due to the nature of the proposed project, there would be no impacts related to wind and shadow, regardless of the baseline conditions, for the reasons described below:

- ***Alter Wind in a Manner that Substantially Affects Public Areas.*** The ACRP involves construction of the following main facilities: pumps mounted on barges (including mooring system) that would be floated in Pit F2, HDPE discharge pipelines, a 100-foot-long pipeline connection, an electrical control building, an electrical transformer and associated power poles. The barges would float on the water surface of Pit F2, well below the elevation of the surrounding ground surface. The only aboveground structures are the electrical control building, electrical transformer, and overhead powerlines. These structures would be similar in size and height to other SFPUC buildings and electrical powerlines in the area and would not alter wind patterns in the project vicinity. There are no publically accessible areas or recreational facilities within the project area. Calaveras Road, a popular route for recreational bicyclists, is located adjacent to the project's eastern boundary, however project construction and operation would not affect wind patterns along Calaveras Road. The project would increase truck traffic and construction-worker vehicle trips on Calaveras Road during the 18-month construction period, but this limited increase in traffic would not affect wind patterns. Therefore, the criterion related to altering wind in a manner that would substantially affect publicly accessible areas is not applicable to the proposed project and is not discussed further.

- ***Create New Shadow in a Manner that Substantially Affects Outdoor Recreation Facilities or Other Public Areas.*** The ACRP does not propose any features that would substantially affect shadow patterns. The tallest structures to be constructed under the proposed project are the electrical control building, and the electrical transformer and associated power poles. The 15 poles for the overhead powerline would be 50 feet tall and 12 inches in diameter. The 12-inch-diameter power poles would cast long, thin shadows but these shadows would be too small to have an adverse effect on the surrounding area. The other proposed aboveground structures would be 24 feet tall or less and would not be tall enough to create substantial new shadows that could affect outdoor recreational facilities or other public areas. Therefore, the criterion related to creating new shadow that would substantially affect outdoor recreational facilities or other public areas is not applicable to the proposed project and is not discussed further.

### 5.10.3.3 Construction and Operational Impacts and Mitigation Measures

As described above, implementation of the proposed project would not result in impacts related to wind and shadow. Therefore, no mitigation measures related to this resource topic are necessary.

**Mitigation**: None required.

### 5.10.3.4 Cumulative Impacts and Mitigation Measures

Implementation of the proposed project would not result in cumulative impacts related to wind and shadow because the project would not cause any project-specific impacts related to this resource topic.

**Mitigation**: None required.

# 5.11 Recreation

This section describes recreational resources in the project area and evaluates the potential impacts on recreational resources associated with implementation of the proposed Alameda Creek Recapture Project (ACRP or proposed project). This analysis addresses publicly accessible recreational resources in the vicinity of the ACRP, including local roadways used for bicycling and designated recreational trails used for hiking, jogging, bicycling, and equestrian use.

## 5.11.1 Setting

The proposed project would be located on land owned by the City and County of San Francisco (CCSF) and managed by the SFPUC within the Sunol Valley in unincorporated Alameda County. The project area abuts the west side of Calaveras Road, just south of the Interstate 680 (I-680) and State Route 84 (SR 84) junction. Public access is limited on CCSF-owned lands, and there are no designated recreational facilities within or immediately adjacent to the project area. However, the Sunol Water Temple and several East Bay Regional Park District (EBRPD) recreational facilities are located in the project vicinity and are accessed via Calaveras Road and other nearby roadways. In addition, Calaveras Road is a popular bicycle route. Recreational resources in the project vicinity are described below.

### 5.11.1.1 Recreational Parks and Trails

The EBRPD operates three public parks and open space areas within five miles of the project area: the Sunol Regional Wilderness, Ohlone Regional Wilderness, and Mission Peak Regional Preserve. The Sunol Regional Wilderness is a 6,859-acre park located approximately three miles southeast from the southernmost portion of the project area; it has a visitor's center as well as facilities for camping, picnicking, hiking, backpacking, and horseback riding.[1] Calaveras Road is the main vehicle access route to the Sunol Regional Wilderness from the north. The Ohlone Regional Wilderness is located east of and adjacent to the Sunol Regional Wilderness. Portions of the Sunol-Ohlone Regional Wilderness are on CCSF-owned Alameda watershed lands. The Mission Peak Regional Preserve, also managed by the EBRPD, is approximately 3.5 miles southwest of the ACRP site. This park provides opportunities for hiking, bicycling, and horseback riding.[2]

The closest recreational trail to the project area is the Maguire Peaks Trail, located approximately 2.5 miles southeast of the project area in the Sunol Regional Wilderness.

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[1] East Bay Regional Park District (EBRPD), Sunol Regional Wilderness Map. Available online at http://www.ebparks.org/parks/sunol. Accessed May 28, 2015.

[2] East Bay Regional Park District (EBRPD), Mission Peak Regional Preserve. Available online at http://www.ebparks.org/parks/mission. Accessed May 28, 2015.

### 5.11.1.2 Popular Bicycle Routes

Calaveras Road is a popular route for recreational cyclists and has been used as a route for the professional AMGEN Tour of California bicycle race.[3] Several local cycling groups, such as the Bay Area Velo Girls and Valley Spokesmen Bicycle Touring Club, use Calaveras Road for regularly scheduled rides.[4,5] Calaveras Road experiences considerable recreational bicycle use on weekends, while bicycle volumes are generally low on weekdays.

### 5.11.1.3 Sunol Water Temple

The Sunol Water Temple (managed by the SFPUC) is located at 505 Paloma Way, Sunol, CA 94586, west of the I-680 and SR 84 junction, approximately 0.7 mile west of the project area. In 1976, the American Society of Civil Engineers designated the Sunol Water Temple a California Historical Engineering Landmark. The temple is open to the public Monday through Friday.[6]

## 5.11.2 Regulatory Framework

There are no federal, state, or local regulations or requirements pertaining to recreational resources or facilities that are directly applicable to the ACRP.

## 5.11.3 Impacts and Mitigation Measures

### 5.11.3.1 Significance Criteria

The project would have a significant impact related to recreation if the project were to:

- 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;
- Include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment; or
- Physically degrade existing recreational resources.

### 5.11.3.2 Approach to Analysis

Due to the nature of the proposed project, there would be no impacts related to the following significance criteria; therefore, no impact discussion is provided for these topics for the reasons described below:

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[3] AMGEN Tour of California, 2014. Stage 3 San Jose, available online: http://www.amgentourofcalifornia.com/stage3, accessed June 13, 2015.
AMGEN Tour of California, 2015. Race Map Stage 3 San Jose, March 30, 2015

[4] Bay Area Velo Girls, Cycling for Women. Available online at http://www.velogirls.com/. Accessed June 8, 2015.

[5] Valley Spokesmen Bicycle Touring Club. Available online at http://www.valleyspokesmen.org. Accessed May 28, 2015.

[6] San Francisco Public Utilities Commission (SFPUC), 2013, Sunol Water Temple. Available online at http://www.sfwater.org/index.aspx?page=94. Accessed May 28, 2015.

- ***Increase the Use of Existing Neighborhood and Regional Parks or Other Recreational Facilities.*** The ACRP does not propose to construct new homes or businesses and would not increase the number of residents in the project area. Thus, implementation of the proposed project would not increase the use of recreational parks or other recreational facilities in the area. Therefore, this significance criterion is not applicable to the proposed project and is not discussed further.

- ***Include Recreational Facilities or Require the Construction or Expansion of Recreational Facilities.*** The ACRP does not propose to construct recreational facilities and would not result in the need for new or expanded recreational facilities. Thus, the significance criterion related to the construction or expansion of recreational facilities is not applicable to the proposed project and is not discussed further.

To evaluate the ACRP's potential to physically degrade recreational resources, this analysis considers whether the ACRP project would degrade existing recreational uses due to:

- Direct removal or damage to existing recreational resources;

- Physical environmental effects (such as air quality, noise, traffic, or aesthetic effects) that would indirectly deteriorate the quality of the recreational experience; or

- Disruption of access to existing recreational facilities (which could divide a recreational user from some of the established recreational amenities).

The evaluation of impacts on recreational resources considers the potential for construction activities to directly or indirectly degrade existing recreational resources and uses in the project vicinity. To determine the potential for construction activities to cause direct effects on recreation, the proposed construction areas were compared to the locations of identified recreational resources and facilities. Potential indirect effects were identified through the same means, as well as through a review of the impact findings presented in other pertinent sections of this EIR (e.g., Sections 5.3, Aesthetics; 5.6, Transportation and Circulation; 5.7, Noise and Vibration; and 5.8, Air Quality). The impact analysis addresses the potential for project construction activities to result in indirect impacts on recreational uses by causing: (1) deterioration in the recreational experience at nearby hiking trails (due to views of construction sites and activities), or (2) disruption of bicycling along Calaveras Road (due to construction-related noise and dust, and increased traffic safety hazards). Local planning documents and maps, including topographic maps, local street maps, and electronic maps available via the Internet were reviewed to identify the recreational resources in the project vicinity.

The ACRP would not degrade existing recreational resources during project operations and therefore would have no impacts for the following reasons. The ACRP area does not contain recreational facilities so the project would have no direct effect on recreational resources. Future project operations would not result in increased noise or air emissions at or immediately adjacent to recreational facilities or resources that would disrupt use. SFPUC staff would periodically visit the facilities in pickup trucks to conduct routine maintenance, but the number of vehicle trips would be similar to the number occurring under existing conditions and would not result in additional traffic congestion or increased traffic hazards. The proposed project facilities would be operated in a manner that would not affect access to, or use of, any recreational resources. Thus, operational impacts to recreational resources are not addressed further.

As described in Section 5.1.2 regarding baseline conditions for evaluation of project impacts, construction-related impacts in this section are evaluated against the existing conditions. The current construction schedule for the proposed project is from fall 2017 to spring 2019 (18 months), and construction of the Calaveras Dam Replacement Project (CDRP) is also anticipated to be completed in spring 2019. It is possible that operation of the CDRP will commence prior to completion of ACRP construction, and that with-CDRP conditions could occur while ACRP is still under construction. However, operation of the CDRP is not expected to change any of the baseline recreation conditions analyzed in this section. Therefore, no change in the approach to the impact analysis is necessary to account for the with-CDRP conditions. More specifically, the construction-related impacts of the ACRP presented in this section would be the same regardless of the implementation of bypass flows at the Alameda Creek Diversion Dam and instream flow releases from Calaveras Reservoir and all other aspects of CDRP operations that characterize the with-CDRP conditions.

### 5.11.3.3 Construction Impacts and Mitigation Measures

**Impact RE-1: The proposed project would not substantially degrade existing recreational uses during construction. (Less than Significant)**

Temporary, direct impacts on established recreational facilities and resources could result if construction activities overlapped geographically with existing recreational facilities or trails. Construction activities could also cause temporary, indirect impacts on recreational resources as a result of visual disruption, impeded access to recreational facilities or trails, construction-related noise, or dust/exhaust emissions at or in proximity to recreational resources.

Construction activities associated with the ACRP would not directly affect recreational facilities because there are no recreational facilities within the project area. In addition, there are no designated recreational trails or facilities in the immediate vicinity of the project area that could be adversely affected by construction-related noise and dust/exhaust emissions. Views of project construction activities from nearby recreational trails (if available) would be distant, largely obstructed by topography and vegetation, and set against a backdrop of existing gravel mining activities. Thus, project construction activities would not adversely affect the recreational experience at designated recreational facilities, including nearby hiking trails, and the Sunol Water Temple.

Calaveras Road, a popular bicycle route, forms the eastern boundary of the project area and provides the primary access to the project vicinity. Construction would generally take place in the vicinity of Pits F2, F3-East and F3-West; Calaveras Road would provide primary access to the project area. Construction equipment used during construction would generate noise and dust/exhaust emissions that could adversely affect the recreational experience of bicyclists traveling along Calaveras Road. In addition, project construction would increase vehicle and truck traffic along Calaveras Road, which would generate noise and diesel emissions and increase traffic safety risks compared to existing conditions. This increased traffic safety risk is due to the increased potential for conflicts between construction vehicles—which have slower speeds and wider turning radii than automobiles—and non-construction-related automobiles and bicyclists (see Impact TR-3, in Section 5.6, Transportation and Circulation). Construction traffic could also result in temporary delays of up to 10 minutes when large construction vehicles turn west into the project site from Calaveras Road due to the wide turning radii of construction vehicles (see Impact TR-3, in Section 5.6, Transportation and Circulation); this could impede weekday access to the nearby EBRPD parks and trails and the Sunol Water Temple which are accessed via Calaveras Road and other nearby roadways. However, such delays would be sporadic, temporary, and not be substantial, and therefore would not result in a significant recreation impact.

Construction-related air quality and traffic safety effects along Calaveras Road would combine to increase the overall impacts on the recreational experience of bicyclists, although these impacts would be limited in duration as the cyclists pass the project area. Construction-related criteria air pollutant emissions and emissions of fugitive dust would be generated by construction activities; however, average daily emissions of all of the criteria pollutants associated with project construction would be below significance thresholds. Because the number of project-generated vehicle trips would be highest on weekdays (when there are few pedestrians and bicyclists on Calaveras Road), the potential for conflicts and increased traffic safety hazards would be limited. Therefore, project impacts on recreational bicycling along Calaveras Road would be *less than significant*. Although not needed to mitigate significant recreational impacts, the less-than-significant recreational impacts of the project on bicyclists would be further minimized through implementation of the **Mitigation Measure M-AQ-1, BAAQMD Basic Construction Measures,** as described in Section 5.8, Air Quality. Mitigation Measures M-AQ-1 would address the effects of construction-related air emissions by requiring construction practices that limit fugitive dust and exhaust emissions.

**Mitigation**: None required.

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### 5.11.3.4 Cumulative Impacts and Mitigation Measures

**Impact C-RE: The project, in combination with past, present, and probable future projects, would not substantially affect recreational resources. (Less than Significant)**

The geographic scope for cumulative impacts on recreational resources consists of the project area and immediate vicinity, and the projects that could contribute to construction-related traffic, air emissions, and noise on Calaveras Road.

As discussed above under Impact RE-1, construction of the ACRP would generate construction-related noise, fugitive dust, diesel emissions, and traffic, which could have a significant impact on recreational bicycling along Calaveras Road. Increased traffic could also cause traffic delays and disrupt vehicular access to the nearby EBRPD parks and trails, and the Sunol Water Temple.

Construction of the ACRP would result in a temporary (approximately 18-month) increase in vehicle trips on Calaveras Road between the project area and I-680. Since the ACRP’s effects to recreation, specifically bicycling along Calaveras Road, would be limited to the construction period, this scope is limited to other present and planned projects that could be constructed concurrently with the proposed project that would also utilize Calaveras Road. Recent projects in the Sunol Valley that do not directly affect Calaveras Road (for example the other infrastructure projects in Table 5.1-6 in Section 5.1, Overview), are not considered further relative to potential cumulative effects.

The San Antonio Backup Pipeline (SABPL) project, New Irvington Tunnel (NIT) project, Sunol Valley Water Treatment Plant Expansion and Treated Water Reservoir (SVWTP Expansion) project, Geary Road Bridge Replacement project, Alameda Siphons Seismic Reliability Upgrade project, San Antonio Pump Station Upgrade project, and the San Antonio Reservoir Hypolimnetic Oxygenation project are already completed and therefore would not contribute to cumulative recreational impacts along Calaveras Road.

The PG&E Line 303 Alameda Creek Relocation project and the ongoing Calaveras Dam Replacement project (CDRP) are both located in the Sunol Valley, and there is a potential for their construction periods to overlap with that of the ACRP. These two cumulative projects would generate construction-related traffic along Calaveras Road associated with construction deliveries, haul trucks, and worker commutes. The CDRP is currently under construction. A 18-month road closure of Calaveras Road started in July 2016 to haul materials to build the dam. During the 18-month road closure period, Calaveras Road will be fully closed on weekdays to vehicle, pedestrian, and bicycle traffic between Geary Road and the Alameda/Santa Clara County boundary. Although bicycle use along Calaveras Road is highest during the weekends, the potential overlap in cumulative project construction schedules in the Sunol Valley region could result in significant cumulative impacts associated with increased traffic and safety hazards for bicyclists traveling on Calaveras Road north of Geary Road. The possible overlap in cumulative project construction schedules in the Sunol Valley region would result in increased traffic and a potentially significant cumulative recreation impact on bicyclists using Calaveras Road north of Geary Road.

However, the ACRP’s limited contribution to the increased traffic and safety hazards for bicyclists (a maximum of 76 construction trips per day and no more than one trip during the peak hours) would not be cumulatively considerable (i.e., would be less than significant). In addition, implementation of the SFPUC Standard Construction Measures (traffic control measures) during construction of the ACRP would further reduce the proposed project's contribution to a cumulative recreation impact. Therefore, this cumulative impact would be less than significant.

**Mitigation**: None required.

# 5.12 Utilities and Service Systems

This section evaluates the potential for implementation of the Alameda Creek Recapture Project (ACRP or proposed project) to adversely affect utilities and service systems. The utilities and service systems discussed in this section include stormwater drainage facilities, water supply pipelines, wastewater collection providers, and solid waste disposal services.

## 5.12.1 Setting

### 5.12.1.1 Utilities

#### *Stormwater Drainage*

Within the Sunol Valley, stormwater is collected and conveyed through a system of culverts, open channels, and natural drainages that discharge into local watercourses, including Alameda and San Antonio Creeks. Stormwater drainage facilities along Calaveras Road are maintained by the Alameda County Department of Public Works, which is also responsible for flood protection in the county.[1]

San Antonio and Alameda Creeks are the primary drainages in the project vicinity. Several culverts and storm drains along Calaveras Road convey runoff from the hilly areas east of Calaveras Road; the water runs beneath Calaveras Road towards Alameda Creek.

#### *Water Supply*

The SFPUC provides potable water service to users in the Sunol Valley, including local businesses and residences, SFPUC facilities, and the town of Sunol. SFPUC water supply pipelines within the project area include the San Antonio Pipeline, the San Antonio Backup Pipeline, a 12-inch potable water pipeline and a 12-inch raw water pipeline to the town of Sunol, and the Sunol Pump Station Pipeline. The California Department of Water Resources (DWR) South Bay Aqueduct is 84 inches in diameter and aligned northeast to southwest through the project area in the berm that separates Pit F2 from Pits F3-East and F3-West.

#### *Wastewater*

The Sunol Valley is not served by local sewer systems, and there are no nearby sewer treatment facilities. Residents and businesses use either onsite septic systems (and associated leachfields) or portable chemical toilets that are periodically replaced and hauled offsite for treatment. Wastewater generated at the SFPUC facilities in the Sunol Valley is collected in holding tanks and is periodically

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[1] Alameda County, 2002. *Alameda County, East County Area Plan, A Portion of the Alameda County General Plan, Volume I: Goals, Policies, and Programs*. May 2002.

pumped from the holding tanks into a truck and transported to the Dublin San Ramon Services District's wastewater facility in Dublin for treatment.[2]

### 5.12.1.2 Solid Waste Disposal

The following solid waste disposal and transfer/processing facilities located in Alameda County could be utilized to dispose of project-related construction waste: Altamont Landfill and Resource Recovery Center, the Vasco Road Sanitary Landfill, and the Tri-Cities Resource and Recovery Facility. **Table 5.12-1** presents capacity information about these facilities. The total remaining capacity of the two landfills is estimated at approximately 53,679,079 cubic yards.[3] The Tri-Cities Resource and Recovery Facility is a transfer station that processes construction and demolition waste for subsequent reuse.[4]

## 5.12.2 Regulatory Framework

### 5.12.2.1 Federal Regulations

No federal regulations related to utilities and service systems are applicable to the proposed project.

### 5.12.2.2 State Regulations

#### *California Integrated Waste Management Act of 1989*

The California Integrated Waste Management Board (CIWMB) was created to oversee, manage, and track waste generated in California. As of January 2010, the CIWMB changed its name to the Department of Resources, Recycling, and Recovery (CalRecycle). The authority and responsibilities of the CIWMB (now CalRecycle) were shaped by Assembly Bill 939 and Senate Bill 1322, which were signed into law as the California Integrated Waste Management Act of 1989 (Public Resources Code [PRC], Division 30).

The California Integrated Waste Management Act, as modified by subsequent legislation, required all California cities and counties to implement programs to reduce, recycle, and compost at least 50 percent of wastes by the year 2000 (PRC Section 41780). A jurisdiction's diversion rate is the percentage of total waste that it diverts from disposal through reduction, reuse, and recycling programs. The state determines compliance with this mandate to divert 50 percent of generated waste (which includes both disposed and diverted waste) through a complex formula. This formula requires cities and counties to conduct empirical studies to establish a "base-year" waste generation

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[2] San Francisco Planning Department, 2008. Initial Study/Mitigated Negative Declaration, SFPUC Alameda Siphons Seismic Reliability Upgrade Project, San Francisco Planning Department File No. 2006.0776E. May 2008.

[3] CalRecycle, 2016. Solid Waste Information System (SWIS)–Facility/Site Listing. Available online at: http://www.calrecycle.ca.gov/FacIT/Facility/Search.aspx. Accessed on April 22, 2016.

[4] Waste Management, 2016. Local Waste Management Facilities. Available at: https://www.wm.com/landfill-and-facilities.jsp Accessed on: April 22, 2016.

## TABLE 5.12-1
## ALAMEDA COUNTY SOLID WASTE DISPOSAL FACILITIES

| Facility Name | Permitted Capacity[a] | Total Estimated Capacity Used[b] (cubic yards) | Percent Used[b] | Estimated Remaining Capacity[a] (cubic yards) | Remaining Capacity Date[c] | Percent Remaining Capacity[b] | Closure Date[a] | Waste Types Accepted/Permitted |
|---|---|---|---|---|---|---|---|---|
| Altamont Landfill and Resource Recovery | 62,000,000 cubic yards (total capacity) | 16,280,000 | 26% | 45,720,000 | As of 08/22/05 | 74% | 01/01/25 | Ash, construction/demolition, contaminated soil, green materials, industrial, mixed municipal, other designated waste, tires, shreds |
| Vasco Road Sanitary Landfill | 32,970,000 cubic yards (total capacity) | 22,071,501 | 67% | 7,959,079 | As of 7/31/14 | 33% | 12/31/22 | Contaminated soil, industrial, mixed municipal, other designated waste, green materials, construction/ demolition |
| Tri-Cities Resource and Recovery Facility | 62,369 tons/year | Not Applicable - This is a transfer/processing facility | | | | | Not Available | Construction and demolition debris, municipal solid waste, and yard waste[d] |

NOTES:

[a] Capacity information from Solid Waste Information System (SWIS) Facility/Site Listings http://www.calrecycle.ca.gov/FacIT/Facility/Search.aspx

[b] Calculated using California Integrated Waste Management Board data.

[c] Remaining capacity date from SWIS Facility/Site Listings. Accessed on July 8, 2016.

[d] Waste Management, 2016. Local Waste Management Facilities. Available at: https://www.wm.com/landfill-and-facilities.jsp Accessed on: April 22, 2016.

rate against which future diversion is measured. The actual determination of the diversion rate in subsequent years is arrived at through deduction instead of direct measurement. Rather than counting the amount of material recycled and composted, the city or county tracks the amount of material disposed of at landfills and then subtracts that amount from the base-year amount; the difference is assumed to be diverted (PRC Section 41780.2).

#### *Utility Notification Requirements*

Title 8, Section 1541 of the California Code of Regulations requires excavators to determine the approximate locations of subsurface installations such as sewer, telephone, fuel, electricity, and water lines (or any other subsurface installations that may reasonably be encountered during excavation work) prior to opening an excavation.

California law (Government Code Section 4216 et seq.) requires owners and operators of underground utilities to become members of and participate in a regional notification center, such as Underground Service Alert–Northern California (USA North). USA North receives reports of planned excavations from public and private excavators, and transmits the information to all participating members that may have underground facilities at the location of an excavation. USA members mark or stake their facilities, provide information, or give clearance to dig.[5]

### 5.12.2.3 Local Policies

#### *Alameda County Source Reduction and Recycling Initiative*

Alameda County Measure D (the Alameda County Source Reduction and Recycling Initiative Charter Amendment), passed by voters in 1990, required that the County prepare a source reduction and recycling plan to assist it in reaching a 75 percent diversion goal by 2010, which exceeds the 50 percent diversion goal for individual jurisdictions mandated by California Integrated Waste Management Act. The plan identifies specific programs, objectives, and strategies for meeting the goal. One major program area covered by the plan is Green Building, which focuses on construction and demolition debris recovery of unpainted wood, concrete, asphalt, and cardboard. The other four major program areas are Organics, Business and Public Agencies, Schools, and Public Education. The Alameda County Source Reduction and Recycling Board, created by Measure D, implements the *Alameda County Source Reduction and Recycling Plan*.

#### *Alameda County Source Reduction and Recycling Plan*

In 2003, the Alameda County Waste Management Authority adopted the *Alameda County Source Reduction and Recycling Plan*, which sets forth the County's plan for achieving a countywide waste diversion goal of 75 percent or higher. This goal includes diverting construction and demolition waste.[6]

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[5] Underground Service Alert–Northern California (USA North), 2015. *"Dig Safely" Brochure*.

[6] Alameda County Waste Management Authority, 2003. *Alameda County Source Reduction and Recycling Plan*, adopted January 29, 2003. Revised January 2006.

## 5.12.3 Impacts and Mitigation Measures

### 5.12.3.1 Significance Criteria

The proposed project would have a significant impacts related to utilities and service systems if the project were to:

- Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board;
- Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects;
- Require or result in the construction of new stormwater drainage facilities or the expansion of existing facilities, the construction of which could cause significant environmental effects;
- Have insufficient water supply available to serve the project from existing entitlements and resources, or require new or expanded water supply resources or entitlements;
- Result in a determination by the wastewater treatment provider that would serve the project that it has inadequate capacity to serve the project's projected demand in addition to the provider's existing commitments;
- Be served by a landfill with insufficient permitted capacity to accommodate the project's solid waste disposal needs; or
- Be out of compliance with federal, state, and local statutes and regulations related to solid waste.

### 5.12.3.2 Approach to Analysis

Due to the nature of the proposed project, there would be no impacts related to five of the above-listed significance criteria; therefore, no impact discussion is provided for these topics for the reasons described below. In addition, as described below, there would be no operational impacts related to any of the significance criteria; therefore, the impact analysis focuses on the potential effects of project construction as relates to the last two criteria listed above.

- ***Exceed Wastewater Treatment Requirements, Result in the Construction or Expansion of New Water or Wastewater Treatment Facilities, or Result in a Determination by the Wastewater Treatment Provider That There is Insufficient Capacity to Serve the Project.*** Construction and operation of the ACRP would not generate wastewater requiring treatment. Therefore, the project would not exceed the wastewater treatment requirements of the Regional Water Quality Control Board, result in the construction or expansion of wastewater facilities, or exceed wastewater treatment capacity. With respect to the construction of water treatment facilities, based on two years of water quality monitoring and testing at Pit F2 (from June 2014 to July 2016)[7], no pretreatment would be required

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[7] San Francisco Public Utilities Commission (SFPUC), 2014. *Final Conceptual Engineering Report for Alameda Creek Recapture Project*, Prepared by SFPUC Engineering Management Bureau. November 21, 2014.

prior to conveying the recaptured water to the Sunol Valley Water Treatment Plant or San Antonio Reservoir (see Chapter 3, Project Description for further details). Thus, the significance criteria related to water treatment, and wastewater treatment and capacity are not applicable to construction or operation of the proposed project and are not discussed further.

- ***Have Insufficient Water Supply Available to Serve the Project.*** The proposed project would not require additional water supply or require new or expanded water supply resources or entitlements. Thus, the significance criterion related to sufficient water supply is not applicable to construction or operation of the proposed project and is not discussed further.

- ***Require or Result in the Construction or Expansion of Stormwater Drainage Facilities.*** The project does not propose to construct or expand stormwater drainage facilities. As discussed in Section 5.16, Hydrology and Water Quality, the project would not alter drainage patterns or result in a substantial increase in impermeable surfaces in the project area, and therefore, project implementation would not substantially increase the rate or amount of stormwater runoff. Thus, project implementation would not cause an exceedance of existing stormwater drainage capacity that would necessitate the construction or expansion of infrastructure. Thus, the significance criterion related to the construction or expansion of stormwater drainage facilities is not applicable to the proposed project and is not discussed further.

- ***Be Served by a Landfill with Insufficient Permitted Capacity to Accommodate the Project's Solid Waste Disposal Needs during Operations, or Be Out of Compliance with Statutes and Regulations Related to Solid Waste During Operations.*** Operation of the proposed project would not generate solid waste. Thus, the significance criteria related to solid waste and landfill capacity are not applicable to project operations and are discussed below only as they relate to project construction (see Impacts UT-1 and UT-2).

The analysis of project effects in Section 5.12.3 below related to utilities and service systems focuses entirely on temporary construction-related impacts. As described in the bullets above, none of the significance criteria are relevant to project operations, and project operations would not result in any impacts on utilities and service systems.

This analysis focuses on potential impacts related to landfill capacity resulting from the disposal of construction waste and the ability of local jurisdiction to comply with federal, state, and local solid waste statutes. Thus, the analysis evaluates the potential effects of landfill disposal with respect to the available capacity of the local landfills and transfer stations, and Alameda County's ability to comply with solid waste diversion rates.

As described in Section 5.1.2 regarding baseline conditions for evaluation of project impacts, construction-related impacts in this section are evaluated against the existing conditions. The current construction schedule for the proposed project is from fall 2017 to spring 2019 (18 months), and construction of the Calaveras Dam Replacement Project (CDRP) is also anticipated to be completed in spring 2019. It is possible that operation of the CDRP will commence prior to completion of ACRP construction, and that with-CDRP conditions could occur while ACRP is still under construction. However, operation of the CDRP is not expected to change any of the baseline utilities and service system conditions analyzed in this section. Therefore, no change in the approach to the impact analysis is necessary to account for the with-CDRP conditions. More specifically, the construction-related impacts of the ACRP presented in this section would be the same regardless of the implementation of bypass flows at the Alameda Creek Diversion Dam and instream flow releases from Calaveras Reservoir and all other aspects of CDRP operations that characterize the with-CDRP conditions.

### 5.12.3.3 Construction Impacts and Mitigation Measures

**Impact UT-1: Project construction would not result in a substantial adverse effect related to landfill capacity. (Less than Significant)**

Construction debris would consist primarily of excavated soil and rock materials. As described in Chapter 3, Section 3.5.2, Spoils Management and Disposal, an estimated 2,236 cubic yards of excess spoils and excavated materials would be generated during construction of the proposed project. It is anticipated that most of the excess excavated material generated during project construction would be placed in earthen berms at the Permanent Spoils Site A and/or Permanent Spoils Site B. Alternately, if feasible, the spoils could be temporarily placed at the SMP-24 or SMP-30 aggregate processing facilities for subsequent processing, resale, and reuse by the quarry operators. Spoils determined to be of poor quality that cannot be resold for reuse or placed in an earthen berm at the permanent spoils sites due to contamination or other reasons would be hauled to an appropriate landfill facility.

Solid waste disposal facilities that could be utilized for disposal of construction and demolition waste are shown in Table 5.12-1, above. Because soils in the project area are generally considered to be of good quality, the SFPUC estimates that no more than 10 percent of the excess spoils would require offsite disposal, as stated in Chapter 3, Project Description. Based on this assumption, approximately 224 cubic yards of excess spoils could be disposed of at nearby landfills. This quantity represents approximately 0.0005 percent and 0.002 percent of the estimated remaining landfill capacities at the Altamont and Vasco Road Sanitary Landfills, respectively, and 0.3 percent of the total permitted annual capacity of the Tri-Cities Resource and Recovery Facility. Because adequate landfill capacity exists to accept the ACRP's construction waste, and the solid waste generated by the ACRP represents a very small percentage of the remaining and permitted capacity of the local solid waste disposal facilities, the construction impact related to landfill capacity would be *less than significant.*

**Mitigation**: None required.

**Impact UT-2: Project construction would not result in a substantial adverse effect related to compliance with federal, state, and local statutes and regulations pertaining to solid waste. (Less than Significant)**

Waste generated during construction that could not be recycled or reused could be disposed of at a local solid waste disposal facility. As discussed above under Impact UT-1, local solid waste disposal facilities in Alameda County have more than sufficient capacity to accept the project's anticipated construction waste.

Alameda County is in compliance with the State of California's 50 percent annual waste diversion goal. As of 2006, unincorporated Alameda County diverted 69 percent of its waste.[8] Since 2007, diversion rates are expressed on a per capita basis. In 2014, Alameda County had a waste diversion rate of approximately 76 percent, based on the total population and when measured per capita. Based on employment rates, Alameda County had an 81 percent diversion rate when measured per capita.[9]

Given that the SFPUC estimates that roughly 90 percent of the waste generated during construction would be diverted by placing in the spoils area in the project area or through recycling of construction debris and that the remaining 10 percent would not impede Alameda County's ability to comply with the state's diversion goal, the impacts related to compliance with federal, state, and local solid waste statutes during construction would be *less than significant*.

**Mitigation**: None required.

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### 5.12.3.4 Cumulative Impacts and Mitigation Measures

**Impact C-UT: The project, in combination with past, present, and probable future projects, would not substantially affect utilities and service systems. (Less than Significant)**

The geographic scope for potential cumulative impacts related to landfill capacity is comprised of the Alameda County landfill facilities where disposal of construction-related waste could occur. For compliance with solid waste statutes and regulations, the geographic scope encompasses Alameda County. The proposed project and all of the projects listed in Table 5.1-6 would generate wastes that could require offsite disposal at the Alameda County landfill facilities. A cumulative impact related to landfill capacity and/or conflicts with solid waste regulations could occur if the ACRP, in combination with other cumulative projects, were to substantially deplete landfill capacity or interfere with the ability of Alameda County to meet state and local waste diversion goals.

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[8] California Department of Resources Recycling and Recovery (CalRecycle), 2015a. *Diversion/Disposal Progress Report Profile for Alameda County (Unincorporated).* Available online at http://www.calrecycle.ca.gov/LGCentral/Reports/Jurisdiction/DiversionDisposal.aspx

[9] CalRecycle, 2016b. Jurisdiction Diversion/Disposal Rate Detail for Alameda County, Reporting Year 2014. Available online at: http://www.calrecycle.ca.gov/LGCentral/Reports/jurisdiction/diversiondisposal.aspx Accessed on: April 22, 2016.

However, each of the cumulative projects would be required to implement source reduction, recycling, and composting measures—as mandated by AB 939 and implemented by the Alameda County waste management ordinance—to divert wastes from landfills. Therefore, given the extent of the remaining capacity at the Alameda County facilities and the requirements of AB 939, the potential cumulative impacts related to landfill capacity and compliance with solid waste statutes and regulations would be *less than significant*.

**Mitigation**: None required.

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# 5.13 Public Services

This section describes the existing conditions and regulatory setting for public services in the Sunol Valley and analyzes potential impacts on public services that could result from the proposed Alameda Creek Recapture Project (ACRP or proposed project). Public services addressed in this section include law enforcement services and fire protection services. Since the ACRP does not propose to construct new homes or businesses in the area, the project would not increase the local population and thus would not affect schools or libraries; therefore, these public services are not addressed in this section. Potential impacts on parks and recreational facilities are analyzed in Section 5.11, Recreation.

## 5.13.1 Setting

The proposed project is located in unincorporated Alameda County, within Alameda watershed lands owned by the City and County of San Francisco (CCSF) and managed by the SFPUC. Existing land uses in the Sunol Valley and project vicinity include commercial gravel quarries, commercial nurseries, the Pacific Gas and Electric Company Sunol Substation, the Hetch Hetchy Water & Power Calaveras Substation, several private residences, grazing land, regional open space, and SFPUC water supply facilities. Two commercial gravel quarries, operated by Hanson Aggregates and Oliver de Silva, are located within and adjacent to the project area. The nearest urban areas are the unincorporated town of Sunol, approximately 1 mile northwest of the project area, and the city of Fremont, approximately 4 miles to the west.

### 5.13.1.1 Law Enforcement Services

The Alameda County Sheriff's Office provides law enforcement services to unincorporated areas of Alameda County, including the project area. The closest sheriff's station is the Eden Township Station located at 15001 Foothill Boulevard in San Leandro, approximately 20 miles northwest of the project area.[1] However, most responders are on mobile patrol, and most responses do not originate from a specific office. The City of Fremont Police Department also provides law enforcement services by responding to emergencies in the project area. The closest police station is at 2000 Stevenson Boulevard in Fremont, approximately 5.5 miles west of the project area.

### 5.13.1.2 Fire Protection Services

The California Department of Forestry and Fire Protection (CAL FIRE), under contract with the Alameda County Fire Department, provides fire project services for unincorporated areas of Alameda County. Services provided by CAL FIRE include emergency response, hazardous materials spill response, medical aid, and wildland fire suppression and training. CAL FIRE has designated portions of the Alameda watershed as State Responsibility Areas and Local Responsibility Areas. State Responsibility Areas are defined in California Public Resources Code

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[1] Alameda County Sheriff's Office, Contact Webpage, available online: https://www.alamedacountysheriff.org/contact_mail.php; accessed June 1, 2015.

Sections 4125–4127 as lands for which the state has financial responsibility with respect to preventing and suppressing fires. CAL FIRE has designated the ACRP area as a Local Responsibility Area.[2] Local Responsibility Areas are defined as areas for which local agencies have the financial responsibility to prevent and suppress fires. Because the project area is within Local Responsibility Areas, the Alameda County Fire Department has a contract with CAL FIRE to provide emergency services.

The CAL FIRE station nearest to the project area is Fire Station 14, which is located at 11345 Pleasanton Sunol Road, just north of Interstate 680 in Sunol's Santa Clara Unit, approximately 1 mile north of the project area.[3] In the event of a fire emergency in the project area, CAL FIRE would be dispatched as the first-response team.

## 5.13.2 Regulatory Framework

### 5.13.2.1 Federal and State Regulations

There are no federal or state regulations governing public services that pertain to the ACRP.

### 5.13.2.2 Local Policies

#### *SFPUC Alameda Watershed Management Plan*

The *Alameda Watershed Management Plan* (Alameda WMP)[4] provides a policy framework for the SFPUC to make management decisions about the activities, practices, and procedures that are appropriate in the Alameda watershed. With respect to public services, the Alameda WMP outlines requirements related to fire protection services, including procedures that contractors must adhere to during construction activities. Section 5.17, Hazards and Hazardous Materials, presents the pertinent Alameda WMP policies related to fire prevention within the Alameda watershed. Chapter 4, Plans and Policies, of this EIR presents an analysis of the proposed project's overall consistency with the Alameda WMP.

## 5.13.3 Impacts and Mitigation Measures

### 5.13.3.1 Significance Criteria

- The project would have a significant impact related to public services if the project were to: Result in substantial adverse physical impacts associated with the provision of, or the need for, new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios,

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[2] California Department of Forestry and Fire Protection (CAL FIRE), Fire and Resource Assessment Program: Alameda County Fire Hazard Severity Zones in Local Responsibility Area [Map]. September 2008.

[3] Alameda County Fire Department, Fire Stations and Facilities – Fire Station 14, available online: http://www.acgov.org/fire/about/station14.htm; accessed on June 1, 2015.

[4] San Francisco Public Utilities Commission (SFPUC), Alameda Watershed Management Plan. April 2001.

response times, or other performance objectives for any public services such as fire protection, police protection, schools, parks, or other services.

### 5.13.3.2 Approach to Analysis

Due to the nature of the proposed project, there would be no impacts related to public services, regardless of the baseline conditions, for the reasons described below:":

- ***Result in Substantial Adverse Physical Impacts Associated with the Provision of, or the Need for, New or Physically Altered Governmental Facilities.*** During the proposed 18-month construction period, if all project components were to be constructed concurrently, up to 34 construction workers could be employed at the project area.[5] The total number of construction workers at the site at any given time would depend on the overlap between project components and on the construction activities taking place (see Table 3-4 in Chapter 3, Project Description). It is expected that construction workers could come from any part of the Bay Area. Although not anticipated, if some workers were to temporarily relocate from other areas, the temporary increase in the local population would be negligible. Potential incidents requiring law enforcement, fire protection, or emergency services could occur during construction; however, based on the small number of construction workers and the general nature of construction activities, construction-related incidents would not exceed the capacity of local law enforcement, fire protection, and emergency facilities such that new or expanded facilities would be required. Therefore, no impact related to the need for new or physically altered governmental facilities would result from project construction.

  The proposed project operation as stated in Section 3.5.4 of Chapter 3, Project Description, is not anticipated to result in an increase in SFPUC staffing requirements. Operation and post-construction maintenance activities would be similar to existing SFPUC maintenance activities in the Alameda watershed and would not result in substantial increases in the demand for public services, including fire protection, police protection, schools, parks, or other services. Therefore, there would be no impact related to public services from operational activities and the criterion is not applicable to the proposed project.

  Because there would be no construction or operational impacts related to public services, the criterion related to the need for new or modified governmental facilities is not applicable to the proposed project and is not discussed further.

### 5.13.3.3 Project-Level Impacts and Mitigation Measures

As described above, implementation of the proposed project would not result in project-level impacts related to public services. Therefore, no mitigation measures related to this resource topic are necessary.

**Mitigation**: None required.

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[5] The maximum number of construction workers is based on the sum of the workers needed for all project components. Based on the construction durations for individual project components, the maximum duration of peak construction activities is one month (see Table 3-4 in Chapter 3, Project Description).

### 5.13.3.4 Cumulative Impacts and Mitigation Measures

Implementation of the proposed project would not result in any cumulative impacts related to public services because the project would not result in any project-specific impacts related to this topic.

**Mitigation**: None required.

# 5.14 Biological Resources

## 5.14.1 Introduction

This section analyzes the potential for the Alameda Creek Recapture Project (ACRP or proposed project) to adversely affect sensitive biological resources, including wetlands and aquatic species, fisheries, sensitive habitats, special-status plant and animal species, and protected trees. Due to the distinct nature of the potential impacts, terrestrial biological resources and fisheries resources are discussed and analyzed separately. The setting, regulatory framework, and impacts/mitigation measures for terrestrial biological resources are discussed in Sections 5.14.2 through 5.14.4, respectively, followed by the setting, regulatory framework, and impacts/mitigation measures for fisheries resources in Sections 5.14.5 through 5.14.7. Supporting technical information on terrestrial biological resources and fisheries resources are provided in Appendices BIO1 and BIO2, respectively.

This section extensively references Section 5.16, Hydrology and Water Quality, and Appendices HYD1 and HYD2, because of the close relationship between biological resources and hydrologic conditions. Section 5.16 considers two baseline scenarios in the setting sections: (1) conditions at the time of publication of the Notice of Preparation (NOP) (2015), referred to as *existing conditions*; and (2) hydrologic conditions that are expected to prevail at the time the ACRP would begin to operate, referred to as *with-CDRP conditions*, which account for completion of the Calaveras Dam Replacement Project (CDRP) and implementation of the associated instream flow schedules (refer to Section 2.3 of Chapter 2 and Section 3.5 of Chapter 3)[1] and restoration of the historical capacity of Calaveras Reservoir. The biological resources impact analyses for both terrestrial and fisheries resources also consider the same two baseline scenarios in order to differentiate between the impacts of the CDRP and those of the ACRP. However, as explained below, the setting information for terrestrial resources focuses on the existing condition, while acknowledging potential changes that could occur under with-CDRP conditions; the setting information for fisheries resources presents both existing conditions and with-CDRP conditions.

Although CDRP instream flow schedules are a necessary condition for implementation of the proposed project, existing conditions are considered a reasonable approximation for the baseline in the terrestrial biological resources analysis. Changes in habitat resulting from alteration of flows in Alameda Creek associated with CDRP operations would take from years to decades to fully develop, yet the proposed project is expected to be built and operational very soon after CDRP operations commence. As noted in the CDRP FEIR, ”Sustained winter and summer minimum flows could facilitate the conversion of existing riparian habitats, such as sycamore alluvial woodland and valley oak woodland to alder- and willow-dominated habitats, but the extent of this potential impact would be small.” Further, the CDRP FEIR states, “The proposed MOU flow releases from the ACDD bypass and Calaveras Dam would provide additional flow in the reaches of Alameda

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[1] As described in Chapter 2, Introduction and Background, and Chapter 3, Project Description, the instream flow schedules are required by the CDRP’s California Department of Fish and Game (CDFG) Streambed Alteration Agreement (CDFG, 2011) and National Marine Fisheries Service (NMFS) Biological Opinion (NMFS, 2011).

Creek from the confluence with Calaveras Creek down to about the Sunol quarries area but not downstream of there in below-normal and dry years compared with the baseline when flows have been diverted at the ACDD in below-normal and dry years: this may be beneficial to riparian habitat in the affected stream reaches." Thus, the CDRP FEIR anticipated some changes in woody riparian vegetation as a result of bypass and releases, but these changes were expected to be relatively minor and generally upstream from the ACRP project area. Therefore, the existing terrestrial habitat and special-status species conditions are concluded to serve as an approximation for with-CDRP conditions.

This analysis describes the existing conditions setting while acknowledging that terrestrial biological resources might change under with-CDRP conditions. Where the hydrology analysis indicates that flows would be expected to differ with the CDRP from existing conditions downstream of the quarries, the general direction of change under with-CDRP conditions is discussed and taken into account in the impact assessment.

By contrast, habitat for fishery resources will change as soon as with-CDRP conditions prevail. Therefore, the with-CDRP scenario is used as the baseline conditions against which ACRP fisheries impacts are analyzed in Sections 5.14.5 through 5.14.7, although the existing conditions are presented for informational purposes.

## 5.14.2 Setting, Terrestrial Biological Resources

### 5.14.2.1 Definitions

The following definitions are used throughout this Biological Resources section:

> ***Project area*** refers to the general area that would experience project-related temporary or permanent surface disturbance, tree removal, or other direct alterations of habitat within the biological resources survey area (see Chapter 3, Figure 3-1, and **Figures 5.14-1a** and **5.14-1b**).
>
> ***Survey area*** refers to a larger area within which biological resources could be subject to indirect effects (e.g., disturbance to wildlife from construction-related noise) (see Figures 5.14-1a and 5.14-1b).
>
> ***Riparian*** refers to habitats and species closely associated with streams, rivers, and watercourses.
>
> ***Habitat types*** are mapping units that describe distinctive biological resources in the survey area, composed of one or more vegetation alliances (defined below), unvegetated or managed areas with similar wildlife habitat characteristics, or composed of a mosaic too fine-textured to map at the scale for this analysis. The mapping units used here were generally consistent with nomenclature used in the Draft Alameda Watershed Habitat Conservation Plan,[2] with slight modifications to reflect the scale of mapping.

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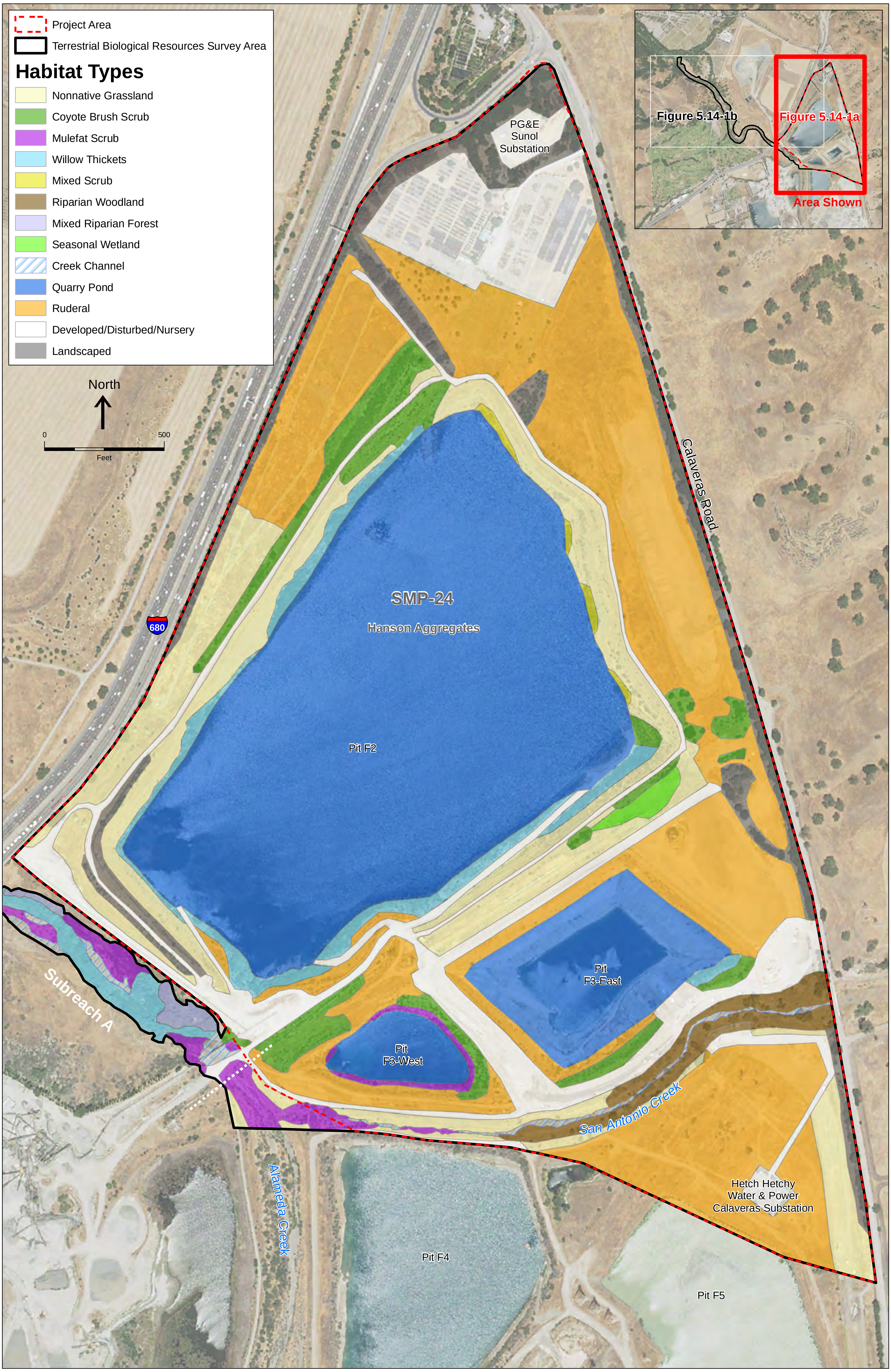
[2] San Francisco Public Utilities Commission (SFPUC), Draft Alameda Watershed Habitat Conservation Plan, Chapters 1, 2 and 3.http://www.sfwater.org/modules/showdocument.aspx?documentid=749, January 2010

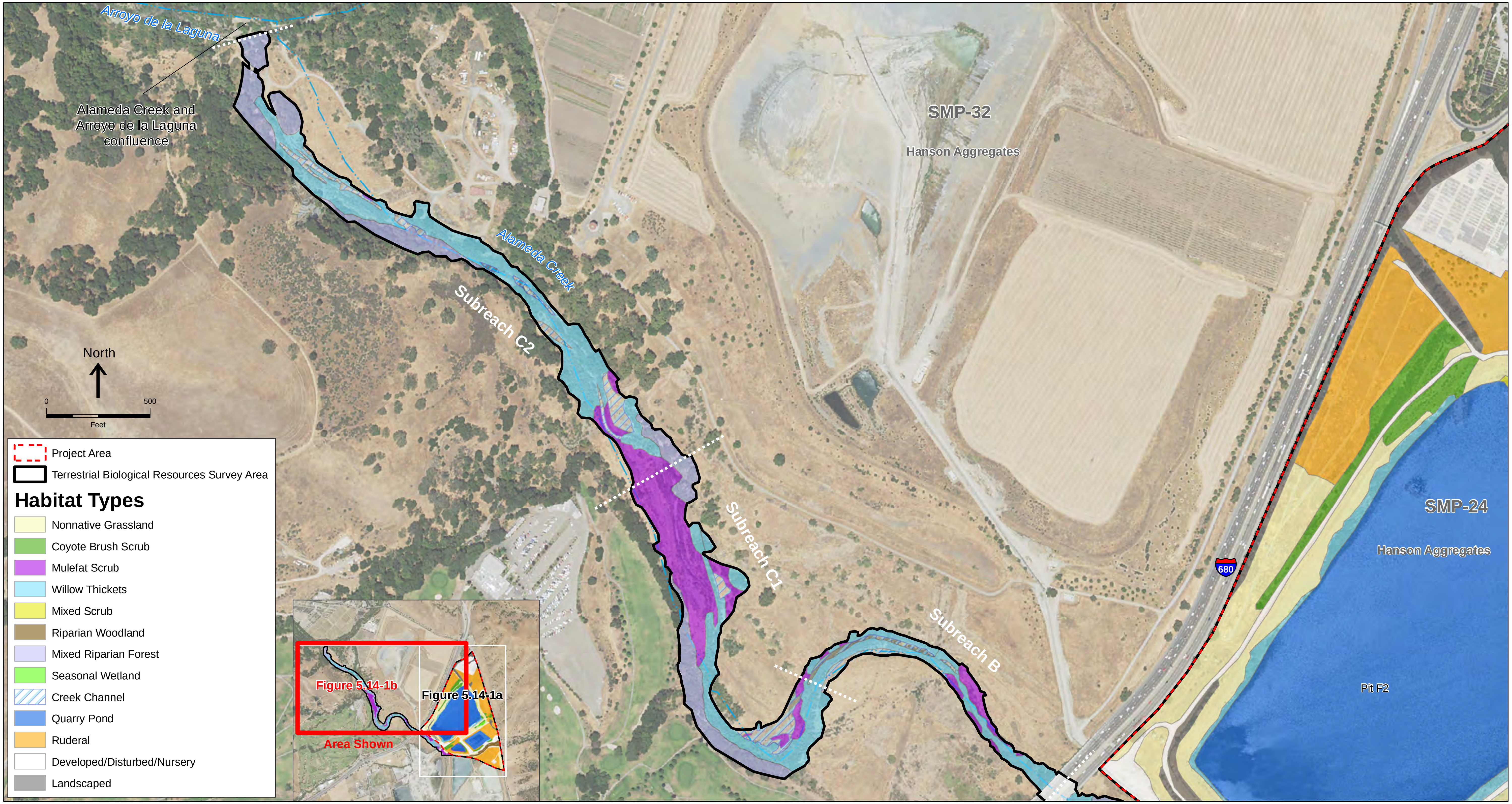


SOURCE: ESA, 2015; Date of aerial photo is 2014.

SFPUC Alameda Creek Recapture Project

**Figure 5.14-1a**

Habitat Types



SOURCE: ESA, 2015; Date of aerial photo is 2014.

SFPUC Alameda Creek Recapture Project

**Figure 5.14-1b**
Habitat Types

***Vegetation alliance*** is a classification of vegetation defined by one or more diagnostic plant species, usually the species contributing the most cover to the uppermost canopy layer.[3] It is roughly equivalent to the term "natural community"; however, vegetation alliances tend to have more narrow definition and "natural community" may be used to describe broader groupings, sometimes encompassing one to several alliances.

***Special-status biological resources*** include special-status plants and animals,[4] sensitive natural communities, wetlands, and other waters of the United States and of the state, as defined by the U.S. Army Corps of Engineers (Corps), the U.S. Fish and Wildlife Service (USFWS), the National Marine Fisheries Service (NMFS), the California Department of Fish and Wildlife (CDFW), and the California Regional Water Quality Control Board (RWQCB). (See Section 5.14.2.7 for a discussion of special-status biological resources, including special-status plant and animal species, in the survey area).

***Sensitive natural community*** is a natural community that receives regulatory recognition from municipal, county, state, and/or federal entities, such as the CDFW in its California Natural Diversity Database (CNDDB), because the community is unique in its constituents, restricted in distribution, supported by distinctive soil conditions, and/or considered locally rare. One criterion for a sensitive natural community is a CNDDB global rank of G1, G2 or G3 or a state rarity rank of S1, S2 or S3 (See Section 5.14.2.4 for a discussion of sensitive natural communities in the survey area). Another criterion for a sensitive natural community under CEQA is any riparian habitat. The CEQA checklist, Question IV.b calls for an assessment of potential project adverse effect on "any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the California Department of Fish and Game [Wildlife] or U.S. Fish and Wildlife Service."

***Special-status plant and animal species*** are defined as:

- Species listed under the Federal Endangered Species Act (FESA), Marine Mammal Protection Act, California Endangered Species Act (CESA), California Fish and Game Code, or Native Plant Protection Act as endangered, threatened, or depleted; species that are candidates or proposed for listing; or species that are designated as rare or fully protected.
- Locally rare species defined in the CEQA Guidelines, which may include species that are designated as sensitive, declining, rare, or locally endemic, or as having limited or restricted distribution by various federal, state, and local agencies, organizations, and watch lists. This includes plants designated as Rank 1 and 2 by the California Native Plant Society (CNPS).[5]

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[3] Sawyer, John O., Todd Keeler-Wolf, and Julie Evens, *A Manual of California Vegetation, Second Edition*, California Native Plant Society and California Department of Fish and Game, Sacramento, 2008.

[4] Several species known to occur within the general project area are accorded "special status" because of their recognized rarity or vulnerability to habitat loss or population decline. Some of these species receive specific protection in federal and/or state endangered species legislation. Others have been designated as "sensitive species" or "species of special concern" on the basis of adopted policies of federal, state, or local resource agencies. These species are referred to collectively as "special-status species."

[5] California Native Plant Society (CNPS), Rare Plant Program, Inventory of Rare and Endangered Plants (online edition, v8-02). Nine-quad search was centered on the La Costa Valley 7.5-minute topographic quadrangle. Also includes plants listed as Rank 3 and 4. California Native Plant Society, Sacramento, CA. Website http://www.rareplants.cnps.org [accessed 10 May 2015; subsequently accessed on March 9, 2016].].

### 5.14.2.2 Information Sources and Survey Methodology

#### *Literature Review*

The EIR consultant team reviewed the following information related to the project area and the plant and wildlife species that may occur there:

- USFWS lists of federal endangered, threatened, proposed, and candidate species that may occur within the survey area[6]
- CNDDB animal records for the La Costa Valley and Niles United States Geological Survey (USGS) 7.5 minute quadrangles[7]
- CNDDB plant records for the La Costa Valley, Niles, Calaveras Reservoir, Milpitas, Newark, Hayward, Mountain View, Livermore, and Dublin USGS 7.5 minute quadrangles[8]
- CNPS Electronic Inventory of Rare and Endangered Plants of California nine-quad search centered on La Costa Valley USGS 7.5 minute quadrangle[9]
- SFPUC San Antonio Backup Pipeline (SABPL) Project Final EIR[10]
- SFPUC New Irvington Tunnel (NIT) Project Final EIR[11]
- SFPUC Alameda Siphons Seismic Reliability Upgrade Project Initial Study/Mitigated Negative Declaration[12]
- SFPUC Sunol/Niles Dam Removal Project Final EIR[13]
- SFPUC Sunol Valley Water Treatment Plant (SVWTP) Expansion and Treated Water Reservoir Project Final EIR[14]

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[6] United States Fish and Wildlife Service (USFWS), Resource List of Federal Endangered and Threatened Species that Occur in or may be Affected by the Alameda Creek Recapture Project. Retrieved April 27, 2015.

[7] CDFW, California Natural Diversity Database. Rarefind 5 printout and GIS database for the Niles and La Costa Valley 7.5 minute topographic quadrangles. Accessed April 27, 2015, March 30, 2016.

[8] CDFW, California Natural Diversity Database. Rarefind 5 printout and GIS database for plants, Niles, La Costa Valley, Calaveras Reservoir, Milpitas, Newark, Hayward, Mountain View, Livermore, and Dublin 7.5 minute topographic quadrangles. Accessed April 27, 2015 and March 9, 2016.

[9] CNPS, Rare Plant Program, Inventory of Rare and Endangered Plants (online edition, v8-02). Nine-quad search centered on La Costa Valley 7.5-minute topographic quadrangle. California Native Plant Society, Sacramento, CA. Website http://www.rareplants.cnps.org [accessed 10 May 2015 and March 9, 2016].

[10] San Francisco Planning Department, Final Environmental Impact Report Comments and Responses for the San Francisco Public Utilities Commission's San Antonio Backup Pipeline Project, San Francisco Planning Department Case No. 2007.0039E, State Clearinghouse No. 2007102030. September 2012.

[11] San Francisco Planning Department, Final Environmental Impact Report for the San Francisco Public Utilities Commission New Irvington Tunnel Project, San Francisco Planning Department File No. 2006.0162E, State Clearinghouse No. 2006092085. November 5, 2009.

[12] San Francisco Planning Department, Initial Study/Mitigated Negative Declaration for the San Francisco Public Utilities Commission Alameda Siphons Seismic Reliability Upgrade Project, San Francisco Planning Department File No. 2006.0776E. February 2008.

[13] San Francisco Planning Department, Final Environmental Impact Report for the San Francisco Public Utilities Commission Sunol/Niles Dam Removal Project, San Francisco Planning Department File No. 2001.01149E, State Clearinghouse No. 2004072049. March 16, 2006.

[14] San Francisco Planning Department, Final Environmental Impact Report for the San Francisco Public Utilities Commission Sunol Valley Water Treatment Plant Expansion and Treated Water Reservoir Project, San Francisco Planning Department File No. 2006.0137E, State Clearinghouse No. 2007082014. December 3, 2009.

- SFPUC Calaveras Dam Replacement Project Final EIR[15]
- SFPUC Alameda Creek Recapture Project Terrestrial Biological Resources Report[16]
- SFPUC Alameda Creek Recapture Project Fisheries Habitat Assessment[17]
- SFPUC San Antonio Backup Pipeline USFWS Biological Opinion[18]

### *Field Surveys*

The descriptions of habitat types and special-status biological resources presented in this section are based on reviews of project-specific information and visits to the project area by Environmental Science Associates (ESA) and Orion Environmental Associates (Orion) biologists.

Habitat mapping and site assessment was initially carried out on various dates in 2010 and 2011 as part of project planning, and verified, revised, and expanded in 2015.[19] During reconnaissance surveys conducted on May 4, 12, and October 23, 2015, ESA and Orion biologists mapped habitats[20,21] and assessed the presence, location, quality and extent of riparian or other sensitive natural communities, potential wetlands/waters, and the potential presence of special-status plant and wildlife species based on habitats present in the survey area. The entire survey area was either walked or driven to the extent necessary to map and characterize habitats, and to assess the potential habitat for special-status plant and wildlife species. Habitats were mapped using the nomenclature used in the Draft Alameda Watershed Habitat Conservation Plan,[22] with slight modifications to reflect the scale of mapping.

Focused surveys for special-status plants were carried out on April 8, 2011; May 13, 2011; April 1, May 4, and May 12, 2015.[23] The surveys were timed to coincide with the period when the target species were most readily detectable. ESA and Orion biologists walked all parts of the survey area, noting all species observed and giving particular attention to those areas with the most

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[15] San Francisco Planning Department, Final Environmental Impact Report for the San Francisco Public Utilities Commission Calaveras Dam Replacement Project, San Francisco Planning Department File No.2005.0161E, State Clearinghouse No. 2005102102. January 27, 2011.

[16] ESA, San Francisco Public Utilities Commission Alameda Creek Recapture Project Terrestrial Biological Resources Report, prepared for the San Francisco Public Utilities Commission, November 2016 (See Appendix BIO1).

[17] ESA. 2016. *Alameda Creek Recapture Project, Alameda Creek Fisheries Habitat Assessment Report.* Prepared for San Francisco Public Utilities Commission. November 2016. Prepared by Environmental Science Associates. (See Appendix BIO2).

[18] USFWS, 2012. Biological Opinion on the Proposed San Francisco Public Utilities Commission (SFPUC) San Antonio Backup Pipeline Project in the Sunol Valley, Alameda County, California (U.S. Army Corps of Engineers [Corps] File Number 2008-00207S), October 17, 2012.

[19] ESA, San Francisco Public Utilities Commission Alameda Creek Recapture Project Terrestrial Biological Resources Report, prepared for the San Francisco Public Utilities Commission, November 2016. (See Appendix BIO1).

[20] The terms "habitats" and "habitat types" are used here in lieu of "natural communities" for consistency with other surveys and with the Draft Alameda Watershed Habitat Conservation Plan.

[21] San Francisco Public Utilities Commission (SFPUC), Draft Alameda Watershed Habitat Conservation Plan, Chapters 1, 2 and 3. http://www.sfwater.org/modules/showdocument.aspx?documentid=749, January 2010

[22] San Francisco Public Utilities Commission (SFPUC), Draft Alameda Watershed Habitat Conservation Plan, Chapters 1, 2 and 3.http://www.sfwater.org/modules/showdocument.aspx?documentid=749, January 2010

[23] ESA, San Francisco Public Utilities Commission Alameda Creek Recapture Project Terrestrial Biological Resources Report, prepared for the San Francisco Public Utilities Commission, November 2016. (See Appendix BIO1).

natural, undisturbed habitat and those with habitat similar to that known for target species. Surveys were conducted in accordance with CNPS Botanical Survey Guidelines,[24] and CDFW's guidelines for assessing the effects of proposed projects on rare, threatened and endangered plants and natural communities; that is, surveys were floristic in nature, occurred at representative times during the flowering season, and covered all parts of the survey area.[25] Surveys were timed as much as possible to coincide with the periods of optimum detectability and identifiability of special-status species known from the region.

### 5.14.2.3 Overview of Setting

The existing conditions described below include the habitats, sensitive natural communities, and wetlands and other waters that were observed within the survey area during surveys conducted in 2015 at the time of publication of the Notice of Preparation (NOP). The existing conditions also describe the special-status species observed, or that have potential to be present, in the survey area based on the prevailing habitat types and habitat quality in the survey area. Additional detail on existing and historical site conditions is included for Alameda Creek riparian habitats.

As mentioned in the Introduction above, the setting information for terrestrial resources focuses on the existing condition, while acknowledging potential changes that could occur under with-CDRP conditions. Where with-CDRP conditions are mentioned, they describe any predicted changes in the habitats and special-status biological resources that could be present, following implementation of the CDRP operations. The descriptions include an analysis of the types of potential changes under with-CDRP conditions, but do not predict their extent, as such potential changes cannot be predicted with accuracy and depend on a number of unquantifiable variables. Within the ACRP survey area, changes between the existing and with-CDRP conditions could occur in Alameda Creek between its confluence with San Antonio Creek and Arroyo de la Laguna, and in Pit F2. Terrestrial biological resources in all other areas (i.e., all upland habitats) would not be influenced by changes associated with implementation of CDRP and associated instream flow schedules.

**Table 5.14-1** presents a summary of the hydrologic and riparian vegetation conditions along Alameda Creek Subreaches A, B, C1 and C2 under existing, with-CDRP and with-project conditions. For each subreach and each scenario, the table summarizes the surface water and subsurface water conditions, based on ASDHM results and monitoring well data, respectively; more detailed and supporting technical information on surface water and subsurface water conditions is presented in Appendices HYD1 and HYD2. In addition, for each scenario, the table describes the conditions of the pools, instream wetlands, and woody riparian vegetation along each subreach so that the relationships between the hydrological and habitats conditions are readily apparent.

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[24] California Native Plant Society (CNPS), CNPS Botanical Survey Guidelines, revision of 1983 guidelines. Available online at www.cnps.org/cnps/rareplants/pdf/cnps_survey_guidelines.pdf. 2001

[25] California Department of Fish and Game (CDFG), Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities, November. Available online at http://www.dfg.ca.gov/biogeodata/cnddb/pdfs/protocols_for_surveying_and_evaluating_impacts.pdf. 2009.

### TABLE 5.14-1
### SUMMARY OF HYDROLOGICAL AND RIPARIAN CONDITIONS ALONG ALAMEDA CREEK SUBREACHES A, B, AND C UNDER EXISTING, WITH-CDRP, AND WITH-PROJECT CONDITIONS
### (See Figure 5.14-1a and 1b for Location of Subreaches)

| Location | Existing Conditions | With-CDRP Conditions | With-Project Conditions |
|---|---|---|---|
| **Subreach A** | **Surface Water**. Surface water conditions in this reach are represented by Node 6 in the ASDHM. Average annual flow volume at Node 6 = 40,100 acre-feet per year, including quarry NPDES discharges. Live stream in wet months. Average total flow volume over the 18-year study period of 834 acre-feet (min: 21 acre-feet, max: 1,534 acre-feet) in dry-season 3-month period of July, August and September, entirely attributable to quarry NPDES discharges. | **Surface Water**. Average annual flow at Node 6 = 35,422 acre-feet per year, including quarry NPDES discharges. Live stream in wet months. Average ASDHM total flow volume over the 18-year study period of 1,618 acre-feet (min: 61 acre-feet, max: 3,667 acre-feet) in dry-season 3-month period of July, August and September, entirely attributable to quarry NPDES discharges. | **Surface Water**. Average annual flow volume at Node 6 = 37,207 acre-feet per year, including quarry NPDES discharges. Live stream in wet months. Average ASDHM flow volume over the 18-year study period of 576 acre-feet (min: 112 acre-feet, max: 1,660 acre-feet) in dry-season 3-month period of July, August and September, entirely attributable to quarry NPDES discharges. |
| | **Subsurface Water**. Subsurface water conditions in this reach are represented by measurements in MW5. Subsurface water levels at MW5 have varied seasonally from at or above the projected creek thalweg[26] elevation of 242 feet elevation in the winter and spring to 223 feet at the end of the dry season in the fall. Altered water management by ODS since 2012 has raised minimum elevations in the fall from 223 feet to about 230 feet.<br>Subsurface water elevations fluctuate within the observed range as a function of hydrology and mining activities, including timing and duration of precipitation through spring, timing and magnitude of dewatering activities by mining operators, and in recent years, water management practices such as by ODS. | **Subsurface Water**. Subsurface water levels at MW5 will vary seasonally from at or above the thalweg elevation of 242 feet in the winter and spring to 230 feet at the end of the dry season in the fall.[1]<br>Fluctuations will occur within this range and will resemble existing conditions as a function of hydrology and mining activities. | **Subsurface Water**. Subsurface water levels at MW5 would vary seasonally from at or above the thalweg elevation of 242 feet in the winter and spring to 230 feet at the end of the dry season in the fall.[1]<br>Fluctuations will occur within this range and will resemble existing conditions as a function of hydrology, mining activities, and variations in ACRP operations. |
| | **Pools.** Live stream through pools in wet months. Pools persist through dry months. | **Pools.** Live stream through pools in wet months. Pools persist longer in dry months. Pools will be larger in the dry months than under existing conditions due to greater quarry NPDES discharges. | **Pools.** Live stream through pools in the wet months. Pools persist in dry months. Pools would be smaller and possibly dry out in the dry season compared to with-CDRP conditions and somewhat smaller in the dry season compared to existing conditions due to ACRP recapture and projected smaller quarry discharges. In some years, about one in three of the hydrologic base period, ACRP would have limited operations leading to a wetter condition. The range from dry to wetter conditions as a function of ACRP operations would produce pooling that is consistent with variability seen under existing conditions. |

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[26] Thalweg is the path of a line connecting the lowest points of cross-sections along a streambed.

### TABLE 5.14-1 (Continued)
### SUMMARY OF HYDROLOGICAL AND RIPARIAN CONDITIONS ALONG ALAMEDA CREEK SUBREACHES A, B, AND C UNDER EXISTING, WITH-CDRP, AND WITH-PROJECT CONDITIONS
### (See Figure 5.14-1a and 1b for Location of Subreaches)

| Location | Existing Conditions | With-CDRP Conditions | With-Project Conditions |
|---|---|---|---|
| **Subreach A (cont.)** | **Instream Wetlands.** Instream wetlands are of two types: **perennial instream wetlands** occupy margins of more or less permanent pools and other perennial reaches of the creek. Perennial instream wetlands are the result of the combination of surface and subsurface flows. In Subreach A, perennial instream wetlands exist only because of the additional contribution of quarry NPDES discharges and would not exist due to surface flows alone. **Seasonal instream wetlands** occupy the periphery of pools, isolated seasonal pools within the floodplain, and other low areas subject to seasonal saturation or inundation from surface flows or groundwater seepage, generally drying in the dry season. | **Instream Wetlands.** The extent of instream perennial wetlands around the margins of permanent pools and other perennial reaches of the creek could increase compared to existing conditions because of increased CDRP releases, potentially replacing seasonal wetlands in these areas. The extent of isolated seasonal pools and the instream seasonal wetlands they support would not change substantially from existing conditions because the seasonal pattern of groundwater elevations would not change substantially due to instream flow schedules. | **Instream Wetlands.** The extent of instream perennial wetlands around the margins of permanent pools and other perennial reaches of the creek could decrease compared to with-CDRP and existing conditions, although seasonal wetlands may replace areas supporting perennial wetlands to some extent. The extent of isolated seasonal pools and the seasonal wetlands they support would not change substantially from with-CDRP or existing conditions. No net loss of wetlands expected, although the proportion (seasonal vs. perennial) could vary slightly. |
|  | **Woody Riparian Vegetation.** Tree-supporting riparian alliances (including willow thicket and riparian forest alliances) and dense mulefat thicket are found in areas along the low-flow channel. Dense vegetative growth depends on consistent access to surface or shallow groundwater supplied by quarry NPDES discharges, especially during the dry summer months. Sparse mulefat thicket alliance is found in the floodplain away from the low-flow channel. | **Woody Riparian Vegetation.** Tree-supporting riparian alliances could increase compared to existing conditions due to increased dry-season flows attributable to increased quarry NPDES discharges. Extent of mulefat thicket would not change except that some might be replaced by tree-supporting alliances. Density of mulefat could increase along the low-flow channel. | **Woody Riparian Vegetation.** Tree-supporting riparian alliances could decrease compared to existing and with-CDRP conditions due to reduction in dry-season quarry NPDES discharges. Mulefat thicket alliance could replace tree-supporting alliances and mulefat density could decrease in some areas. |
| **Subreach B** | **Surface Water.** Live flow in wet months. Average ASDHM annual flow volume lower than at Node 6 (40,100 acre-feet per year) in Subreach A due to seepage losses to groundwater. Lower total dry-season flow volume in July, August and September in Subreach B than at Node 6 for the same reason. Dry-season flow and pooling attributable to quarry NPDES discharges. | **Surface Water.** Live flow in wet months. Average ASDHM annual flow volume lower than at Node 6 ( at 35,422 acre-feet per year) in Subreach A due to seepage losses to groundwater. Lower total dry-season flow volume in July, August and September than at Node 6 for the same reason. Greater dry-season flow compared to existing conditions due to expected increased quarry NPDES discharges. | **Surface Water.** Live flow in wet months. Average ASDHM annual flow volume lower than at Node 6 (at 37,207 acre-feet per year) in Subreach A due to seepage losses to groundwater. Lower total flow volume in July, August and September than at Node 6 for the same reason. Lower dry-season flow volume compared to existing or with-CDRP conditions because of expected reduced dry season quarry NPDES discharges. |
|  | **Subsurface Water.** Subsurface water conditions in this reach are represented by measurements in MW6. Subsurface water levels at MW6 have varied seasonally from at or above the projected creek thalweg elevation of 236 feet elevation in the winter and spring to 221 feet in the fall. Altered water management by ODS since 2012 has raised minimum elevations to about 227 feet. | **Subsurface Water**. Subsurface water levels at MW6 will vary seasonally from the thalweg elevation of 236 feet in the winter and spring to 227 feet in the fall.[1]<br>Fluctuations will occur within this range and will resemble existing conditions as a function of hydrology and mining activities. | **Subsurface Water**. Subsurface water levels at MW6 would vary seasonally from as high as the thalweg elevation of 236 feet in the winter and spring to 227 feet in the fall.[1]<br>Fluctuations will occur within this range and will resemble existing conditions as a function of hydrology, mining activities, and variations in ACRP operations. |

### TABLE 5.14-1 (Continued)
### SUMMARY OF HYDROLOGICAL AND RIPARIAN CONDITIONS ALONG ALAMEDA CREEK SUBREACHES A, B, AND C UNDER EXISTING, WITH-CDRP, AND WITH-PROJECT CONDITIONS
### (See Figure 5.14-1a and 1b for Location of Subreaches)

| Location | Existing Conditions | With-CDRP Conditions | With-Project Conditions |
|---|---|---|---|
| **Subreach B (cont.)** | **Pools**. Live stream through pools in wet months. Pools persist through dry months. | **Pools**. Live stream through pools in wet months. Pools persist longer in dry months. Pools will be larger than under existing conditions due to greater quarry discharges and greater subsurface flow. | **Pools**. Live stream through pools in wet months. Pools persist in dry months. Pools would be smaller and possibly dry out in the dry season compared to with-CDRP conditions and somewhat smaller in the dry season compared to existing conditions due to ACRP recapture and projected smaller quarry discharges. In some years, about one in three of the hydrologic base period, ACRP would have limited operations leading to a wetter condition. The range from dry to wetter conditions as a function of ACRP operations would produce pooling that is consistent with variability seen under existing conditions. |
| | **Instream Wetlands.** Instream perennial wetlands occupy margins of permanent pools and other perennial reaches of the creek. Instream seasonal wetlands occupy the periphery of permanent pools, isolated seasonal pools within the floodplain, and other low areas subject to seasonal saturation or inundation from surface flows or groundwater seepage, generally drying in the dry season. | **Instream Wetlands.** The extent of instream perennial wetlands around the margins of permanent pools and other perennial reaches of the creek could increase compared to existing conditions. The extent of seasonal pools and the instream seasonal wetlands they support will not change substantially from existing conditions. | **Instream Wetlands.** The extent of instream perennial wetlands could decrease compared to with-CDRP and existing conditions, although instream seasonal wetlands may replace areas supporting perennial wetlands somewhat. The extent of isolated seasonal pools and the instream seasonal wetlands they support would not change substantially from with-CDRP or existing conditions. No net loss of wetlands expected, although the proportion (seasonal vs. perennial) could vary slightly. |
| | **Woody Riparian Vegetation.** Tree-supporting willow and riparian forest alliances and dense mulefat thickets found in areas along the low-flow channel. Dense growth depends on consistent access to surface or shallow groundwater supplied by quarry NPDES discharges, especially during the dry summer months. Sparse mulefat thicket alliance found in the floodplain away from the low-flow channel. | **Woody Riparian Vegetation.** Tree-supporting willow and riparian forest alliances could increase compared to existing conditions due to increased dry-season quarry NPDES discharges. Extent of mulefat thicket alliance would not change except that a small amount might be replaced by tree-supporting riparian vegetation because of increased dry-season flows. | **Woody Riparian Vegetation.** Tree-supporting willow and riparian forest alliances could decrease compared to existing and with-CDRP conditions due to reduction in dry-season quarry NPDES discharges. Mulefat thicket could replace tree-supporting alliances. |
| **Subreach C1** | **Surface Water.** Live flow in wet months. Average annual flow volume lower than at Node 6 (40,100 acre-feet per year) and in Subreach B due to seepage losses to groundwater. Lower total flow volume in dry-season July, August and September than at Node 6 and in Subreach B for the same reason. Dry-season flow and pooling attributable to quarry NPDES discharges. | **Surface Water.** Live flow in wet months. Average annual flow volume lower than at Node 6 (35,422 acre-feet per year) and in Subreach B due to seepage losses to groundwater. Lower total flow volume in dry-season July, August and September than at Node 6 and in Subreach B for the same reason. Greater dry-season flows compared to existing conditions due to increased quarry NPDES discharges. | **Surface Water.** Live flow in wet months. Average annual flow volume lower than at Node 6 (37,207 acre-feet per year) and in Subreach B due to seepage losses to groundwater. Lower total flow volume in July, August and September than at Node 6 and in Subreach B for the same reason. Lower dry-season flow volume compared to existing or with-CDRP conditions because of reduced dry-season quarry NPDES discharges. |

## TABLE 5.14-1 (Continued) SUMMARY OF HYDROLOGICAL AND RIPARIAN CONDITIONS ALONG ALAMEDA CREEK SUBREACHES A, B, AND C UNDER EXISTING, WITH-CDRP, AND WITH-PROJECT CONDITIONS (See Figure 5.14-1a and 1b for Location of Subreaches)

| Location | Existing Conditions | With-CDRP Conditions | With-Project Conditions |
|---|---|---|---|
| **Subreach C1 (cont.)** | **Subsurface Water.** Subsurface water conditions in the downstream portion of this subreach are represented by measurements in MW8. Groundwater levels at MW8 have varied seasonally within a narrow range from at or above the projected creek thalweg elevation of 224 feet in the winter and spring to 220 feet in the fall. In the absence of a monitoring well in the upstream portion of this reach, using the aquifer profile, it can be inferred that the subsurface water in the upstream portion of this subreach would fluctuate similar to Subreach B and the downstream portion similar to Subreach C2.<br>Streambed gravels are thin and the aquifer has less storage capacity than in upstream reaches. | **Subsurface Water**. Subsurface water levels at MW8 will vary seasonally from at or above the thalweg elevation of 224 feet in the winter and spring to 220 feet in the fall. Subsurface water levels in average years could be comparable to subsurface water levels in wetter years under existing conditions.<br>Fluctuations will occur within this range and will resemble existing conditions as a function of hydrology and mining activities. | **Subsurface Water**. Subsurface water levels at MW8 would vary seasonally from at or above the thalweg elevation of 224 feet in the winter and spring to 220 feet in the fall.<br>Fluctuations will occur within this range and will resemble existing conditions as a function of hydrology, mining activities, and variations in ACRP operations. |
| | **Pools.** Live stream through pools in wet months. Pools probably persist through dry months. Water-bearing streambed gravels are thin and the pools may extend to their base. | **Pools.** Live stream through pools in wet months. Pools persist in dry months. Pools could be larger than under existing conditions due to greater quarry discharges and greater subsurface flow. Live flow may persist longer through pools in dry months. | **Pools**. Live stream through pools in wet months. Pools persist in dry months. Pools would be smaller and possibly dry out in the dry season compared to with-CDRP conditions and somewhat smaller in the dry season compared to existing conditions due to ACRP recapture and smaller quarry discharges ACRP recapture and projected smaller quarry discharges. In some years, about one in three of the hydrologic base period, ACRP would have limited operations leading to a wetter condition. The range from dry to wetter conditions as a function of ACRP operations would produce pooling that is consistent with variability seen under existing conditions. |
| | **Instream Wetlands**. Instream perennial wetlands occupy margins of permanent pools and other perennial reaches of the creek. Instream seasonal wetlands occupy the periphery of permanent pools, isolated seasonal pools within the floodplain, and other low areas subject to seasonal saturation or inundation from surface flows or groundwater seepage, generally drying in the dry season. | **Instream Wetlands.** The extent of instream perennial wetlands around the margins of permanent pools and other perennial reaches of the creek could increase compared to existing conditions. The extent of seasonal pools and the instream seasonal wetlands they support will not change substantially from existing conditions. | **Instream Wetlands.** The extent of instream perennial wetlands around the margins of permanent pools and other perennial reaches of the creek could decrease compared to with-CDRP and existing conditions. Instream seasonal wetlands may replace areas supporting instream perennial wetlands to some extent. Other than this small effect, the extent of seasonal pools and the instream seasonal wetlands they support would not change substantially from with-CDRP or existing conditions. No net loss of wetlands expected, although the proportion (seasonal vs. perennial) could vary slightly. |

### TABLE 5.14-1 (Continued)
### SUMMARY OF HYDROLOGICAL AND RIPARIAN CONDITIONS ALONG ALAMEDA CREEK SUBREACHES A, B, AND C UNDER EXISTING, WITH-CDRP, AND WITH-PROJECT CONDITIONS
### (See Figure 5.14-1a and 1b for Location of Subreaches)

| Location | Existing Conditions | With-CDRP Conditions | With-Project Conditions |
|---|---|---|---|
| **Subreach C1 (cont.)** | **Woody Riparian Vegetation.** Tree-supporting willow and riparian forest alliances, and dense mulefat thickets found along the low-flow channel. Dense growth depends on consistent access to surface or shallow groundwater supplied by quarry NPDES discharges, especially during the dry summer months. Sparse mulefat thicket alliance found in the floodplain away from the low-flow channel. | **Woody Riparian Vegetation.** Tree-supporting willow and riparian forest alliances could increase compared to existing conditions due to increased dry-season quarry NPDES discharges. Extent of mulefat thicket would not change except that some might be replaced by dense woody riparian vegetation because of increased dry-season flows. | **Woody Riparian Vegetation.** Tree-supporting willow and riparian forest alliances could decrease compared to existing and with-CDRP conditions due to reduction in dry-season quarry NPDES discharges. Mulefat thicket alliance could replace tree-supporting alliances. |
| **Subreach C2** | **Surface Water.** Surface water conditions in this reach are represented by Node 7 in the ASDHM. Average annual flow volume at Node 7 = 38,274 acre-feet per year, about 5 percent lower than at Node 6. Average total flow volume over the 18-year study period of 16 acre-feet (min: 0 acre-feet, max: 275 acre-feet) in dry-season 3-month period of July, August and September, entirely attributable to quarry NPDES discharges. | **Surface Water.** Average ASDHM annual flow volume at Node 7 = 32,752 acre-feet per year, about 8 percent lower than at Node 6. Average ASDHM total flow volume over the 18-year study period of 476 acre-feet (min: 0 acre-feet, max: 2,301 acre-feet) in dry-season 3-month period of July, August and September, entirely attributable to quarry NPDES discharges. | **Surface Water.** Average ASDHM annual flow at Node 7 = 35,934 acre-feet per year, about 3 percent lower than at Node 6. Average ASDHM total flow volume over the 18-year study period of 39 acre-feet (min: 0 acre-feet, max: 356 acre-feet) in dry-season 3-month period of July, August and September, entirely attributable to quarry NPDES discharges. |
| | **Subsurface Water.** Subsurface water conditions in this reach are represented by measurements in MW10. Subsurface water levels at MW10 have varied seasonally within a narrow range from at or above the projected creek thalweg elevation of 215 feet in the winter and spring to 211 feet in the fall. Streambed gravels are thin and the aquifer has less storage capacity than in upstream reaches. Groundwater elevations higher than 215 feet may occasionally occur as a result of inundation from nearby Arroyo de la Laguna. | **Subsurface Water.** Subsurface water levels at MW10 will vary seasonally from 215 feet in the winter and spring to 211 feet in the fall.<br>Subsurface water levels in average years could be comparable to ground water levels in wetter years under existing conditions.<br>Fluctuations will occur within this range and will resemble existing conditions as a function of hydrology and mining activities. | **Subsurface Water.** Subsurface water levels at MW10 will vary seasonally from 215 feet in the winter and spring to 211 feet in the fall. Little change from existing conditions due to the limited aquifer thickness.<br>Fluctuations will occur within this range and will resemble existing conditions as a function of hydrology, mining activities, and variations in ACRP operations. |
| | **Pools.** Live stream through pools in wet months. Pools may persist through dry months as permeable streambed gravels are thin. | **Pools.** Live stream through pools in wet months. Pools will persist through dry months. Extent of pools in average years will be similar to extent of pools in wetter years under existing conditions. | **Pools.** Live stream through pools in wet months. Pools may persist through dry months. Little change from existing conditions. |
| | **Instream Wetlands**. Instream perennial wetlands occupy margins of permanent pools and other perennial reaches of the creek. Instream seasonal wetlands occupy isolated seasonal pools within the floodplain and other low areas subject to seasonal saturation or inundation from surface flows or groundwater seepage, generally drying in the dry season. | **Instream Wetlands**. Slight increases in groundwater water levels may more consistently support instream perennial wetlands. The extent of seasonal pools and the instream wetlands they support will not change substantially from existing conditions. | **Instream Wetlands**. Little change from with-CDRP and existing conditions. |

### TABLE 5.14-1 (Continued)
### SUMMARY OF HYDROLOGICAL AND RIPARIAN CONDITIONS ALONG ALAMEDA CREEK SUBREACHES A, B, AND C UNDER EXISTING, WITH-CDRP, AND WITH-PROJECT CONDITIONS
### (See Figure 5.14-1a and 1b for Location of Subreaches)

| Location | Existing Conditions | With-CDRP Conditions | With-Project Conditions |
|---|---|---|---|
| **Subreach C2 (cont.)** | **Woody Riparian Vegetation.** Tree-supporting willow and riparian forest alliances dominate most of this Subreach. Dense growth depends primarily on consistent access to shallow groundwater rather than from quarry NPDES discharges. Sparse mulefat thickets found in the floodplain in the upstream portion of subreach. | **Woody Riparian Vegetation.** Tree-supporting willow and riparian forest alliances expected to change little if at all because increased dry-season flows are likely to simply flow through the shallow stream channel gravels. Most of this subreach already contains tree-supporting alliances. | **Woody Riparian Vegetation.** Tree-supporting willow and riparian forest alliances expected to change little if at all compared to with-CDRP and existing. Increased dry-season flows with-CDRP are likely to simply flow through the shallow stream channel gravels. With-project dry-season flows are nearly the same as existing. Most of this subreach already contains tree-supporting alliances. |

NOTES: See Appendix HYD1 for details and further explanation of surface water conditions, and see Appendix HYD2 for details and further explanation of subsurface and ground water conditions.

[1] Future scenarios assume that water management changes made by ODS in 2012 will continue in the future.

SOURCE: ESA, LSCE, and Orion, 2016

### 5.14.2.4 Site Conditions, Habitats

The majority of the project area has been repeatedly and extensively disturbed from past and current land uses including quarry operations, commercial nursery operations, and construction and operation of SFPUC water supply infrastructure as well as other utility infrastructure such as transmission lines and pipelines. Portions of the project area have been cleared and graded, and were previously fenced with special-status species exclusion fence during construction of the SFPUC's SABPL and NIT projects, which started in 2013 and 2010, respectively. Potential upland burrows identified in the SABPL and NIT project areas during preconstruction surveys for these projects were excavated and collapsed to minimize direct loss of special-status species during construction, and special-status species were excluded from these areas with exclusion fence. NIT construction was then completed in 2016 and SABPL construction was completed in 2015, and the temporarily impacted areas were restored to pre-construction conditions following construction. Temporary exclusion fencing has since been removed.

The survey area outside of the project area includes about 1.5 miles of disturbed Alameda Creek channel. Alameda Creek in the Sunol Valley has been altered by realignment, grade controls at pipeline crossings, infiltration galleries, impoundments, and regulated discharges, all of which affect the shape and width of the floodplain and the type and distribution of vegetation it supports. Within the survey area, the Alameda Creek floodplain supports several riparian habitat types: mulefat scrub, willow thickets, riparian woodland, mixed riparian forest, and creek channel, including pools and instream wetlands. Some of these habitats, such as riparian woodland and mixed riparian forest, are dominated by large, mature trees which have been in place for many decades. Other habitats found in the survey area, such as willow thickets, have formed during approximately 25 to 30 years of NPDES-permitted discharges into the creek from quarry operations and do not represent the vegetation that would have been present historically. Mulefat scrub and creek channel represent historic vegetation in this reach of Alameda Creek but their characteristics, extent, and distribution have been altered, most notably by the past 25 to 30 years of quarry NPDES discharges.

Subreaches A, B, and C of Alameda Creek within the survey area are defined to focus the setting and impact discussions and are also shown on Figure 5.14-1a and 5.14-1b. Subreach A extends along Alameda Creek from its confluence with San Antonio Creek downstream to the I-680 overcrossing, a total of about 1,520 feet. Subreach B extends from the I-680 overcrossing downstream approximately 1,700 feet. Subreach C begins where the aquifer begins to thin, and extends from the end of Subreach B to the confluence with Arroyo de la Laguna, a total of about 4,980 feet. Subreach C is further subdivided into Subreach C1, which extends about 2,000 feet to about the northern end of the former Sunol Valley Golf Club, and Subreach C2, which continues about 2,980 feet from that point to the confluence with Arroyo de la Laguna. The survey area portion of Alameda Creek is bordered by various developments, including quarry operations and the former golf course, and is bisected by I-680.

The remainder of the survey area supports non-native grassland, coyote brush scrub, mulefat scrub, willow thicket, mixed scrub, riparian woodland, mixed riparian forest, seasonal wetland, creek channel and instream wetland, quarry pond, ruderal, developed/disturbed/nursery, and landscaped habitats.[27] Figures 5.14-1a and 5.14-1b show the distribution of these habitat types within the survey area. Equivalent vegetation alliances[28] and an evaluation of whether the habitat type contains any sensitive natural communities are presented for each habitat type.

### *Non-native grassland*

Non-native grassland consists of a dense to sparse cover of non-native annual grasses of medium height. Throughout its range, this habitat type is found on a wide variety of soils and slopes, from valley bottoms to steep slopes, and heavy clay soils to sandy or rocky soils. The dominant species vary based on location and soils, and may also vary from year to year depending on precipitation patterns and levels of residual dry matter. The dominant non-native species in the survey area include the grasses ripgut brome (*Bromus diandrus*), soft brome (*B. hordeaceus*), red brome (*B. madritensis*), wild oats (*Avena fatua, A. barbata*), Italian ryegrass (or perennial rye grass, *Festuca perennis* formerly *Lolium multiflorum*), and annual fescue (*Festuca* spp. formerly *Vulpia* spp.) species, stork's bill (*Erodium* spp.), and smooth cat's ear (*Hypochaeris glabra*). In less-disturbed areas, non-native grassland also supports a considerable variety of native grasses and forbs. Under favorable conditions, these may create showy, colorful displays in the spring. Typical native herb species in non-native grassland include California poppy (*Eschscholzia californica*), sky lupine (*Lupinus nanus*), miniature lupine (*L. bicolor*), and shining pepperweed (*Lepidium nitidum* var. *nitidum*). Non-native grassland may also support some very persistent invasive non-native annual herbs, such as shortpod mustard (*Hirschfeldia incana*), poison hemlock (*Conium maculatum*), Italian thistle *(Carduus pycnocephalus*), stinkwort (*Dittrichia graveolens*), and yellow star thistle (*Centaurea solstitialis*). Where these broadleaf species are dominant rather than simply abundant, vegetation may instead be mapped as ruderal. Non-native grassland encompasses several vegetation alliances, including wild oats grasslands, annual brome grasslands, and perennial rye grass fields. This habitat type is not a sensitive natural community, nor are any of the vegetation alliances it contains.[29]

In the survey area, non-native grassland is generally found in areas of coarser soils (i.e., sandy rather than clay-dominated) with limited residual soil moisture. Species richness is generally very low and is overwhelmingly dominated by a few species of non-native grasses with few native herbs. More recently-disturbed sites often support weedy, herb-dominated developed/ruderal habitat rather than non-native grassland. Non-native grassland sites left undisturbed for many years in the survey area are eventually replaced by coyote brush scrub. Non-native grassland was mapped in the survey area along San Antonio Creek above the active channel, on the higher edge of quarry pit F2, and along berms.

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[27] ESA, San Francisco Public Utilities Commission Alameda Creek Recapture Project Terrestrial Biological Resources Report, prepared for the San Francisco Public Utilities Commission, November 2016. (See Appendix BIO1).

[28] Sawyer, John O., Todd Keeler-Wolf, and Julie Evens, 2009. A Manual of California Vegetation Second Edition, California Native Plant Society and California Department of Fish and Game, Sacramento, CA, 2009.

[29] Sawyer, John O., Todd Keeler-Wolf, and Julie Evens, 2009. A Manual of California Vegetation Second Edition, California Native Plant Society and California Department of Fish and Game, Sacramento, CA, 2009.

During the reconnaissance level survey, small mammal burrows were noted within the non-native grasslands. These grasslands likely support low densities of small and medium-sized mammals like California vole (*Microtus californicus*), Botta's pocket gopher (*Thomomys bottae*), California ground squirrel (*Otospermophilus beecheyi*), cottontail (*Sylvilagus audubonii*), and black-tailed jackrabbit (*Lepus californicus*). Western rattlesnake (*Crotalus viridis helleri*) and Pacific gopher snake (*Pituophis catenifer catenifer*) are also common in grasslands with small mammal populations.

The grasslands provide foraging habitat for large raptors like red-tailed hawk and nesting habitat for passerines like the western meadowlark (*Sturnella neglecta*). The occasional shrub or tree also provides roosting and nesting habitat for birds and cover for other wildlife.

### Coyote brush scrub

Coyote brush scrub is a low, dense shrub habitat type with scattered grassy openings. This natural community is dominated by coyote brush (*Baccharis pilularis*), usually with smaller amounts of bush monkeyflower (*Mimulus aurantiacus*), coastal sage (*Artemisia californica*) and Pacific poison oak (*Toxicodendron diversilobum*). In the Alameda watershed, coyote brush scrub is usually found on exposed steep, north-facing slopes. In deeper and less sloping soils on south-facing slopes, it grades into non-native grassland; in steeper and rockier areas it grades into Diablan sage scrub; in less exposed areas it grades into any one of several oak woodland communities. Coyote brush scrub forms as a seral (successional) stage following disturbance in relatively mesic sites, following non-native grassland and eventually being replaced by oak woodland, forest, or coastal scrub in the absence of further disturbance. Coyote brush scrub is a recognized vegetation alliance; it is not a sensitive natural community.[30]

In the survey area coyote brush scrub is relatively uncommon, limited to slopes on the berms surrounding Pits F2, F3-East and F3-West. In these areas, coyote brush scrub is strongly dominated by a single species, coyote brush, with limited amounts of bush monkeyflower and coastal sage and some mulefat (*Baccharis salicifolia*). The inner slopes of Pit F2 contain a fine-textured mosaic of co-dominating coyote brush, mulefat, and willow; this mosaic is mapped as mixed scrub and is described in a later section. Openings in coyote brush scrub typically contain non-native grassland species.

Wildlife species commonly found in scrub habitat include mammalian species such as Botta's pocket gopher, house mouse (*Mus musculus*), California vole, raccoon (*Procyon lotor*), and striped skunk (*Mephitis mephitis*). Reptile species common to these areas include kingsnake (*Lampropeltis getulus*), Pacific gopher snake, and western fence lizard (*Sceloporus occidentalis*). These species in turn attract larger predators and scavengers, particularly to scrub edges and nearby grassland clearings. These areas provide nesting and perching habitat for scrub jay (*Aphelocoma californica*) and mockingbird (*Mimus polyglottos*), and also serve as a food bank of insects and seeds.

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[30] Sawyer, John O., Todd Keeler-Wolf, and Julie Evens, 2009. A Manual of California Vegetation Second Edition, California Native Plant Society and California Department of Fish and Game, Sacramento, CA, 2009.

### *Mulefat scrub*

Mulefat scrub is a tall shrub habitat strongly dominated by mulefat. This habitat is equivalent to the mulefat thickets vegetation alliance. It is found primarily in larger stream channels that carry flow in the winter but are dry in the summer. Mulefat depends on access to subsurface water, so it is usually closely associated with active channels. The continued existence of mulefat scrub along creeks is dependent on disturbance caused by frequent flooding and scouring. Other species found in mulefat scrub include California brickellbush (*Brickellia californica*) and many weedy annual species. Sandbar willow and arroyo willow are found in areas with higher and more consistent year-round subsurface water. Mulefat scrub is equivalent to the mulefat thicket vegetation alliance. It is not a sensitive natural community as defined by CNDDB based on rarity,[31] although when it is associated with riparian systems such as along Alameda Creek, mulefat scrub is considered a sensitive natural community under CEQA.

In the survey area, mulefat scrub is found in the lower portion of San Antonio Creek; in a narrow band near the water's edge at Pit F3-West; and in many locations along Alameda Creek. In subreaches A and B, it forms a dense and fairly broad band adjacent to willow thickets within the stream channel, and is sparser away from the low-flow channel. In Subreach C1 it occupies a broader band within the floodplain where it consists of widely spaced individuals within a mostly unvegetated stream channel. It sometimes forms a narrow band at the periphery of willow riparian scrub but was too narrow to map at the scale of the habitat map.

Mulefat scrub supports wildlife species typical of other scrub habitats. This includes small mammals such as brush rabbit (*Sylvilagus bachmani*) and Botta's pocket gopher, reptiles such as western rattlesnake and gopher snake and passerines such as white-crowned sparrow (*Zonotrichia leucophrys*) and mockingbird.

Under with-CDRP conditions, typical sparse mulefat scrub along the Alameda Creek channel could become denser, and portions could be replaced by willow thickets because of extended flows in Alameda Creek.

### *Willow thickets*

The willow-dominated habitats in the survey area are a mosaic of two alliances identified by Sawyer et al.[32] arroyo willow (*Salix lasiolepis*) thickets and sandbar willow (*Salix exigua*) thickets. Willow thickets occur in two areas: in association with Alameda Creek and in association with Pit F2. In themselves, these alliances are not sensitive natural communities by CNDDB based on rarity because their state and global ranks are 4 and 5; however, when occurring as riparian habitats along Alameda Creek willow thickets are considered sensitive natural communities under CEQA. Willow thickets associated with Pit F2 are created by and largely depend upon ongoing quarry operations; as a result, these areas are not considered sensitive natural communities. The two types of willow thickets (arroyo willow and sandbar willow) are briefly described below.

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[31] Sawyer, John O., Todd Keeler-Wolf, and Julie Evens, 2009. A Manual of California Vegetation Second Edition, California Native Plant Society and California Department of Fish and Game, Sacramento, CA, 2009.

[32] Sawyer, John O., Todd Keeler-Wolf, and Julie Evens, 2009. A Manual of California Vegetation Second Edition, California Native Plant Society and California Department of Fish and Game, Sacramento, CA, 2009.

Arroyo willow thickets are low, dense, closed-canopy riparian forests dominated by arroyo willow. They are found in areas with moist soil year-round, either near ponds, near permanent streams, or in canyons with ephemeral flow or seepage. Soils vary from relatively fine-grained (in smaller arroyos) to fine sand and gravel bars near the larger creeks and streams. In the Alameda watershed, arroyo willow is the most common dominant riparian willow species, but red willow (*S. laevigata*) is also frequent, along with occasional sandbar willow, mulefat, and California blackberry (*Rubus ursinus*).

Sandbar willow thickets are a scrubby streamside vegetation type, varying from open to impenetrable, found on temporarily flooded floodplains, depositions along rivers and streams, and at springs. Sandbar willow requires freshly deposited alluvium on which to germinate, so this vegetation type is typically found in active channels. It is usually the first woody riparian type to colonize point bars and cut banks, followed eventually by cottonwood (*Populus fremontii*) and other taller, longer-lived species.[33]

Willow thickets are found along much of Alameda Creek between San Antonio Creek and Arroyo de la Laguna. They form a dense, sandbar willow-dominated thicket in Subreach A largely due to the quarry operator's NPDES permitted discharges. In Subreach B, willow thickets consisting of a mix of sandbar willow and arroyo willow have experienced periodic dieback as evidenced by taller dead branches and shorter live regrowth. This is attributed to varying amounts of available water, presumably the result of varying amounts of discharge into Alameda Creek by the quarry operators. The location of the Hanson Aggregates discharge point is shown on **Figure 5.14-2**. In Subreaches C1 and C2, willow thickets contain primarily sandbar willow and arroyo willow. Historic records show that willow thickets were not present in Subreach A and B, and may have been limited in Subreach C where the depth to groundwater drops considerably in the summer months.[34] The willow thickets have developed since Hanson NPDES quarry discharges into Alameda Creek began about 25 to 30 years ago.

Willow thickets are also found within areas characterized by quarry operations, such as the edges of quarry pits that receive consistent subsurface water seepage. Bands of arroyo and sandbar willow grow on the side slopes of quarry Pit F2 at the lower boundary of the highly transmissive stream channel deposits.

Willow thickets support a variety of wildlife due to the presence of water and relatively dense vegetation cover. Willow thickets along Alameda Creek provide a greater value to wildlife than the quarry pit walls since the former has been subject to less intensive disturbance and is in close proximity to creek resources. However, wildlife common to willow thickets would likely be found in any of these areas (see the discussions of mixed scrub and riparian woodland, below).

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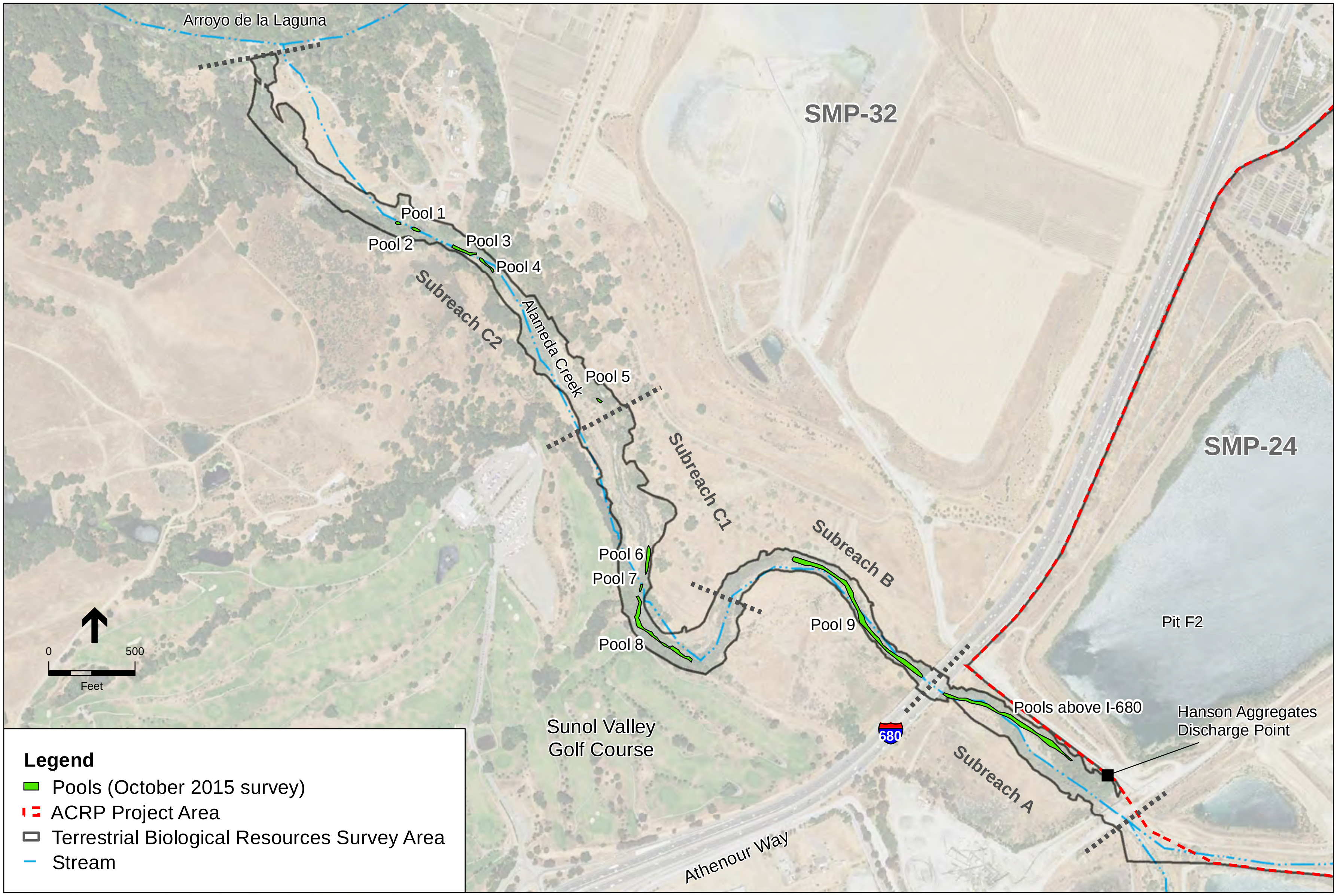
[33] Sawyer, John O., Todd Keeler-Wolf, and Julie Evens, 2009. A Manual of California Vegetation Second Edition, California Native Plant Society and California Department of Fish and Game, Sacramento, CA, 2009.

[34] Stanford, B., R.M. Grossinger, J. Beagle, R.A. Askevold, R.A. Leidy, E.E. Beller, M. Salomon, C. Striplen, and A.A. Whipple, 2013, Alameda Creek Watershed Historical Ecology Study. San Francisco Estuary Institute Publication #679, San Francisco Estuary Institute, Richmond, Ca.



SOURCE: ESA

SFPUC Alameda Creek Recapture Project . 209484

**Figure 5.14-2**

Pools Observed in Terrestrial Resources Survey Area during October 2015 Amphibian Survey

Under with-CDRP conditions, instream releases from Calaveras Reservoir percolating into active quarry pits are expected to cause the quarry operators to increase their dry-season NPDES discharges (see Appendix HYD1 for detailed discussion). This could result in an increase in development of woody riparian habitat within the survey area. Since the thickets on the slopes of Pit F2 are restricted to the lower boundary of the stream channel deposits, their location would not be substantially altered under with-CDRP conditions, although there could be a slight increase in extent or density due to increased seepage.

### *Mixed scrub*

The term mixed scrub was created to describe extensive areas supporting a fine-textured mosaic of non-native grassland, coyote brush scrub, willow thickets and mulefat scrub (described above) in areas too small to distinguish at the mapping scale for this document. Mixed scrub, including its subsidiary habitat types, is not recognized as a natural community by CDFW[35] based on rarity, and it is mapped in quarry areas that are not considered riparian; therefore, it is not treated here as a sensitive natural community. The plant composition appears to form in response to variable hydrologic conditions as well as potentially other periodic disturbance. Mixed scrub occurs in patches along the edges of quarry Pit F2.

These areas provide habitat for wildlife species common in the coyote brush, mulefat, and willow thickets.

Similar to willow thickets, mixed scrub occurs at the lower edge of the stream channel deposits in Pit F2, where it is supported by seepage. The annual pattern of rise and fall of subsurface water elevations is expected to be the same under existing and with-CDRP conditions although the aquifer may fill up more quickly and reach its maximum level more often under with-CDRP conditions. The quantity of subsurface water moving through the Sunol Valley would increase with increased instream flows, so a small increase in the extent of mixed scrub within Pit F2 is anticipated.

### *Riparian woodland*

Riparian woodland is a kind of riparian habitat consisting of a mix of trees found in moderate to mesic upland conditions associated with streambanks of ephemeral streams or the floodplains of larger streams in otherwise dry, grass-dominated landscapes. It typically is an open woodland with low to moderately tall trees in the canopy including coast live oak (*Quercus agrifolia*) with valley oak (*Quercus lobata*) and California buckeye (*Aesculus californica*), and an open understory consisting of blue wildrye (*Elymus glaucus* ssp. *glaucus*), coastal sage, coyote brush, California rose *(Rosa californica*), California blackberry (*Rubus ursinus*), common elderberry, California beeplant (*Scrophularia californica*), and poison oak. Native species frequently dominate the understory. In sites with more permanent access to surface and subsurface water, riparian woodland habitat grades into willow forest and thickets. In the survey area it grades into non-native grassland and disturbed habitats in upland conditions. Riparian woodland is not recognized as a sensitive natural

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[35] Sawyer, John O., Todd Keeler-Wolf, and Julie Evens, 2009. A Manual of California Vegetation Second Edition, California Native Plant Society and California Department of Fish and Game, Sacramento, CA, 2009.

community by the CDFW, but some alliances and associations (a sub-category of vegetation alliance) that comprise portions of this mapping unit are considered sensitive natural communities based on their rarity. California buckeye groves and Central California coast live oak riparian forest association both have CNDDB ranks of G3 and S3. [36, 37] Buckeye-dominated areas of riparian woodland are found along the floodplain of Alameda Creek outside the survey area and well downstream of the project area, while Central California coast live oak woodland (also containing some buckeye) is found along San Antonio Creek upstream and southeast of the project area. Because this habitat type is found only in association with streams and is found only on streambanks, all examples of the habitat type are considered riparian and therefore a sensitive natural community under CEQA.

In the survey area, riparian woodland habitat was mapped only along San Antonio Creek, where it covers the steep slopes above the creek channel, especially on the north-facing slopes. There, it is strongly dominated by California buckeye and coast live oaks, with a few California sycamores (*Platanus racemosa*), valley oaks, and associated shrubs such as common elderberry. The understory is typical of non-native grassland.

Typically, riparian habitat supports a large variety of wildlife species—including passerines such as Bewick's wren (*Thryomanes bewickii*) and black phoebe (*Sayornis nigricans*), as well as many species of bats. Within the survey area, the structure and extent of riparian habitat is so limited along San Antonio Creek that this habitat is not expected to support species other than those found in non-native grassland.

### Mixed riparian forest

Mixed riparian forest is comprised of taller, longer-lived riparian vegetation dominated by a variety of riparian trees. Within much of the survey area along Alameda Creek this habitat type most closely corresponds to black willow (*Salix gooddingii*) thickets alliance as described by Sawyer et al.[38] The CDFW considers black willow alliance a sensitive natural community (CNDDB Rank G4, S3). Farther downstream near the Sunol Water Temple and the confluence with Arroyo de la Laguna, mixed riparian forest also contains limited areas with a predominance of California sycamore and some valley oaks. Other trees present include Fremont cottonweed, red willow, arroyo willow, and white alder. The California sycamore alliance is considered a sensitive natural community (CNDDB Rank G3, S3). Examples of both black willow thickets and sycamore woodland were too small to map separately. Since this habitat type is riparian, it is considered sensitive based on the CEQA criterion defining all riparian habitats as sensitive natural communities.

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[36] CDFG, 2010. Natural Communities List. Pdf prepared by the California Natural Diversity Database, Sacramento, CA. 72 pp.

[37] CDFW, California Natural Diversity Database. Rarefind 5 printout and GIS database for plants, Niles, La Costa Valley, Calaveras Reservoir, Milpitas, Newark, Hayward, Mountain View, Livermore, and Dublin 7.5 minute topographic quadrangles. Accessed April 27, 2015 and March 9, 2016.

[38] Sawyer, John O., Todd Keeler-Wolf, and Julie Evens, 2009. A Manual of California Vegetation Second Edition, California Native Plant Society and California Department of Fish and Game, Sacramento, CA, 2009.

Black willow thickets have open to continuous tree canopy dominated by black willow. They are found in terraces along large rivers and canyons and along rocky floodplains of small, intermittent streams, seeps, and springs. Within the survey area, mixed riparian forest occurs along Alameda Creek interspersed within the willow thickets and mulefat scrub habitats. In addition to black willow, tree species within the mixed riparian forest include arroyo willow and sandbar willow, with occasional Fremont cottonwood, red willow (*Salix laevigata*), white alder (*Alnus rhombifolia*) and California sycamore, occasionally with a mulefat understory. Small areas of mixed riparian forest are found in Alameda Creek in Subreach A, downstream from the quarry discharge outfall and adjacent to Pit F2. Larger areas of mixed riparian forest are found in the deep, fairly permanently ponded water in Subreach C1 along the steep bluffs near the former Sunol Valley Golf Club and farther downstream in Subreach C2.

Wildlife species that may be found in mixed riparian forest include those described above for mulefat scrub and riparian woodland. Larger trees within the mixed riparian forest also provide nesting habitat for larger raptors and colonial nesting birds. A great blue heron (*Ardea herodias*) rookery was observed in large California sycamore trees on the Alameda Creek floodplain within the survey area.

Under with-CDRP conditions, particularly the anticipated increased summertime quarry NPDES releases, mixed riparian forest could increase slightly in extent in the survey area. However, development of riparian forest occurs on the time scale of years to decades, and even if the operation of the ACRP occurs one or two years after implementation of the CDRP, substantial changes in the extent, structure, or species composition in mixed riparian forest would be unlikely to occur by the time of project operation.

### *Seasonal wetlands*

Seasonal wetland is characterized by at least seasonally saturated or inundated soils and usually dense grass and grass-like plants. In well-established seasonal wetlands the soils are deep and highly organic. Dominant species may include spikerush (*Eleocharis* spp.), sedges (*Carex* spp.), nutsedges (*Cyperus* spp.) and rushes (*Juncus* spp.), as well as some perennial dicots, such as verbena (*Verbena lasiostachys*).

Seasonal wetland was mapped just south of, and outside of, the southeastern corner of Pit F2, (see Figure 5.14-1a). Google Earth imagery of this area during the period 1993 to 2011 shows that it has been repeatedly disturbed and graded.[39] Since the latter area has not been previously identified as a wetland, it may have developed relatively recently, perhaps as a result of changes in grading or subsurface water levels. The predominant species noted in this seasonal wetland was nutsedge (*Cyperus eragrostis*). Nutsedge seasonal wetland is not considered sensitive natural community. Although within the survey area, the nutsedge seasonal wetland is outside of the construction footprint.

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[39] https:www///earth.google.com. Google Earth imagery for Sunol Valley, accessed July 5, 2016.

Wildlife use of seasonal wetland would likely be similar to that of the surrounding grassland areas and include passerines, small mammals, and reptiles. When saturated soils or standing water is present, this wetland may be used by adult Sierran treefrog (*Pseudacris sierra*).

### *Creek channel and instream wetlands*

Creek channel includes the active channels, including higher flow channels, of ephemeral or seasonal streams. In-channel pools are also included in this mapping unit and are described under 'Stream flow and pool conditions' below. Creek channel was mapped within the survey area along the active channels of both San Antonio and Alameda Creeks. These areas are either largely unvegetated, pooled, support some emergent wetland vegetation, seasonal wetland vegetation, or support sparse weedy annual plants similar to those found in ruderal and mulefat scrub habitat types. However, extensive vegetation development is limited by disturbance during high flow events. Creek channel is not recognized as a natural community[40] and therefore is not considered a sensitive natural community by CNDDB based on rarity; however, active creek channels are included within the CEQA definition of riparian habitat and therefore are considered sensitive natural communities.

Some small areas within the creek channel that are dominated by aquatic or wetland vegetation may be within state or federal jurisdiction. Two general types of instream wetlands occur within the creek channel: those that support perennial wetland vegetation and those that support seasonal wetland vegetation. **Instream perennial wetlands** are found at the shallow margins of more or less permanent pools in the deeper portions of the active channel, and in some cases these support taller emergent wetland species such as tule (*Bolboschoenus* spp.), cattails (*Typha* spp.) and spikerush. Vegetation alliances included in this sub-habitat type include cattail marshes, pale spikerush marshes, and bulrush marsh. **Instream seasonal wetlands** are found on the periphery of the instream pools where the seasonal rise and fall of subsurface water provides suitable conditions for the development of this vegetation. They are also found as isolated pools in low areas away from the active channel. These wetlands are fed by seepage when groundwater elevations are high. Typical species in these instream seasonal wetlands include nutsedge, rushes, and rabbitfoot grass (*Polypogon monspeliensis*).

Instream wetlands are found within the creek floodplain and are therefore considered riparian habitats. Under CEQA definition, instream wetlands would be considered sensitive vegetation communities. They may also be considered federally protected wetlands as defined by Section 404 of the Clean Water Act, which is evaluated under CEQA. Within the survey area, instream wetlands were found in all of the subreaches between San Antonio Creek and Arroyo de la Laguna, although often in narrow or limited patches too small to map at the scale of the habitat map shown in Figure 5.14-1; they are included in the creek channel mapping unit.

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[40] Sawyer, John O., Todd Keeler-Wolf, and Julie Evens, 2009. A Manual of California Vegetation Second Edition, California Native Plant Society and California Department of Fish and Game, Sacramento, CA, 2009.

Wetland tributary (seasonal wetland) was also delineated within San Antonio Creek near the confluence of Alameda Creek as part of the SABPL delineation.[41]

Within the survey area, creek channel was mapped in all of the subreaches and in San Antonio Creek. It was most extensive in Subreach A above the quarry NPDES discharge outfall and in the lower portion of Subreach C1, both areas where relatively natural hydrologic conditions are prevalent.

Under with-CDRP conditions, stream flow will be decreased in the winter and increased in the summer compared to the existing condition in Alameda Creek. The extent of the creek channel was not predicted to change substantially as a result. Summertime releases are not expected to reach the survey area as surface flows. With-CDRP conditions could result in increased quarry NPDES discharges within the survey area, which manifest as surface flow. Over time, increased quarry NPDES discharges could result in woody riparian vegetation replacing largely unvegetated creek channel or mulefat scrub to some extent, and could also result in a shift in the location, type, or extent of instream wetland within the creek channel mapping unit. The extent of any such changes would also depend on factors outside the changes in instream flows, such as quarry NPDES discharges, management of excess accumulation of water in quarry ponds, and annual weather patterns.

### *Stream flow and pool conditions*

#### San Antonio Creek

Within the survey area, San Antonio Creek does not receive direct NPDES discharges from the adjacent quarry operations and typically lacks continuous flow during most of the year. Currently, flow in this reach of San Antonio Creek is dependent on seasonal precipitation and local runoff; releases from Turner Dam, an impoundment on San Antonio Creek several miles to the east, rarely causes flow in this reach of the creek. San Antonio Creek was dry during the March and May 2015 surveys. The channel was an estimated 6 to 30 feet in width at ordinary high water and the substrate was mostly silt and sand.

See Appendix HYD2, Section 6 and Figure 17 for a description, cross-section, and stationing for the Alameda Creek subreaches described below.

#### Subreach A, Alameda Creek from the Confluence with San Antonio Creek to I-680

Subreach A is about 1,520 feet in length and extends from San Antonio Creek to the I-680 overcrossing. During the May 2015 survey, both San Antonio Creek and Alameda Creek were dry at their confluence. Water was present approximately 50 feet downstream from the confluence and a quarry access road that crosses Alameda Creek immediately downstream from the confluence. In this area, isolated seepage pools were present within Alameda Creek. These pools were generally small, up to 16 feet in length and less than 3 feet deep, with abundant

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[41] USACE, Letter to YinLan Zhang, San Francisco Public Utilities Commission from Jane Hicks, U.S. Army Corps of Engineers verifying the jurisdictional delineation maps submitted on June 14, 2010 entitled "USACE File # 08-00207S, San Francisco Public Utilities Commission, San Antonio Backup Pipeline." July 8, 2011.

duckweed in the water, and emergent cattail margins. These pools were occupied by adult and juvenile bullfrogs (*Lithobates catesbeianus*) during the May 2015 and October 2015 surveys. Additional flowing water was encountered downstream from these isolated pools. Alameda Creek in this reach has abundant emergent vegetation, high riparian cover, and slow-moving water dominated by pool habitat with interspersed riffle habitat. The habitat in this reach is likely quite dynamic with minor changes in pool locations dependent on woody debris dams that form and move during high flow events and variation caused by sediment transport during high flow events. Although the pool location may change within this subreach, for the purpose of this analysis we assume that several pools exist within this subreach. Substrate in this reach was dominated by silt and fine sediment with some gravels in the isolated riffles.

#### Subreach B, Alameda Creek from I-680 Overcrossing to Downstream Approximately 1,700 Feet

In this reach, Alameda Creek is dominated by a series of long glides, with high algal cover, and dense riparian vegetation on the creek margins. Water depths were up to 3 feet deep and water was generally very slow moving. Largemouth bass (*Micropterus salmoides*) and bullfrog tadpoles were observed in this reach in 2015.

#### Subreach C (which includes Subreaches C1 and C2), Alameda Creek from Approximately 1,700 Feet Downstream from I-680 to Arroyo de la Laguna Confluence

Subreach C1 begins approximately 1,700 feet downstream of I-680 and continues for about 2,000 feet. There is an increase in cobble substrate and habitat diversity with a few riffle/pool complexes present. Largemouth bass and bullfrog tadpoles were observed in this reach. Both riparian vegetation cover and flows decrease as Alameda Creek approaches Arroyo de la Laguna. During May 2015 habitat surveys, there was no flowing water in Subreach C2. However, several isolated pools with standing water and emergent vegetation were present within this predominantly dry reach, which extends for about 2,980 feet to the confluence with Arroyo de la Laguna.

Under with-CDRP conditions, additional dry-season quarry NPDES discharges could cause unvegetated creek channel within Subreaches A, B, and C1 to be replaced to some extent by mulefat scrub or possibly willow thickets. Increased flow in the summer could extend the portion of Alameda Creek where tree-supporting woody riparian vegetation (i.e., willow thickets and mixed riparian forest) may grow.

### *Quarry Ponds*

Quarry ponds are the areas of open water within the pits created by quarry operations. Within the survey area, the largest of these ponds is Pit F2; much smaller in size is Pit F3-East and smallest is Pit F3-West. Other quarry ponds are located in Sunol Valley to the north, south, and west of the survey area. The ponds are fed by subsurface water seepage, but also are managed by the quarry operators pumping water into and out of the ponds. The ponds within the survey area did not support any emergent aquatic vegetation, which generally depends on fairly stable water levels. However, Pit F2 and F3-West supported discontinuous rings of willow and mixed scrub vegetation around their perimeter at the time of the surveys in 2015, as well as areas of non-native grassland on the inner sides of the pits. These rings of scrub vegetation were situated at the elevation of subsurface water seepage, at the zone of contact between the more permeable stream channel deposits above and the slowly-permeable Livermore gravel deposits below, reportedly in the range of 220 to 240 feet elevation in most of the survey area (see Figure 2, Appendix HYD2).

Shallow edges of the quarry ponds may support Sierran treefrog and possibly western toad breeding habitat. The ponds also provide extensive waterfowl loafing and foraging habitat.

Under with-CDRP conditions, the increased flows in Alameda Creek could directly result in increased seepage into Pit F2, F3-East and F3-West. Water management in SMP-30 upstream from the project area could also indirectly result in increased seepage down-valley if water elevations are maintained high enough in Pit F4 to cause seepage into the permeable stream deposits. Although this could result in higher water elevations of the ponds in the project area, water levels in the pits are controlled by the quarry operators. Unless the quarry operators' operational objectives changed, water elevations in the quarry ponds would be expected to be maintained in much the same manner as under existing conditions. If the quarry operators dealt with increased instream flows by storing more water in pits, the elevations in the pits could rise. Otherwise, the operators would discharge the water or move it to other pits.

### *Ruderal*

Ruderal is a term created to describe sites that have experienced disturbance resulting in removal of the natural vegetation, but at least some vegetation has returned. Typically, ruderal vegetation is sparse and consists of a low diversity of weedy species, typically broadleaf rather than grassy. Typical species found in ruderal habitats in the survey area include shortpod mustard, stinkwort, poison hemlock, milk thistle (*Silybum marianum*), bristly ox-tongue (*Helminthotheca echioides = Picris echioides*) and fennel (*Foeniculum vulgare*). Areas dominated by pampas grass (*Cortaderia selloana*) have also been included in this habitat type. Shrubs are sometimes present, such as coyote brush, but these tend to be sparse. Ruderal itself is not recognized as a natural community, although several non-native-dominated vegetation alliances are represented, for example, upland mustards, yellow star-thistle fields, and poison hemlock patches, among others [42]. Ruderal therefore is not considered a sensitive natural community by CDFW.

Ruderal is the most extensive upland habitat type mapped within the survey area, which has been extensively and repeatedly disturbed over the decades from a variety of extractive and infrastructure development activities. The uplands south of San Antonio Creek support ruderal vegetation, as well as the areas between the quarry pits and Calaveras Road, and former nursery areas abandoned for several years also have developed ruderal vegetation. The species composition varies from site to site, depending on site conditions and the history of past disturbance.

Ruderal areas provide marginal wildlife habitat due to high levels of human disturbance and high cover of non-native vegetation. These areas contain a limited number of small mammal burrows and only a few California ground squirrel burrows located within friable soils. These

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[42] Sawyer, John O., Todd Keeler-Wolf, and Julie Evens, 2009. A Manual of California Vegetation Second Edition, California Native Plant Society and California Department of Fish and Game, Sacramento, CA, 2009.

areas may serve as a movement corridor for common wildlife species such as black-tailed jackrabbit and mule deer (*Odocoileus hemionus*) and nesting habitat for common birds such as American crow (*Corvus brachyrhynchos*), house finch (*Carpodacus mexicanus*), mourning dove (*Zenaida macroura*), and killdeer (*Charadrius vociferus*). Large expanses of tall mustard may also provide nesting habitat for passerines.

### *Developed/disturbed/nursery*

The developed/disturbed/nursery habitat type describes sites that have experienced disturbance so recently that little or no vegetation has become established, or where the site is maintained in a vegetation-free condition, such as for roads or for nursery management. These sites are characterized by open, bare soil, although other man-made features may also be present, such as sheds, buildings, roads and parking areas. This habitat type is not recognized as a natural community[43] and therefore is not considered a sensitive resource by CDFW.

Disturbed habitat areas within the survey area include: some of the recently-completed work areas for the San Antonio Backup Pipeline, in and around Pit F3-East; the maintained nursery areas at the northern end of the survey area between Calaveras Road and I-680; access roads; and areas maintained free of vegetation as part of quarry operations on the west side of Pit F-2.

Soils in developed/disturbed/nursery habitat areas are typically compact, lined with gravel or paved, and provide limited habitat for burrowing wildlife species. These areas would only be used occasionally by common wildlife species tolerant of human disturbance. These areas may serve as a refuge for common birds, but would not provide ideal wildlife habitat because of constant human disturbance.

### *Landscaped*

The landscaped habitat type describes areas where the predominant vegetation, usually trees and shrubs, have been planted and persist, with or without maintenance such as irrigation. It is not recognized as a natural community by CDFW[44] and therefore is not considered a sensitive natural community. Landscaped habitat was mapped along the western edges of Pit F2, where cottonwood (*Populus* sp.) and oleander (*Nereum oleander*) have been planted in rows along the perimeter road; along I-680 where walnut (*Juglans* sp.) have been planted; at the northern portion of the survey area between Pit F2 and I-680 where a row of tall blue gum eucalyptus (*Eucalyptus globulus*) trees extends in a more or less north-south row; near the nursery at the northern tip of the survey area where scattered redwoods (*Sequoia sempervirens*) have been planted; along Calaveras Road where cork oak (*Quercus suber*) and other oaks (*Quercus* sp.) have been planted; and in the vicinity of the PG&E Sunol Substation south of San Antonio Creek, where oleander and blue elderberry have been planted. The trees and shrubs may provide potential roosting and nesting

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[43] Sawyer, John O., Todd Keeler-Wolf, and Julie Evens, 2009. A Manual of California Vegetation Second Edition, California Native Plant Society and California Department of Fish and Game, Sacramento, CA, 2009.

[44] Sawyer, John O., Todd Keeler-Wolf, and Julie Evens, 2009. A Manual of California Vegetation Second Edition, California Native Plant Society and California Department of Fish and Game, Sacramento, CA, 2009.

habitat for the common bird species listed above. The larger trees may also provide habitat for birds of prey such as the red-tailed hawk (*Buteo jamaicensis*).

## 5.14.2.5 Site Conditions, Alameda Creek Riparian Habitats

Four riparian habitats in the Alameda Creek floodplain—mulefat scrub, willow thickets, mixed riparian forest, and creek channel, described above—have been altered by past and ongoing watershed activities that affect hydrologic conditions and will continue to be affected by future watershed activities. This section reviews the historic natural riparian vegetation in the survey area (i.e., between San Antonio Creek and Arroyo de la Laguna), then describes physical and hydrologic alterations influencing these riparian habitats in Alameda Creek. Finally, it describes changes to these existing riparian habitats that could be expected under with-CDRP conditions. Each riparian habitat responds differently, and on a different timeline, to the physical and hydrologic changes brought about by past, present, and future conditions.

### *Alameda Creek Riparian Habitats*

#### Historical Conditions

Alameda Creek has been affected by many influences over the past century, with resulting changes in riparian vegetation and habitats. Construction of the Calaveras Dam in 1925 diverted about two-thirds of the flow in Alameda Creek, greatly reducing peak winter flows. The James Turner Dam, built in 1964, impounds most flow in San Antonio Creek. Realignment of the Alameda Creek channel westward in the 1970s resulted in a new, unvegetated channel with grade controls and restricted capacity for the active channel to meander in the section upstream from the confluence with San Antonio Creek (and therefore slightly upstream from the survey area for this project). This, together with reduced flows, has confined the Alameda Creek channel and limited its tendency to meander and form braided channels in the reach within the survey area, although a widely meandering, braided, largely unvegetated depositional channel up to 0.25 mile wide was the historic condition documented in this area in the late 1800s.[45] In 2001, the California Department of Water Resources, Division of Safety of Dams (DSOD) imposed restrictions on the maximum operating level of Calaveras Reservoir, which meant that less storage was available in Calaveras Reservoir and more water was allowed to flow down Alameda Creek.

Other alterations include: prior to 1950 an infiltration area in Sunol Valley was established about a quarter mile north (downstream) from the project area consisting of a low impoundment across Alameda Creek. The Sunol Valley Golf Club was built in the 1970s (and closed in 2016), which utilized subsurface water collected in the infiltration galleries for irrigation, and potentially creating seepage back into adjacent Alameda Creek.

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[45] Stanford, B., R.M. Grossinger, J. Beagle, R.A. Askevold, R.A. Leidy, E.E. Beller, M. Salomon, C. Striplen, and A.A. Whipple, 2013, Alameda Creek Watershed Historical Ecology Study. San Francisco Estuary Institute Publication #679, San Francisco Estuary Institute, Richmond, Ca.

The result of all these hydrologic changes is that the riparian habitat in the survey area has changed considerably from unimpaired conditions. The stream channel in the survey area has been confined, and the reduced flows have narrowed the channel. Quarry operations removed vegetation in areas of mining activity, while concurrently intercepting subsurface flow, utilizing water for processing mined material, and discharging water to Alameda Creek when necessary for their operations.

The Hanson Aggregates NPDES discharge occurs at a point just west of Pit F2 in the middle of Subreach A. The existing riparian vegetation in Subreach A is largely the result of the quarry NPDES discharges, which began in the late 1980s, as deduced from an examination of historical photographs.[46,47] Riparian vegetation farther downstream in Subreaches B and C1 is also substantially affected by the quarry NPDES discharges, and may also be affected by other impoundments and withdrawals such as from the Sunol infiltration galleries which were reportedly in use as recently as 2013.[48]

Stanford et al.[49] conducted an in-depth study of historical vegetation in the Alameda Watershed. They concluded that in the early 1800s, the lowest half-mile of San Antonio Creek channel and the nearly 2 miles of Alameda Creek channel upstream from Arroyo de la Laguna consisted of sparsely vegetated braided channel consisting of largely unvegetated gravel and riverwash and occasional sycamores, and shrubs such as mulefat. Pools occasionally formed within the complex, braided channel. The lower portion of the surrounding Sunol Valley floor was vegetated with oak savanna. The sparsely vegetated braided channel vegetation is assumed to be the original vegetation in the Sunol Valley as it would be consistent with the extremely high winter flows characteristic of the unconfined Alameda Creek in a highly pervious alluvial valley, alternating with no flows and a substantial drop in the water table during the dry summer months. The vicinity of the confluence of Alameda Creek and Arroyo de la Laguna has always supported large, mature valley oaks, California sycamores, black willows, coast live oaks, box elders (*Acer negundo*), and cottonwoods. Sunol Valley was also reported as containing wet meadows in places.

Historical aerial photographs from the past 60 years also illustrate changes in riparian vegetation.[50] A 1958 photograph showed a braided and largely unvegetated Alameda Creek channel in the Quarry Reach (Subreaches A, B, and most of C). Mulefat and California sycamores were extremely sparse in this reach. North of the present-day I-680 (Subreach B) an impoundment forming the historic infiltration gallery was visible; downstream from the impoundment was a floodplain savanna which contained (based on today's presence of mature trees) widely spaced sycamores,

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[46] www/earth.google.com. Google Earth imagery for Sunol Valley, accessed July 5, 2016.

[47] Historic Aerials, Inc., historicaerials.com, photos of Sunol Valley from various dates, 1948- 2012, purchased April 2015.

[48] Stanford, B., R.M. Grossinger, J. Beagle, R.A. Askevold, R.A. Leidy, E.E. Beller, M. Salomon, C. Striplen, and A.A. Whipple, 2013, Alameda Creek Watershed Historical Ecology Study. San Francisco Estuary Institute Publication #679, San Francisco Estuary Institute, Richmond, Ca.

[49] Stanford, B., R.M. Grossinger, J. Beagle, R.A. Askevold, R.A. Leidy, E.E. Beller, M. Salomon, C. Striplen, and A.A. Whipple, 2013, Alameda Creek Watershed Historical Ecology Study. San Francisco Estuary Institute Publication #679, San Francisco Estuary Institute, Richmond, Ca.

[50] Historic Aerials, Inc., aerial photographs of Sunol Valley, various dates from 1958 through 2014. Historic Aerials, Inc.

buckeyes, elderberries, and possibly valley oaks and black willows. A constructed levee separated the northeastern edge of the Alameda Creek floodplain from farm land in the vicinity of the Sunol Water Temple. Quarry operations may have started by 1958 on the western side of the valley.

By 1987, the Alameda Creek channel through the Quarry Reach was relocated to the west side of Sunol Valley to facilitate quarry operations. Grade controls (levees) were installed to ensure the stability of the channel near two pipelines that cross the Sunol Valley, the State Department of Water Resources South Bay Aqueduct (along the southern edge of Pit F2, Subreach A) and a PG&E natural gas pipeline (along the southern edge of Pit F4, upstream from Subreach A). As of 1987 the Alameda Creek channel in Subreaches A, B and C1 extending nearly to Arroyo de la Laguna was still largely an unvegetated channel with well-developed floodplain woodland. Quarry operations were well-developed south of San Antonio Creek, replacing the widely spaced savanna trees seen in the earlier photographs. Around this time quarry operations began in the project area. It is likely that Hanson Aggregates quarry NPDES discharges to Alameda Creek also began at this time.

In 2012, mining was greatly expanded north of I-680. Agriculture northeast of Alameda Creek near the Sunol Water Temple was replaced by expanded quarry operations in SMP-32. In a change since the 1987 aerial photograph was taken, riparian woody vegetation now lines most of the Alameda Creek channel from most of Subreach A to C2 instead of a broad very sparsely vegetated floodplain from Subreach A through C1. The development of dense woody riparian vegetation, and particularly tree-supporting riparian alliances such as willow thickets and mixed riparian forest, is concluded to be the result of quarry operations, since substantial quarry NPDES discharges into Alameda Creek have been reported to the RWQCB, and these NPDES discharges provide water to the root zone of many riparian species downstream from the discharge point.

#### Existing Conditions and Relationship to Quarry NPDES Discharges

Quarry NPDES discharges in the summer dry months are the most important factor in development of woody riparian vegetation, since this is when riparian plants are most actively growing and have the highest requirements for water, and the summer months are when natural flows have ceased and subsurface water elevations have typically subsided. Riparian vegetation receive the greatest influence from quarry NPDES discharges at locations nearest the discharge point; this influence diminishes with distance from the discharge point because of percolation into alluvium. Riparian vegetation nearest the discharge point therefore have received the most consistent water supply, while riparian vegetation at greater distance have been most affected by variation in quarry NPDES discharges. Over the long-term, the average summer quarry NPDES discharges is an indicator of the potential quantity and type of woody riparian vegetation that can be supported by dry-season discharges; for example, extremely low dry-season discharges would be limiting on the extent and type of woody riparian vegetation. See Appendix HYD1 for a detailed description of quarry NPDES discharges in recent years.

The greater the variation in quarry NPDES discharges, the more limited the extent and variety of riparian vegetation. An examination of Google Earth aerial photos[51] and a comparison with Hanson Aggregates and Oliver de Silva, Inc. (ODS) RWQCB NPDES discharge records shows that Hanson discharged only 103 acre-feet of water to Alameda Creek in Water Year 2012; this is only 3 percent of their long-term average NPDES discharges. ODS discharged no water during the same period. During the typically driest summer months, July to September, NPDES discharge volumes were 21 acre-feet compared with the long-term average of 834 acre-feet for this summer period. The lack of dry-season flows affected the woody riparian vegetation: in August 2012, woody riparian vegetation in Subreaches B and C can be seen as brown, indicating substantial mortality or dieback, whereas in all other years during the baseline summer woody riparian vegetation is green in these areas. Tall dead willow trunks were observed in this reach during field surveys in 2015, with much shorter new willow growth arising below.

As noted in the preceding paragraphs, vegetation in Subreach A did not turn brown in August 2012, most likely because even the small amount of dry season NPDES quarry discharges still provided effective water to the root zones of this nearby riparian vegetation. By contrast, the very limited discharges in 2012 created very limited surface flows and may have quickly percolated into the alluvium, leaving riparian vegetation at greater distance in Subreaches B and C1 to experience stress or mortality. This effect would have ended still farther downstream where shallow depth to groundwater is and always has been a consistent feature year round, such as at Monitoring Well 8 and Subreach C2.

Hanson and ODS NPDES discharge permits regulate the maximum quantity and the quality of water discharged and do not require minimum discharges. Their NPDES permits could be further restricted or terminated at any time. Similarly, if Hanson changes their water management actions to reduce NPDES discharges and eventually when Hanson's mining operations eventually cease at SMP-32 several decades from now, quarry NPDES discharges will be terminated and the woody riparian vegetation would be expected to be revert back to historic vegetative, natural conditions.

The fact that the woody riparian vegetation began to appear in the 1990s rather than in the early 2000s indicates factors other than the DSOD restrictions on Calaveras Reservoir imposed in 2001, are responsible for this woody vegetation growth. If upstream flows are not responsible, the probable cause is an increase in quarry NPDES discharges to Alameda Creek.

### Ongoing Restoration Planning for Sunol Valley

The SFPUC is developing a restoration plan for the Sunol Valley as a whole. The Sunol Valley Restoration Report is intended to provide a framework for coordinating restoration and conservation opportunities in Sunol Valley in the context of its historical ecology. This approach will consider restoration actions consistent with the ecosystem processes under which native species evolved in this reach of Alameda Creek, as well as existing management constraints. The Sunol Valley Restoration Report (SVRR) will describe existing physical and biological processes

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[51] Google Earth historical images for Sunol Valley, http/googleearth.com/, accessed July 7, 2016.

and identify opportunities for rehabilitating targeted physical processes and restoring habitat for native species.[52]

### *Relationship Between Monitored Subsurface Water Elevations and Woody Riparian Habitat*

As discussed in the preceding section, woody riparian habitat expresses a synthesis of factors, some of which can be readily measured and some not. It reflects the effects of peak flows, sediment transport, and channel-forming events, which can remove woody riparian vegetation and create conditions for establishment of new riparian vegetation. Many woody riparian species, including willows, cottonwoods and mulefat, release seed on an annual cycle closely tied to the receding limb of the natural hydrograph. The successful establishment of seedlings relies on the rate at which the subsurface water elevation declines; too rapid, and the seedlings die. Too early or late, and the seed may not be present or capable of germinating even if conditions are favorable. Depth to subsurface water for established plants is another limiting factor, and the timing, depth and duration of low summer subsurface water can be limiting. A fairly extensive restoration literature describes prescriptions for establishing seedlings and willow stakes, but comparative literature on water relationships is not widely available, and sometimes conflicting; for example, the widespread species sandbar willow is described as both shallow-rooted and deep-rooted.[53] Nevertheless, examining the relationship between existing woody riparian vegetation and subsurface water elevation patterns in the Sunol Valley may provide some insight into recent prevailing conditions and species requirements.

The range of subsurface water elevations and their relationship to the streambed elevation (thalweg) varies from location to location and between dry and wet years. In many years, subsurface water elevations approach or exceed the streambed in winter, resulting in surface flow or ponding, and then drop considerably in the summer so the stream channel is dry.

At monitoring wells MW4 and MW5 (see Figure 5.16-6, in Section 5.16, Hydrology and Water Quality, for a location map), upstream from the project area, the annual range of subsurface water elevation is typically 10 to 15 feet, extending from the streambed (or slightly higher, when the creek is flowing) to near the bottom of the highly transmissible alluvium layers, or stream channel deposits. This area supports sparse to moderately dense mulefat, a species that can tolerate high, flashy winter flows and considerable depth to subsurface water in summer.

As described in detail in Section 5.16 and Appendices HYD1 and HYD2, the natural pattern of subsurface water elevations is closely tied to the quantity and timing of both surface flow and subsurface flow as water from upper Alameda Creek moves through the Quarry Reach, with considerable percolation and subsurface flow through the highly porous stream channel deposits. Hanson Aggregates generally manages the water elevation in its pits well below the base of the porous stream channel deposits, pumping water out of the pits when necessary. When managed

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[52] Sivyer, Antonia, SFPUC. Email communication dated August 31, 2016 regarding Sunol Valley Restoration Report.

[53] U.S. Forest Service, Salix exigua species description, http://www.fs.fed.us/database/feis/plants/shrub/salexi /all.html, accessed October 15, 2015.

in this way, subsurface water only seeps into the quarry pits but cannot move out because the lower Livermore gravel stratum is only very slowly pervious.

However, when pit elevations are allowed to rise or are actively managed at elevations higher than the stream channel deposits, quarry operations can also influence adjacent subsurface water elevations and hence the type and pattern of woody riparian vegetation. As shown in Appendix HYD2, Figure 3, water levels in the adjacent Pit F4 were raised in 2015 and earlier, seepage out of the pit occurred, and elevated subsurface water elevation resulted at nearby monitoring wells MW4 and MW5. This is concluded to be the current and ongoing water management program by ODS. The figure shows alternating intervals of rising and falling water elevations in Pit F4 within the range of the stream channel gravels during the dry season when the only source could be quarry pumping into the pit, with levels dropping due to percolation out of the pit and into the stream gravels. Sustained high subsurface water elevations from this pattern of water management could result in a change in riparian vegetation, such as increased mulefat density or development of willow thickets. This section of Alameda Creek is upstream from the project area and was not studied for this report; however, sustained high water elevations in Pit F4 could influence conditions in Subreach A, a short distance downstream from the project area.

Monitoring at MW6 began in late 2011, and has a shorter period of record (see Hydrology Appendix HYD2 Figure 2). The lowest depth to subsurface water is about 9 feet below the streambed centerline, typically dropping to the annual minimum elevation at the end of the dry season. The vegetation in the Alameda Creek channel near MW6 consists of a dense thicket of sandbar willow and mulefat, with a few larger willow trees and is evidently supported by Hanson's NPDES quarry discharges which empty into Alameda Creek a short distance upstream from the monitoring well. The period of riparian vegetation dieback in 2012 corresponds to a period when the MW6 monitoring well showed somewhat lower subsurface water elevations than have been recorded subsequently, but unfortunately the monitoring record is not available to show the pattern in preceding years.

MW8, MW9, and MW10 consistently have shallow depth to subsurface water, and often have standing or flowing water where subsurface water elevation is higher than the streambed. The vegetation in this area consists of dense, tall willows and cottonwoods, with mature valley oaks and sycamores on the adjacent floodplain.

### *Comparison Between Existing Conditions and with-CDRP Conditions—Riparian Habitats*

As discussed in Appendix HYD1 and summarized in Table 5.14-1 above, "with-CDRP" hydrologic conditions after commencement of CDRP operations are expected to differ from existing conditions. Average annual stream flow volumes in Alameda Creek at Subreach A are expected to be about lower 12 percent lower under with-CDRP conditions compared to existing conditions because more storage in Calaveras Reservoir will occur. Peak winter flows may increase due to reduced maximum diversions at the Alameda Creek Diversion Dam (i.e., maximum diversion of 370 cubic feet per second [cfs] instead of the current 650 cfs), but this difference is expected to occur infrequently and briefly, resulting in relatively little change in the total flow volume in Alameda Creek.

The additional instream flows under with-CDRP conditions will affect low-flow conditions throughout the year, extending the duration of surface flow in the Alameda Creek channel upstream of the project area. The project area is in a "losing reach" of Alameda Creek in which surface flow decreases through percolation into the porous substrate (see Appendix HYD1 regarding estimated losses to subsurface water between San Antonio Creek and Arroyo de la Laguna). As shown in Appendix HYD1, Figure HYD5-7, stream flow in Alameda Creek just above San Antonio Creek will continue for longer, on average, under with-CDRP conditions compared with existing conditions, and this effect is expected to extend into the project area to some extent. More or less continuous flows would be expected during December through April in the survey area under with-CDRP conditions.

Subsurface water conditions are also expected to change under with-CDRP conditions. The instream flows, in particular dry-season releases, will cause more infiltration, resulting in greater losses of stream flow to subsurface waters. Because of the transmissivity of the stream channel gravels and the general slope of the lower boundary of these gravels, subsurface water elevations would still be expected to decline to a seasonal low similar to existing conditions, although it might do so more slowly.

Under existing conditions, it is estimated that during the 3-month period of July-August-September, the average total flow volume is 843 acre-feet, ranging from a low of 21 acre-feet to a high of 1,534 acre-feet. This dry season stream flow is entirely attributable to quarry NPDES discharges. In contrast, under with-CDRP conditions, the average total flow volume for the same 3-month period will be about twice as much, at 1,618 acre-feet, ranging from 61 to 1,6,18 acre-feet. This increase is again entirely attributable in a presumed increase in quarry NPDES discharges (see Appendix HYD1 for further discussion).

The composition, structure, and age of woody riparian vegetation are a reflection of prevailing conditions over a period of time. In addition to reflecting average prevailing conditions, vegetation is often determined by extreme, limiting events such as drought, floods, fire, extreme temperatures, or disease. Since the late 1980s, woody riparian vegetation along Alameda Creek has responded to the presence of quarry NPDES discharges in Subreaches A, B, and a portion of C1 by forming a zone of willow thickets and dense mulefat scrub where this vegetation was not previously supported. The predicted increase in quarry NPDES discharges under with-CDRP conditions could potentially increasing the extent or density of these thickets; however, this effect would take several years to decades to fully develop. Thus, even if the ACRP implementation were to occur one or two years after the CDRP instream flow schedules commence, it is concluded that the existing woody riparian vegetation conditions are representative of what this habitat will be like along this reach of the creek under the with-CDRP conditions at the time of implementation of ACRP operations.

## 5.14.2.6 Site Conditions, Sensitive Natural Communities

Sensitive natural communities and habitats include the following: natural communities identified by the CNDDB as having Global or State rank of 1, 2, or 3;[54] and all riparian habitats, which are defined as sensitive natural communities under CEQA Guidelines Appendix G, checklist question IV.b. **Figure 5.14-3** shows the distribution of sensitive natural communities in Sunol Valley on file with CNDDB. This figure shows the locations of sycamore alluvial woodland habitat along the lower portion of San Antonio Creek and the extensive stands of sycamore alluvial woodland in the central portion of the Sunol Valley, about 1 mile south and upstream from the survey area.

The CEQA Guidelines Appendix G, checklist question IV.b, includes all riparian communities within the definition of sensitive natural communities, so all of the identified natural communities associated with the Alameda Creek and San Antonio Creek floodplain within the survey area are considered sensitive. They are listed here, with an asterisk if they also are identified by CNDDB as sensitive:

- Willow thickets associated with Alameda Creek (includes arroyo willow thicket and sandbar willow thicket alliances)
- Mulefat scrub
- Creek channel (includes small areas of instream perennial wetlands and instream seasonal wetlands)
- Mixed riparian forest (includes small areas of black willow thickets*)
- Riparian woodland (includes small areas of California buckeye groves*, Central Coast live oak riparian forest*)

As noted throughout this section, the vegetation in this portion of the Sunol Valley has been greatly altered due to human activity, and the riparian communities are no exception. Historical analysis of Alameda Creek[55] indicates that in the past the floodplain in the reach of Alameda Creek including the survey area was very different. The broad, braided channel has been narrowed and realigned, the hydrologic regime has been dramatically altered by upstream diversions and by quarry operations, and the creek is crossed by utility corridors, roads, highways, and quarry facilities.

As described above in Riparian Habitats, above, with the implementation of instream flow schedules under with-CDRP conditions, the extent and composition of the woody riparian communities may further change if those conditions prevail for an extended period. However, such changes would take several years to decades to develop. The project is proposed to be implemented soon after CDRP begins operations; even if delayed for a year or two, the riparian setting under existing conditions and with-CDRP conditions are expected to be substantially similar.

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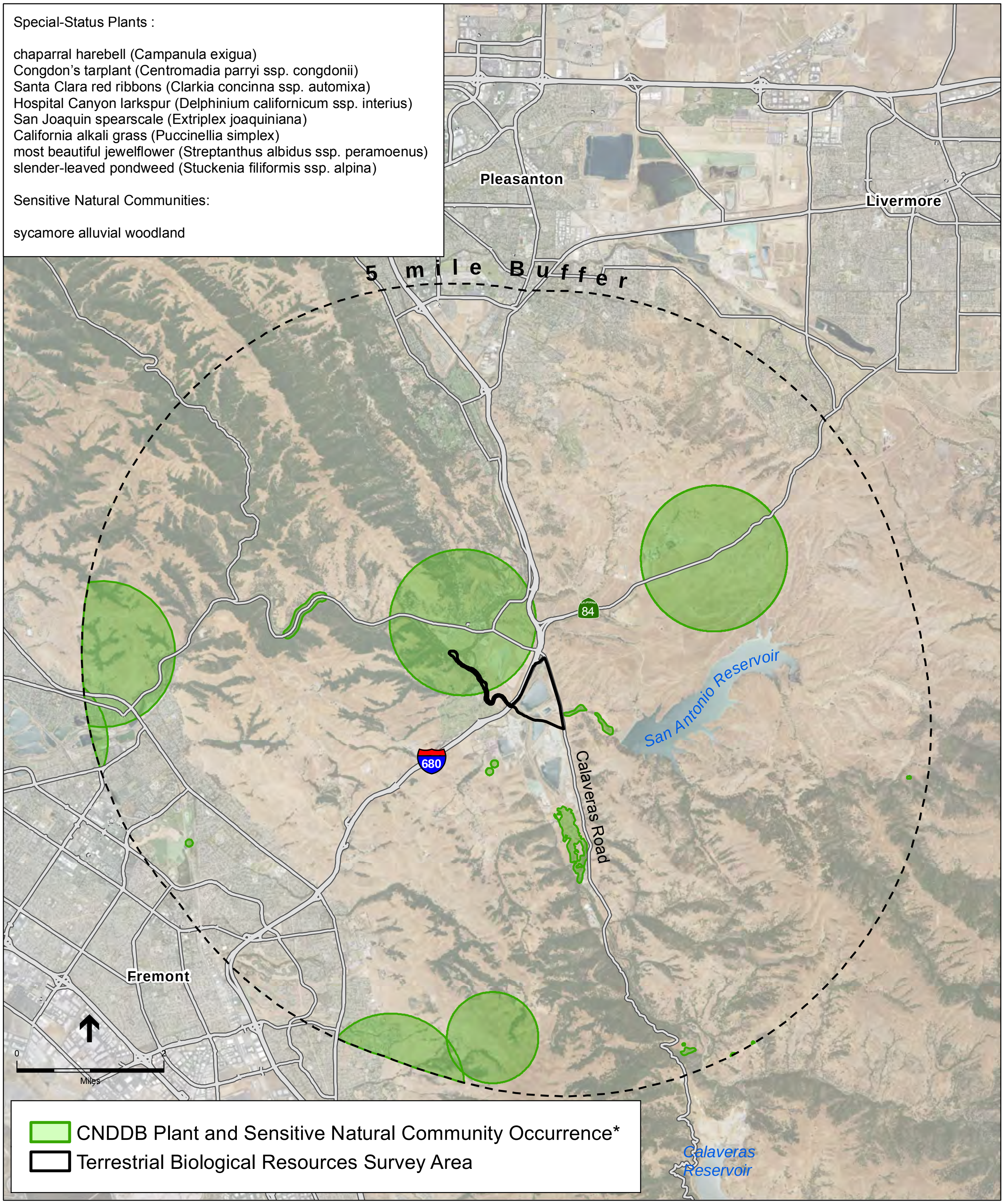
[54] Sawyer, John O., Todd Keeler-Wolf, and Julie Evens, 2009. A Manual of California Vegetation Second Edition, California Native Plant Society and California Department of Fish and Game, Sacramento, CA, 2009.

[55] Stanford, B., R.M. Grossinger, J. Beagle, R.A. Askevold, R.A. Leidy, E.E. Beller, M. Salomon, C. Striplen, A.A. Whipple, Alameda Creek Watershed Historical Ecology Study, San Francisco Estuary Institute, prepared for San Francisco Public Utilities Commission and Alameda County Flood Control and Water Conservation District, Richmond, CA. February 2013.



SFPUC Alameda Creek Recapture Project

**Figure 5.14-3**
Special-Status Plants and Sensitive Communities within 5 Miles of the Survey Area

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* The occurrences shown on this map represent the known locations of the species listed here as of the date of this version of CNDDB (03/2016). There may be additional occurrences or additional species within this area which have not yet been surveyed and/or mapped. Details on documented locations of special-status species is withheld according to CNDDB guidelines due to the sensitivity of the information.

SOURCE: CDFW, 2016

The subsurface water-dependent vegetation within the quarry pits, such as willow thickets and mixed scrub, is created by and largely depends upon ongoing quarry operations, which have exposed and intercepted the subsurface water seepage along the edges of the quarry pits. These areas are not considered sensitive natural communities because they are not associated with any riparian feature.

Seasonal wetlands outside of the Alameda Creek floodplain, although not considered a sensitive natural community, may be considered a jurisdictional wetland and regulated by the CDFW, RWQCB, and/or Corps (see next section).

### 5.14.2.7 Site Conditions, Wetlands and Other Waters

Federal and state definitions of wetlands and waters are detailed below in Section 5.14.3, Regulatory Framework. There are typically two types of federal and state jurisdictional waters: wetlands and other waters. Wetlands and other waters may fall under federal and state regulation by the Corps, RWQCB and/or CDFW.

A portion of the project survey area in and around Pit F3-West and Pit F3-East and San Antonio Creek was delineated as part of the SFPUC's San Antonio Backup Pipeline Project (SABPL);[56] however, a formal wetland delineation has not been conducted within the entire ACRP project survey area. The only feature identified as jurisdictional for the SABPL project, which is also within the ACRP survey area, is San Antonio Creek.

Three features within the survey area were identified in the Terrestrial Biological Resources Report prepared for the proposed project as potentially jurisdictional by the Corps, RWQCB, and CDFW.[57] These features include Alameda Creek, San Antonio Creek, and the seasonal wetland located west of Pit F2 and just south and outside of the southeastern corner of Pit F2. Open water areas of Alameda Creek and San Antonio Creek below the ordinary high water mark are generally considered "other waters." Both of these creeks also contain areas that may be considered jurisdictional wetlands by the Corps and RWQCB. Alameda Creek, within the survey area, contains instream wetlands, although these features have not been delineated, and a small segment of wetland tributary was delineated within San Antonio Creek near the Alameda Creek confluence.

Pit F3-West and Pit F3-East were not considered jurisdictional by the Corps,[58] RWQCB,[59] or CDFW[60] under permits issued for the SABPL project so it is assumed that Pit F2 would also be

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[56] ESA, Addendum to Appendix G of the San Francisco Public Utilities Commission San Antonio Backup Pipeline Project, Final Delineation of Waters of the United States, Alameda County, California (Corps File No. 09-00021S). Prepared for the San Francisco Public Utilities Commission. August 6, 2010.

[57] ESA, Final San Francisco Public Utilities Commission Alameda Creek Recapture Project Terrestrial Biological Resources Report, prepared for the San Francisco Public Utilities Commission, November 2016. (See Appendix BIO1).

[58] USACE, Letter to YinLan Zhang, San Francisco Public Utilities Commission from Jane Hicks, U.S. Army Corps of Engineers verifying the jurisdictional delineation maps submitted on June 14, 2010 entitled "USACE File # 08-00207S, San Francisco Public Utilities Commission, San Antonio Backup Pipeline." July 8, 2011.

[59] RWQCB, Conditional Water Quality Certification for the San Antonio Backup Pipeline Project, Alameda County, February 5, 2013.

[60] CDFW, Final Lake or Streambed Alteration Agreement Notification No. 1600-2012-0277-R3 San Antonio Backup Pipeline Project, December 19, 2012.

considered non-jurisdictional, since it is also part of SMP-24 (consisting of Pits F2, F3-West, and F3-East), which since 2006 has been used to store and manage water to support active mining on SMP-32.

As described in Appendices HYD1 and HYD2, the hydrology of Alameda Creek will change under with-CDRP conditions. The jurisdictional area of the creek may also change under with-CDRP conditions, but the extent of that change, if any, would occur independently and regardless of the proposed project. These hydrological changes, if any, would not result in the placement of dredge or fill material, which is regulated by the Corps and RWQCB, but may result in physical changes to the extent or condition of jurisdictional areas. Alameda Creek would continue to be considered potentially jurisdictional by the Corps, RWQCB, and CDFW under with-CDRP conditions.

### 5.14.2.8 Special-Status Wildlife Species

A number of species known to occur in the Alameda watershed are protected under state and federal endangered species laws, or have been designated by the CDFW as species of special concern. In addition, Section 15380(b) of the CEQA Guidelines provides a definition of rare, endangered, or threatened species that are not included in any listing.[61] Species recognized under these terms are collectively referred to as "special-status species." For this EIR, special-status species include:

- Plant and wildlife species listed as rare, threatened, or endangered under either FESA or CESA
- Plants listed as Rank 1 or 2 by the CNPS
- Species that are candidates for listing under either federal or state law
- Species designated by the CDFW as species of special concern or fully protected
- Species protected by the federal Migratory Bird Treaty Act (Title 16, United States Code [USC], Sections 703–711)
- Candidate species that may be considered rare or endangered pursuant to Section 15380(b) of the CEQA Guidelines

A Terrestrial Biological Resources Report has been prepared for the proposed project, which evaluated the potential for the special-status species to occur within the survey area, and is included as Appendix BIO1 to this EIR.[62] The results from that report are summarized in the following subsections.

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[61] For example, vascular plants listed by the CNPS as rare or endangered or as Rank 1, 2, 3, or 4 are considered subject to Section 15380(b).

[62] ESA, Final San Francisco Public Utilities Commission Alameda Creek Recapture Project Terrestrial Biological Resources Report, prepared for the San Francisco Public Utilities Commission, November 2016. (See Appendix BIO1).

### *Special-Status Wildlife Species*

Based on habitat present within the survey area and locally documented occurrences, several special-status wildlife species have potential to occur within the survey area. **Appendix BIO1** contains a full list of special-status wildlife species considered, which was compiled from a CNDDB search of the La Costa Valley and Niles USGS 7.5-minute quadrangles.[63] **Table 1** in Appendix BIO1 includes a description of the potential for each special-status species from the CNDDB and USFWS[64] search to occur within the survey area. See **Figure 5.14-4** for a map of special-status species occurrences within 5 miles of the survey area. A description of each special-status wildlife species that has a moderate potential or higher to occur in the survey area is provided below.[65] Note that fisheries are considered separately in Sections 5.14.5 through 5.14.7.

#### Federal and/or State Listed Species

#### *California Tiger Salamander*

**Status.** The central California Distinct Population Segment (DPS) of California tiger salamander (CTS; *Ambystoma californiense*) is federally listed as threatened and is a state threatened species.

**General Ecology and Distribution.** CTS are principally an upland species found in annual grasslands and in the grassy understory of valley-foothill hardwood habitats in Central and Northern California. They require underground refuges (usually ground squirrel or other small mammal burrows), where they spend the majority of their annual cycle. Between December and February, when seasonal ponds begin to fill, adult CTS engage in mass migrations to aquatic sites during a few rainy nights and are explosive breeders.[66,67]

During drought years when ponds do not form, adults may spend the entire year in upland environments. Juveniles may spend 4 to 5 years in their upland burrows before reaching sexual maturity and breeding for the first time.[68,69] Adults have been documented at distances of 1.2 miles or more from breeding ponds.[70] Typical upland sites include the burrows of California ground squirrels and valley pocket gophers.

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[63] CDFW, California Natural Diversity Database. Rarefind 5 printout and GIS database for the Niles and La Costa Valley 7.5 minute topographic quadrangles. Accessed March 30, 2016.

[64] USFWS, 2015. Resource List of Federal Endangered and Threatened Species that Occur in or may be Affected by the Alameda Creek Recapture Project. Retrieved April 27, 2015.

[65] Foothill yellow-legged frog has a low potential to occur within the survey area, however a discussion of its potential to occur is included in this section because of scoping comments on this species.

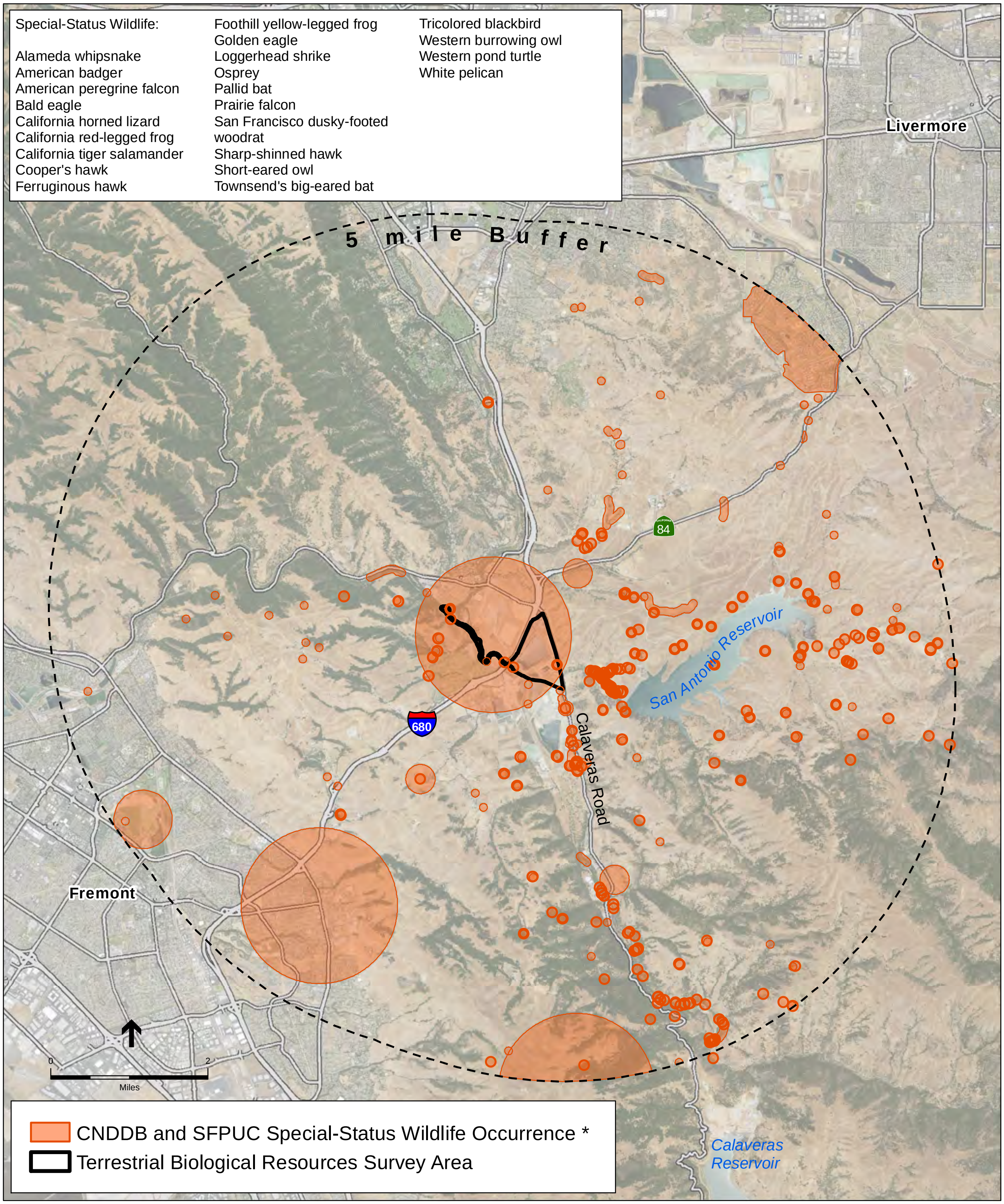
[66] A species in which the breeding season is very short; in the case of tiger salamander, this usually occurs at the time of the first heavy rains of the rainy season.

[67] Barry, S.J. and H.B. Shafer, 1994. *The status of the California tiger salamander (Ambystoma californiense) at Lagunita: a 50-year update*. *Copeia 1994*:159-164, 1994.

[68] Petranka, James W., 1998 *Salamanders of the United States and Canada*. Smithsonian Institution Press, 1998.

[69] Trenham, P., H.B. Shaffer, W.D. Koenig, and M.R. Stromberg, 2000. *Life history and demographic variation of the California tiger salamander* (*Ambystoma californiense*), (2):365-377, Copeia, 2000.

[70] Orloff, S, 2007. *Migratory Movements of California Tiger Salamander in Upland Habitat – A Five Year Study*, Pittsburg, California. Prepared for Bailey Estates, LLC, May 2007.



SFPUC Alameda Creek Recapture Project

**Figure 5.14-4**

Special-Status Wildlife within 5 Miles of the Survey Area

* The occurrences shown on this map represent the known locations of the species listed here as of the date of this version of CNDDB (03/2016) and other species observed during SFPUC surveys or projects. There may be additional occurrences or additional species within this area which have not yet been surveyed and/or mapped. Details on documented locations of special-status species is withheld according to CNDDB guidelines due to the sensitivity of the information.

SOURCE: CDFW, 2016; Dettman, 2009; SFPUC, 2010a; SFPUC, 2011a; SFPUC, 2011b; SFPUC, 2011c; SFPUC, 2011d; SFPUC, 2015; ESA, 2009a; ESA, 2016

**Survey Area Occurrence.** CTS have been documented from at least 48 locations within 5 miles of the survey area, including five stock ponds in the foothills within 1.2 miles of the survey area.[71] Several of these occurrence records are described below. In 2015, one adult was found under a placed cover board less than 300 feet south of the southern project area boundary.[72] Several adults have been observed in upland areas in close proximity to the survey area. In February 2011, one adult was observed less than 0.2 mile south of the survey area boundary in non-native grassland habitat east of the SMP-30 aggregate processing facility and west of Calaveras Road.[73] The adult was unearthed while excavating burrows within the SFPUC's New Irvington Tunnel (NIT) spoils area and then relocated into adjacent grasslands outside of the work area. In February 2014, one adult was found in a pitfall trap, approximately 0.7 mile south of the survey area; it was subsequently relocated 0.08 mile to the east.[74] In March 2011, one adult was observed approximately 0.8 mile southeast of the survey area, just east of Calaveras Road, during work for the Alameda Siphons project. The adult was subsequently moved outside of the construction area.[75] Additionally, three adults have been observed (one in 2009, 2011, and 2013) approximately 0.9 mile south of the survey area near the Sunol Valley Chloramination Facility in staging areas for the SFPUC's Alameda Siphons and San Antonio Backup Pipeline and NIT projects.[76] The adults were relocated to suitable habitat outside of the staging areas. The closest documented breeding ponds are located approximately 0.3 and 0.5 mile west of the survey area. In 1994, many larvae were observed in these seasonal stock ponds located east of Alameda Creek and north of the Sunol Valley Golf Course.[77] The next closest documented breeding pond is located approximately 0.9 mile south of the survey area east of SMP-33. Many larvae were observed in this seasonal stock pond in 1994.[78]

The survey area does not contain CTS breeding habitat. The seasonal wetland located south of Pit F2 does not provide breeding habitat for this species. No standing water was present during the May 2015 survey and, from a review of historical aerial photographs of the site, this seasonal wetland does not appear to support standing water. The quarry pits may support predatory fish species and are generally considered too deep (pond depths are greater than 10 feet) to support breeding CTS.

The majority of the project area within the survey area has been heavily disturbed from commercial nursery use, quarry operations, and construction of other SFPUC projects. Portions of

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[71] CDFW, California Natural Diversity Database. Rarefind 5 printout and GIS database for the Niles and La Costa Valley 7.5 minute topographic quadrangles. Accessed March 30, 2016.

[72] CDFW, California Natural Diversity Database. Rarefind 5 printout and GIS database for the Niles and La Costa Valley 7.5 minute topographic quadrangles. Accessed March 30, 2016.

[73] SFPUC, 2011a. Email from Kimberly Stern Liddell, San Francisco Public Utilities Commission, regarding a California tiger salamander salvaged from NIT spoils area, dated February 16, 2011.

[74] SFPUC, 2015. Special Status Animals GIS data for the SFPUC Alameda Watershed (includes file 'SSAnimals.shp' and '2000-2014 CNDDB spreadsheet.xlsx'. Data from J. Lukins, SFPUC-NRD, 9/9/15.

[75] SFPUC, 2011b. Email from Scott MacPherson, San Francisco Public Utilities Commission, regarding a California tiger salamander salvaged relocated from AS4. March 7, 2011.

[76] CDFW, California Natural Diversity Database. Rarefind 5 printout and GIS database for the Niles and La Costa Valley 7.5 minute topographic quadrangles. Accessed March 30, 2016.

[77] CDFW, California Natural Diversity Database. Rarefind 5 printout and GIS database for the Niles and La Costa Valley 7.5 minute topographic quadrangles. Accessed March 30, 2016.

[78] CDFW, California Natural Diversity Database. Rarefind 5 printout and GIS database for the Niles and La Costa Valley 7.5 minute topographic quadrangles. Accessed March 30, 2016.

the survey area along Calaveras Road north and south of San Antonio Creek and the area around Pit F3-East was fenced off with special-status species exclusion fencing and disturbed as part of construction for SFPUC's SABPL project. All exclusion fencing that was installed for SABPL construction has been removed. Although the areas that were temporarily disturbed during SABPL construction have been revegetated, the exclusion fence prohibited CTS from entering these areas during SABPL construction. A permanent exclusion fence has been installed around the SMP-30 quarry site. This fence is located south of San Antonio Creek and west of the patch of grassland that borders Calaveras Road.

Non-native grassland within the survey area contains a small number of small mammal burrows, which would limit the extent of upland habitat and foraging opportunities for this species. However, CTS have potential to utilize the non-native grasslands within the survey area, since the grasslands are located within 1.2 mile of several documented breeding ponds, and adult CTS have been documented to travel within the valley floor. Coyote brush scrub, mulefat scrub, willow thickets, mixed riparian forest, and riparian woodland habitats along Alameda and San Antonio Creeks provide potential upland dispersal habitat for CTS. Although CTS are typically found in grassland habitats, these areas are relatively undisturbed and may serve as a movement corridor for this species.

Undeveloped habitats (including coyote brush scrub, mulefat scrub, willow thickets, mixed scrub, and ruderal habitats) surrounding the quarry pits may provide low quality upland dispersal habitat for CTS. Although these areas contain some native vegetation and may be utilized by CTS for dispersal, they contain relatively few small mammal burrows and are located within active quarry work sites.

California tiger salamander may occasionally travel through the developed portions of the site on a transient basis, but developed areas do not contain CTS habitat.

#### *California Red-legged Frog*

**Status.** The CRLF is federally listed as a threatened species and is a California species of special concern.

**General Ecology and Distribution.** This ranid species is principally a pond frog that can be found in permanent or semi-permanent (seasonal or ephemeral) ponds, pools, streams, springs, marshes, and lakes. Moist woodlands, forest clearings, and grasslands also provide suitable or upland dispersal habitat for this species in the non-breeding season. Adult CRLF seek waters with shoreline vegetation for breeding and protection from predators, but may be found in unvegetated waters as well. Adults consume insects such as beetles, caterpillars and isopods, while tadpoles forage on algae and detritus.

CRLF breed from January to May. Eggs are attached to vegetation in shallow water and are deposited in irregular clusters. Tadpoles grow to about 3 inches before metamorphosing.

Historically, CRLF occurred along the coast from the vicinity of Point Reyes National Seashore, Marin County, and inland from Redding, Shasta County southward to northwestern Baja

California, Mexico.[79] The majority of CRLF occurrences in the San Francisco Bay Area are from Contra Costa and Alameda Counties. Grazing practices have altered CRLF breeding habitat. In some instances grazing has contributed to CRLF decline by decreasing riparian breeding habitat.[80] In other instances stock pond creation for livestock has increased breeding habitat and grazing has also kept ponds clear by removing dense vegetation.

**Survey Area Occurrence.** CRLF have been observed in Alameda Creek within the survey area. On July 24, 2014, one adult CRLF was observed within Alameda Creek approximately 100 feet downstream from I-680.[81] In 1999, one adult was observed within the creek, approximately 0.1 mile north of I-680 and just east of the Sunol Valley Golf Course.[82] In 2002, several CRLFs were observed approximately 0.2 mile northwest of the survey area in an off-channel pond between Western Star Nursery and Alameda Creek.[83] They were not observed at that location during USFWS protocol-level surveys conducted in 2008, 2009, and 2010, but two individuals were documented during the 2011 survey.[84,85,86,87] No individuals were observed during 2012, 2013, or 2014 surveys of that location.[88,89,90] Upstream from the survey area within Alameda Creek, at a distance of approximately 3 miles, one juvenile was observed in a riffle, run, and pool complex in 1998.[91] CRLFs have also been documented in San Antonio Creek approximately 0.4 mile upstream from the survey area.[92] On March 23, 2013, one adult frog was observed approximately 0.7 mile south of

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[79] Jennings, M. R., and M. P. Hayes, 1994. *Amphibian and reptile species of special concern in California. Final Report to the California Department of Fish and Game*, Inland Fisheries Division, Rancho Cordova, CA. 225pp., 1994.

[80] USFWS, 2002a. *Recovery Plan for the California Red-legged Frog (*Rana aurora draytonii*)*, Region 1 United States Fish and Wildlife Service. Portland Oregon.

[81] SFPUC, 2015. Special Status Animals GIS data for the SFPUC Alameda Watershed (includes file 'SSAnimals.shp' and '2000-2014 CNDDB spreadsheet.xlsx'. Data from J. Lukins, SFPUC-NRD, 9/9/15.

[82] CDFW, California Natural Diversity Database. Rarefind 5 printout and GIS database for the Niles and La Costa Valley 7.5 minute topographic quadrangles. Accessed March 30, 2016.

[83] CDFW, California Natural Diversity Database. Rarefind 5 printout and GIS database for the Niles and La Costa Valley 7.5 minute topographic quadrangles. Accessed March 30, 2016.

[84] ESA, 2009a. San Francisco Public Utilities Commission San Antonio Backup Pipeline Project Terrestrial Assessment. Prepared for the San Francisco Public Utilities Commission. June, 2009.

[85] ESA, 2009b. Sunol and Niles Dam Removal Project, California Red-legged Frog Habitat and Population Assessment – Year 2. Prepared for San Francisco Public Utilities Commission, Barbara Palacios, Project Manager. December 2009.

[86] ESA, 2010. Sunol and Niles Dam Removal Project, California Red-legged Frog Habitat and Population Assessment – Year 3. Prepared for San Francisco Public Utilities Commission, Carin Apperson, Project Manager. December 2010

[87] ESA, 2011. Sunol and Niles Dam Removal Project, California Red-legged Frog Habitat and Population Assessment – Year 4. *Prepared for* San Francisco Public Utilities Commission, Carin Apperson, Project Manager. December 2011.

[88] ESA, 2012. Sunol and Niles Dam Removal Project, California Red-legged Frog Habitat and Population Assessment – Year 5. *Prepared for* San Francisco Public Utilities Commission, Carin Apperson, Project Manager. December 2012.

[89] ESA, 2013. Sunol and Niles Dam Removal Project, California Red-legged Frog Habitat and Population Assessment – Year 6. Prepared for San Francisco Public Utilities Commission, Carin Apperson, Project Manager. December 2013.

[90] ESA, 2014. Sunol and Niles Dam Removal Project, California Red-legged Frog Habitat and Population Assessment – Year 7 (2014). Prepared for San Francisco Public Utilities Commission. December 2014.

[91] CDFW, California Natural Diversity Database. Rarefind 5 printout and GIS database for the Niles and La Costa Valley 7.5 minute topographic quadrangles. Accessed March 30, 2016.

[92] SFPUC, 2015. Special Status Animals GIS data for the SFPUC Alameda Watershed (includes file 'SSAnimals.shp' and '2000-2014 CNDDB spreadsheet.xlsx'. Data from J. Lukins, SFPUC-NRD, 9/9/15.

survey area and was moved to a pond one mile to the west.[93] In February 2010, during surveys for the Alameda Siphons project, one CRLF was observed within a seasonal wetland and one in an overflow ditch east of Calaveras Road, approximately 0.8 miles south of the survey area.[94] The frogs were relocated and the overflow ditch and seasonal wetland features have been removed as a result of the Alameda Siphons and NIT projects. On December 30, 2009, one CRLF was observed in a small freshwater pond at the base of Pit F6, approximately 0.8 mile south of the survey area.[95] The nearest documented CRLF breeding sites are in San Antonio Creek approximately 0.5 mile east of the survey area[96] and a small, shallow pond located 1.25 miles northeast of the survey area.[97]

### *Alameda Creek*

Potential CRLF aquatic habitat is present along Alameda Creek within the survey area. The isolated seepage pools located adjacent to Pit F2 in Subreach A contain emergent vegetation along the margin. These pools provide potential breeding habitat, although the presence of bullfrogs reduce habitat quality in Subreach A. Other potential CRLF breeding pools are located in the creek channel downstream from I-680 in Subreach B. These pools are dammed by woody debris and their location and size likely fluctuate when woody debris is moved during high flow events. The presence of bullfrogs in the reach, combined with the highly variable water source, reduces habitat quality. Further downstream, potential breeding pools were observed within the wetted creek channel (in Subreach C1) and in isolated pools within the dry creek reach (in Subreach C2). Habitat quality is diminished in each of these areas due to the presence of bullfrogs and largemouth bass in the wetted creek channel. Other riffle and glide segments of the creek provide potential non-breeding aquatic habitat when water is present. Pools observed during the October 2015 survey are shown in Figure 5.14-2.

As described in Appendix HYD2, pools in Alameda Creek within the survey area are observed when subsurface flows rise above low points in the streambed in the absence of a live stream. Hydrologic conditions in Alameda Creek within the survey area have varied over the years as water operations at Calaveras Reservoir and quarry operations have changed over the years. Variable annual quarry releases between 2002 and 2015 are shown in Tables HYD3-2 and HYD3-3 in Appendix HYD1. Quarry NPDES releases from Hanson Aggregates have ranged from 103 acre-feet to 4,970 acre-feet annually and quarry NPDES releases from Cemex/Oliver de Silva, Inc. have ranged from 0 acre-feet to 3,181 acre-feet annually.

Currently, Subreaches A, B, and the upstream portion of C1 are influenced by a combination of quarry NPDES discharges and elevated subsurface water from Alameda Creek underflow. As described in *Section 4. Groundwater Conditions*, in Appendix HYD2, in 2012 operational changes

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[93] SFPUC, 2015. Special Status Animals GIS data for the SFPUC Alameda Watershed (includes file 'SSAnimals.shp' and '2000-2014 CNDDB spreadsheet.xlsx'. Data from J. Lukins, SFPUC-NRD, 9/9/15.

[94] SFPUC, 2011dc. Email from J.T. Mates-Muchin, San Francisco Public Utilities Commission, regarding special status species sightings near the Upper Alameda Creek Filter Gallery Project area. January 13, 2011.

[95] Dettman, D.H. 2009. California Native Species Field Survey Form for California red-legged frog observation at SMP-30. Survey date: 12/30/09.

[96] SFPUC, 2015. Special Status Animals GIS data for the SFPUC Alameda Watershed (includes file 'SSAnimals.shp' and '2000-2014 CNDDB spreadsheet.xlsx'. Data from J. Lukins, SFPUC-NRD, 9/9/15.

[97] CDFW, California Natural Diversity Database. Rarefind 5 printout and GIS database for the Niles and La Costa Valley 7.5 minute topographic quadrangles. Accessed March 30, 2016.

were made at the SMP-30 quarry. At that time water was no longer directly discharged from Pit F4 to Alameda Creek, which resulted in higher water storage levels in Pit F4 and F3 West. These higher storage levels, in combination with quarry NPDES discharges from Pit F2, appear to have supported the pools through the dry season since 2012. Prior to the change in quarry operations in 2012 pools were also present in the dry season in these subreaches as shown in Google Earth imagery. Dry season water in the pools prior to 2012 was likely supported solely by quarry NPDES discharges as surface water is not apparent upstream of the Pit F2 discharge point.

As described in Appendix HYD2 for MW 9, which is located within Subreach C2 and represents conditions in Subreach C2 and the downstream portion of Subreach C1, "because the aquifer is thinner than upstream reaches, groundwater level fluctuations would be constrained by the limited capacity of the aquifer to store or release water; i.e., it can only fill or drain within a narrow range of groundwater elevations." Due to the thin aquifer with little storage capacity to allow for water fluctuations, water in Subreach C2 and the downstream portion of Subreach C1is not greatly influenced by upstream quarry practices. Surface water in these subreaches is typically present only during the wet months, with the exception of a few isolated perennial pools that are located at the base of younger alluvium as shown on Figure 16 in Appendix HYD2. The absence of perennial flow in these subreaches is supported by generally dry conditions, with the exception of the few isolated perennial pools, observed during the October 2015 survey.

*San Antonio Creek*

Flow along San Antonio Creek within the survey area is not continuous during the rainy season and is not sufficient to sustain CRLF breeding. Non-breeding aquatic refugia habitat may be present along San Antonio Creek following seasonal storm events, and portions of the creek corridor may provide year-round upland refugia habitat.

*Quarry Pits*

The quarry pits do not support emergent aquatic vegetation, such as cattails and tules, and are deep with steep side slopes. The lack of emergent vegetation for egg attachment and lack of warm, shallow tadpole rearing areas limits breeding potential. The quarry pit edges with riparian shrub or tree cover provide marginal aquatic refugia habitat. Although frogs could occur at these areas, the pit edges lack emergent aquatic vegetation, have steep side slopes, and fluctuating water levels. Additionally, several large fish were observed in Pit F2 during the May 2015 reconnaissance survey and may also be present in Pits F3-West and East. The seasonal wetland located south of Pit F2 does not support standing water deep enough to provide breeding habitat.

*Uplands*

Coyote brush scrub, mulefat scrub, willow thickets, riparian woodland, and mixed riparian forest along Alameda and San Antonio Creeks provide cover and potential upland dispersal habitat for CRLF. These areas are relatively undisturbed and may serve a movement corridor for this species. Small mammal burrows and rock and debris piles in non-native grasslands offer refugia habitat.

As with the CTS, undeveloped habitats surrounding the quarry pits may provide low quality upland dispersal habitat for CRLF. Although these areas contain some native vegetation and are located adjacent to aquatic features, they are actively disturbed by quarry operations. As described for CTS, CRLFs have been recently excluded from some of these upland areas during construction of the SFPUC SABPL project. Developed areas do not contain CRLF habitat.

**With-CDRP Conditions.** Because Alameda Creek provides potential CRLF habitat and this habitat has potential to change under with-CDRP conditions, with-CDRP conditions are described for CRLF. As described in *Section 7. CEQA Scenarios* in Appendix HYD2, under with-CDRP conditions, a live stream will be present through all of the subreaches during wet months (November to April). The findings from Appendix HYD2 for dry months are summarized below. Two different scenarios could occur during dry months (April to October) depending on how water is managed at the quarries and would result in either similar or wetter conditions compared to existing conditions. First, if the quarry operator holds water in Pit F4 at high levels allowing seepage instead of discharging into the creek, as has occurred since 2012, the pools observed in Subreaches A, B, and C1 could remain inundated and may increase in extent as subsurface flows increase from the instream flow schedule. Alternatively, if the quarry operator chooses not to use Pit F4 for water storage, water from the creek would seep into the quarry pits. Under this scenario, the quarry operators could discharge directly into the creek. Either way, the effects of instream releases and quarry mining operations would fall within the range of past hydrologic conditions within the survey area. The monthly surface water flows presented in Table HYD 6-2 in Appendix HYD1 support the conclusions that with-CDRP conditions would generally provide either similar or wetter dry season conditions compared to existing conditions. Monthly flows modeled at Node 6, which is located slightly upstream from I-680 and represents conditions within the ACRP survey area, would generally decrease in the winter and increase in the summer under with-CDRP conditions. Assuming the quarry operators do not change their water practices and their NPDES permit conditions remain the same, the decreases in average monthly flow volumes between December and June range between -6 percent to -37 percent and the increases in monthly flow volumes between July and November range between 63 percent and 98 percent. Although the winter and spring flows would decrease under with-CDRP conditions, a live stream and pools would still prevail in the winter and increased flow in the summer months would maintain, or possibly increase, the extent or duration of pooled and flowing water in Subreaches A, B, and the upstream portion of C1. The summer monthly flow volumes are the result of quarry operations, as surface flow from the dam releases and ACDD bypasses would be lost to the subsurface between Welch Creek and San Antonio Creek and would not be present in these subreaches in the summer months. Since the aquifer is thinner at the downstream end of Subreach C1 and into C2, the implementation of the instream flow schedule or any changes in quarry water management would not likely influence the condition of the pools in these areas.

CRLF aquatic habitat in Subreaches A, B, and the upstream portion of C1 is fairly uniform and consists of slow-moving glide water with perennial water. Small portions of these segments may be suitable for CRLF breeding in isolated pools that lack predatory species; however, most areas would not support CRLF breeding due to deep water and the associated presence of non-native bass and bullfrogs. Under with-CDRP conditions, if water is held in Pit F4 during dry months as it has been since 2012, or if quarry releases continue as they did prior to 2012, habitat conditions may remain the same or the area of perennial water in the creek may increase. If the area of perennially-flooded habitat increased, habitat supporting invasive predators and competitors, such as bullfrogs and bass, would expand. This would not increase CRLF habitat quality within the creek. Because water management in Pit F4 and quarry release schedules are outside the control of the SFPUC, and because it would be too speculative to quantify changes in habitat conditions under with-CDRP conditions, for the purposes of this EIR, it is assumed that existing conditions with the current quarry operations will continue and thus existing conditions also represent with-CDRP conditions for CRLF.

### *Alameda Whipsnake*

**Status.** Alameda whipsnake (AWS; *Masticophis lateralis euryxanthus*) is a federal and state threatened species.

**General Ecology and Distribution.** AWS are dependent upon open chaparral, sage scrub, and coastal scrub. Core habitat most commonly occurs on east, southeast, south, and southwest facing slopes.[98] However, telemetry data indicate that although core habitat is centered on shrub communities, they extensively utilize adjacent habitats including grassland, oak savanna, and occasionally oak-bay woodland. AWS use grassland habitats for periods of up to several weeks, with males using grassland habitats more frequently in the mating season and females using grassland habitats after mating occurs. Rock outcrops are an important feature of AWS habitat because they provide retreat opportunities and support lizard populations.[99,100]

Historically, AWS were probably found in the coastal scrub and oak woodland communities of the East Bay in Contra Costa, Alameda, western San Joaquin, and northern Santa Clara Counties.[101] Currently, they are only found in the inner Coast Range in western and central Contra Costa and Alameda Counties.[102] Five isolated populations of AWS are now recognized within its historical range: Tilden–Briones, Oakland–Las Trampas, Hayward–Pleasanton Ridge, Sunol–Cedar Mountain, and Mt. Diablo–Black Hills.[103]

**Survey Area Occurrence.** AWS is known from several occurrences in the La Costa Valley and Niles USGS 7.5-minute quadrangles, which includes the Sunol Valley. All locations are sensitive and thus are suppressed data, though CDFW disclosed that the nearest occurrence is approximately 4.2 miles southeast of the survey area.[104]

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[98] USFWS, 2000. Final Determination of Critical Habitat for the Alameda Whipsnake (Masticophis lateralis euryxanthus). 50 CFR Part 17. October 3, 2000.

[99] USFWS, 2002b. Draft Recovery Plan for Chaparral and Scrub Community Species East of San Francisco Bay, California, U.S. Department of the Interior, Fish and Wildlife Service, Region 1, Portland, OR. xvi + 306 pp, 2002.

[100] USFWS, 2005. Endangered and threatened wildlife and plants; proposed determination of critical habitat for the Alameda whipsnake (Masticophis lateralis euryxanthus). 70:200 FR, U.S. Department of the Interior, Fish and Wildlife Service, October 18, 2005.

[101] USFWS, 2002b. Draft Recovery Plan for Chaparral and Scrub Community Species East of San Francisco Bay, California, U.S. Department of the Interior, Fish and Wildlife Service, Region 1, Portland, OR. xvi + 306 pp, 2002.

[102] USFWS, 2002b. Draft Recovery Plan for Chaparral and Scrub Community Species East of San Francisco Bay, California, U.S. Department of the Interior, Fish and Wildlife Service, Region 1, Portland, OR. xvi + 306 pp, 2002.

[103] United States Fish and Wildlife Service (USFWS), 1997. Endangered and Threatened Wildlife and Plants; Determination of Endangered Status for the Callippe Silverspot Butterfly and the Behren's Silverspot Butterfly and Threatened Status for the Alameda Whipsnake, 62:234 FR, U.S. Department of the Interior, Fish and Wildlife Service, December 5, 1997.

[104] Acord, Brian, 2015. Personal communication with CDFW's Biogeographic Data Branch regarding suppressed location data in the vicinity of the survey area. April 28, 2015.

Core habitat consisting of sage scrub, chaparral, coastal scrub habitats and rock outcrops are absent from the survey area. Sage scrub is present outside of the survey area in small, discontinuous patches on the upper south and west-facing slopes east of Calaveras Road, approximately 300 feet east of the survey area. AWS have been found at distances of over 4 miles from such habitat.[105]

The non-native grassland throughout the survey area and riparian and scrub habitats along Alameda and San Antonio Creeks provide potential moderate quality habitat for the AWS. These areas contain small mammal burrows and are relatively undisturbed.

Undeveloped habitats (including coyote brush scrub, mulefat scrub, willow thickets, riparian woodland, and riparian forest habitats) surrounding the quarry pits may provide low quality habitat for the AWS. Although these areas contain some native vegetation, they are located within active quarry work sites and subject to disturbance.

Developed and aquatic portions of the site do not contain potential AWS habitat.

### Other Special-Status Species

#### *Foothill Yellow-legged Frog*

**Status.** The foothill yellow-legged frog (*Rana boylii*) is a California species of special concern.

**General Ecology and Distribution.** This ranid species historically occurred in most Pacific drainages west of the Sierra/Cascade Crest from the Santiam River system in Oregon to the San Gabriel River in Los Angeles.[106] Their present range excludes coastal areas south of northern San Luis Obispo County and foothill areas south of Fresno County where this species is presumed extirpated.[107] This species' known elevation range extends from near sea level to approximately 6,700 feet above sea level.[108] The foothill yellow-legged frog is known from several perennial drainages in the Bay Area, including from the Alameda Creek watershed.

The foothill yellow-legged frog is a stream-dwelling species that requires shallow, flowing water, apparently preferentially in small to moderate-sized streams in areas with at least some cobble-sized substrate.[109] Some researchers emphasize riffles as one of the key aspects of this species'

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[105] Alvarez, J.A., Shea, M.A., Murphy, A.C., 2005. Compilation of Observations of Alameda Whipsnakes Outside of Typical Habitat, Transactions of the Western Section of the Wildlife Society 41: 21-25, 2005.

[106] Jennings, M. R., and M. P. Hayes, 1994. Amphibian and reptile species of special concern in California. Final Report to the California Department of Fish and Game, Inland Fisheries Division, Rancho Cordova, CA. 225pp., 1994.

[107] Jennings, M. R., and M. P. Hayes, 1994. Amphibian and reptile species of special concern in California. Final Report to the California Department of Fish and Game, Inland Fisheries Division, Rancho Cordova, CA. 225pp., 1994.

[108] Stebbins, R. C., 2003 A Field Guide to Western Reptiles and Amphibians. Third Edition. Houghton Mifflin Company, Boston. 533 pp., 2003.

[109] Hayes, M. P. and M. R. Jennings. 1988. Habitat correlates of distribution of the California red-legged frog (Rana aurora draytonii) and the foothill yellow-legged frog (Rana boylii): implications for management. In R. C. Szaro, K. E. Severson, D. R. Patton (tech. coords.), Management of Amphibians, Reptiles, and Small Mammals in North America, pp 144-158. USDA Forest Service, Rocky Mountain Forest and Range Experiment Station, Gen. Tech. Rep. RM-166, Fort Collins, Colorado.

habitat.[110,111] Jennings and Hayes (1988)[112] note that as intermittent streams lose surface flow during late summer, riffles disappear, and this species can then be found associated with stream pools. However, foothill yellow-legged frogs are not described from ephemeral streams that lack water during summer and fall months. Some degree of riparian vegetation coverage is preferred by foothill yellow-legged frogs, as is open habitat and sunny banks.[113] This species may be excluded by dense canopy. For example, Moyle found no yellow-legged frogs at sites with greater than 90 percent shading.[114] Studies suggest that this species is infrequent or absent in habitats where introduced aquatic predators (e.g., predatory fishes and bullfrogs) are present,[115] probably because their aquatic developmental stages are susceptible to such predators.[116]

Adult foothill yellow-legged frogs feed primarily on both aquatic and terrestrial insects[117]; tadpoles preferentially graze on algae.[118] Post-metamorphic larvae eat aquatic and terrestrial insects.[119]

California yellow-legged frogs generally breed following the period of high flow discharge resulting from winter rainfall and snowmelt, which results in oviposition usually occurring between late March and early June.[120,121] Ashton et al. (1997)[122] report that cobble and pebble are the preferred substrate for egg mass attachment, but egg masses may be attached to other available in-water structure as well.

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[110] Stebbins, R. C., 2003 A Field Guide to Western Reptiles and Amphibians. Third Edition. Houghton Mifflin Company, Boston. 533 pp., 2003.

[111] Hayes, M. P. and M. R. Jennings. 1988. Habitat correlates of distribution of the California red-legged frog (Rana aurora draytonii) and the foothill yellow-legged frog (Rana boylii): implications for management. In R. C. Szaro, K. E. Severson, D. R. Patton (tech. coords.), Management of Amphibians, Reptiles, and Small Mammals in North America, pp 144-158. USDA Forest Service, Rocky Mountain Forest and Range Experiment Station, Gen. Tech. Rep. RM-166, Fort Collins, Colorado.

[112] Hayes, M. P. and M. R. Jennings. 1988. Habitat correlates of distribution of the California red-legged frog (Rana aurora draytonii) and the foothill yellow-legged frog (Rana boylii): implications for management. In R. C. Szaro, K. E. Severson, D. R. Patton (tech. coords.), Management of Amphibians, Reptiles, and Small Mammals in North America, pp 144-158. USDA Forest Service, Rocky Mountain Forest and Range Experiment Station, Gen. Tech. Rep. RM-166, Fort Collins, Colorado.

[113] Stebbins, R. C., 2003 A Field Guide to Western Reptiles and Amphibians. Third Edition. Houghton Mifflin Company, Boston. 533 pp., 2003.

[114] Moyle, Peter B., and Robert D. Nichols. 1973. Ecology of some native and introduced fishes of the Sierra Nevada Foothills in Central California. Copeia 1973:478-490.

[115] Hayes, M. P. and M. R. Jennings. 1988. Habitat correlates of distribution of the California red-legged frog (Rana aurora draytonii) and the foothill yellow-legged frog (Rana boylii): implications for management. In R. C. Szaro, K. E. Severson, D. R. Patton (tech. coords.), Management of Amphibians, Reptiles, and Small Mammals in North America, pp 144-158. USDA Forest Service, Rocky Mountain Forest and Range Experiment Station, Gen. Tech. Rep. RM-166, Fort Collins, Colorado.

[116] Grinnell, J., and T. I. Storer. 1924. Animal life in the Yosemite. University of California Press, Berkeley.

[117] Ashton, D.T. and K.E. Schlick. 1997. Foothill yellow-legged frog (*Rana boylii*) natural history. USDA Forest Service, Pacific Southwest Research Station, Redwood Sciences Laboratory, 1700 Bayview Drive, Arcata, CA.

[118] Jennings, M. R., and M. P. Hayes, 1994. Amphibian and reptile species of special concern in California. Final Report to the California Department of Fish and Game, Inland Fisheries Division, Rancho Cordova, CA. 225pp., 1994.

[119] Storer, T. I. 1925. A synopsis of the amphibia of California. University of California Publication Zoology 27:1-342.

[120] Storer, T. I. 1925. A synopsis of the amphibia of California. University of California Publication Zoology 27:1-342.

[121] Jennings, M. R., and M. P. Hayes, 1994. Amphibian and reptile species of special concern in California. Final Report to the California Department of Fish and Game, Inland Fisheries Division, Rancho Cordova, CA. 225pp., 1994.

[122] Ashton, D.T. and K.E. Schlick. 1997. Foothill yellow-legged frog (*Rana boylii*) natural history. USDA Forest Service, Pacific Southwest Research Station, Redwood Sciences Laboratory, 1700 Bayview Drive, Arcata, CA.

**Survey Area Occurrence.** CDFW notified the SFPUC of an undocumented 2006 FYLF sighting along Alameda Creek between the treatment plant and quarry.[123] However, the nearest documented foothill yellow-legged frog to the survey area is located within Alameda Creek approximately 2.6 miles south of the survey area near the Sunol Valley Water Treatment Plant.[124] There are also several occurrence records in Alameda Creek upstream of this record and into the Sunol Regional Wilderness.[125, 126] The segment of Alameda Creek where this species occurs supports year-round flows with riffle habitat, gravel, cobble, and boulder substrate. Annual focused CRLF surveys in Alameda Creek approximately 0.1 mile downstream of the survey area have not identified foothill yellow-legged frog, and suggest no evidence of foothill yellow-legged frog presence.[127,128,129,130]

ESA biologists performed a focused habitat assessment survey of Alameda Creek within the survey area on October 23, 2015 to assess the quality of potential foothill yellow-legged frog habitat and ascertain the potential for species' presence.[131] The survey included portions of Alameda Creek from the downstream confluence with Arroyo de la Laguna to the quarry NPDES discharge point near Pit F2.

In all, nine pools were recorded within the survey area and are shown in Figure 5.14-2. The pools varied greatly in size and character. The five relatively small downstream pools in Subreach C2 appeared to maintain semi-permanent water with input from underground water sources. The profile of Alameda Creek in this area is that of a low gradient stream with a predominance of silt and clay substrate and organic material. The stillwater pools ranged in size from approximately 650 to 2,200 square feet with water depth from 6 to 27.5 inches and approximately 50 percent coverage by riparian vegetation around their margins. Large numbers of bullfrog larvae, up to 50 per pool, were observed; however, no other ranid species were noted in any life history stage. Fish species were generally absent from these pools. These pools are not considered optimal habitat for foothill yellow-legged frog because they do not support appropriate riffle habitat,

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[123] Personal communication between Marcia Grefsrud, California Department of Fish and Wildlife and Deborah Craven-Green, San Francisco Public Utilities Commission via email dated October 3, 2016.

[124] SFPUC, 2015. Special Status Animals GIS data for the SFPUC Alameda Watershed (includes file 'SSAnimals.shp' and '2000-2014 CNDDB spreadsheet.xlsx'. Data from J. Lukins, SFPUC-NRD, 9/9/15.

[125] SFPUC, 2015. Special Status Animals GIS data for the SFPUC Alameda Watershed (includes file 'SSAnimals.shp' and '2000-2014 CNDDB spreadsheet.xlsx'. Data from J. Lukins, SFPUC-NRD, 9/9/15.

[126] CDFW, California Natural Diversity Database. Rarefind 5 printout and GIS database for the Niles and La Costa Valley 7.5 minute topographic quadrangles. Accessed March 30, 2016.

[127] Environmental Science Associates (ESA), 2008. Sunol and Niles Dam Removal Project, California Red-legged Frog Baseline Population Assessment. Prepared for San Francisco Public Utilities Commission, Barbara Palacios, Project Manager. December 2008.

[128] ESA, 2009b. Sunol and Niles Dam Removal Project, California Red-legged Frog Habitat and Population Assessment – Year 2. Prepared for San Francisco Public Utilities Commission, Barbara Palacios, Project Manager. December 2009.

[129] ESA, 2010. Sunol and Niles Dam Removal Project, California Red-legged Frog Habitat and Population Assessment – Year 3. Prepared for San Francisco Public Utilities Commission, Carin Apperson, Project Manager. December 2010

[130] ESA, 2011. Sunol and Niles Dam Removal Project, California Red-legged Frog Habitat and Population Assessment – Year 4. Prepared for San Francisco Public Utilities Commission, Carin Apperson, Project Manager. December 2011.

[131] ESA, San Francisco Public Utilities Commission Alameda Creek Recapture Project Terrestrial Biological Resources Report, prepared for the San Francisco Public Utilities Commission, November 2016. (See Appendix BIO1).

contain inappropriate substrates, and also support a large population of predators. The likelihood that foothill yellow-legged frog would be present is also reduced due to the distance from documented populations and seasonally dry instream conditions upstream from the quarry area.

The roughly 0.65-mile portion of Alameda Creek downstream from the quarry NPDES discharge point near Pit F2 (in Subreaches A, B, and the upstream portion of C1) supports perennial water and four large pools, greater than 330 to 660 feet in length. The perennial water reach includes Pool 6, 7, 8, and 9, and areas upstream from I-680 as shown in Figure 5.14-2. All portions of the stream upstream from Pool 6 showed perennial flows and dense riparian vegetation. These larger pools support bullfrog breeding, red swamp crayfish (*Procambarus clarkii*), minnows, California roach (*Hesperoleucus symmetricus)*, and mosquito fish, (*Gambusia affinis*) and largemouth bass. In most areas, the creek margins supported dense willow growth with water present from bank-to-bank with no protruding rocks or boulders. Upstream from Pool 7, the shoreline and bottom substrate overwhelmingly consisted of silt and clay, often overlain with organic materials. Such habitat can be used by yellow-legged frog larvae when stream conditions may otherwise support this species, though adult yellow-legged frogs typically occur in deeper water in association with instream rock features, such as large cobble or boulders that provide resting sites for adult and immature frogs or some degree of gravel or sandy substrate overlain by organic materials. Such habitat was absent from Subreaches A, B, and the upstream portion of Subreach C1. Habitat quality for yellow-legged frog is also diminished in these features due to the presence of predators, whether largemouth bass, bullfrogs, or crayfish, in each examined pool. Other riffle and glide segments of the creek provide potential non-breeding aquatic habitat when water is present.

In summary, based on the findings of the October 23, 2015 habitat assessment, distance from known populations of this species, and presence of a seasonally dry channel between known populations and the survey area, Alameda Creek within the survey area may seasonally support low quality foothill yellow-legged frog movement habitat. Given the absence of established foothill yellow-legged frog source populations near the survey area, such intermittent movement through the area would be exceedingly rare.

San Antonio Creek is typically dry for most of the year and, due to its ephemeral nature and distance from documented populations, foothill yellow-legged frogs are unlikely to occur in this creek within the survey area. Since foothill yellow-legged frogs are a stream-dwelling frog, they are not expected to occur in the quarry pits or upland areas within the survey area.

Since foothill yellow-legged frog are unlikely to occur within Alameda Creek in the ACRP survey area under existing conditions, they would similarly not be expected to occur in the survey area under with-CDRP conditions.

### *Western Pond Turtle*

**Status.** Western pond turtle (*Emys marmorata*) is a California species of special concern.

**General Ecology and Distribution.** Western pond turtles are uncommon and discontinuously distributed throughout California west of the Cascade-Sierran crest.[132] Western pond turtles are typically found in ponds, lakes, marshes, rivers, streams, and irrigation ditches with rocky or muddy substrates surrounded by aquatic vegetation. These watercourses usually are within woodlands, grasslands, and open forests, between sea level and 6,000-foot elevation. Turtles bask on logs or other objects when water temperatures are lower than air temperatures. Nests are located at upland sites, often up to 0.25 mile from an aquatic site.[133,134,135] General dispersal may occur throughout upland habitat.

**Survey Area Occurrence.** Western pond turtle has been documented in Alameda Creek and its tributaries and other aquatic features in the vicinity of the survey area.[136, 137] Western pond turtle was observed near the Alameda Creek and Arroyo de la Laguna confluence just outside of the survey area.[138] The closest CNDDB documented occurrence is approximately 0.4 mile west of the survey area where one turtle was observed in a stock pond in 2010.[139] Additionally, during reconnaissance surveys for the San Antonio Backup Pipeline Project, this species was observed in San Antonio Creek at the base of Turner Dam [140] approximately 0.8 mile east of the survey area.

Alameda Creek, San Antonio Creek, and SMP-24 quarry pits provide potential aquatic habitat for the western pond turtle. Non-native grassland, riparian, and scrub habitats, particularly those with friable soils, contain potential nesting and dispersal habitat for this species.

**With-CDRP Condition.** With-CDRP conditions are described for western pond turtle because Alameda Creek provides potential western pond turtle habitat and this habitat has potential to change compared with existing conditions. As described under with-CDRP conditions for CRLF and foothill yellow-legged frog, and in *Section 7. CEQA Scenarios* in Appendix HYD2, conditions in Subreaches A, B, and the upstream portion of Subreach C1 with-CDRP would be either similar or wetter during the dry season compared to the existing condition. As described above for CRLF and foothill yellow-legged frog, habitat conditions within Subreach C2 and the downstream portion of C1 are not expected to change under with-CDRP conditions because of the presence of

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[132] Jennings, M. R., and M. P. Hayes, 1994. Amphibian and reptile species of special concern in California. Final Report to the California Department of Fish and Game, Inland Fisheries Division, Rancho Cordova, CA. 225pp., 1994.

[133] Jennings, M. R., and M. P. Hayes, 1994. Amphibian and reptile species of special concern in California. Final Report to the California Department of Fish and Game, Inland Fisheries Division, Rancho Cordova, CA. 225pp., 1994.

[134] Stebbins, R. C., 2003 A Field Guide to Western Reptiles and Amphibians. Third Edition. Houghton Mifflin Company, Boston. 533 pp., 2003.

[135] Zeiner, D.C., W.F. Laudenslayer, Jr., and K.E. Mayer, 1988. California's Wildlife, Vol. I-III, California Department of Fish and Game, 1988.

[136] CDFW, California Natural Diversity Database. Rarefind 5 printout and GIS database for the Niles and La Costa Valley 7.5 minute topographic quadrangles. Accessed March 30, 2016.

[137] SFPUC, 2015. Special Status Animals GIS data for the SFPUC Alameda Watershed (includes file 'SSAnimals.shp' and '2000-2014 CNDDB spreadsheet.xlsx'. Data from J. Lukins, SFPUC-NRD, 9/9/15.

[138] SFPUC, 2015. Special Status Animals GIS data for the SFPUC Alameda Watershed (includes file 'SSAnimals.shp' and '2000-2014 CNDDB spreadsheet.xlsx'. Data from J. Lukins, SFPUC-NRD, 9/9/15.

[139] CDFW, California Natural Diversity Database. Rarefind 5 printout and GIS database for the Niles and La Costa Valley 7.5 minute topographic quadrangles. Accessed March 30, 2016.

[140] ESA, 2009a. San Francisco Public Utilities Commission San Antonio Backup Pipeline Project Terrestrial Assessment. Prepared for the San Francisco Public Utilities Commission. June, 2009.

a thinner aquifer in those subreaches. The extent of changes in Subreaches A, B, and the upstream portion of Subreach C1 between the existing condition and with-CDRP, if any, is too speculative to quantify in this EIR. For the purposes of this EIR, it is assumed that existing conditions represent with-CDRP conditions for western pond turtle.

#### *Coast Horned Lizard*

**Status.** The coast horned lizard (*Phrynosoma coronatum*) is a California species of special concern.

**General Ecology and Distribution.** The coast horned lizard occurs in the Sierra Nevada foothills from Butte County to Kern County and throughout the central and southern California coast. The species is found in several habitat types including areas with an exposed gravelly-sandy substrate containing scattered shrubs, clearings in riparian woodlands, dry uniform chamise chaparral, and annual grassland with scattered perennial seepweed or saltbush. Horned lizard populations reach maximum abundance in sandy loam areas. Coast horned lizards utilize small mammal burrows or burrow into loose soils under surface objects during extended periods of inactivity or hibernation.[141]

**Survey Area Occurrence.** This species has not been documented in the Sunol Valley. The closest documented occurrence is approximately 4.8 miles east of the survey area within eastern La Costa Valley.[142] This species is often found in alkaline areas with sandy loam soils, which are absent from the survey area. Alameda Creek contains washes that consist of cobble beds with sand; a habitat type that supports coast horned lizards in other regions. For this reason, this species has potential to occur in this area.

#### *Cooper's Hawk*

**Status.** Cooper's hawk (*Accipiter cooperii*) is protected under Section 3503.5 of the California Fish and Game Code.

**General Ecology and Distribution.** Cooper's hawks nest throughout most of the wooded portion of California.[143] They are often found in oak, riparian, or other forest habitats and typically forage near open water or riparian vegetation. They prey on small birds and mammals and some reptiles and amphibians.

**Survey Area Occurrence.** This species has been documented nesting at several locations within 5 miles of the survey area.[144] Nests have typically been found in oak woodland or mixed oak woodland habitat. Riparian woodland along San Antonio Creek and riparian forest along Alameda Creek provide potential nesting habitat for this species.

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[141] Jennings, M. R., and M. P. Hayes, 1994. Amphibian and reptile species of special concern in California. Final Report to the California Department of Fish and Game, Inland Fisheries Division, Rancho Cordova, CA. 225pp., 1994.

[142] SFPUC, 2010a. GIS data relating to sensitive species and other biological resources, supplied by SPFUC for the project vicinity. Shapefiles entitled "SSAnimals_pt," "SSAnimals_py," and "SFPUC Pond Survey."

[143] Zeiner, D.C., W.F. Laudenslayer, Jr., and K.E. Mayer, 1988. California's Wildlife, Vol. I-III, California Department of Fish and Game, 1988.

[144] CDFW, California Natural Diversity Database. Rarefind 5 printout and GIS database for the Niles and La Costa Valley 7.5 minute topographic quadrangles. Accessed March 30, 2016.

### *Tricolored Blackbird*

**Status.** On December 10, 2015, the California Fish and Game Commission advanced the tricolored blackbird (*Agelaius tricolor*) as a candidate for state endangered species listing, thereby granting protection under CESA for 12 months while the commission makes their final status determination.

**General Ecology and Distribution.** Tricolored blackbird is a colonial species that nests in dense vegetation in and around freshwater wetlands. When nesting, tricolored blackbirds generally require freshwater wetland areas large enough to support colonies of 50 pairs or more. They prefer freshwater emergent wetlands with tall, dense cattails or tules for nesting, but will also breed in thickets of willow, blackberry, wild rose, or tall herbs. During the nonbreeding season, flocks are highly mobile and forage in grasslands, croplands, and wetlands.[145]

**Survey Area Occurrence.** Tricolored blackbirds have been documented from the Sunol Valley and in the survey area.[146,147] During the 2009 reconnaissance survey for the SABPL project, a large mixed flock of tricolored and red-winged blackbirds numbering in the hundreds-to-thousands were observed flying back and forth over the SABPL and ACRP project areas. Another smaller flock of tricolored blackbirds numbering approximately 100 was also observed foraging in the floodplain of Alameda Creek south of SMP-30 and flying back and forth over the quarry area.[148]

Large expanses of freshwater emergent wetlands, which tricolored blackbird typically prefer for nesting, are absent from the survey area. Potential nesting habitat is present in the willow or mulefat scrub habitat located within the project area; however these areas are relatively small in extent and are subject to disturbance from the surrounding quarry operations. Breeding may occur outside of the survey area in a large freshwater marsh located southwest of Pit F3-West on the west side of Alameda Creek, which contains abundant cattails and measures roughly 6 acres in size. Since only low-quality nesting habitat is present in the project area, tricolored blackbirds would not be expected to nest here with high quality nesting habitat present nearby.

Willow thickets and mixed riparian forest along Alameda Creek within the survey area, but outside of the project area, provide suitable nesting habitat and are subject to less disturbance than in the vicinity of the quarry area.

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[145] Shuford, W. David and Thomas Gardali, editors. 2008. California Bird Species of Special Concern: A ranked assessment of species, subspecies, and distinct populations of birds of immediate conservation concern in California. Studies of Western Birds 1. Western Field Ornithologists, Camarillo, California, and California Department of Fish and Game, Sacramento.

[146] CDFW, California Natural Diversity Database. Rarefind 5 printout and GIS database for the Niles and La Costa Valley 7.5 minute topographic quadrangles. Accessed March 30, 2016.

[147] SFPUC, 2015. Special Status Animals GIS data for the SFPUC Alameda Watershed (includes file 'SSAnimals.shp' and '2000-2014 CNDDB spreadsheet.xlsx'. Data from J. Lukins, SFPUC-NRD, 9/9/15.

[148] ESA, 2009a. San Francisco Public Utilities Commission San Antonio Backup Pipeline Project Terrestrial Assessment. Prepared for the San Francisco Public Utilities Commission. June, 2009.

### *Golden Eagle*

**Status.** The golden eagle (*Aquila chrysaetos*) is a CDFW fully protected species.

**General Ecology and Distribution.** Golden eagles nest in open areas on cliffs and in large trees, often constructing multiple nests in one breeding territory.[149] They prefer open habitats such as rolling grasslands, deserts, savannahs, and early successional forest and shrub habitats, with cliffs or large trees for nesting and cover.

**Survey Area Occurrence.** Golden eagle nests have been documented from several locations within the vicinity of the survey area, with the closest record along Alameda Creek just outside of the survey area, approximately 0.2 mile upstream of the Arroyo de la Laguna confluence.[150] There are several other occurrence records east of the survey area near San Antonio Creek and San Antonio Reservoir. This species was observed flying during the site survey in 2011. Potential nesting habitat is present in the eucalyptus trees near the nursery or in the larger trees along Alameda and San Antonio Creeks.

### *Short-Eared Owl*

**Status.** The short-eared owl (*Asio flammeus*) is a California species of special concern.

**General Ecology and Distribution.** The short-eared owl is an open country bird that is seen most often at dawn and dusk. Short-eared owls usually nest on dry ground in depressions that are concealed by vegetation, sometimes nesting within burrows. Breeding is from early March through July with a typical clutch size of five to seven eggs. This owl is a widespread winter migrant with resident populations in portions of California.[151] The short-eared owl is one of the most widely distributed owls in the world.

**Survey Area Occurrence.** Nesting short-eared owls are documented from western La Costa Valley at a distance of 2.7 miles east of the survey area.[152] This species was not observed during the reconnaissance survey, however, non-native grasslands within the survey area provide suitable nesting habitat for this species.

### *Western Burrowing Owl*

**Status.** The western burrowing owl (*Athene cunicularia hypugaea*) is a California species of special concern.

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[149] Zeiner, D.C., W.F. Laudenslayer, Jr., and K.E. Mayer, 1988. California's Wildlife, Vol. I-III, California Department of Fish and Game, 1988.

[150] SFPUC, 2015. Special Status Animals GIS data for the SFPUC Alameda Watershed (includes file ‘SSAnimals.shp’ and ‘2000-2014 CNDDB spreadsheet.xlsx’. Data from J. Lukins, SFPUC-NRD, 9/9/15.

[151] Shuford, W. David and Thomas Gardali, editors. 2008. California Bird Species of Special Concern: A ranked assessment of species, subspecies, and distinct populations of birds of immediate conservation concern in California. Studies of Western Birds 1. Western Field Ornithologists, Camarillo, California, and California Department of Fish and Game, Sacramento.

[152] SFPUC, 2010a. GIS data relating to sensitive species and other biological resources, supplied by SPFUC for the project vicinity. Shapefiles entitled “SSAnimals_pt,” “SSAnimals_py,” and "SFPUC PondSurvey."

**General Ecology and Distribution.** Western burrowing owls are relatively small, semicolonial owls, and are mostly residents of open dry grasslands and desert areas. They occupy burrows for both breeding and roosting. They use burrows excavated by ground squirrels and other small mammals and will use human-made burrows and cavities. Where the number and availability of natural burrows is limited, owls may occupy human-made burrows such as drainage culverts, cavities under piles of rubble, discarded pipe, and other tunnel-like structures.[153] Burrowing owls hunt from perches and are opportunistic feeders. They consume arthropods, small mammals (e.g., meadow voles), birds, amphibians, and reptiles. Insects are often taken during the day, while small mammals are taken at night.[154]

**Survey Area Occurrence.** The closest documented occurrence of the western burrowing owl is approximately 1 mile east of the survey area on the northern slopes of San Antonio Reservoir,[155] but there are several additional observations in the vicinity of San Antonio Reservoir. Western burrowing owls have not been observed during construction of the SFPUC's NIT and SABPL projects.[156][157] Non-native grasslands and ruderal areas within the survey area are fairly compact with few small mammal burrows. However, there is some potential for burrowing owl to occur in these areas due to presence of burrows and proximity of known occurrence records.

### *Northern Harrier*

**Status.** The northern harrier (*Circus cyaneus*) is a California species of special concern.

**General Ecology and Distribution.** Northern harriers are found in a wide variety of habitats from Central Valley grasslands up to lodgepole pines and alpine meadow habitats. They are known to frequent meadows, grasslands, open rangelands, desert sinks, freshwater and saltwater emergent wetlands. Harriers are seldom found in wooded areas. Harriers nest on the ground, usually within patches of dense, tall vegetation in undisturbed areas.[158]

**Survey Area Occurrence.** No northern harrier nesting sites are documented within the vicinity of the survey area.[159,160] Suitable nesting habitat is present within the survey area along the edges of

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[153] Shuford, W. David and Thomas Gardali, editors. 2008. California Bird Species of Special Concern: A ranked assessment of species, subspecies, and distinct populations of birds of immediate conservation concern in California. Studies of Western Birds 1. Western Field Ornithologists, Camarillo, California, and California Department of Fish and Game, Sacramento.

[154] Shuford, W. David and Thomas Gardali, editors. 2008. California Bird Species of Special Concern: A ranked assessment of species, subspecies, and distinct populations of birds of immediate conservation concern in California. Studies of Western Birds 1. Western Field Ornithologists, Camarillo, California, and California Department of Fish and Game, Sacramento.

[155] SFPUC, 2010a. GIS data relating to sensitive species and other biological resources, supplied by SPFUC for the project vicinity. Shapefiles entitled "SSAnimals_pt," "SSAnimals_py," and "SFPUC PondSurvey."

[156] K. Stern Bureau of Environmental Management project manager, pers. comm., August 18, 2016

[157] M. Weinand of Environmental Management project manager, pers. comm., August 19, 2016

[158] Shuford, W. David and Thomas Gardali, editors. 2008. California Bird Species of Special Concern: A ranked assessment of species, subspecies, and distinct populations of birds of immediate conservation concern in California. Studies of Western Birds 1. Western Field Ornithologists, Camarillo, California, and California Department of Fish and Game, Sacramento.

[159] CDFW, California Natural Diversity Database. Rarefind 5 printout and GIS database for the Niles and La Costa Valley 7.5 minute topographic quadrangles. Accessed March 30, 2016.

[160] SFPUC, 2010a. GIS data relating to sensitive species and other biological resources, supplied by SPFUC for the project vicinity. Shapefiles entitled "SSAnimals_pt," "SSAnimals_py," and "SFPUC PondSurvey."

Alameda Creek and in the grassland and scrub habitats adjacent to the quarry pits. However, much of the quarry area is heavily disturbed, which would likely preclude nesting in that area.

### *White-Tailed Kite*

**Status.** The white-tailed kite (*Elanus leucurus*) is a CDFW fully protected species.

**General Ecology and Distribution.** White-tailed kites forage in open grasslands, meadows, farmlands, and emergent wetlands. They typically nest in oak woodlands or trees, especially along marsh or river margins, although they will use any suitable tree or shrub that is of moderate height. They are rarely found far from agricultural areas.[161]

**Survey Area Occurrence.** Nesting locations are not documented within the vicinity of the survey area.[162,163] White-tailed kite was observed foraging east of Calaveras Road during the 2009 reconnaissance surveys for the SABPL project[164] and was observed flying overhead during the December 2010 reconnaissance survey. Suitable nesting habitat is present within the trees along Alameda and San Antonio Creeks.

### *Loggerhead Shrike*

**Status.** The loggerhead shrike (*Lanius ludovicianus*) is a California species of special concern.

**General Ecology and Distribution.** Loggerhead shrikes are a California semi-permanent resident species that occurs in abundance in the Central Valley and central coast where scrub habitats and open woodlands are available. Shrikes generally forage on the fringes of open habitats where suitable hunting perches are available. This species typically hunts from dead trees, tall shrubs, utility wires and fences, impaling their prey on sharp twigs, thorns, or barbed wire.

**Survey Area Occurrence.** Nesting loggerhead shrikes have been documented approximately 2 miles east of the survey area on the northern slopes of San Antonio Reservoir.[165] Shrike populations are generally known from wooded riparian corridors and grazed lands, with breeding often associated with blackberry and willows ranging in size from individual shrubs to dense thickets. Shrikes are common throughout California and could nest and forage within the grassland and scrub habitats adjacent to the creeks and quarry pits.

### *Pallid bat*

**Status.** The pallid bat (*Antrozous pallidus*) is a California species of special concern.

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[161] Zeiner, D.C., W.F. Laudenslayer, Jr., and K.E. Mayer, 1988. California's Wildlife, Vol. I-III, California Department of Fish and Game, 1988.

[162] SFPUC, 2010a. GIS data relating to sensitive species and other biological resources, supplied by SPFUC for the project vicinity. Shapefiles entitled “SSAnimals_pt,” SSAnimals_py,” and "SFPUC PondSurvey."

[163] CDFW, California Natural Diversity Database. Rarefind 5 printout and GIS database for the Niles and La Costa Valley 7.5 minute topographic quadrangles. Accessed March 30, 2016.

[164] ESA, 2009a. San Francisco Public Utilities Commission San Antonio Backup Pipeline Project Terrestrial Assessment. Prepared for the San Francisco Public Utilities Commission. June, 2009.

[165] SFPUC, 2010a. GIS data relating to sensitive species and other biological resources, supplied by SPFUC for the project vicinity. Shapefiles entitled “SSAnimals_pt,” “SSAnimals_py,” and "SFPUC PondSurvey."

**General Ecology and Distribution.** Pallid bat occurs throughout California except for the high Sierra Nevada from Shasta to Kern Counties, and the northwestern corner of the state from Del Norte and western Siskiyou Counties to northern Mendocino County.[166] This large pale bat establishes maternity roosts in crevices in rocky outcrops and cliffs, caves, mines, hollowed trees, large tree cavities, and vacant buildings.[167]

**Survey Area Occurrence.** A pallid bat maternity colony was documented approximately 4.4 miles south southeast of the survey area in 2001.[168] Potential roosting habitat is present within the survey area in larger trees, particularly alongside Alameda and San Antonio Creeks. Quarry pits and Alameda Creek channel provide foraging habitat for insectivorous bats.

*San Francisco Dusky-footed Woodrat*

**Status.** The San Francisco dusky-footed woodrat (*Neotoma fuscipes*) is a California species of special concern.

**General Ecology and Distribution.** This woodrat subspecies is found on the San Francisco peninsula southward to Santa Cruz County, and in the East Bay hills as well. It is a medium-sized native rodent. Dusky-footed woodrats are widespread in chaparral, woodland, and forest habitats with well-developed undergrowth, where their conical stick houses are often visible.[169] These houses may be as much as 6 feet tall, and contain multiple chambers used for sleeping and food storage. Reproduction occurs from February through September.

**Survey Area Occurrence.** San Francisco dusky-footed woodrat nests have been documented within the Alameda Creek riparian corridor, approximately 0.5 mile northwest of the survey area.[170] A woodrat nest was also observed during the 2011 reconnaissance survey along the northern segment of Alameda Creek within the survey area and in 2015 elsewhere along Alameda Creek downstream from the project area.

*American Badger*

**Status.** The American badger (*Taxidea taxus*) is a California species of special concern.

**General Ecology and Distribution.** In North America, American badgers occur as far north as Alberta, Canada and as far south as central Mexico. In California, American badgers occur throughout the state except in humid coastal forests of northwestern California in Del Norte and Humboldt Counties. The species has been decreasing in numbers throughout California over the last century. American badgers occur in a wide variety of open, arid vegetation communities but are most commonly associated with grasslands, savannas, mountain meadows, and open areas of

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[166] Zeiner, D.C., W.F. Laudenslayer, Jr., and K.E. Mayer, 1988. California's Wildlife, Vol. I-III, California Department of Fish and Game, 1988.

[167] Western Bat Working Group (WBWG), 2005. Antrozous pallidus (pallid bat) species account. http://wbwg.org/western-bat-species Accessed May 15, 2015

[168] CDFW, California Natural Diversity Database. Rarefind 5 printout and GIS database for the Niles and La Costa Valley 7.5 minute topographic quadrangles. Accessed March 30, 2016.

[169] Carraway, L. N. and B. J. Verts. 1991. Neotoma fuscipes. Mammalian Species 386:1-10.

[170] CDFW, California Natural Diversity Database. Rarefind 5 printout and GIS database for the Niles and La Costa Valley 7.5 minute topographic quadrangles. Accessed March 30, 2016.

desert scrub. The principal habitat requirements for this species appear to be sufficient food (burrowing rodents), friable soils, and relatively open uncultivated ground. American badgers are primarily found in areas of low to moderate slope.

**Survey Area Occurrence.** Badgers have been documented approximately 1 mile east of the survey area in the grassland hills and north banks of San Antonio Reservoir (SFPUC, 2010a).[171] Although most of the grassland within the survey area is located within close vicinity of quarry operations, some mammal and ground squirrel burrows are located within the survey area. Due to a known occurrence record in the survey area vicinity, and potentially suitable grassland habitat present, badger use of the site cannot be ruled out.

### 5.14.2.9 Special-Status Plant Species

A full list of 41 special-status plant species considered as potentially occurring in the project area is included in Appendix BIO1.[172] This list was compiled from California Natural Diversity Database (CNDDB) and CNPS queries for the nine-quadrangle area centered on the La Costa Valley 7.5-minute quadrangle;[173,174] USFWS official lists;[175] and review of previous environmental studies in the vicinity of the survey area. No federal- or state-listed species were documented within 5 miles or determined to have potentially suitable habitat onsite. From the list of 41 special-status plant species considered, a list of 8 special-status plants was given further consideration as having potential to occur in the survey area. These consisted of species appearing on CNDDB and CNPS queries for the La Costa Valley and Niles quadrangles (including CNPS Rare Plant Ranks 1 and 2); any rare (i.e., CNPS Rank 1 or 2, candidate or listed) plant species known from the Alameda Watershed;[176] and rare species which, in the opinion of the investigators, should be further considered based on similarity of the project area to known habitat and distribution for the species. **Table 5.14-2** presents information on the name, status, habitat, distribution, flowering period and an assessment of the potential for the species to occur in the project area for these 8 special-status plants. Appendix BIO1 provides additional narrative on the ecology, distribution and known and potential occurrence of these species within the region.

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[171] SFPUC, 2010a. GIS data relating to sensitive species and other biological resources, supplied by SPFUC for the project vicinity. Shapefiles entitled “SSAnimals_pt,” “SSAnimals_py,” and "SFPUC PondSurvey."

[172] Note: CNDDB and CNPS queries also include CNPS Rank 3 and 4 species. Data were collected on these species if they were encountered in the field, but SF Planning Department policy does not consider these species to be special-status and impacts on these species is not necessarily considered significant. However, occurrence data are provided in Appendix BIO1.

[173] California Natural Diversity Database, Rarefind 5 printout and GIS database for plants on the Niles, La Costa Valley, Calaveras Reservoir, Milpitas, Newark, Hayward, Mountain View, Livermore and Dublin 7.5-minute topographic quadrangles. Initially accessed April 27, 2015; subsequently accessed on March 9, 2016.

[174] California Native Plant Society Rare Plant Program Inventory of Rare and Endangered Plants (online edition, v8-02). Nine-quad search centered on La Costa Valley 7.5-minute topographic quadrangles. California Native Plant Society, Sacramento, CA. Website http://www.rareplants.cnps.org (Initially accessed 10 May 2015; subsequently accessed on March 9, 2016).

[175] U.S. Fish and Wildlife Service, Resource List of Federal Endangered and Threatened Species that Occur in or may be Affected by the Alameda Creek Recapture Project. Data initially retrieved April 27, 2015; subsequently accessed on March 9, 2016.

[176] Nomad Ecology, Focused Rare Plant Survey Report, Alameda Watershed, Alameda and Santa Clara Counties, California, prepared for San Francisco Public Utilities Commission, San Francisco, 2009.

## TABLE 5.14-2
## SPECIAL-STATUS PLANTS KNOWN FROM THE REGION, ALAMEDA CREEK RECAPTURE PROJECT

| Common Name Scientific Name | Listing Status FESA/ CESA/ CRPR | Habitat and Distribution[b] | Elevation Range | Potential for Species Occurrence Within the Survey area | Blooming Period |
|---|---|---|---|---|---|
| **SPECIAL-STATUS PLANTS** | | | | | |
| Chaparral harebell *Campanula exigua* | –/–/1B.2 | Rocky, usually serpentinite chaparral habitats; on talus slopes; sometimes in coastal scrub or chaparral, at edges of blue oak and gray pine; vernally moist areas, often very open or barren. Nearest record is a general locality near Sunol, last seen in 1973. Most localities are south of the Alameda watershed. Range: ALA, CCA, SBT, SCL, STA. | 900-4100 feet | **Not observed.** Suitable serpentinite soil and chaparral habitats absent from the survey area; species not found during focused surveys for this and nearby projects. | May – June |
| Congdon's tarplant *Centromadia parryi* ssp. *congdonii* | –/–/1B.2 | Alkaline valley and foothill grassland, probably in low areas with high residual soil moisture. Reported in 2009 from vicinity of Andrade Road; also known from Irvington District in Fremont. Range: ALA, CCA, MNT, SCL, SLO, SMT. | 0-750 feet | **Not observed.** Alkaline soils absent from the survey area; species not found during focused surveys for this and nearby projects. | May – October, uncommonly in November |
| Hospital Canyon larkspur *Delphinium californicum* ssp. *interius* | –/–/1B.2 | Chaparral, cismontane woodland; wet, boggy meadows, openings in soft chaparral habitat, woodland in canyons; shaded gullies, sometimes in thick undergrowth. Nearest records are Williams Gulch and near Arroyo Mocho. Range: ALA, CCA, MER, SBT, SCL, SJQ, SBT. | 750-3600 feet | **Not observed.** Suitable chaparral and woodland habitats absent from the survey area; species not observed during suitably-timed surveys for this and nearby projects. | April – June |
| San Joaquin spearscale *Extriplex joaquiniana* | –/–/1B.2 | Chenopod scrub, meadows and seeps, playas, valley and foothill grassland; seasonal wetlands or alkali sink scrub. Nearest records are from Warm Springs in Fremont and Livermore area. Range: ALA, CCA, COL, FRE, GLE, MER, MNT, NAP, SBT, SCL* SJQ*, SLO, SOL, TUL*?, YOL | 0-2750 feet | **Not observed.** Suitable alkaline habitats absent from the survey area. Species not found during suitably-timed focused surveys for this and nearby projects. | April – October |
| Diablo helianthella *Helianthella castanea* | –/–/1B.2 | Broadleaved upland forest, chaparral, cismontane woodland, coastal scrub, riparian woodland, valley and foothill woodland; openings or outcrops in scrub or forest; often in soils formed on sandstone. Recent studies have concluded that species present in the Alameda watershed is California helianthella. Range: ALA, CCA, MRN, SFO, SMT; most localities in CCA | 200-4300 feet | **Not observed.** Although moderately suitable grassland habitat present in the survey area, species not found during suitably-timed focused surveys for this and other nearby projects. Project area appears to be out of range for species. | March – June |

## TABLE 5.14-2 (Continued)
## SPECIAL-STATUS PLANTS KNOWN FROM THE REGION, ALAMEDA CREEK RECAPTURE PROJECT

| Common Name Scientific Name | Listing Status FESA/ CESA/ CRPR | Habitat and Distribution[b] | Elevation Range | Potential for Species Occurrence Within the Survey area | Blooming Period |
|---|---|---|---|---|---|
| **SPECIAL-STATUS PLANTS (cont.)** | | | | | |
| California alkali grass *Puccinellia simplex* | --/--/1B.2 | Meadows and seeps, saline flats; chenopod scrub, valley and foothill grasslands, vernal pools. Nearest record is 5 miles south of Livermore in Vallecitos area. Range: ALA, BUT, CCA, COL, GLE, KRN, KNG, LAK, LAX, FRE, MAD, MER, NAP, SCL, SCR, SOL, STA, SBD, SLO, YOL. | 0-3050 feet | **Not observed.** Alkaline soils, vernal pools, and chenopod scrub are unknown from the project area; species not found during suitably-timed focused surveys. | March-May |
| Most beautiful jewelflower *Streptanthus albidus* ssp. *peramoenus* | –/–/1B.2 | Chaparral, coastal scrub woodland, and grassland; outcrops and barren areas on south- and west-facing exposures on ridges and slopes; serpentine soils. Nearest records are from Sunol Regional Wilderness, Goat Rock, and east of Calaveras Reservoir. Range: ALA, CCA, SCL, MNT, SLO. | 300-3300 feet | **Not observed.** Suitable habitats absent from survey area; species not found during suitably-timed focused surveys for this and nearby projects. | April September, uncommonly in March and October |
| Slender-leaved pondweed *Stuckenia filiformis* ssp. *alpina* | –/–/2B.2 | Shallow freshwater marshes and swamps. Record from Niles quadrangle. Range: ALA, BUT, CCA, ELD, LAS, MER, MON, MOD, MPA, PLA, SCL* SIE, SHA, SMT, SON, SOL, AZ, NV, OR, + | 980-7050 feet | **Not observed.** Suitable habitats absent from survey area; species not found during suitably-timed focused surveys for this and nearby projects. | May – July |

**STATUS CODES:**

FEDERAL ENDANGERED SPECIES ACT (FESA)
FE = Listed as Endangered (in danger of extinction) by the Federal Government.
FT = Listed as Threatened (likely to become Endangered within the foreseeable future) by the Federal Government.
FC = Candidate to become a *proposed* species.

CALIFORNIA ENDANGERED SPECIES ACT (CESA)/CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE (CDFW)
CE = Listed as Endangered by the State of California.
CT = Listed as Threatened by the State of California.
CC= Candidate to become a *proposed* species.

California Rare Plant Rank (CRPR; Formerly known as CNPS List):
1A = Plants presumed extinct in California.
1B = Plants rare, threatened, or endangered in California and elsewhere.
2A = Plants presumed extirpated in California.
2B = Plants rare, threatened, or endangered in California, but more common elsewhere.
3 = Plants about which more information is needed.
4 = Plants of limited distribution.

An extension reflecting the level of threat to each species is appended to each CRPR as follows:
.1 – Seriously threatened in California.
.2 – Moderately threatened in California.
.3 – Not very threatened in California.

**TABLE 5.14-2 (Continued)**
**SPECIAL-STATUS PLANTS KNOWN FROM THE REGION, ALAMEDA CREEK RECAPTURE PROJECT**

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[b] Distribution range is based on County codes, as follows:

County abbreviations: AMA--Amador; BUT-- Butte; CAL-- Calaveras; CCA--Contra Costa; COL—Colusa; DNT--Del Norte; ELD--El Dorado; FRE—Fresno; GLE—Glenn; HUM—Humboldt; KRN—Kern; LAK—Lake; LAS—Lassen; LAX--Los Angeles; MAD—Madera; MOD—Modoc; MEN—Mendocino; MER—Merced; MNT—Monterey; MPA—Mariposa; MRN—Marin; NEV—Nevada; ORA—Orange; PLA—Placer; PLU—Plumas; RIV—Riverside; SAC—Sacramento; SBA--Santa Barbara; SBD--San Bernardino; SBT--San Benito; SCL--Santa Clara; SCR--Santa Cruz; SCT--Santa Catalina Island; SCZ--Santa Cruz Island; SDG--San Diego; SFO--San Francisco; SHA—Shasta; SIE—Sierra; SIS—Siskiyou; SJQ--San Joaquin; SMI--San Miguel Island; SMT--San Mateo; SNI--San Nicolas Island; SOL—Solano; SON—Sonoma; SRO--Santa Rosa Island; TEH—Tehama; TRI—Trinity; TUL—Tulare; VEN—Ventura; YOL—Yolo; YUB—Yuba
"*" indicates species is presumed extirpated from county; "?" indicates questionable record from county

SOURCES:

California Department of Fish and Wildlife (CDFW), California Natural Diversity Database (CNDDB) Rarefind 5 printout and GIS database for plants, Niles, La Costa Valley, Calaveras Reservoir, Milpitas, Newark, Hayward, Mountain View, Livermore, and Dublin 7.5 minute topographic quadrangles. Accessed April 27, 2015 and March 9, 2016.

California Native Plant Society (CNPS) Rare Plant Program Inventory of Rare and Endangered Plants (online edition, v8-02). Nine-quad search centered on La Costa Valley 7.5-minute topographic quadrangles. California Native Plant Society, Sacramento, CA. Website http://www.rareplants.cnps.org (Initially accessed 10 May 2015; subsequently accessed on March 9, 2016).

Consortium of California Herbaria, collection records for plants listed in table, http://ucjeps.berkeley.edu/consortium/, information retrieved May 7, 2015.

U.S. Fish and Wildlife Service, Resource List of Federal Endangered and Threatened Species that Occur in or may be Affected by the Alameda Creek Recapture Project. Data initially retrieved April 27, 2015.

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No special-status plants were found in the survey area during seasonally-appropriate, floristic surveys. Based on the habitats present, no special-status plants are expected to occur there due to the highly disturbed nature of much of the project area, and the relatively common habitats and soil types found there.

## 5.14.3 Regulatory Framework, Terrestrial Biological Resources

### 5.14.3.1 Federal Regulations

#### *Endangered Species Act*

FESA, which is administered by USFWS and NMFS, protects fish and wildlife species identified by these agencies as threatened or endangered, as well as the habitats of identified species. In general, NMFS is responsible for the protection of FESA-listed marine species and anadromous fishes, whereas the USFWS has jurisdiction over FESA-listed wildlife, plant, and freshwater fish species.

*Endangered* refers to species, subspecies, or distinct population segments that are in danger of extinction throughout all or a significant portion of their range.

*Threatened* refers to species, subspecies, or distinct population segments that are likely to become endangered in the near future.

*Take*[177] of listed species can be authorized through either the Section 7 consultation process for actions undertaken by federal agencies, or through the Section 10 permit process for actions undertaken by non-federal agencies where a Section 404 permit or other federal approval is not required.

Species protected by FESA with the potential to occur in the project area include California tiger salamander, California red-legged frog, and Alameda whipsnake.

### *Migratory Bird Treaty Act*

The Federal Migratory Bird Treaty Act (MBTA) (16 USC 703) authorizes the U.S. Secretary of the Interior to protect and regulate the taking of migratory birds. It establishes seasons and bag limits for hunted species and protects migratory birds, their occupied nests, and their eggs (16 USC 703; 50 CFR 10, 12). Most actions that result in taking or in permanent or temporary possession of a protected species constitute violations of the MBTA. Examples of permitted actions that do not violate the MBTA are the possession of a hunting license to pursue specific gamebirds, legitimate research activities, display in zoological gardens, bird-banding, and other similar activities. The USFWS is responsible for overseeing compliance with the MBTA, and the U.S. Department of Agriculture's Animal Damage Control Officer makes recommendations on related animal protection issues.

### *Clean Water Act Section 404*

The federal Clean Water Act (CWA) was enacted as an amendment to the federal Water Pollution Control Act of 1972, which outlined the basic structure for regulating discharges of pollutants to waters of the United States. The CWA serves as the primary federal law protecting the quality of the nation's surface waters, including lakes, rivers, and coastal wetlands.

Waters of the United States are areas subject to federal jurisdiction pursuant to Section 404 of the CWA. Waters of the United States are typically divided into two types: (1) wetlands and (2) other waters of the United States. Wetlands are "areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions" (33 CFR Section 328.3[b], 40 CFR Section 230.3). To be considered subject to federal jurisdiction, a wetland must normally support hydrophytic vegetation (plants growing in water or wet soils), hydric soils, and wetland hydrology.[178] Other waters of the United States are seasonal or perennial water bodies, including lakes, stream channels, drainages, ponds, and other surface water features, that exhibit an ordinary high-water mark but lack positive indicators for the three wetland parameters (33 CFR 328.4).

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[177] FESA defines *take* as "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct."

[178] Environmental Laboratory. 1987. Corps of Engineers Wetland Delineation Manual, January 1987, Final Report, Department of the Army Waterways Experiment Station, Vicksburg, Mississippi.

CWA Section 404 regulates the discharge of dredged and fill materials into waters of the United States. Applicants must obtain a permit from the Corps for discharges of dredged or fill material into waters of the United States, including wetlands, before proceeding with a proposed activity. The proposed project would not result in the discharge of dredged or fill material into federally jurisdictional waters; therefore, a Section 404 permit would not be needed.

## 5.14.3.2 State Regulations

### *California Endangered Species Act*

CESA (Fish and Game Code Sections 2050–2097), which is administered by CDFW, prohibits the take[179] of plant and animal species designated by the Fish and Game Commission as either threatened or endangered in the State of California. Section 2081 of CESA allows CDFW to authorize exceptions to the state's prohibition against take of a listed species, such as for educational, scientific, or management purposes. Species protected by CESA with the potential to occur in the project area include California tiger salamander and Alameda whipsnake.

### *California Fish and Game Code*

#### Fully Protected Species

California Fish and Game Code Section 2080 provides protection from take for a variety of species, referred to as fully protected species. Except for take of species related to scientific research, all take of fully protected species is prohibited. Fully protected wildlife species that have the potential to occur in the project area include white-tailed kite and golden eagle.

#### Streambed Alteration Agreements

Under California Fish and Game Code Section 1602 et seq., CDFW has jurisdictional authority over wetland resources associated with rivers, streams, and lakes. CDFW can regulate all work under the jurisdiction of California that would: substantially divert, obstruct, or change the natural flow of a river, stream, or lake; substantially change the bed, channel, or bank of a river, stream, or lake; or use material from a streambed.

In practice, CDFW typically marks its jurisdictional limit at the top of the stream or lake bank or the outer edge of the riparian vegetation, where present. Because riparian habitats do not always support wetland hydrology or hydric soils, wetland boundaries (as defined by CWA Section 404) sometimes include only portions of the riparian habitat adjacent to a river, stream, or lake. Therefore, jurisdictional boundaries under Section 1602 may encompass a greater area than those regulated under CWA Section 404.

The CDFW requires a Streambed Alteration Agreement notification for activities within its jurisdictional area. If CDFW determines that a project would result in substantial adverse effects on

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[179] *Take* in the context of CESA means to hunt, pursue, kill, or capture a listed species, as well as any other actions that may result in adverse impacts when attempting to take individuals of a listed species. The take prohibitions also apply to candidates for listing under CESA.

an existing fish or wildlife resource, CDFW would prepare a Lake or Streambed Alteration Agreement that includes reasonable measures to protect the resources. The streambed or lakebed alteration agreement is not a permit, but rather a mutual agreement between CDFW and the applicant.

#### Bird/Raptor Protections in the Fish and Game Code

Section 3503 of the California Fish and Game Code prohibits take, possession, or destruction of the eggs and nests of all birds. Section 3503.5 prohibits the take of raptor species and the destruction of raptor nests. Take or possession of any migratory, non-game bird as designated in the MBTA is prohibited under Sections 3513 and 3800.

### *Water Quality Certification (Clean Water Act Section 401)*

Under CWA Section 401, applicants for a federal license or permit to conduct activities that may result in the discharge of a pollutant into waters of the United States must obtain certification from the state in which the discharge would originate or, if appropriate, from the interstate water pollution control agency with jurisdiction over affected water at the point where the discharge would originate. The California RWQCB administers this certification. Therefore, all projects that have a federal component and that may affect state water quality (including projects that require federal agency approval, such as issuance of a Section 404 permit) must also comply with CWA Section 401. The project would not result in the discharge of a pollutant into waters of the United States.

### *Porter-Cologne Water Quality Control Act of 1969*

The Porter-Cologne Water Quality Control Act (Porter-Cologne Act) established the State Water Resources Control Board (SWRCB) and divided the state into nine basins, each with its own regional board (RWQCB). The SWRCB is the primary state agency responsible for protecting the quality of the state’s surface and subsurface water supplies, while the RWQCBs are responsible for developing and enforcing water quality objectives and implementation plans (basin plans).

The Porter-Cologne Act authorizes the SWRCB to enact state policies regarding water quality in accordance with Section 303 of the CWA. In addition, the act authorizes the SWRCB to issue Water Discharge Requirements for projects that would discharge to state waters. “Waters of the state” are broadly defined as “any surface water or groundwater, including saline waters, within the boundaries of the state”[180] and include isolated, intrastate, and non-navigable waters and/or wetlands. The Porter-Cologne Act also provides for protection of the beneficial uses of waters of the state, as described in the regional basin plan.

With respect to biological resources, the SWRCB and RWQCBs have authority over any fill activities within state waters, including isolated water/wetlands that may be outside the jurisdiction of the Corps. The California Wetlands Conservation Policy Executive Order W-59-93) established a primary objective to “ensure no overall net loss….of wetlands acreage and values in

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[180] California Water Code Section 13050.

California." The RWQCBs implement this policy, which requires mitigation for wetland impacts. Construction of the proposed project would not result in discharges into state waters.

### 5.14.3.3 Local Plans and Policies

The SFPUC, as a government agency and public utility, has intergovernmental immunity from the building and zoning ordinances of other cities and counties for activities conducted on the land it owns, leases, or acquires. The issue of intergovernmental immunity is discussed in greater detail in Chapter 4, Plans and Policies.

The proposed project would be constructed on SFPUC watershed lands within the Sunol Valley in unincorporated Alameda County. The City and County of San Francisco (CCSF) exerts land use control over CCSF-owned lands and has adopted the *Alameda Watershed Management Plan* (Alameda WMP) to manage these SFPUC watershed lands.

The section below discusses local plan policies and the local tree ordinance because they are specifically related to the significance criteria applied to assess impacts on biological resources. This discussion is followed by a summary of the relevant requirements of the Alameda WMP.

#### *East County Area Plan*

On May 5, 1994, the Alameda County Planning Commission adopted the East County Area Plan (ECAP). The Plan was later modified in November 2000 by the passage of the Measure D Initiative. The East County encompasses 418 square miles of eastern Alameda County; it extends from the Pleasanton/Dublin ridgeline on the west to the San Joaquin County line on the east and from the Contra Costa County line on the north to the Santa Clara County line on the south. The Project area is located with the East County. The project area is designated as Water Management land within the ECAP. ECAP policies pertaining to natural resources with potential relevance to implementation of the proposed project include the following:

- *Policy 110*: The County shall require that developments are sited to avoid or, if avoidance is infeasible, to minimize disturbance of large stands of mature, healthy trees and individual healthy trees of notable size and age. Where healthy trees will be removed, the County shall require a tree replacement program which includes a range of tree sizes, including specimen-sized trees, to achieve immediate visual effect while optimizing the long-term success of the replanting effort.
- *Policy 122*: The County shall encourage that wetland mitigation be consolidated in areas that are relatively large and adjacent to or otherwise connected to open space. To the extent possible, these areas should be included in, adjacent to, or linked through open space corridors with lands designated as "Resource Management" that are managed specifically for the preservation and enhancement of biological resources.
- *Policy 123*: Where site-specific impacts on biological resources resulting from a proposed land use outside the Urban Growth Boundary are identified, the County shall encourage that mitigation is complementary to the goals and objectives of the ECAP. To that end, the County shall recommend that mitigation efforts occur in areas designated as "Resource Management" or on lands adjacent to or otherwise contiguous with these lands in order to establish a continuous open space system in East County and to provide for long term protection of biological resources.

- *Policy 125*: The County shall encourage preservation of areas known to support special status species.
- *Policy 126*: The County shall encourage no net loss of riparian and seasonal wetlands.
- *Policy 129:* The County shall protect existing riparian woodland habitat present along the Arroyo Mocho, Arroyo Del Valle, Arroyo Las Positas, Arroyo de la Laguna; and Alamo, Tassajara, and Alameda Creeks. Exceptions to these requirements shall apply for those portions of the Arroyo del Valle to be excavated for water transfer Lakes A and B under the Specific Plan for the Livermore- Amador Valley Quarry Area Reclamation, which shall instead be subject to riparian habitat restoration as specified by Policies 128 and 164; and for any approved quarry operations in Regionally Significant Construction Aggregate Resource Sector C (Arroyo Mocho) or any other streambeds, which shall also be subject to habitat restoration under Policies 128 and 164, and according to applicable State Public Resources Code requirements, to the extent that proposed reclamation specifies riparian habitat as the end use.

### *Alameda County Tree Ordinance*

The Alameda County Tree Ordinance (Ordinance No. 0-2004-23, Chapter 12.11 of the Alameda County General Ordinance Code) applies only to trees within a county right-of-way. Alameda County does not have a tree ordinance that applies to land outside of the county right-of-way. The Alameda County Tree Ordinance requires project sponsors to obtain an encroachment permit for planting, pruning, or removing trees in the right-of-way of a county road, and to replace any removed trees.

### *Alameda Watershed Management Plan*

The Alameda Watershed Management Plan (WMP), adopted by the CCSF in 2000, includes policies for watershed management. Those relevant to the proposed project are summarized below.

- *Policy V1*: Manage an Integrated Pest Management program in accordance with the City and County of San Francisco's City Pesticide Management Plan ordinance (No. 274-97) and the SFPUC Integrated Pest Management Plan.
- *Policy V3*: Prohibit the planting of exotic plant species.
- *Policy V4*: Reduce the occurrence of noxious weeds and invasive exotic plant species through eradication and control practices.
- *Policy V5*: Protect, preserve and enhance significant botanical resources, including populations of rare, threatened, endangered and sensitive plant species and their habitat.
- *Policy V7*: Preserve the biodiversity and genetic integrity of the watershed plant communities, where possible.
- *Policy V8*: Protect, conserve and enhance wetlands and riparian communities. The WMP [Figure 2-5] identifies valley oak woodland [mapped below the Sunol Water Temple and on the side tributary to the west], arroyo willow, coast live oak riparian forest, and sycamore alluvial woodland as highly sensitive communities within the survey area.

- *Policy V9*: Protect and restore unique, local and/or indigenous plant species to maintain biodiversity and specialized habitat values.
- *Policy W1*: Protect high Ecological Sensitivity Zones, including host plant communities supporting populations of State and federally listed animals. The WMP identifies Alameda Creek and adjacent land through the entire survey area as an area of high ecological sensitivity. Highly sensitive habitats include the sensitive communities mentioned above plus annual grassland [see Figure 2-6], which has importance for special status animals.
- *Policy W2*: Protect, conserve and enhance existing native wildlife populations and their habitat.
- *Policy W3*: Preserve the biodiversity and genetic integrity of local wildlife populations, where possible.
- *Policy W4*: Protect, conserve and enhance ecosystems that provide important wildlife habitat values.
- *Policy W6:* Maintain the integrity of the watershed creeks to retain their value as riparian ecosystems and wildlife corridors.
- *Policy W10:* Protect the integrity of wildlife movement corridors by properly siting infrastructure, facilities, and public access features to maintain landscape connectivity, and minimize fragmentation and degradation of wildlife habitat.

### SFPUC Alameda Watershed Habitat Conservation Plan

The SFPUC Alameda Watershed Habitat Conservation Plan (AWHCP) is currently in draft form and not yet finalized as an HCP.[181] The overall goal of the AWHCP is to develop and implement a conservation plan that will accomplish the following objectives:

- Avoid, minimize, and mitigate for potential adverse effects on threatened and endangered species resulting from SFPUC activities;
- Accommodate current and future operations and maintenance (O&M) activities in the Alameda watershed; and
- Provide the basis for take authorization pursuant to FESA and CESA.

California red-legged frog is a covered species under the AWHCP. Other terrestrial species included in the AWHCP are California tiger salamander, Alameda whipsnake, foothill yellow-legged frog, western pond turtle, tricolored blackbird, and western burrowing owl.

With respect to fisheries resources, the SFPUC is working with USFWS and NMFS in developing the AWHCP. Steelhead is a covered species in the AWHCP. Other fish species included in the AWHCP are Pacific lamprey and Chinook salmon.

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[181] SFPUC Alameda Watershed Habitat Conservation Plan, http://sfwater.org/index.aspx?page=412, accessed March 19, 2016.

### *East Alameda County Conservation Strategy*

The project is located within the planning area for the East Alameda County Conservation Strategy (EACCS). The EACCS is a joint effort among several local, State, and federal agencies intended to provide an effective framework to protect, enhance and restore natural resources in eastern Alameda County while improving and streamlining the environmental permitting process for impacts resulting from infrastructure and development projects. The EACCS is focused on the conservation of biological resources such as endangered and other special-status plant and wildlife species, and sensitive habitat types (e.g., wetlands, riparian corridors, rare upland communities). The EACCS enables local projects to comply with State and federal regulatory requirements within a framework of comprehensive conservation goals and objectives, and to be implemented using consistent and standardized mitigation requirements. By implementing the EACCS, local agencies can more easily address the legal requirements relevant to these species. The EACCS will not result in permits, but rather serves as guidance for project-level permits, and the federal and State resource agencies are participating in the development of the EACCS with the intent that it becomes the blueprint for all mitigation and conservation in the study area. The USFWS issued a Programmatic Biological Opinion for Corps-permitted projects that are utilizing EACCS and may affect federal listed species that are addressed in EACCS.

The EACCS study area encompasses 271,485 acres, or approximately 52 percent of Alameda County, including the cities of Dublin, Livermore, and Pleasanton. The western boundary of the study area runs along the western boundary of the Alameda Creek watershed and the northern, southern, and eastern boundaries follow the Alameda County line with its adjacent counties. The EACCS study area includes the watershed lands in the Alameda Creek watershed within Alameda County, or about 23,000 acres out of the 36,000-acre SFPUC Alameda watershed, including the project area. The EACCS study area has been divided into 18 discrete units, or conservation zones, to identify locations for conservation actions in areas with the same relative ecological function as those areas where impacts occur. The ACRP project area is located within Conservation Zone 15.[182] The overall conservation priorities for Conservation Zone 15 are:

- Protect, restore and conserve sycamore alluvial woodland, and improve habitat value for central California coast steelhead and Alameda whipsnake along Alameda Creek.
- Protect critical habitat and recovery unit habitat for Alameda whipsnake.
- Protect potential breeding and movement habitat for foothill yellow-legged frog.
- Protect serpentine bunchgrass grassland and northern coastal scrub/Diablan sage scrub land cover.
- Protect and enhance opportunities for ponds to increase potential breeding habitat for California red-legged frog.

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[182] The northern boundary of CZ 15 is I-680; CZ 14 lies to the north and includes the portion of the survey area encompassing Alameda Creek to Arroyo de la Laguna.

- Complete surveys in annual grassland habitat for callippe silverspot butterfly larval host/food plants and map occurrences of plant populations.
- Protect annual grassland in area between SR 84 and San Antonio Reservoir to support potential habitat for callippe silverspot butterfly, western burrowing owl and American badger.

The EACCS is guidance document and is not an adopted or approved management plan, and is not a Habitat Conservation Plan or a Natural Community Conservation Plan.

### 5.14.3.4 CDRP Regulatory Permit Requirements

#### *National Marine Fisheries Service (NMFS) Biological Opinion*

A summary of the NMFS Biological Opinion for the CDRP is provided below in Section 5.14.6, under the Fisheries portion of this section. As described in Section 5.14.6, the Calaveras Dam Replacement Project Adaptive Management Implementation Plan for Central California Coast Steelhead[183] is required to be implemented under the Biological Opinion. The Adaptive Management Implementation Plan provides language for monitoring amphibians and riparian vegetation as part of adaptive management for steelhead. The Plan does not include performance standards for amphibians. The performance criterion related to riparian habitat states that the project should have "a post-project increase in the quality and quantity of steelhead/rainbow trout spawning and rearing habitat," but does not include a stand-alone performance criterion for riparian vegetation.

#### *California Department of Fish and Wildlife Streambed Alteration Agreement*

A CDFW Streambed Alteration Agreement (SAA) was issued for the CDRP in June 2011. The SAA stipulates that the SFPUC implement the Adaptive Management Implementation Plan to maintain in good health biological resources below Calaveras Dam and the ACDD.

## 5.14.4 Impacts and Mitigation Measures, Terrestrial Biological Resources

### 5.14.4.1 Significance Criteria

The project would have a significant impact related to terrestrial biological resources if it were to:

- Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations or by the CDFW or USFWS;
- Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations or by the CDFW or USFWS;

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[183] SFPUC, Calaveras Dam Replacement Project Final Adaptive Management Implementation Plan, July 16, 2010.

- Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means;
- Interfere substantially with the movement of any native resident or migratory wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites;
- Conflict with any local policies or ordinances protecting terrestrial biological resources, such as a tree preservation policy or ordinance; or
- Conflict with the provisions of an adopted habitat conservation plan, natural community conservation plan, or other approved local, regional, or state habitat conservation plan pertaining to terrestrial biological resources.

### 5.14.4.2 Approach to Analysis

#### *Criterion Not Analyzed*

Due to the nature of the proposed project, there would be no impact on terrestrial biological resources related to the following topic(s) for the reasons described below:

- ***Conflict with the Provisions of an Adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other Adopted Local, Regional, or State Habitat Conservation Plan.*** There are no adopted habitat conservation plans, natural community conservation plans, or other approved plans that apply to the proposed ACRP project area. Thus, this criterion is not applicable to construction or operation of the proposed project and is not discussed further.

#### *Overall Approach*

Three basic changes in biological conditions could result from implementation of the proposed project:

- Effects on wetlands, aquatic resources, or riparian habitat, including conversion from one riparian habitat type to another
- Effects on other sensitive habitats (i.e., sensitive natural communities and wildlife movement corridors)
- Effects on special-status wildlife – direct mortality and/or alteration of habitat

For each of the above, this EIR provides a project-level evaluation of the direct and indirect impacts resulting from project-related construction and operational activities as well as an analysis of the project's contribution to cumulative impacts.

#### *Baseline Conditions*

As described in Section 5.1.2, Baseline Conditions for Evaluation of Project Impacts, the appropriate baseline to use for flow-dependent resources—including terrestrial biological resources—is the with-CDRP conditions in order to differentiate the ACRP impacts from those of the CDRP. However, for reasons described below, the existing conditions are considered a reasonable approximation for the baseline in the terrestrial biological resources analysis. Changes in habitat resulting from alteration of flows in Alameda Creek associated with CDRP operations would take from years to decades to fully develop, yet the proposed project is scheduled to be operational about the same time as or soon after CDRP operations commence (for the purposes of this EIR, the ACRP is assumed to begin operations no later than two years after CDRP goes into effect). Therefore, the existing terrestrial habitat and special-status species conditions are concluded to serve as an approximation for with-CDRP conditions. This analysis describes the existing conditions setting while acknowledging that terrestrial biological resources might change under with-CDRP conditions. Where the hydrology analysis indicates that flows would be expected to differ under with-CDRP conditions from existing conditions downstream of the quarries, the general direction of change under with-CDRP conditions is discussed and taken into account in the impact assessment.

### Construction Impacts

Construction-related impacts in this section are evaluated against the existing conditions. The current construction schedule for the proposed project is from fall 2017 to spring 2019 (18 months), and construction of the CDRP is also anticipated to be completed in spring 2019. Thus, it is possible that operation of the CDRP will commence prior to completion of ACRP construction, and that with-CDRP conditions could occur while ACRP is still under construction. However, as explained above in Section 5.14.1, Introduction, with-CDRP conditions are expected to result in flow-related changes, primarily within Alameda Creek, which is outside of the upland area of the project construction footprint. Existing conditions and with-CDRP conditions within the upland area of the project construction footprint would thus be the same with respect to terrestrial biological resources. Operation of the CDRP is not expected to change any of the baseline terrestrial biological resources conditions analyzed in this section. Therefore, no change in the approach to this impact analysis is necessary to account for the with-CDRP conditions. More specifically, the construction-related impacts of the ACRP presented in this section would be the same regardless of the implementation of bypass flows at the Alameda Creek Diversion Dam and instream flow releases from Calaveras Reservoir, and all other aspects of CDRP operations that characterize the with-CDRP conditions.

### Operational Impacts

Operational impacts are compared to with-CDRP conditions, which would occur following completion of CDRP and implementation of the CDRP instream flow schedules, but, as described above, vegetation or habitat conditions respond slowly to the hydrological changes predicted to occur under with-CDRP conditions, and would be unlikely to change appreciably before the ACRP begins operation, even for a year or two after CDRP operations are implemented. However, where habitat and special-status species conditions could change if the ACRP operation occurs substantially after CDRP implementation and the changes can be adequately predicted, any changes in project effects from existing conditions are discussed in the impact analysis.

### *Significance Thresholds*

For purposes of determining the significance of impacts to riparian habitats, this EIR takes into account the high variability and transitory nature of the existing conditions. Alameda Creek and its associated riparian habitats are subject to highly variable surface and subsurface flows under existing conditions and will continue to be so under with-CDRP conditions. In the area of the quarry pits, the unpredictable and variable quarry NPDES discharges, quarry pit water management practices, and other quarry operations affecting surface and subsurface conditions in particular, are part of the existing and with-CDRP conditions. The historical records show evidence of periodic stress and damage to riparian habitats, and in particular tree-dominated habitats, in response to periods of reduced quarry NPDES discharges. The impact analysis accounts for this variability in assessing potential impacts. Further, the tree-dominated riparian habitat in Alameda Creek Subreaches A, B, and C in its present state is relatively recently formed and artificially sustained by quarry NPDES discharges within an active mining area. The transitory nature of quarry operations is taken into account in assessing appropriate mitigation.

Wetlands, including riparian habitats, are a special case in the determination of significance thresholds. Wetlands are widely recognized as having exceptional productivity and species diversity. They have been greatly altered and reduced in California and elsewhere, and by policy the threshold of significance for wetlands is no-net-loss of extent. This analysis applies the no-net-loss threshold with respect to wetlands, riparian habitats, and sensitive natural communities, but also takes into account the variability of the baseline conditions and the potential under baseline conditions for one riparian habitat type to convert to another type due to this variability.

Tree-supporting riparian vegetation (willow and mixed riparian forest), is most dependent on the pattern of quarry NPDES discharges, and is the vegetation type that provides the greatest habitat structure and complexity. It is also the vegetation type most vulnerable to impacts potentially resulting from the project. Project impacts could result in replacement or more rapid replacement of one riparian vegetation type with another, such as perennial instream wetland with seasonal instream wetland, mulefat scrub with willow scrub, and so on. All such impacts could be considered potentially significant if a net loss is likely, although this would be tempered by the fact that any change of one riparian vegetation type would result in an increase of another riparian type. Consequently, the analysis takes into account the relative value of habitat types. Because of the habitat value of tree-supporting riparian vegetation, the potential loss of tree-supporting riparian vegetation is given the greatest scrutiny.

As discussed in the setting section, the baseline conditions show that dry-season quarry discharges have been instrumental in the development of tree-supporting riparian vegetation, replacing mulefat scrub. Also, however, in years of low dry-season discharges dieback or mortality of riparian tree (and possibly scrub) vegetation has occurred. This vegetation showed evidence of recovering its extent, if not its full ecological functions and services, during the baseline period. There is a challenge in translating a temporally-variable condition into a clear and quantifiable significance threshold of no-net-loss. On the basis that riparian vegetation maintained its extent, on average, during the baseline, the no-net-loss threshold for this specific impact is proposed as a multi-year rolling average measurement of extent of tree-supporting riparian vegetation. This would allow for occasional conditions of dieback or mortality, as has occurred in the baseline, but a sustained change would be detected, quantified and mitigated.

### 5.14.4.3 Construction Impacts

**Impact BI-1: Construction of the proposed project could have a substantial adverse effect on special-status species. (Less than Significant with Mitigation)**

As discussed in Section 5.14.2.7, above, no special-status plants are known to occur within or adjacent to the construction area and none are considered likely to occur there. Therefore, there would be ***no impact*** on special-status plants, and this impact discussion focuses on special-status animal species.

**California Tiger Salamander, California Red-legged Frog, Alameda Whipsnake**

Project construction activities would occur in areas that potentially serve as habitat for CTS, CRLF, and AWS. The quarry pit edges with overhanging riparian trees provide marginal quality non-breeding aquatic refugia habitat for CRLF. The upland non-native grassland, coyote brush scrub, mulefat scrub, willow thickets, and ruderal areas provide upland refugia or dispersal habitat for CTS, CRLF, and AWS.

While much of the proposed construction area (including Staging Areas 1, 2, and 3 and Permanent Spoils Site B) were recently cleared, graded, and previously enclosed by wildlife exclusion fence during construction of the SFPUC's SABPL and NIT projects, both projects have been completed and the temporarily impacted areas have been restored to pre-construction conditions. Therefore, under the baseline conditions with the restored habitat, there is potential for CRLF, CTS, and AWS to occur in these areas.

Site clearing and preparation for construction activities could remove refugia and dispersal habitat for these species. The movement of construction vehicles, equipment, or project materials across the project area could cause direct mortality of individuals, if present, by crushing them within or outside of their burrows. Trenches and excavations, if left open during the night, could trap CTS, CRLF, and AWS that are moving through the construction area, potentially resulting in injury to the animals. Construction activities could also impede the dispersal, foraging, or other movement of CTS, CRLF, and AWS. The presence of human activities and potential degradation of water quality (for CTS and CRLF) during construction could affect habitat and cause injury or mortality to CTS, CRLF, and AWS.

Potential adverse impacts on CTS, CRLF, and AWS upland refugia and dispersal habitat would be temporary during project construction. Temporary staging areas, spoils sites (which would be revegetated to pre-project conditions), HDPE discharge pipelines, 100-foot 36-inch-diameter pipeline connection to Sunol Pump Station, demolition of a segment of the Sunol Pump Station Pipeline and PG&E natural gas line, power line pole work areas, and power line trench areas would temporarily impact approximately 10 acres of CTS, CRLF, and AWS upland habitat. Construction of the Electrical Control Building, Electrical Transformer, Valve Vault, powerline poles, and Anchor Blocks would result in permanent loss of approximately 0.43 acre of upland habitat for these species.

Trenching for the HDPE discharge pipelines would occur above the aquatic margin of the quarry pit. However, the above-ground segment of the bundle of four 16-inch HDPE discharge pipelines would be installed from the HDPE discharge pipeline trench down to the aquatic margin of the pit. Only minor vegetation removal is anticipated for this work. There would be no significant loss of non-breeding aquatic refugia habitat in this area. However, CRLF have potential to be present within this work area and could be injured or killed during construction.

Loss of habitat and the potential for direct injury or mortality of CTS, CRLF, and AWS in these areas would be a *potentially significant* impact.

### Foothill Yellow-legged Frog

Foothill yellow-legged frog is not expected to occur in upland areas nor in and around Pit F2 where construction activities would occur. Therefore, ACRP construction would not directly or indirectly impact foothill yellow-legged frog.

### Western Pond Turtle

The aquatic margin of Pit F2 provides potential aquatic habitat for western pond turtle. As described for CRLF, trenching for the HDPE discharge pipelines would occur above the aquatic margin of the quarry pit. However, the above-ground segment of the bundle of four 16-inch HDPE discharge pipelines would be installed from the HDPE discharge pipeline trench down to the aquatic margin of the pit. Only minor vegetation removal is anticipated for this work, so there is no anticipated loss of western pond turtle aquatic habitat in this area.

It is anticipated that, if turtles are present within Pit F2 during construction of the HDPE Discharge Pipeline, they would move to other areas of the pit during construction. However, if a western pond turtle is present within the construction area, construction equipment or the placement of project materials could cause direct injury or mortality of individuals, by crushing them. This would be a *potentially significant* impact.

### Western Burrowing Owl

Non-native grassland and ruderal areas within the construction footprint provide potential habitat for western burrowing owl. Habitat quality is limited by the presence of active mining operations. This species was not observed during construction of the SFPUC's NIT and SABPL projects.[184,185] There is a low likelihood for owls to occur within or adjacent to the project area. If owls are present within the construction footprint during construction, there is a remote possibility of injury or mortality if a burrowing owl were to become trapped or buried in a burrow or crushed by construction equipment or vehicles while foraging in the project area. Additionally, if owls are present, their habitat could be temporarily lost as a result of construction

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[184] K. Stern Bureau of Environmental Management project manager, pers. comm., August 18, 2016
[185] M. Weinand of Environmental Management project manager, pers. comm., August 19, 2016

activities. If owls are located outside of, but in the vicinity of the project area, they could be impacted by construction noise or human disturbance. Loss of owl habitat or direct disturbance from construction activities or noise would be a *potentially significant* impact.

### Nesting Birds, Raptors, and Bats

Construction activities could result in direct impacts to breeding birds and roosting bats through direct removal of breeding or roosting habitat or disruption of breeding and roosting due to construction noise and activities. Project construction would result in the removal of one large mature tree in a ruderal area and possibly trimming and/or removal of other trees along the margin of Pit F2 that may provide breeding and roosting habitat for nesting birds, raptors, and bats. Potentially affected special-status bird and bat species that could occur in the area include white-tailed kite, northern harrier, Cooper's hawk, short-eared owl, loggerhead shrike, and pallid bat, among others. These species are sensitive to human activity and noise from construction activity in close proximity to an active nest or maternity site (for bats) could disrupt breeding of these species. Direct disturbance from construction activities to breeding birds or roosting bats would be a *potentially significant* impact.

### American Badger

Non-native grassland within the construction footprint provide potential habitat for American badger. Habitat quality is limited by the presence of active mining operations. However, there is some potential for badgers to occur within the project area. If badgers are present within the construction footprint during construction, there is a remote possibility of injury or mortality if a badger were to become trapped or buried in a burrow or crushed by construction equipment or vehicles while foraging in the project area. Additionally, if badgers are present, their habitat could be temporarily lost as a result of construction activities. This would be a *potentially significant* impact.

### Impact Conclusion

Construction of the proposed project could result in potentially significant impacts associated with the temporary and permanent loss of habitat and the potential for direct injury or mortality of CTS, CRLF, AWS, western burrowing owl, and American badger; potential for direct injury or mortality of western pond turtle; and disruption of breeding and roosting birds, raptors, and bats. However, with implementation of general protection measures, worker training and awareness programs, preconstruction surveys, vegetation restoration plan and compensatory mitigation, and specific minimization and avoidance measures as specified in Mitigation Measures M-BI-1a through M-BI-1i, described below, these impacts would be reduced to *less than significant with mitigation*.

#### Mitigation Measure M-BI-1a: General Protection Measures.

The SFPUC shall ensure that the following general measures are implemented by the contractor(s) during construction to minimize or avoid impacts on biological resources:

- Construction contractor(s) shall limit the construction disturbance area to that necessary for project construction and avoid outside areas by posting signage delineating the construction disturbance area with flags, stakes, or fencing.

- Protective fencing shall be installed outside the driplines of all trees to be retained that are located within 50 feet of any grading, road improvements, underground utilities, or other construction activity. A biologist who is experienced in special-status species and sensitive habitat identification and the SFPUC must first approve any encroachment beyond these fenced areas. The contractor shall maintain the temporary fencing until all construction activities are completed. No construction activities, parking, or staging shall occur beyond the fenced areas.
- Project-related vehicles shall observe a 15-mile-per-hour speed limit on unpaved roads in the work area, or as otherwise determined by the applicable regulatory agencies.
- The contractor shall provide closed garbage containers for the disposal of all food-related trash items (e.g., wrappers, cans, bottles, food scraps). All garbage shall be collected daily from the project area and placed in a closed container, from which garbage shall be removed weekly.
- Construction personnel shall not feed or otherwise attract fish or wildlife in the project area.
- No pets shall be allowed in the project area.
- No firearms shall be allowed in the project area.
- Staging areas shall be located at least 50 feet from riparian habitat, creeks, and wetlands.
- If vehicle or equipment fueling or maintenance is necessary, it shall be performed in the designated staging areas and at least 50 feet from riparian habitat, creeks, or wetlands.
- In cases where excavations require dewatering, the intakes shall be screened with a maximum mesh size of 5 millimeters.

**Mitigation Measure M-BI-1b: Worker Training and Awareness Program.**

The SFPUC shall ensure that mandatory biological-resources awareness training is provided to all construction personnel as follows:

- The training shall be developed and provided by a biologist who is experienced in special-status species and sensitive habitat identification or a construction compliance manager familiar with the sensitive species that may occur in the project area.
- The training shall be provided before any work, including vegetation clearing and grading, occurs within the work area boundaries.
- The training shall provide education on the natural history of the special-status species potentially occurring in the project area, and discuss the required mitigation measures to avoid impacts on the special-status species and the penalties for failing to comply with biological mitigation requirements.
- If new construction personnel are added to the project, the contractor shall ensure that they receive training prior to starting work. The subsequent training of personnel can include a videotape of the initial training and/or the use of written materials rather than in-person training by a biologist.

**Mitigation Measure M-BI-1c: Prevent Movement of Sensitive Wildlife Species through the Work Areas.**

To prevent CTS, CRLF, and AWS, western pond turtles, and American badgers from moving through the project area, the SFPUC or its contractors shall install temporary wildlife exclusion fencing along the work area boundaries (including access roads, staging areas, spoils sites, etc.) prior to the start of project construction activities. The SFPUC shall ensure that the temporary fencing is continuously maintained until all construction activities are completed and that construction equipment is confined to the designated work areas. The fencing shall be made of suitable material that does not allow any of the animals listed above to pass through, and the bottom shall be buried to a depth of 6 inches (or to a sufficient depth as specified by the applicable resource agencies) so that these species cannot crawl under the fence. Fencing shall be equipped with exit funnels at least every 200 feet. To provide wildlife refugia and minimize CTS and CRLF mortality during construction, 2-foot by 4-foot plywood coverboards shall be placed adjacent to the exclusion fence at a minimum interval of 200 feet, alternating inside and outside of the fence.

During fence installation and immediately prior to any initial ground-disturbing or vegetation removal activities, a biologist who is experienced in special-status species and sensitive habitat identification shall be present onsite to monitor for any special-status species present in suitable habitat within the fence installation area. If a special-status species is present within the fence installation area, work shall cease in the vicinity of the animal, and the animal shall be allowed to relocate of its own volition unless relocation is permitted by state and/or federal regulatory agencies. After construction is completed, the exclusion fencing and cover boards shall be removed.

**Mitigation Measure M-BI-1d: Preconstruction Surveys and Construction Monitoring and Protocols for California Tiger Salamander, California Red-Legged Frog, and Alameda Whipsnake.**

*Preconstruction Surveys*

Prior to initial ground-disturbing activities in the project area, a biologist who is experienced in the identification of CTS, CRLF, and AWS shall survey the project area for the presence of CTS, CRLF, and AWS, as follows:

> *California tiger salamander and California red-legged frog.* Not more than two weeks prior to the onset of work activities (including equipment mobilization) and immediately prior to commencing work, a biologist who is experienced in the identification of CTS and CRLF shall survey suitable habitat in the project area for CTS and CRLF. Burrow areas identified within the project boundaries shall be temporarily fenced and avoided, where feasible. If a burrow is present within the construction footprint and cannot be avoided, the biologist shall coordinate with USFWS and CDFW to avoid impacts to CTS and CRLF to the extent feasible using the most recent CTS and CRLF clearance methodology recognized by the USFWS and CDFW.
>
> *Alameda whipsnake.* Not more than two weeks prior to the onset of work activities (including equipment mobilization) and immediately prior to commencing work, a

biologist who is experienced in the identification of AWS shall conduct a reconnaissance survey of suitable upland habitat for AWS in the project area.

Federal or state listed species shall only be relocated upon authorization from federal (USFWS) and/or state (CDFW) regulatory agencies. Otherwise, encountered individuals shall be allowed to relocate of their own volition.

### *Construction Monitoring and Protocols*

At the beginning of each workday that includes initial ground disturbance, including grading, excavation, and vegetation-removal activities, a biologist who is experienced in the identification of CTS, CRLF, and AWS (biological monitor) shall conduct onsite monitoring for the presence of CTS, CRLF, and AWS in the area where ground disturbance or vegetation removal shall occur. The following protective provisions shall apply:

- Suitable CTS, CRLF, and AWS habitat shall be surveyed immediately prior to any ground-disturbing or vegetation removal activities.
- Perimeter fences shall be inspected to ensure they do not have any tears or holes, that the bottoms of the fences are still buried, and that no individuals have been trapped in the fences.
- Coverboards shall be inspected once a month between June 15 and October 15, once a week from October 15 to June 15, daily during a rain event, and once following the rain event (within 48 hours of the rain event), or as otherwise approved by USFWS and/or CDFW.
- Any CTS, CRLF, or AWS found along and inside the fence shall be closely monitored until they move away from the construction area or, if they don’t move out of the work area of their own volition shall be relocated by the biologist with authorization from USFWS and/or CDFW. The time to wait for the animal to move of its own volition shall be determined by the biological monitor and as approved by USFWS and/or CDFW.
- All open trenches or holes and areas under parked vehicles shall be checked for the presence of CTS, CRLF, and AWS.
- All excavated or deep-walled holes or trenches greater than 2 feet shall be covered at the end of each workday using plywood, steel plates, or similar materials, or escape ramps shall be constructed of earth fill or wooden planks to allow animals to exit. Before such holes are filled, they shall be thoroughly inspected for trapped animals.
- Project personnel shall be required to immediately report any harm, injury, or mortality of a special-status species during construction (including entrapment) to the construction foreman or biological monitor, and the construction foreman or biological monitor shall immediately notify the SFPUC. The SFPUC shall provide verbal notification to the USFWS Endangered Species Office in Sacramento, California and/or to the local CDFW warden or biologist (as applicable) and written notification as requested by the agencies.

The SFPUC shall designate an SFPUC representative as the point of contact in the event that a CTS, CRLF, or AWS is discovered onsite when the biological monitor is not present.

If the biological monitor or construction personnel find any of these species within the work area, construction activities shall cease in the immediate vicinity. The animals shall be allowed to relocate of its own volition outside of the work area or, if they don't move out of the work are of their own volition shall be relocated by a biologist who is experienced in the identification of CTS and CRLF. Federal or state listed species shall not be relocated without authorization from federal (USFWS) and/or state (CDFW) regulatory agencies.

Once all initial ground-disturbing activities are completed, the biological monitor shall perform spot checks of the project area at least once a week, and during rain events, for the duration of construction to ensure that the perimeter fence is in good order, trenches are being covered if left open overnight (or escape ramps provided), project personnel are conducting checks beneath parked vehicles prior to their movement, and all other required biological protection measures are being followed.

All observations of federal- and state-listed species shall be recorded in the CNDDB.

**Mitigation Measure M-BI-1e: Prepare and Implement a Vegetation Restoration Plan and Compensatory Mitigation.**

To restore temporarily impacted habitat for CTS, CRLF and AWS, the SFPUC shall prepare and implement a vegetation restoration plan with detailed specifications for minimizing the introduction of invasive weeds and restoring all temporarily disturbed areas, and shall ensure that the contractor successfully implements the plan. The plan shall indicate the best time of year for seeding to occur.

To facilitate preparation of the plan, the SFPUC shall ensure that, prior to construction, a botanist (experienced in identifying sensitive plant species in the project area) performs additional preconstruction surveys of the areas to collect more detailed vegetation composition data, including species occurrence, vegetation characterization (tree diameter size, etc.), and percent cover of plant species. Photo documentation shall be used to show pre-project conditions.

The minimum weed control and restoration measures as well as success criteria to be included in the vegetation restoration plan are described below.

*Invasive Weed Control Measures*

Invasive weeds such as yellow star-thistle, purple star-thistle, Italian thistle, bull thistle, milk thistle, shortpod mustard, jubata or pampas grass, and stinkwort readily colonize soils that have been disturbed by grading or other mechanical disturbance. Although much of the project area has an extensive weed infestation and relatively few native species, the SFPUC shall incorporate the following measures into the construction plans and specifications to prevent the further spread of invasive weeds into nearby areas:

- Construction equipment shall arrive at the project area free of soil, seed, and plant parts to reduce the likelihood of introducing new weed species.
- Any imported fill material, soil amendments, gravel etc., required for construction and/or restoration activities that would be placed within the upper 12 inches of the ground surface shall be free of vegetation and plant material.

- Certified, weed-free, imported erosion-control materials (or rice straw in upland areas) shall be used exclusively, as applicable (this measure concerns biological material and does not preclude the use of silt fences, etc.).
- The environmental awareness training program for construction personnel shall include an orientation regarding the importance of preventing the spread of invasive weeds.
- To reduce the seed bank in weed-dominated ruderal areas, the contractor shall mow, disk, apply spot-applications of herbicide to weeds, and/or remove weeds, as appropriate (i.e., before seed set and dispersal) and prior to surface clearing and site preparation.
- The top 3 inches of soil shall not be conserved and re-spread due to the high levels of weed seeds it contains. This soil may be disposed of off-site or in the spoils deposit area.
- Before tracked and heavy construction equipment leaves the project area, any accumulation of plant debris, soil, and mud shall be washed off the equipment or otherwise removed onsite, and air filters shall be blown out.
- The restoration plan shall specify measures to remove and/or control weeds in the project area, including *not* conserving and respreading the surface layer of soil which contains a high level of weed seeds.
- No invasive species shall be used in any restoration seeding.
- Implementation of these measures during construction and site restoration activities shall be verified and documented by a biological or environmental monitor.

***Minimum Restoration Measures***

Restoration areas are areas within the project area that would be disturbed during project-related construction activities but would subsequently be restored to their preconstruction conditions, or better. Current SFPUC policy specifies that no container stock or soil-containing plant materials may be used for revegetation on Watershed lands to avoid inadvertent introduction of non-native plant pathogens like phytophthora (*Phytophthora* species). The use or exclusion of container stock for restoration actions shall abide by effective SFPUC directives at the time of planting. To restore temporarily-disturbed areas, the SFPUC shall ensure the following:

- The SFPUC shall specify that topsoil is not salvaged to minimize respreading of weeds. All areas proposed for disturbance are composed of poorly-sorted alluvium containing cobbles, gravels, sand and silt and material from any depth can be used as material for final grading.
- Grassland, ruderal, coyote brush scrub and mixed scrub areas shall be reseeded with a native or non-invasive grass and forb seed mix.
- Willow thickets within Pit F2 shall be allowed to revegetate naturally; planting willow stakes is impractical on the steep slopes of the pits. Willow thickets elsewhere, if impacted, shall be replanted using willow stakes derived from cuttings of local willow plants.

- For any tree to be removed, the SFPUC shall ensure that replacement trees are planted within or in the vicinity of the project area as follows:
  - For each isolated locally native tree removed that is 6 inches in diameter at breast height [dbh] or 10 inches aggregate dbh for multi-trunk trees, one replacement planting shall be installed per inch of diameter of trees removed. Replacement plantings shall be of the same species as that removed, unless site conditions are unsuitable, in which case a suitable native species shall be installed. For example, eight planting basins shall be planted with coast live oak acorns to replace one 8-inch coast live oak tree. Seeds shall be used at planting sites rather than container stock to prevent the spread of soil-borne pathogens such as phytophthora.
  - Trees shall be replaced within the first year after the completion of construction or as soon as possible in an area where construction is completed during a favorable time of year as determined by an arborist or biologist with experience in restoration.
  - Replacement trees shall be planted in or near the location from where trees were removed as feasible and in locations suitable for the replacement species.
  - Selection of replacement sites and installation of replacement plantings shall be supervised by an arborist or biologist with experience in restoration. Irrigation of tree plantings during the initial establishment period shall be provided as deemed necessary by an arborist or biologist with experience in restoration.
  - An arborist or biologist with experience in restoration shall monitor new plantings at least once a year for five years (seven years for oaks) or as otherwise determined by the applicable resource agencies.
  - Any replacement plantings installed as remediation for failed plantings shall be planted as stipulated here for original plantings, and shall be monitored for a period of five years (seven years for oaks) following installation, or as otherwise determined by the applicable resource agencies.

### *Minimum Success Criteria*

Unless the applicable resource agencies determine different but equivalent or more stringent criteria should be applied, the success criteria for restoring temporarily disturbed areas shall be as follows:

- All temporarily disturbed areas shall be restored to approximate their baseline condition. Vegetation cover shall be at least 70 percent of the baseline; that is, absolute cover of the revegetation site shall be no less than 70 percent of baseline absolute cover of native and naturalized species (i.e., excluding target invasives). Cover in the revegetation site shall contain no more than 10 percent absolute cover of target invasives or no more cover of invasives than the baseline, whichever is greater, as defined in the summary table, below.
- Vegetation within restoration areas shall be functional, fully established, and self-sustaining as evidenced by successive years of healthy vegetative growth; observed increase in vegetative cover, canopy cover, and/or plant height; successful flowering, seed set, and/or vegetative reproduction over the five-year monitoring period.
- Revegetation work shall start within one year of construction completion.

- Revegetation of grassland areas shall be monitored at least once a year for five years or as otherwise determined by the applicable resource agencies. With the exception of oak trees, which shall be monitored for up to seven years, all other replacement trees shall be monitored for five years.
- Restoration areas shall be monitored for target invasive plants quarterly in the first five years following replanting. If invasive plants are found during the five-year monitoring period, they shall be removed as necessary to support meeting the cover and vegetation composition success criteria.
- Monitoring and maintenance shall continue until the minimum success criteria specified in the **Table M-BI-1E**, below are met, or as otherwise determined by the applicable resource agencies.

**TABLE M-BI-1E**
**MINIMUM SUCCESS CRITERIA FOR VEGETATION RESTORATION**

| Parameter | Field Indicator/Measurement |
|---|---|
| Vegetative Cover | **Grassland:** 70 percent relative cover (relative cover is cover compared with baseline) of typical native and naturalized grassland species known from the Sunol Region by the end of the fifth monitoring year.<br>**Individual Native Trees:** 65 percent survivorship by the fifth monitoring year. |
| Invasive Species | At the end of the fifth monitoring year, a restoration area shall have no more cover by invasives than the baseline. Invasive plant species shall be defined as any high-level species on the California Invasive Plant Council Inventory. |

*Compensatory Mitigation*

The SFPUC shall fully compensate for permanent losses of non-native grassland and ruderal habitat that provide potential low-quality upland refugia and dispersal habitat for CTS and CRLF, as well as potential low quality foraging and dispersal habitat for AWS. This area is approximately 0.43 acre. Compensatory mitigation may occur through habitat enhancements at any one of the SFPUC's Bioregional Habitat Restoration sites, such as the Goat Rock compensation site and the San Antonio Creek compensation site, or through purchase of credits at an off-site mitigation bank. Permanently impacted areas shall be mitigated at a ratio of 2:1, unless otherwise approved by USFWS and/or CDFW. Enhancements at the SFPUC's Bioregional Habitat Restoration sites shall be conducted in accordance with the SFPUC's Sunol Region Mitigation and Monitoring Plan, which specifies the success criteria and mechanisms for monitoring to ensure compensation.

**Mitigation Measure M-BI-1f: Measures to Minimize Disturbance to Western Burrowing Owl.**

The SFPUC shall implement one of the following two measures to avoid and minimize impacts on western burrowing owl:

1. The SFPUC shall provide evidence (in the form of a burrowing owl habitat assessment, focused survey, etc.) to, and receive concurrence from, CDFW that western burrowing owl are not expected to occur within the project area and a 500-foot buffer.

2. If the potential for presence of western burrowing owl cannot be ruled out, the SFPUC shall implement preconstruction surveys for burrowing owl as follows:

    a. A biologist with experience in western burrowing owl identification (qualified biologist) shall conduct preconstruction surveys of suitable habitat within the project area, and in a 500-foot buffer of the project area (as access is allowed on adjacent private lands), to locate active breeding or wintering burrowing owl burrows less than 14 days prior to construction and/or prior to exclusion fencing installation. If no burrowing owls are detected, no additional action is necessary.

    b. If burrowing owls are detected during the nesting and fledging seasons (April 1 to August 15 and August 16 to October 15, respectively), the SFPUC shall establish a no-disturbance buffer around the nesting location to avoid disturbance or destruction of the nest site until after the breeding season or after the biologist determines that the young have fledged or would not be affected by planned construction activities. The extent of these buffers shall be determined by the biologist and would depend on the level of noise or construction disturbance; line of sight between the nest and the disturbance; ambient noise under existing conditions (baseline noise) and other disturbances; and consideration of other topographical or artificial barriers.

    c. If burrowing owls are detected during the non-breeding (winter) season (October 16 to March 31), the SFPUC shall establish a no-disturbance buffer around any active burrows. The extent of the buffer shall be determined by the biologist. If active winter burrows are found that would be directly affected by ground-disturbing activities, owls can be displaced from winter burrows according to recommendations made in the *Staff Report on Burrowing Owl Mitigation*.[186] Burrowing owls should not be excluded from burrows unless or until a Burrowing Owl Exclusion Plan is developed by the qualified biologist.

**Mitigation Measure M-BI-1g: Measures to Minimize Disturbance to Special-Status Bird Species.**

The SFPUC shall conduct tree and shrub removal in the project area during the nonbreeding season (generally August 16 through February 14) for migratory birds and raptors if possible. In the event that the construction schedule requires work during the breeding season, then tree and shrub removal may have to occur during the breeding season.

If the SFPUC must conduct construction activities during the avian breeding season (February 15 to August 15), the SFPUC shall retain a wildlife biologist who is experienced in identifying birds and their habitat to conduct nesting-raptor surveys in and within 500 feet of the project area (as access is allowed on adjacent private lands). Migratory bird surveys shall be conducted within at least 250 feet of all work areas (as access is allowed on adjacent private lands). All migratory bird and active raptor nests within these areas shall be mapped. These surveys shall be conducted within two weeks prior to initiation of construction activities at any time between February 15 and August 15. If no active nests are detected during surveys, no additional mitigation is required.

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[186] California Department of Fish and Game, 2012. Staff Report on Burrowing Owl Mitigation. March 7, 2012.

If migratory bird and/or active raptor nests are found in the project area or in the adjacent surveyed area, the SFPUC shall establish a no-disturbance buffer around the nesting location to avoid disturbance or destruction of the nest site until after the breeding season or after the biologist determines that the young have fledged (usually late June through mid-July). The extent of these buffers shall be determined by the biologist and would depend on the species' sensitivity to disturbance (which can vary among species); the level of noise or construction disturbance; line of sight between the nest and the disturbance; ambient noise under existing conditions (baseline noise) and other disturbances; and consideration of other topographical or artificial barriers. CDFW and/or USFWS shall be consulted regarding nesting bird buffers if the species is a listed species.

**Mitigation Measure M-BI-1h: Conduct Preconstruction Surveys for Special-Status Bats and Implement Avoidance and Minimization Measures.**

A pre-construction survey for special-status bats shall be conducted by a biologist who is experienced in the identification of special-status bats (qualified biologist) in advance of any tree removal to identify potential bat habitat and identify active roost sites. Should potential roosting habitat or active bat roosts be found in trees to be disturbed under the project, the following measures shall be implemented:

- Trimming of trees shall occur when bats are active, approximately between the periods of March 1 to April 15 and August 15 to October 15; outside of bat maternity roosting season (approximately April 15 to August 15) if a maternity roost is present and outside of months of winter torpor (approximately October 15 to February 28 or as determined by a biologist who is experienced in the identification of special-status bats), to the extent feasible.

- If trimming of trees during the periods when bats are active is not feasible and bat roosts being used for maternity or hibernation purposes are found on or in the immediate vicinity of the project area where these activities are planned, a no-disturbance buffer as determined by a biologist who is experienced in the identification of special-status bats shall be established around these roost sites until they are determined to be no longer in-use as maternity or hibernation roosts or the young are volant.

  Buffer distances may be adjusted around roosts depending on the level of surrounding ambient activity (i.e., if the project area is adjacent to a road or active quarry area) and if an obstruction, such as a large rock formation, is within line-of-sight between the nest and construction. For bat species that are State-sensitive species (i.e. any of the species of special concern with potential to occur on the project area), an SFPUC representative, supported by the qualified biologist, shall consult with CDFW regarding modifying roosts buffers, prohibiting construction within the buffer, and modifying construction around maternity and hibernation roosts.

- A biologist who is experienced in the identification of special-status bats shall be present during tree trimming and disturbance to rock crevices or outcrops if bat roosts are present. Trees and rock crevices with roosts shall be disturbed only when no rain is occurring or is not forecast to occur for three days and when daytime temperatures are at least 50 degrees Fahrenheit (°F).

- Trimming of trees containing or suspected to contain roost sites shall be done under supervision of a biologist who is experienced in the identification of special-status bats and implemented over two days. On day one, branches and limbs not containing cavities or fissures in which bats could roost shall be cut only using chainsaws. The following day, branches or limbs containing roost sites shall be trimmed, under the supervision of the biologist, also using chainsaws.

- Bat roosts that begin during construction shall be presumed to be unaffected, and no buffer shall be necessary.

**Mitigation Measure M-BI-1i: Avoidance and Minimization Measures for American Badger.**

The following measures shall be implemented to avoid and minimize impacts on American badger:

a) A biologist who is experienced in American badger identification (qualified biologist) shall conduct preconstruction surveys for American badger dens prior to the start of construction at potentially affected sites. The survey results shall be submitted to the SFPUC.

b) Areas of suitable habitat for American badger in the project area include non-native grasslands. Surveys shall be conducted wherever this vegetation community exists within 100 feet of the project area boundary. Surveys shall be phased to occur within 14 days prior to disturbance.

c) If no potential American badger dens are found during the preconstruction surveys, no further action is required.

d) If the qualified biologist determines that any potential dens identified during the preconstruction surveys are inactive, the biologist shall excavate the dens by hand with a shovel to prevent use by badgers during construction.

e) If active badger dens are found during the course of preconstruction surveys, the following measures shall be taken to avoid and minimize adverse effects on American badger:

   i. Relocation shall be prohibited during the badger pupping season (typically February 15 to June 1).

   ii. Construction activities shall not occur within 50 feet of active badger dens. The biologist shall contact CDFW immediately if natal badger dens are detected to determine suitable buffers.

   iii. If the qualified biologist determines that potential dens within the project area, and outside the breeding season, may be active, the biologist shall notify CDFW. Badgers shall be passively relocated from active dens during the non-breeding season. Passive relocation may include incrementally blocking the den entrance with soil, sticks, and debris for three to five days to discourage use of these dens prior to project disturbance. After the biologist determines that badgers have abandoned any active dens found within the project area, the dens shall be hand-excavated with a shovel to prevent re-use during construction.

These measures would address impacts on CTS, CRLF, AWS, special-status birds, raptors, bats, as well as species that are less likely to occur, such as western burrowing owl, western pond turtle, and American badger by requiring general protection measures, a worker training and awareness program, exclusion fencing, biological monitoring, implementation of protocols if individuals are found in the project area during construction, and revegetation and site restoration. Additionally, as described in Section 5.16, Hydrology and Water Quality, a stormwater pollution prevention plan (SWPPP) would be prepared and implemented to avoid construction-related water quality impacts, which would also provide some protection for aquatic-dependent special-status species. Therefore, with implementation of all components of Mitigation Measure M-BI-1a through M-BI-1i, this impact would be *less than significant with mitigation*.

**Impact BI-2: Construction of the proposed project could have a substantial adverse effect on riparian habitat and other sensitive habitats. (Less than Significant with Mitigation)**

Willows thickets are present along the margin of Pit F2 and were created by natural underground seepage being exposed by quarry operations; as a result, these areas are not considered sensitive natural communities. These willow thickets would not likely be regulated by CDFW under California Fish and Game Code Section 1602 since other, similar vegetation, within quarry Pit F3-East was not regulated as such in the Lake and Streamed Alteration Agreement for the SFPUC's SABPL project.[187] Regardless, it is anticipated that construction would not result in substantial loss of willow thickets within Pit F2. Some willows may be trimmed or removed for placement of the aboveground bundle of the four 16-inch HDPE Discharge Pipelines, anchor blocks, and mooring lines; however this would be a relatively small area (approximately 1,100 square feet for the HDPE Discharge Pipeline and one anchor block, plus minor trimming or removal for the mooring lines). In light of SFPUC policy of not planting willows or other densely-rooting species over water supply pipelines, no replacement plantings are proposed above the HDPE Discharge Pipeline, although natural regrowth of mulefat is anticipated and may be allowed. Given the small area and limited nature of the disturbance, and since these willow thickets are not considered sensitive natural communities, this would be a *less than significant* impact.

The adjacent Alameda Creek would be avoided during construction. The only work required at San Antonio Creek would be the installation of overhead powerlines. Overhead powerline installation may require riparian tree trimming to facilitate construction. As described in Section 3.5.8 of the Project Description, an arborist would monitor any tree trimming that is required during installation of the powerlines over San Antonio Creek to ensure tree survival. Since there would be no loss of riparian trees, this would be a *less than significant* impact.

Construction activities, such as staging, access, and installation of the overhead powerlines, would occur adjacent to Alameda Creek and San Antonio Creek riparian habitat. Although no work would occur within these features, if adjacent upland areas are graded, sediment could erode into the creek channels. If construction equipment is leaking fuel or other hazardous materials in upland areas, these contaminants could flow into the creek channel causing a significant impact. Additionally, due to the proximity of these riparian features to the construction site, construction worker foot traffic could extend beyond the designated construction work area and into these

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[187] CDFW, Final Lake or Streambed Alteration Agreement Notification No. 1600-2012-0277-R3 San Antonio Backup Pipeline Project, December 19, 2012.

features; such disturbance would be a potentially significant impact. As described in Section 5.16, Hydrology and Water Quality, Impact HY-1, a SWPPP would be prepared and implemented to avoid construction-related water quality impacts. Implementation of **Mitigation Measure M-BI-2 (Avoidance and Protection Measures for Riparian Habitats and Wetlands) and Mitigation Measures M-BI-1a, 1b, and 1e (General Protection Measures, Worker Training and Awareness Program, Vegetation Restoration Plan and Compensatory Mitigation)**, described below, would reduce impacts on riparian habitat to *less than significant with mitigation*.

**Mitigation Measure M-BI-2: Avoidance and Protection Measures for Riparian Habitats and Wetlands.**

The SFPUC and its contractors shall avoid impacts on riparian habitats and jurisdictional wetlands, by implementing the following measures:

- A silt fence shall be installed adjacent to all riparian habitats and wetlands to be avoided within 50 feet of any proposed construction activity, and signs installed indicating the required avoidance. No equipment mobilization, grading, clearing, or storage of equipment or machinery, or similar activity, shall occur until a biologist who is experienced in the identification of riparian habitats and wetlands has inspected and approved the fencing installed around these features. This restriction applies to both onsite construction and any offsite mitigation area. The SFPUC shall ensure that the temporary fencing is continuously maintained until all construction activities are completed. No construction activities, including equipment movement, material storage, or temporary spoil stockpiling, shall be allowed within the fenced areas protecting riparian habitats and wetlands.
- Exposed slopes shall be stabilized immediately upon the completion of construction activities.

**Mitigation Measure M-BI-1a: General Protection Measures.**

(See Impact BI-1, above, for description.)

**Mitigation Measure M-BI-1b: Worker Training and Awareness Program.**

(See Impact BI-1, above, for description.)

**Mitigation Measure M-BI-1e: Prepare and Implement a Vegetation Restoration Plan and Compensatory Mitigation.**

(See Impact BI-1, above, for description.)

These measures would address impacts on riparian habitats by requiring fencing of riparian habitats to be avoided to protect water quality in receiving water bodies during construction activities, requiring general impact avoidance measures, requiring worker training regarding the resources present, and establishing protocols and performance standards for revegetation and restoration activities for impacted upland areas. Therefore, with implementation of the identified mitigation measures and the required SWPPP, the impact to riparian habitats would be *less than significant with mitigation*.

### Impact BI-3: Construction of the proposed project could have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act through direct removal, filling, hydrological interruption, or other means. (Less than Significant with Mitigation)

Federally protected wetlands, as defined by Section 404 of the Clean Water Act, occur within the project area. A seasonal wetland is located within the project area, just south of, and outside of, the southeastern corner of Pit F2. This wetland may be considered jurisdictional by the Corps and RWQCB, although a formal wetland delineation has not been conducted within the entire project boundary. San Antonio Creek, which is jurisdictional by both the Corps and RWQCB, is located within the project area. The majority of San Antonio Creek is considered other waters, but a small portion near the Alameda Creek confluence was delineated as wetland tributary (seasonal wetland) as part of the SABPL delineation. The creek is located adjacent to, and south of, the access road along the southern edge of Pit F3-East. Alameda Creek, including instream wetlands, which would be considered jurisdictional by both the Corps and RWQCB, is located approximately 50 feet east of the access road to the proposed anchor blocks. For the purpose of this analysis, the seasonal wetland, wetland tributary in San Antonio Creek, and instream wetlands within Alameda Creek are assumed to be federally protected wetlands.

Although no work would occur within the seasonal wetland, wetland tributary in San Antonio Creek, or Alameda Creek instream wetlands, construction activities could adversely impact these features. As described in Impact BI-2 construction activities in upland areas could result in erosion in adjacent wetlands, leaking fuel or other hazardous materials could contaminate wetlands, or worker foot traffic could inadvertently extend into these features; all of which would cause a significant impact. Implementation of the required SWPPP (see Section 5.16, Hydrology and Water Quality, Impact HY-1) plus **Mitigation Measures M-BI-1a, 1b, and 1e (General Protection Measures, Worker Training and Awareness Program, Vegetation Restoration Plan and Compensatory Mitigation) and Mitigation Measure M-BI-2 (Avoidance and Protection Measures for Riparian)** would reduce impacts on jurisdictional wetlands to less than significant with mitigation.

The quarry pits are not jurisdictional because they are part of active quarrying operations. Pits F3 West and F-3 East were verified as non-jurisdictional in the Corps verified delineation for the SFPUC's SABPL project.[188] These pits also were not regulated by the RWQCB as waters of the state in the Water Quality Certification for the SFPUC's SABPL project.[189] As Pit F2 is operated similarly to Pits F-3 West and F-3 East, it assumed that it would not be considered jurisdictional by the Corps or RWQCB. Therefore, construction activities within Pit F2 would not be considered a significant impact on jurisdictional wetlands.

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[188] USACE, Letter to YinLan Zhang, San Francisco Public Utilities Commission from Jane Hicks, U.S. Army Corps of Engineers verifying the jurisdictional delineation maps submitted on June 14, 2010 entitled "USACE File # 08-00207S, San Francisco Public Utilities Commission, San Antonio Backup Pipeline." July 8, 2011.

[189] RWQCB, Conditional Water Quality Certification for the San Antonio Backup Pipeline Project, Alameda County, February 5, 2013.

Dewatering may be required to drill the piers for the mooring anchors and to install one of the discharge pipelines. Dewatering effluent from excavated areas would be treated, as necessary, and discharged to a containment facility to allow sediment to settle out prior to discharging the effluent to vegetated upland areas, San Antonio Creek, Alameda Creek, or Pit F3-East, or it could be used onsite for dust control. If high levels of suspended sediment and/or trace amounts of construction-related chemicals (e.g., fuels, lubricants, cement products) are present in the dewatering effluent and that effluent is discharged into San Antonio Creek and/or Alameda Creek, it could degrade water quality and have a significant impact on jurisdictional wetlands. As described in Section 5.16, Hydrology and Water Quality, Impact HY-1, a SWPPP would be prepared and implemented to avoid construction-related water quality impacts and any dewatering activities would comply with regulatory requirements to avoid water quality impacts. Therefore, impacts to jurisdictional waters from dewatering would be *less than significant*.

Overall, with implementation of the following mitigation measures, the project's construction impacts on federally jurisdictional wetlands are *less than significant with mitigation*.

**Mitigation Measure M-BI-1a: General Protection Measures.**

(See Impact BI-1, above, for description.)

**Mitigation Measure M-BI-1b: Worker Training and Awareness Program.**

(See Impact BI-1, above, for description.)

**Mitigation Measure M-BI-1e: Prepare and Implement a Vegetation Restoration Plan and Compensatory Mitigation.**

(See Impact BI-1, above, for description.)

**Mitigation Measure M-BI-2: Avoidance and Protection Measures for Riparian Habitats and Wetlands.**

(See Impact BI-2, above, for description.)

These measures would address impacts on jurisdictional wetlands by requiring general impact avoidance, requiring worker training regarding the resources present, establishing protocols and performance standards for revegetation and restoration activities for impacted upland areas, and requiring fencing of wetlands to be avoided to protect water quality in receiving water bodies during construction activities. Therefore, with implementation of the identified mitigation measures and the required SWPPP, the impact to jurisdictional wetlands would be *less than significant with mitigation*.

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**Impact BI-4: Project construction would not interfere substantially with the movement of any native resident or migratory wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites. (Less than Significant)**

Construction activities could temporarily impede wildlife movement across the project area where work would occur at the proposed staging areas, spoils sites, and construction of the project components in and around Pit F2. Wildlife movement is currently limited in these areas from active quarry operations. Construction of the ACRP would temporarily restrict some wildlife movement, but the site would be returned to pre-project conditions following construction. Construction activities would be similar to those that are either currently being implemented, or have recently been implemented, at the project area and would not substantially alter the existing condition. Therefore this impact would be *less than significant*.

**Mitigation:** None required.

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## 5.14.4.4 Operational Impacts

**Impact BI-5: Project operations would not have a substantial adverse effect on special-status species. (Less than Significant)**

Alameda Creek within the ACRP survey area provides habitat for CRLF, Alameda whipsnake, foothill yellow-legged frog, and western pond turtle. Since ACRP project operations have potential to change hydrological conditions in Alameda Creek within the ACRP survey area, the potential ACRP project operational impacts on CRLF, Alameda whipsnake, foothill yellow-legged frog, and western pond turtle are described below.

### *California red-legged frog*

Project operations would have the potential to affect CRLF either due to changes in hydrological conditions at Pit F2 or along Alameda Creek, downstream from Pit F2.

#### Pit F2

Individual CRLF could seek cover along the aquatic margin of Pit F2 or within willow thickets or mixed scrub cover within Pit F2. Much of the vegetation grows at and near the contact zone between Livermore gravel and recent alluvium—about 224 feet in elevation within Pit F2. This vegetation is dependent on seepage from subsurface water. During project operations, the water level in Pit F2 would typically be held between 150 and 180 feet in elevation between May and December and between 150 and 240 feet in elevation between January and April. In rare occurrences of extreme drought, the water elevation may be lowered as low as 100 feet. Under existing conditions, the quarry operators have varied pit elevation between 0 and 223 feet. Vegetation currently occurs at an elevation of approximately 224 feet. If water levels in Pit F2 are at or below 224 feet, vegetation conditions would likely remain the same as existing conditions (and with-CDRP conditions). As described in Impact BI-6 below, if water levels in Pit F2 are higher than the current elevation of vegetation, then the species composition of willow thickets and mixed scrub within Pit F2 could shift to flood-tolerant sandbar willow. The willow thickets form at about 224 feet elevation, at the contact between the transmissive stream channel deposits and the impervious Livermore gravels, and are fed by seepage. Even if seepage is allowed to accumulate above this contact zone, water will seep out through the permeable gravels as valley-wide subsurface water elevations drop in the dry season. The willow species present can tolerate some increase in inundation, especially during their winter dormancy. The proposed project would not result in the loss of CRLF habitat as a sandbar willow-dominated quarry edge would provide similar quality non-breeding refugia habitat to the existing quarry conditions. Impacts to CRLF and their habitat due to water level changes in Pit F2 would be less than significant.

As described in the project description, the SFPUC would pump water out of Pit F2 during project operations. The pumps would operate at the center of deep open water within Pit F2, approximately 300 feet from the vegetated pit wall when the water levels are at maximum height. Water depth in the center of the pit would be a minimum of 90 feet deep and range between 140 and 230 feet deep. It is unlikely that CRLF would occur within the deep portion of the pit. If they are present in the pit then they would typically be found along the margin of the pit. Since CRLF would not be expected to occur in the vicinity of pumps, then pumping of water from Pit F2 would have no impacts on CRLF.

#### Alameda Creek

##### *Summary of Hydrologic Conditions with-Project*

As summarized in Table 5.14-1, compared to with-CDRP conditions, the pumping of water from Pit F2 under the proposed project would result in reduced volumes of water that the quarry operators would have to manage thereby reducing the potential for quarry NPDES discharges to Alameda Creek, with associated reductions in Alameda Creek stream flow downstream of the quarries. This reduced flow could impact CRLF habitat in Alameda Creek in the survey area. As described in Appendix HYD1, during the summer months, there is no flow in Alameda Creek under existing conditions at the San Antonio Creek confluence. There will be no flow in the summer under with-CDRP conditions downstream of the quarry reach as a result of releases and bypasses from the CDRP project because all summer flows would seep to the quarry pit area. The only flow in Alameda Creek below the San Antonio Creek confluence in the summer is that provided by the NPDES discharges from the quarries and these volumes and timing of discharges are currently variable and would continue to be variable in the future.

As presented in the discussion of CRLF in Section 5.14.2.7 above, hydrological conditions within Subreaches A, B, and the upstream portion of Subreach C1 can be influenced by upstream quarry operations. A description of with-project hydrologic conditions within these subreaches is provided in Section *7. CEQA Scenarios* in Appendix HYD2 and briefly summarized in this section. Additionally, Table 5.14-1 compares existing, with-CDRP, and with-project hydrologic conditions within each of the subreaches. Table 5.14-1 summarizes how the condition of pools, which provide CRLF habitat, may change under the proposed project. During project operations, water that naturally seeps into Pit F2 would be pumped by the SFPUC out of Pit F2 to the regional water system for municipal use. This would generally occur in years when Calaveras Reservoir does not fill. As described in Appendix HYD2 and in Table 5.14-1, during typical operational years when the SFPUC is recapturing water from Pit F2, the with-project subsurface hydrological condition in the creek would be similar to the existing/with-CDRP condition. As shown in Table HYD6-2 in Appendix HYD1, monthly flows would increase in winter/early spring (January through April), but decrease the remainder of the year as a result of assuming the quarry operators would have less water to manage and therefore to discharge under their NPDES permits. The increase in monthly flows between January and April range between 2 percent and 56 percent and the decrease in monthly flows between May and December range between -9 percent and -67 percent. As summarized in Table 5.14-1, in general, pools in these subreaches would be smaller in the dry season compared to with-CDRP conditions and somewhat smaller in the dry season compared to existing conditions due to smaller quarry discharges and decreased subsurface flow. These would be average conditions and there could still be some occasional dry years when the pools dry in the summer months or occasional wet years when the pools are more expansive during the dry months.

As summarized in Table 5.14-1, pools in Subreach C2, and the downstream portion of Subreach C1 as described in Appendix HYD2, would have little change from existing conditions.

### *Potential With-Project Impacts on California Red-legged Frog*

Pools within Subreaches A, B, C1, and C2 provide potential CRLF breeding and aquatic refugia habitat, although the presence of perennial pools that support bullfrogs and bass within the creek reduce the quality of the CRLF habitat and likelihood of species' presence. As described above in the CRLF discussion in Section 5.14.2.7, in Appendix HYD2, and in Table 5.14-1, hydrological conditions within Subreaches A, B, and the upstream portion of C1 are influenced by upstream quarry operations. Due to the thinner aquifer within the downstream end of Subreach C1 and in Subreach C2, quarry water management do not likely influence the condition of pools within these subreaches.

When, under the ACRP, water is being pumped from Pit F2 during the summer months, less water would need to be managed by the quarry operators and therefore lower-volume NPDES discharges are likely to occur and subsequently flows may be reduced in the summer months compared to existing/with-CDRP conditions due to decreased quarry discharges and reduced seepage from Pit F2. Under these conditions the pools would be reduced during the dry season. In dry years, pools may dry in the summer months. If some pools, or portions of pools, only support water seasonally and not year-round, then bass and breeding bullfrogs would be eliminated from these areas, which would increase the quality of habitat for CRLF. Ideal CRLF breeding habitat dries in the fall every few years, since fish and introduced bullfrogs, which are CRLF predators, would not survive these seasonal drying patterns.[190] CRLF larvae are highly susceptible to fish predation, particularly immediately after hatching.[191] Bullfrogs may prey or have a competitive advantage over CRLF, and CRLF decline and eventual disappearance has been observed in central California once bullfrogs become established at the same site.[192] During wetter years, pools would likely remain similar to existing/with-CDRP conditions. Under this scenario, CRLF habitat conditions would not change and there would be no impact on CRLF habitat.

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[190] Fellers, Gary. M. California Red-legged Frog in Amphibian Declines: The Conservation Status of United States Species Edited by Michael Lannoo, University of California Press, 2005.

[191] USFWS, 2002a. Recovery Plan for the California Red-legged Frog (Rana aurora draytonii), Region 1 United States Fish and Wildlife Service. Portland Oregon.

[192] USFWS, 2002a. Recovery Plan for the California Red-legged Frog (Rana aurora draytonii), Region 1 United States Fish and Wildlife Service. Portland Oregon.

In conclusion, on average, the proposed project's influence on the pools within Subreaches A, B, and the upstream portion C1 would not result in adverse impacts on CRLF. By creating a more ephemeral system, habitat for CRLF predators and competitors that rely on perennial water would be reduced. Or alternatively, habitat conditions in wet years would remain the same as existing conditions. Because of the thin aquifer present in the downstream portion of Subreach C1 and in Subreach C2 quarry operations would not influence hydrologic conditions within these reaches. Therefore, because the project would not substantially affect habitat conditions for CRLF in Subreaches A, B, C1, and C2, the project's operational impact on CRLF would be less than significant.

### *Alameda whipsnake*

As described in Section 5.14.2.7, Alameda whipsnake core habitat includes upland habitats such as chaparral, sage scrub, and coastal scrub. Riparian habitat along Alameda Creek provides dispersal habitat for this species. Although whipsnake could utilize this riparian habitat for dispersal, it does not provide core habitat for this species. Impact BI-6, below, evaluates the potential project impacts on riparian habitat and describes potential changes to riparian habitat from ACRP operations. If riparian habitat is impacted, the extent of riparian habitat may be reduced (and converted to another type of upland habitat) or converted from one type of riparian habitat to another type. Under both of these scenarios, Alameda whipsnake would still continue to be able to use the creek corridor for dispersal as they can use a variety of upland habitats for dispersal such as grassland and woodland communities. Therefore, even if riparian habitat is impacted under project operations, it would not impact Alameda whipsnake habitat.

### *Foothill yellow-legged frog*

As described in the discussion of foothill yellow-legged frog in Section 5.14.2.7, foothill yellow-legged frog is unlikely to occur within the survey area. Although unlikely, even if individual frogs dispersed through the site, the project would not significantly change the existing low habitat quality for this species or impede species movement within the Alameda Creek corridor. As summarized in Table 5.14-1, hydrologic conditions within Subreaches A, B, and the upstream portion of C1 could change under with-project conditions in dry months; however, a live stream is still expected to be present in these reaches during the wet season. Wet season conditions would generally remain the same as existing conditions and would continue to allow frog dispersal when flowing water is present. Similar to the discussion above for CRLF, if pools are reduced in the summer months, habitat for bullfrogs and bass would be reduced. Such changes could improve conditions for foothill yellow-legged frog, if present, as bullfrogs and bass are predators of foothill yellow-legged frog.[193]

Because of the thin aquifer present in the downstream portion of Subreach C1 and in Subreach C2, quarry operations would not influence hydrologic conditions in these areas. Therefore, in the unlikely scenario that a foothill yellow-legged frog traverses these subreaches, the project would

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[193] Fellers, Gary. M. Foothill Yellow-legged Frog in Amphibian Declines: The Conservation Status of United States Species Edited by Michael Lannoo, University of California Press, 2005.

have no direct or indirect impacts on available habitat or foothill yellow-legged frogs within these subreaches.

Since foothill yellow-legged frog are unlikely to occur in the project area and the project would not substantially alter wet season conditions in Subreaches A, B, C1 and C2, project operations would not impact foothill yellow-legged frog.

### *Western pond turtle*

Project operations would have the potential to affect western pond turtle either due to changes in water conditions at Pit F2 or along Alameda Creek, downstream from Pit F2.

#### Pit F2

The aquatic margin of Pit F2 provides potential aquatic habitat for western pond turtle. As described above for CRLF, during project operations, the water level in Pit F2 would occur between 150 and 180 feet in elevation between May and December and between 150 and 240 feet in elevation between January and April, although the water elevation may be lowered as low as 100 feet in elevation during periods of extreme drought. Vegetation currently occurs at an elevation of approximately 224 feet. If water levels in Pit F2 are at or lower than the current elevation of vegetation, vegetation conditions would likely remain the same as existing conditions (and with-CDRP conditions). As described in Impact BI-6 below, and the CRLF impact discussion above, if water levels are higher than the current elevation of vegetation, then the species composition of willow thickets and mixed scrub could shift to flood-tolerant sandbar willow. Any of these changes would provide similar quality habitat to existing (and with-CDRP) conditions and would not result in a significant impact on western pond turtle. Impacts on western pond turtle due to water level changes in Pit F2 would be less than significant.

#### Alameda Creek

Pools within Alameda Creek in subreaches A, B, C1, and C2 provide potential aquatic habitat for western pond turtle. Subreaches A, B and the upstream portion of C1 are almost entirely perennial, while Subreach C2 and the downstream portion of Subreach C1 are dry in the summer except for a few isolated perennial pools. As discussed above for CRLF, and summarized in Table 5.14-1, in general, pools in Subreaches A, B, and the upstream portion of C1 would be smaller in the dry season compared to with-CDRP conditions and somewhat smaller in the dry season compared to existing conditions due to smaller quarry discharges and decreased subsurface flow. Although this would reduce the extent of habitat available, there would typically still be some flow present within these subreaches in the summer months as modeled for Node 6 in Table HYD6-2 in Appendix HYD1. During very dry years, the pools have potential to dry in the summer months. These conditions would be similar to the natural conditions of Alameda Creek that would have existed in these subreaches prior to quarry operations and would be an extension of similar ephemeral conditions present upstream. Alameda Creek downstream of the survey area would continue to provide perennial water, because of flows from Arroyo de la Laguna, and western pond turtle could utilize those areas during years when surface water has been reduced in the summer months from reductions in quarry NPDES discharges. Western pond turtle have been shown to travel varying distances which may vary depending on site conditions. They can move overland, often more than 0.6 mile and up to 3.1 miles.[194] The confluence of Alameda Creek and Arroyo de la Laguna is approximately 0.6 mile from Subreach C1. Additionally, a study of western pond turtle conducted in coastal creeks in central California showed that most turtles left drying creeks during the late summer for upland refuge and returned after winter floods.[195] If pools dry in the summer months, western pond turtle may seek refuge in adjacent riparian woodland during these months.

Since in most years there would still be some areas of perennial water, ACRP operations would return habitat to natural conditions prior to quarry NPDES discharges, pond turtles could use adjacent riparian areas for upland refuge, and pond turtles could travel to adjacent perennial water in Alameda Creek downstream, there would not be a significant impact on western pond turtle in Subreaches A, B, and the upstream portion of C1. Similar to that described for CRLF, due to the thin aquifer within Subreach C2 and in the downstream portion of Subreach C1 quarry water management would not likely influence hydrologic conditions in these subreaches. Therefore, project impacts on western pond turtle due to changes in flows in Alameda Creek would be less than significant.

### *Summary of Impact BI-5*

Project operations and associated changes in hydrological conditions in Subreaches A, B, and C of Alameda Creek would have a *less than significant* impact on CRLF, Alameda whipsnake, foothill yellow-legged frog, and western pond turtle.

**Mitigation:** None required.

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**Impact BI-6: Project operations could have a substantial adverse effect on riparian habitat or other sensitive natural community, including wetland habitats. (Less than Significant with Mitigation)**

This impact addresses the effects of project operations on vegetation in Pit F2 as well as woody riparian and wetland habitats in and along Alameda Creek downstream from the project area.

### Operational Impacts on Vegetation in Pit F2

As described in the Setting, bands of willow thickets and mixed scrub grow on the side slopes of quarry Pit F2 at the lower boundary of the highly transmissive stream channel deposits, at approximately elevation 224 feet, where this vegetation is supported by seepage.

The proposed project would allow water elevation in Pit F2 to rise up to a maximum elevation of 240 feet, which would be expected to occur between January and April. This is somewhat higher

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[194] Holland, Dan C., 1994 The Western Pond Turtle: Habitat and History Final Report, Prepared for the U.S. Department of Energy.

[195] Rathbun, Galen B., Norman J. Scott, Jr., and Thomas G. Murphy, 2002. *Terrestrial Habitat Use by Pacific Pond Turtles in a Mediterranean Climate*, The Southwestern Naturalist 47(2):225-235.

than during the baseline period. The water elevations would decline to about 224 feet as subsurface water elevations drop throughout the valley during the dry season. Due to the permeability of the stream channel deposits, the willow thickets and mixed scrub could not be inundated past the normal seasonal drop in subsurface water elevation, as the water elevation in the pit would fall along with the decline in groundwater elevation valley-wide.

If water elevations in Pit F2 regularly remain higher than the base of the stream channel deposits during the winter months, the species composition of the willow thickets and mixed scrub on the side slopes of the pit could shift toward increased sandbar or arroyo willow, which are more tolerant of inundation, over mulefat and coyote bush, which are somewhat less tolerant of extended inundation. However, the willow thickets and mixed scrub would remain in the same location and occupy about the same extent as at present because the valley-wide annual pattern of rise and fall of subsurface water elevations will remain about the same.

Willow thickets within a quarry pit are not sensitive natural communities under CEQA because they are not associated with riparian habitat and are not considered jurisdictional by CDFW. Potential minor changes on woody vegetation within Pit F2 would therefore be *less than significant*.

#### Operational Impacts on Alameda Creek Woody Riparian Vegetation and Habitats

For purposes of analyzing impacts, the comparison was made between existing and with-project conditions. While a comparison between with-CDRP and with-project conditions could result in more severe impacts (i.e., impact associated with higher dry-season flows attributable to increased NPDES quarry discharges), ACRP operations are scheduled to commence at the same time as or soon after CDRP operations, and with-CDRP conditions would not prevail for long enough to make an appreciable difference in the development of woody riparian vegetation.

All riparian habitats along Alameda Creek in the survey area—willow thickets, mulefat scrub, mixed riparian forest, riparian woodland, and creek channel, including instream wetlands—are considered sensitive natural communities under CEQA. As described in Appendix HYD1, peak winter flows may increase and total flows decrease somewhat under with-CDRP conditions compared to existing conditions. Peak flows would be substantially the same under with-CDRP and with-project conditions. When the ACRP is in operation, total annual flow volumes would be greater than under with-CDRP conditions but less than under existing conditions. Overall, the extent of the floodplain in the survey area is expected to remain about the same as under existing conditions. Therefore, the total extent of these sensitive natural communities is expected to remain the same, although the extent of each type could change under with-project conditions.

As described in Appendix HYD1 and summarized in Table 5.14-1, several changes would occur to the pattern and quantity of surface flow that could alter the location and extent of various types of woody riparian vegetation. The natural hydrology of the Sunol Valley supported sparsely vegetated channel in most of this reach of Alameda Creek, a condition that prevailed until the late 1980s. Tree-supporting riparian vegetation alliances began to form in Subreaches A, B, and C1 with the onset of quarry operations and associated NPDES discharges into Alameda Creek. Thus it is concluded that the existing tree-supporting riparian vegetation alliances in these subreaches are dependent on the quarry NPDES discharges. The potential impact of the proposed project focuses on these subreaches.

With the ACRP in operation, dry-season (July-September) surface flows in Subreach A are predicted to decrease by about 30 percent compared to existing condition due to reduced quarry NPDES discharges. The hydrologic analysis described in Appendix HYD1 also indicates that dry-season surface flows in Subreach A would be more variable under with-project conditions than under existing conditions.

Woody riparian vegetation, and particularly tree-supporting alliances, is sensitive to the quantity, consistency, and duration of surface water flow, particularly during the dry summer months when this vegetation is actively growing and water demands are great. Based on the assumption that Alameda Creek loses stream flow to the subsurface between San Antonio Creek and Arroyo de la Laguna, a reduction in dry-season flows under the ACRP would be likely to have a more observable effect in Subreaches B and C1 at the current downstream limits of this NPDES discharge-dependent riparian vegetation.

Riparian vegetation responds to a reduction in available water depending on many factors, including the age, size, condition, and species of plants, season and rate of the change in available water, prevailing weather conditions, and underlying soil conditions. Minor reductions could result in subtle physical and physiological stress effects in vegetation, such as closure of the stomata (leaf pores needed for gas exchange), leaf wilt, dieback of rootlets, or reduction in growth rate. Plants subjected to repeated stress may become more vulnerable to disease. More pronounced effects could include leaf browning and loss, early senescence (leaf drop and entry into winter dormancy), branch sacrifice (in which entire limbs die), complete dieback of top growth, or mortality of the plant.[196] The severity of the stress reaction is generally proportional to the length of time required for the plant to recover; that is, vegetation recovers more quickly from minor stress and requires a longer period to recover from greater stress.

Both a reduction in quarry NPDES discharges and an increase in the variability of those discharges could have a substantial impact on the extent of woody riparian types most dependent on surface flows. To account for the fact that the existing condition is currently a variable system that already experienced one episode of dieback or mortality during the baseline period, for the purposes of this EIR, a substantial impact on the riparian habitat based on the no net loss threshold is defined as a persistent reduction in the extent of tree-supporting vegetation alliances. Because of the magnitude of the predicted reduction and greater variability in dry-season surface flows in Subreaches A, B, and C1, a reduction in the extent of tree-supporting riparian vegetation alliances may occur in these subreaches under long-term ACRP operations. This reduction would be a *potentially significant impact*. Implementation of **Mitigation Measures M-BI-6a through M-BI-6c,** requiring baseline mapping, annual monitoring/reporting, and habitat enhancement would reduce this impact to less than significant. These measures require baseline monitoring and mapping of the extent of tree-supporting riparian alliances along Alameda Creek

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[196] Horton, Jonathan, Thomas E. Kolb, and Stephen C. Hart, 2000, Physiological Response to Groundwater Depth Varies Among Species and with River Flow Regulation, Ecological Applications, 11(4): 1046-1059

Subreaches A, B, and C1, and annual monitoring after start of ACRP recapture operations. If there is a net reduction in the extent of tree-supporting woody riparian alliances compared to the baseline conditions, then habitat enhancement in Subreaches B and C1 and possibly elsewhere shall be implemented. Riparian habitat enhancement is proposed that would be consistent with the SFPUC's Sunol Valley Restoration Report.[197] In light of the initial quarry-induced development of tree-supporting riparian vegetation alliances in Subreaches A, B, and C1 and the eventual reversion to sparsely-vegetated, shrub dominated alliances upon cessation of quarry operations, riparian habitat enhancement is proposed that would be consistent with future conditions post-quarry discharges. For example, sparse California sycamore and valley oak once dominated stream terraces and islands between the braided stream channel threads; these species are adapted to the natural rise and fall of subsurface water independent of quarry NPDES discharges.

In Subreach C2, depth to subsurface water is shallow and is expected to change little. With-project dry-season surface flows in Subreach C2 are predicted to increase slightly compared to existing. As a result the proposed project is expected to have a less than significant impact on tree-supporting riparian vegetation alliances in this subreach.

If tree-supporting riparian vegetation alliances are reduced in extent, they would likely be replaced by the mulefat thicket alliance. The dense mulefat thickets lining the low-flow channel in portions of Subreaches A, B, and C1 depend on regular surface flow resulting from the current quarry NPDES discharge practices. Under with-project conditions, these dense mulefat thickets could be replaced by a sparser mulefat thicket. Sparse mulefat thickets are more typical of the historical vegetation in this reach of Alameda Creek, which historically lacked dry-season flows. These two effects—a potential increase in the extent of mulefat thickets and a potential decrease in mulefat density along the low-flow channel—offset one another to some extent, and together would not result in a substantial change in riparian conditions, a less than significant impact.

It is noted that in the future, the quarry operator for SMP-24 and SMP-32 may change their water management practices or their RWQCB permit requirements could change, resulting in lower-volume NPDES discharges at Subreach A. For example, ODS, the quarry operator for SMP-30, reportedly changed its water management practices upstream from the project area in 2012 that raised dry-season groundwater elevations. Changes in water management practices may have effects on woody riparian vegetation within the survey area. Notwithstanding the above, this impact analysis is based on the assumption that in the future, quarry operations will generally remain the same as they are under existing conditions.

When the quarries cease operations in the future, the NPDES quarry discharges will also stop. With the eventual completion of quarry operations and the end of quarry NPDES discharges into Alameda Creek, the existing riparian habitat would be expected to revert back to its natural condition in this reach of Alameda Creek downstream of the discharge point. Any changes to quarry operations and quarry NPDES discharges—including termination of quarry operations—that result in downstream changes in hydrological conditions (both surface and subsurface waters)

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[197] Appel, Jessica, Biologist, San Francisco Public Utilities Commission personal communication via email entitled SFPUC: ACRP FYLF Feedback, September 26, 2016.

would affect the riparian habitat in Subreaches A, B, and C1. Such changes would be independent of and not related to the ACRP, and therefore, would not be considered project-related impacts. When quarry operations permanently cease or their NPDES discharge permit becomes null and void, implementation of Mitigation Measures M-BI-6b through M-BI-6c shall also cease.

**Operational Impacts on Alameda Creek Other Riparian Vegetation, Including Instream Wetlands**

Table 5.14-1 and Appendix HYD2 conclude that the seasonal instream wetlands within the floodplain are largely supported by the seasonally-dependent rise and fall of groundwater related to the filling and emptying of the highly porous stream channel alluvium. The perennial emergent instream wetlands, along with the pools that support them, are primarily dependent on the quarry NPDES discharges. Evidence for this includes the observation that the pools and associated perennial wetlands have formed since initiation of Hanson's NPDES discharges in Subreach A.

Impacts on seasonal wetlands, therefore, would be influenced by the total quantity and annual pattern of flows in Alameda Creek which dictate dry-season subsurface water elevations. As shown in Table 5.14-1, total annual flow volumes in Alameda Creek in Subreach A (Node 6) are predicted to decrease by about 9 percent under with-project conditions compared with existing conditions; however, the ASHDM model results indicate that the shape of the flows would be somewhat flattened, with lower peak flows and more extended low flows due to the instream flow schedule, resulting in a slower drop in subsurface water elevations. Fluctuations in subsurface water are expected to resemble existing conditions. As a result, both isolated instream seasonal wetlands and the outer limits of seasonal wetlands surrounding instream pools are expected to change little if at all.

Impacts on perennial wetlands would be influenced primarily by the quantity and timing of quarry NPDES discharges. As with woody riparian vegetation, the persistence of pooled water in the low-flow channel is determined largely by dry-season quarry NPDES discharges. The Hydrology analysis predicts a with-project reduction in extent of pooled water, and with this some reduction in the extent of perennial wetland is predicted.

A third phenomenon is likely to occur, that is, an expansion of seasonal wetlands toward the reduced perimeter of pooled water. If quarry NPDES discharges were reduced under with-project conditions, seasonal wetlands are likely to occupy at least a portion, if not all, of the habitat vacated by pools and associated perennial emergent vegetation. The total extent of instream wetland is expected to be no less than under existing conditions. As a result, the impact of the proposed project on instream wetlands is concluded to be *less than significant.*

The overall extent of the floodplain would not change as a result of the proposed project, which does not affect peak flows. Therefore, the sum of woody-riparian vegetation (tree-supporting and non-tree-supporting alliances), and creek channel (including instream wetlands, pools, and unvegetated creek channel) would not be affected by the project. It has already been concluded that any decrease in tree-supporting woody riparian vegetation is predicted to result in an increase in non-tree-supporting vegetation such as mulefat scrub. Similarly, any change in pooled habitats or in instream wetlands could result in an increase in unvegetated creek channel. This impact would be *less than significant*.

### *Impact Conclusion*

The proposed project would have minor changes on woody vegetation within Pit F2, but this vegetation is not considered a sensitive natural community under CEQA, and therefore this impact would be less than significant. Project-related impacts on instream wetlands are concluded to be less than significant because fluctuations in subsurface water are expected to resemble existing conditions and the overall extent of instream wetlands are not expected to decrease. The sum of woody-riparian vegetation (tree-supporting and non-tree-supporting alliances), and creek channel (including instream wetlands, pools, and unvegetated creek channel) would not be affected by the project, since any change in pooled habitats or in instream wetlands would result in an increase in unvegetated creek channel habitat.

Dry-season hydrological changes in Subreaches A, B, and C1 due to the reduction in quarry NPDES discharges because of the proposed project could result in long-term reductions in the extent of tree-supporting riparian vegetation alliances in these areas. This reduction would be a potentially significant impact, primarily due to the magnitude of the predicted reduction in NPDES discharges and the greater variability in dry-season surface flows in Subreaches A, B, and C1. Tree-supporting riparian vegetation alliances along Subreach C2, however, are not expected to be substantially affected by the project. In addition, a potential decrease in mulefat density along the low-flow channel due to the hydrological changes could be offset by a conversion to and increase in sparser mulefat thickets. Implementation of **Mitigation Measure M-BI-6a through M-BI-6c,** requiring mapping, monitoring, and habitat enhancement as appropriate, would reduce this impact to *less than significant with mitigation*.

#### Mitigation Measure M-BI-6: Riparian Habitat Monitoring and Enhancement Mitigation

##### Mitigation Measure M-BI-6a: Baseline riparian habitat mapping.

Prior to commencing project operations, the SFPUC shall prepare a plan to submit to the Environmental Review Officer (ERO) for review and approval describing quantitative methods for measuring extent of baseline riparian habitat and subsequent changes in extent following commencement of project operations. The SFPUC shall map the extent of tree-supporting riparian alliances (i.e., sandbar and arroyo willow thickets and mixed riparian forest) along Alameda Creek Subreaches A, B, and C1, starting from the confluence with San Antonio Creek and extending downstream to about the northern end of the former Sunol Valley Golf Club (see Figure 5.14-2).

##### Mitigation Measure M-BI-6b: Annual riparian habitat monitoring and reporting.

Once ACRP recapture operations begin, the SFPUC shall conduct annual monitoring within Subreaches A, B, and C1, applying the same mapping protocol used to establish the baseline map (Mitigation Measure M-BI-6a), to document the extent of tree-supporting riparian alliances. A reduction in extent of tree-supporting riparian alliances from the baseline conditions, as calculated below, shall trigger implementation of habitat enhancement measures described in Mitigation Measure M-BI-6c on a 1:1 ratio based on extent.

Changes in the extent of tree-supporting woody riparian alliances shall be calculated as the difference in extent between the baseline conditions and a multi-year rolling average based on the current year and the years preceding.

The SFPUC shall prepare and submit to the ERO an annual report documenting the annual monitoring of riparian habitat and any associated habitat enhancement activities, with the first year report consisting of baseline monitoring and plan for habitat enhancement (see Mitigation Measure M-BI-6c).

In the future, when quarry operations cease, implementation of this mitigation measure shall cease.

**Mitigation Measure M-BI-6c: Habitat enhancement, Subreaches B and C1 to achieve no net loss of tree-supporting riparian alliances.**

The SFPUC shall develop a habitat enhancement plan to be reviewed and approved by the ERO and shall implement the plan based on the triggers described in Mitigation Measure M-BI-6b. The plan shall be consistent with the SFPUC's Sunol Valley Restoration Report (in prep.) and shall consist of a combination of plantings such as valley oaks and sycamores in the floodplain, and protecting and managing natural valley oak and sycamore recruits. Mitigation gains in woody riparian habitat shall be calculated in the same manner as losses are calculated in Mitigation Measure M-BI-6b. To the extent feasible, habitat enhancement shall be implemented in a portion of Subreaches B and C1, and in all cases, within the Sunol Valley.

No net loss will be considered to be achieved under this mitigation measure at such time that the SFPUC establishes and maintains woody riparian habitat that fully replaces the baseline extent of woody riparian habitat in accordance with the approved habitat enhancement plan. Upon documentation that this performance standard has been satisfied, the SFPUC may request ERO approval to discontinue the monitoring and enhancement actions required under this mitigation measure.

This measure shall be superseded at such time that the SFPUC implements the Sunol Valley Restoration Report that accomplishes the equivalent or greater habitat enhancement.

In the future, when quarry operations cease, implementation of this mitigation measure shall cease.

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**Impact BI-7: Project operations would not interfere substantially with the movement of any native resident or migratory wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites. (Less than Significant)**

Alameda Creek within the survey area currently provides a movement corridor for many native wildlife species that utilize riparian corridors. The I-680 overcrossing may deter some wildlife movement, but wildlife can still pass underneath or overtop this overcrossing. There are no other structures within the creek and there is little human disturbance, with the exception of noise from the adjacent golf course and quarry facilities, within the creek corridor. Wildlife, such as birds and amphibians, can use the creek to breed and/or raise young. However, the only wildlife nursery observed was a heron rookery located in large sycamore trees within the survey area.

The project would not add any components or obstructions to the creek that would interfere with the movement of any wildlife species, wildlife movement corridors, or wildlife nursery sites. As discussed in Impact BI-5, the project is not expected to significantly reduce habitat for special status species in Alameda Creek. As discussed in Impact BI-6, the project could result in a loss in the extent or condition of riparian habitat, which would be a significant impact to riparian habitat. Although the project could alter riparian habitat quality (e.g., a change from dense willow trees to sparsely vegetated mulefat), such a change would not prevent or substantially interfere with the movement of migratory wildlife through the creek corridor. The composition of riparian habitat is variable throughout the entire Alameda Creek riparian corridor and includes an approximately 2-mile segment of generally sparsely vegetated braided channel just upstream of the survey area. Wildlife that currently migrate through the entire creek corridor already migrate through a long segment of sparsely vegetation riparian habitat. Therefore, the conversion of riparian habitat within the survey area would not prevent wildlife from migrating through Alameda Creek.

The large sycamore trees, which support the heron rookery, are located within the riparian canopy and just within the survey area boundary. The trees are located near Subreach C1 (refer to Figure 5.14-1b) where project operations would have limited influence. Sycamore trees located in this area are likely to tolerate shallow subsurface water in the summer and would likely not be impacted by project operations.

Therefore, the project would not alter existing wildlife movement or nursery habitat. The impact would be *less than significant*.

**Mitigation:** None required.

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**Impact BI-8: Construction and operation of the proposed project could conflict with local policies or ordinances protecting biological resources. (Less than Significant with Mitigation)**

The relevant policies and ordinances protecting biological resources in the project area are the Alameda WMP, Alameda County Tree Ordinance, and the East County Area Plan.

The actions and guidelines of the Alameda WMP were used to inventory the resources in the project area, assess the impact of the project, and develop appropriate mitigation where necessary to address potentially significant impacts. It is the standard practice of the SFPUC to conduct construction activities in accordance with the policies of the Alameda WMP. These standard practices include reviewing relevant information sources, conducting appropriate surveys, minimizing the extent of the construction zone in areas of sensitive biological features, and carrying out construction and operations so as to minimize impacts on biological resources. Therefore, the project would not conflict with the Alameda WMP.

The Alameda County Tree Ordinance only protects trees within the Calaveras Road right-of-way. No trees within the Calaveras Road right-of-way would be removed or impacted. Therefore the project would not conflict with the local tree ordinance and the project would have a less-than-significant impact with respect to conflicts with the local tree ordinance.

As described in the Regulatory Framework, the East County Area Plan contains general policies protective of biological resources including special-status species, riparian areas, and wetlands. Policy 110 protects healthy trees, Policy 125 encourages preservation of areas known to support special-status species, Policy 126 encourages no net loss of riparian and seasonal wetlands, and Policy 129 protects existing riparian woodland habitat along Alameda Creek. As discussed above for Impacts BI-1, BI-3, and BI-6, construction and operations of the project could result in potentially significant impacts on biological resources, which could conflict with applicable East County Area Plan policies protecting biological resources; this would be a significant impact. However, implementation of Mitigation Measures M-BI-1a through M-BI-1i, M-BI-2, and M-BI-6a through M-BI-6c would reduce project impacts on biological resources to less than significant. Therefore, with implementation of the measures described above, the potential for the project to conflict with applicable local policies or ordinances protecting biological resources would be *less than significant*.

**Mitigation Measure M-BI-1a: General Protection Measures.**

(See Impact BI-1, above, for description.)

**Mitigation Measure M-BI-1b: Worker Training and Awareness Program.**

(See Impact BI-1, above, for description.)

**Mitigation Measure M-BI-1c: Prevent Movement of Sensitive Wildlife Species through the Work Areas.**

(See Impact BI-1, above, for description.)

**Mitigation Measure M-BI-1d: Preconstruction Surveys and Construction Monitoring and Protocols for California Tiger Salamander, California Red-Legged Frog, and Alameda Whipsnake.**

(See Impact BI-1, above, for description.)

**Mitigation Measure M-BI-1e: Prepare and Implement a Vegetation Restoration Plan and Compensatory Mitigation.**

(See Impact BI-1, above, for description.)

**Mitigation Measure M-BI-1f: Measures to Minimize Disturbance to Western Burrowing Owl.**

(See Impact BI-1, above, for description.)

**Mitigation Measure M-BI-1g: Measures to Minimize Disturbance to Special-Status Bird Species.**

(See Impact BI-1, above, for description.)

**Mitigation Measure M-BI-1h: Conduct Preconstruction Surveys for Special-Status Bats and Implement Avoidance and Minimization Measures.**

(See Impact BI-1, above, for description.)

**Mitigation Measure M-BI-1i: Avoidance and Minimization Measures for American Badger.**

(See Impact BI-1, above, for description.)

**Mitigation Measure M-BI-2: Avoidance and Protection Measures for Riparian Habitats and Wetlands.**

(See Impact BI-2, above, for description.)

**Mitigation Measure M-BI-6a: Baseline riparian habitat mapping.**

(See Impact BI-6, above, for description.)

**Mitigation Measure M-BI-6b: Annual riparian habitat monitoring and reporting.**

(See Impact BI-6, above, for description.)

**Mitigation Measure M-BI-6c: Habitat enhancement, Subreaches B and C1 to achieve no net loss of tree-supporting riparian alliances.**

(See Impact BI-6, above, for description.)

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### 5.14.4.5 Cumulative Impacts

**Impact C-BI-1: The project, in combination with past, present, and probable future projects, could substantially affect terrestrial biological resources. (Less than Significant with Mitigation)**

The cumulative impact analysis assumes that construction and operations of other projects in the geographical area, listed in Table 5.1-6, would be required to comply with the same regulatory requirements as the project, which would serve to avoid and reduce many impacts to less-than-significant levels on a project-by-project basis. The analysis then considers whether or not there would be a significant, adverse cumulative impact on terrestrial biological resources associated with project implementation in combination with past, present, and probable future projects in the geographical area, and if so, whether or not the project’s incremental contribution to the cumulative impact would be considerable. Both conditions must apply in order for a project’s cumulative effects to rise to the level of significance. If the project's contribution to a cumulative impact is determined to be cumulatively considerable (i.e., significant), then mitigation measures are identified to reduce the project's contribution to the impact.

The geographic scope of the cumulative analysis includes the Sunol Valley in the vicinity of the project, which includes the Alameda Creek riparian corridor from San Antonio Creek to Arroyo de la Laguna.

### *Cumulative Construction Impacts on Special-Status Species*

As discussed in Impact BI-1, construction of the ACRP would result in potentially significant impacts associated with the temporary and permanent loss of habitat and the potential for direct injury or mortality of CTS, CRLF, AWS, western burrowing owl, and American badger; potential for direct injury or mortality of western pond turtle; and direct impacts to breeding and birds, raptors, and bats. It is assumed that several of the cumulative projects listed in Table 5.1-6, particularly those projects located in the Sunol Valley, could adversely affect some of the same special-status species which have similar likelihood of occurrence in this geographical area; therefore, this would be a potentially significant cumulative impact. For the reasons discussed in Impact BI-1, the ACRP's contribution to this impact would be cumulatively considerable (i.e., significant).

However, the ACRP's temporary and permanent impacts on special-status species would be reduced to a less-than-significant level with implementation of **Mitigation Measures M-BI-1a (General Protection Measures), M-BI-1b (Worker Training and Awareness Program), M-BI-1c (Prevent Movement of Sensitive Wildlife Species through the Work Areas), M-BI-1d (Preconstruction Surveys and Construction Monitoring and Protocols for California Tiger Salamander, Red-Legged Frog, and Alameda Whipsnake), M-BI-1e (Prepare and Implement a Vegetation Restoration Plan and Compensatory Mitigation), Mitigation Measure M-BI-1f (Measures to Minimize Disturbance to Western Burrowing Owl), M-BI-1g (Measures to Minimize Disturbance to Special-Status Bird Species), M-BI-1h (Conduct Preconstruction Surveys for Special-Status Bats and Implement Avoidance and Minimization Measures),** and **Mitigation Measure M-BI-1i (Avoidance and Minimization Measures for American Badger).** These measures would address construction-related impacts on CTS, CRLF, AWS, western burrowing owl, western pond turtle, special-status birds, raptors, and bats, and American badger by requiring general protection measures, a worker training and awareness program, exclusion fencing, biological monitoring, implementation of protocols if individuals are found in the project area during construction, and revegetation and site restoration. Additionally, as described in Section 5.16, Hydrology and Water Quality, a SWPPP would be prepared and implemented to avoid construction-related water quality impacts, which would also provide some protection for aquatic-dependent special-status species. With implementation of these mitigation measures, the project's residual contribution to temporary and permanent cumulative impacts on special-status species would not be cumulatively considerable and the impact would be *less than significant with mitigation*.

**Mitigation Measure M-BI-1a: General Protection Measures.**

(See Impact BI-1)

**Mitigation Measure M-BI-1b: Worker Training and Awareness Program.**

(See Impact BI-1)

**Mitigation Measure M-BI-1c: Prevent Movement of Sensitive Wildlife Species through the Work Areas.**

(See Impact BI-1)

**Mitigation Measure M-BI-1d: Preconstruction Surveys and Construction Monitoring and Protocols for California Tiger Salamander, Red-Legged Frog, and Alameda Whipsnake.**

(See Impact BI-1)

**Mitigation Measure M-BI-1e: Prepare and Implement a Vegetation Restoration Plan and Compensatory Mitigation.**

(See Impact BI-1)

**Mitigation Measure M-BI-1f: Measures to Minimize Disturbance to Western Burrowing Owl.**

(See Impact BI-1)

**Mitigation Measure M-BI-1g: Measures to Minimize Disturbance to Special-Status Bird Species.**

(See Impact BI-1)

**Mitigation Measure M-BI-1h: Conduct Preconstruction Surveys for Special-Status Bats and Implement Avoidance and Minimization Measures.**

(See Impact BI-1)

**Mitigation Measure M-BI-1i: Avoidance and Minimization Measures for American Badger.**

(See Impact BI-1)

### *Cumulative Construction Impacts on Riparian Habitat and other Sensitive Habitats*

As discussed in Impact BI-2, construction activities, such as staging, site access, and installation of the overhead powerlines, would occur in the vicinity of Alameda Creek and San Antonio Creek riparian habitat, which could impact these resources. Several of the cumulative projects listed in Table 5.1-6 could also affect riparian resources in the region, resulting in a potentially significant cumulative impact, and for the reasons described in Impact BI-2, the proposed project's contribution to this impact would be cumulatively considerable. However, the ACRP's impact on this resource would be reduced to a less-than-significant level with implementation of **Mitigation Measures M-BI-1a, 1b, and 1e (General Protection Measures, Worker Training and Awareness Program, Vegetation Restoration Plan and Compensatory Mitigation) and Mitigation Measure M-BI-2 (Avoidance and Protection Measures for Riparian Habitats and Wetlands)**. Implementation of these mitigation measures would protect riparian habitat by requiring general impact avoidance, requiring worker training regarding the resources present, establishing protocols and performance standards for revegetation and restoration activities for impacted upland areas, and requiring fencing of riparian habitats to be avoided to protect water quality in receiving water bodies during construction activities. Additionally, as described in Section 5.16, Hydrology and Water Quality, a SWPPP would be prepared and implemented to avoid construction-related water quality impacts. Therefore, with implementation of these mitigation measures, and compliance with regulatory requirements for water quality protection, the proposed project's residual contribution to cumulative impacts on riparian habitat and other sensitive habitats would not be cumulatively considerable, and the impact would be *less than significant with mitigation*.

**Mitigation Measure M-BI-1a: General Protection Measures.**

(See Impact BI-1)

**Mitigation Measure M-BI-1b: Worker Training and Awareness Program.**

(See Impact BI-1)

**Mitigation Measure M-BI-1e: Prepare and Implement a Vegetation Restoration Plan and Compensatory Mitigation.**

(See Impact BI-1)

**Mitigation Measure M-BI-2: Avoidance and Protection Measures for Riparian Habitats and Wetlands.**

(See Impact BI-2)

### *Cumulative Construction Impacts on Wetlands*

As discussed in Impact BI-3, although no work would occur within the seasonal wetland, wetland tributary in San Antonio Creek, or Alameda Creek instream wetlands, construction activities could indirectly adversely impact these features. Many of the cumulative projects listed in Table 5.1-6 could also adversely affect jurisdictional wetlands, resulting in a potentially significant cumulative impact, and for the reasons described in Impact BI-3, the ACRP's contribution to this cumulative impact could be cumulatively considerable. However, the proposed project's impact on jurisdictional wetlands would be reduced to a less-than-significant level with implementation of **Mitigation Measure M-BI-1a (General Protection Measures), M-BI-1b (Worker Training and Awareness Program), M-BI-1e (Prepare and Implement a Vegetation Restoration Plan and Compensatory Mitigation), and Mitigation Measure M-BI-2 (Avoidance and Protection Measures for Riparian Habitats and Wetlands).** These measures would address impacts on jurisdictional wetlands by requiring general impact avoidance, requiring worker training regarding the resources present, establishing protocols and performance standards for revegetation and restoration activities for impacted upland areas, and requiring fencing of wetlands to be avoided to protect water quality in receiving water bodies during construction activities. Additionally, as described in Section 5.16, Hydrology and Water Quality, a SWPPP would be prepared and implemented to avoid construction-related water quality impacts and any dewatering activities would comply with regulatory requirements to avoid water quality impacts. With implementation of these mitigation measures and compliance with regulatory requirements for water quality protection, the project's residual contribution to cumulative impacts on jurisdictional waters would not be cumulatively considerable and this impact would be less than significant with mitigation.

**Mitigation Measure M-BI-1a: General Protection Measures.**

(See Impact BI-1)

**Mitigation Measure M-BI-1b: Worker Training and Awareness Program.**

(See Impact BI-1)

**Mitigation Measure M-BI-1e: Prepare and Implement a Vegetation Restoration Plan and Compensatory Mitigation**

(See Impact BI-1)

**Mitigation Measure M-BI-2: Avoidance and Protection Measures for Riparian Habitats and Wetlands.**

(See Impact BI-2)

### *Cumulative Operational Impacts on Special Status Species due to Changes in Pit F2 Water Levels*

As described in Impact BI-5, the SFPUC would pump water out of Pit F2 during project operations. Changes in the water level in Pit F2 would not result in the loss of CRLF habitat in the pit. The pumps would operate in the center of the Pit where CRLF are unlikely to occur and pumping is not expected to impact CRLF. Compared to the ACRP, none of the other projects listed in Table 5.1-6 are expected to substantially affect the water levels in Pit F2. Therefore, there would be no cumulative impact on CRLF with respect to changes in Pit F2 water levels and this impact would be *less than significant*.

### *Cumulative Operational Impacts on Flow-related Resources*

Under the proposed project, subsurface water and surface water conditions in Alameda Creek between San Antonio Creek and Arroyo de la Laguna and in Pit F2 would be different under existing conditions and with-CDRP conditions, and as discussed above in Impacts BI-5 and BI-6, these changes in flow regimes could affect special-status species, woody riparian habitat especially tree-supporting alliances, and wetland vegetation. The only projects listed in Table 5.1-6, the operation of which could affect the surface and subsurface flows in Alameda Creek within the biological resources survey area are: the CDRP, the SMP-30 Quarry Expansion, the SMP-30 Cut-off Wall and Creek Restoration project, and the PG&E Line 303 Alameda Creek Relocation project. None of the other listed projects would contribute to a cumulative effect on flow conditions in this reach of Alameda Creek with respect to project operations because operations of those projects would not affect Alameda Creek flows within the ACRP terrestrial biological resources survey area. The Joint Lower Alameda Creek Fish Passage Improvements Project could change flow conditions along Alameda Creek tributaries upstream of the Alameda Creek and Arroyo de la Laguna confluence, but outside of the ACRP terrestrial biological resources survey area.

The impacts of the CDRP operations, including restoration of the Calaveras Reservoir capacity and implementation of instream flow schedules, were considered and acknowledged in the project analysis of Impacts BI-5 and BI-6 above. They were also addressed in the CDRP EIR, certified in 2011. The CDRP project will reduce downstream flows to Alameda Creek compared to existing conditions by restoring the historical capacity of Calaveras Reservoir, but at the same time, the CDRP will also increase flows to Alameda Creek by implementation of the instream flow schedules. See Appendix HYD1 for details.

The PG&E Line 303 Alameda Creek Relocation project is located in the Sunol Valley above the Alameda Creek/San Antonio Creek confluence and would involve removing a concrete mat and lowering the pipeline within the creek channel to facilitate fish migration upstream of this crossing. Implementation of this project would improve flow in Alameda Creek immediately upstream of the ACRP project site and would improve opportunities for fish passage. Therefore, this project would have a beneficial effect on stream flow at this location and would not contribute to any adverse cumulative impact. The SMP-30 Quarry Expansion by Oliver de Silva, Inc. would increase the maximum depth of excavation from 140 feet below the ground surface to a maximum depth of 400 feet below the ground surface, expanding the active mining area by 58 acres. The EIR concluded that the project would not result in appreciable changes in stormwater or groundwater discharges.[198] Although no NPDES discharges from Oliver de Silva, Inc. were included in the hydrology analysis, this project could result in changes in NPDES discharges to Alameda Creek from the active downstream quarry pits (operated by Hanson), that could in turn, affect surface and subsurface water conditions in Subreaches A, B, and C.

The SMP-30 Cut-off Wall and Creek Restoration project would install a 7,800-foot-long, 35- to 45-foot-deep cutoff wall along Alameda Creek just upstream of the ACRP project area to reduce the seepage of water from Alameda Creek into active mining areas. This project has not yet been designed; however, the project is intended to improve stream flow within the creek channel.

Operations related to the Joint Lower Alameda Creek Fish Passage Improvements Project may alter flows within the “upstream reach,” which includes Alameda Creek and tributaries used by ACWD to deliver water from the State Water Project’s South Bay Aqueduct turnout at Vallecitos Creek. Although this area is outside of the ACRP terrestrial biological resources survey area, it could impact the same type of sensitive biological resources along Alameda Creek.

Taken together, the cumulative effect of the ACRP, CDRP, SMP-30 quarry expansion, SMP-30 cut-off wall, and Joint Lower Alameda Creek Fish Passage Improvements Project would result in an altered flow regime in Alameda Creek. The changes in flow within the ACRP terrestrial biological resources survey area are almost entirely due to alteration of quarry discharges resulting from the CDRP and ACRP projects.

No modeling has been conducted to account for the other cumulative projects (some of which have not yet been designed), but it can be surmised that, in general, implementation of the cumulative projects listed above would alter flows in Alameda Creek and the associated relationship to subsurface waters from what is identified in Appendices HYD1 and HYD2. Thus, the actual pattern, distribution, and magnitude of these changes cannot be determined at this time. Nevertheless, the cumulative effect of the ACRP together with these projects could result in

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[198] Lamphier – Gregory, 2012. SMP-30 Revised Use Permit Sunol Valley Aggregate Quarry Project Draft Environmental Impact Report. Prepared for the County of Alameda Planning Department.

significant cumulative adverse effects on flow-dependent terrestrial biological resources, including special-status species, riparian vegetation, and wetlands.

### Special Status Species

As described in Impact BI-5, operation of the proposed project and subsequent changes in subsurface water and surface water is not expected to significantly alter CRLF, Alameda whipsnake, foothill yellow-legged frog, and western pond turtle habitat in Subreaches A, B, and C. The CDRP FEIR identified potentially significant impacts to CRLF and foothill yellow-legged frog habitat within Alameda Creek, from filling and/or operation of the CDRP project.[199] However, those impacts were reduced to a less-than-significant level with incorporation of mitigation. The Joint Lower Alameda Creek Fish Passage Improvements Project Draft Initial Study with Mitigated Negative Declaration/Environmental Assessment with Finding of No Significant Impacts[200] found that the project would not adversely impact, and may be beneficial to CRLF, and would have low potential to affect western pond turtle. The cumulative effects of flow changes associated with implementation of SMP-30 quarry expansion, SMP-30 cut-off wall, and PG&E Line 303 relocation project could alter flow conditions in Alameda Creek. However, as described in Impact BI-5, operation of the proposed project and subsequent changes in subsurface water and surface water is not expected to significantly alter CRLF, Alameda whipsnake, foothill yellow-legged frog, and western pond turtle habitat. Therefore, cumulative impacts related to changes in subsurface water and surface water to Alameda Creek during operations would be less than significant, and the project's residual contribution to cumulative impacts on special status species would not be cumulatively considerable (*less than significant*).

### Riparian Habitats

As discussed in Impact BI-6, under the proposed project, subsurface water and surface water conditions in Alameda Creek between San Antonio Creek and Arroyo de la Laguna would be different under existing conditions and with-CDRP conditions. Operation of the proposed project and associated reductions in subsurface water and surface water in Subreaches A, B, and C1 during the summer months was determined to result in potentially significant impacts on tree-supporting riparian alliances present along these subreaches. However, implementation of Mitigation Measure M-BI-6a through M-BI-6c, requiring mapping, monitoring, and habitat enhancement, would reduce this impact to less than significant. The CDRP would also change instream flow conditions in the same segment of Alameda Creek as the ACRP survey area. The CDRP EIR concluded that operation of the CDRP project would have less than significant impacts on wetlands and riparian areas. The cumulative effects of flow changes associated with implementation of SMP-30 quarry expansion, SMP-30 cut-off wall, and PG&E Line 303 relocation project, would likely result in altered hydrologic conditions in Alameda Creek, as discussed

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[199] San Francisco Planning Department, *Final Environmental Impact Report for the San Francisco Public Utilities Commission Calaveras Dam Replacement Project*, San Francisco Planning Department File No.2005.0161E, State Clearinghouse No. 2005102102. January 27, 2011

[200] Hanson Environmental, 2016. Alameda County Water District and Alameda County Flood Control and Water Conservation District Joint Lower Alameda Creek Fish Passage Improvements Project Draft Initial Study with Mitigated Negative Declaration/Environmental Assessment with Finding of No Significant Impacts. Prepared for Alameda County Water District, Alameda County Flood Control & Water Conservation District, and U.S. Army Corps of Engineers San Francisco District. October 2016.

above. Mitigation Measure M-C-BI, however, requires the SFPUC to coordinate its implementation of mitigation measures with these other cumulative projects. By doing so, the SFPUC would reduce the project's contribution to any potential cumulative impacts to less than significant. Thus, an additional, cumulative mitigation measure to address potential cumulative effects of flow changes on tree-supporting riparian alliances in Subreaches A, B, and C1—Mitigation Measure M-C-BI, Coordination of Measures for Monitoring and Habitat Enhancement in Subreaches A, B, and C1—would reduce the project's contribution to any cumulative impact to less than significant. Therefore, cumulative impacts on riparian habitats related to changes in subsurface water and surface water to Alameda Creek during operations would be less than significant with mitigation, and the project's residual contribution to cumulative impacts on riparian habitat with implementation of Mitigation Measure M-BI-6a through M-BI-6c would not be cumulatively considerable. This impact would be *less than significant with mitigation*.

**Mitigation Measure M-C-BI: Coordination of Measures for Monitoring and Habitat Enhancement in Subreaches A, B, and C1.**

In the event that implementation of the SMP-30 quarry expansion, SMP-30 cut-off wall, and PG&E Line 303 relocation (either individually or collectively) are determined to result in downstream impacts to riparian habitat in Subreaches A, B, and C1 of Alameda Creek (i.e., tree-supporting riparian vegetation alliances), and mitigation measures are required by those projects to mitigate significant impacts to riparian habitat in these subreaches, then the SFPUC shall coordinate or as necessary modify the habitat enhancement plan it developed to implement Mitigation Measure M-BI-6c, to ensure that habitat restoration and enhancement efforts along Alameda Creek are consistent with each other in these subreaches.

**Mitigation Measure M-BI-6a: Baseline riparian habitat mapping.**

(See Impact BI-6, above, for description.)

**Mitigation Measure M-BI-6b: Annual riparian habitat monitoring and reporting.**

(See Impact BI-6, above, for description.)

**Mitigation Measure M-BI-6c: Habitat enhancement, Subreaches B and C1.**

(See Impact BI-6, above, for description.)

### Instream Wetlands

As discussed in Impact BI-6, project-related impacts on instream wetlands are concluded to be less than significant because fluctuations in subsurface water are expected to resemble existing conditions and the overall extent of instream wetlands are not expected to decrease. This analysis accounted for flow changes attributable to the CDRP, and cumulative effects of implementation of the SMP-30 quarry expansion, SMP-30 cut-off wall, and PG&E Line 303 relocation project would not be expected to substantially alter this effect due to the physical properties of the subsurface system and thickness of the alluvium in Subreaches A, B, and C. Therefore, the cumulative impact on instream wetlands would be less than significant, and no mitigation would be required.

## 5.14.5 Setting, Fisheries Resources

### 5.14.5.1 Definitions

#### *Primary and Extended Study Areas*

For purposes of assessing fish habitat in Alameda Creek, two discrete study areas have been identified; a primary area and an extended study area (see **Figure 5.14-5**). They consist of all aquatic habitats that could be directly or indirectly affected by the construction and operation of the ACRP.

**Primary Study Area**

The stream reaches immediately adjacent to and downstream of the project area could be affected by construction and operation of the proposed project and comprise the primary study area. This area includes the Alameda Creek channel from the confluence with San Antonio Creek downstream approximately 1.6 miles to the confluence with Arroyo de la Laguna. The primary study area has been further divided into Subreaches A, B, and C based on physical habitat characteristics (see **Figure 5.14-6**).

**Extended Study Area**

The extended study area includes the segments of the Alameda Creek main stem from the Arroyo de la Laguna confluence downstream approximately 16.5 miles to San Francisco Bay. Streamflow and the related fisheries habitat conditions in the extended study area are strongly influenced by operation of other water projects in the watershed including Del Valle Reservoir and water deliveries to the Alameda County Water District (ACWD) from the South Bay Aqueduct via Vallecitos Creek, which enters Arroyo de la Laguna just upstream of the Alameda Creek confluence. While operation of the proposed ACRP has the potential to influence flow conditions in Alameda Creek in the extended study area, the potential influence is greatly diminished due to the effects of these other water projects in the Arroyo de la Laguna watershed (see Appendix HYD1 for description of other water projects in this watershed).

### 5.14.5.2 Information Sources and Survey Methodology

#### *Literature Review*

The Alameda Creek watershed has been studied in detail to support the Calaveras Dam Replacement Project (CDRP), and the potential for restoration of an anadromous fishery within Alameda Creek is the focus of the Alameda Creek Fisheries Restoration Workgroup (ACFRW); a multi-agency stakeholder group formed in 1999 to develop and implement a strategy to restore steelhead trout to Alameda Creek. The ACFRW is composed of numerous community and citizens' groups, local water management and flood control agencies, state and federal resource agencies, and others. Numerous studies have been prepared detailing the potential for restoration of anadromous fish within Alameda Creek, and in support of the CDRP Environmental Impact Report (EIR). The following documents were reviewed for information on current and potential future environmental conditions in the primary and extended project areas as they relate to the ACRP:

- *Alameda Creek Recapture Project, Alameda Creek Fisheries Habitat Assessment Report* (see Appendix BIO2 of this EIR);[1]
- *An Assessment of the Potential for Restoring a Viable Steelhead Trout Population in the Alameda Creek Watershed;*[2]
- *Ecology, Assemblage Structure, Distribution, and Status of Fishes in Streams Tributary to the San Francisco Estuary, California;*[3]
- *Calaveras Dam Replacement Project Fisheries Technical Report 2008 (ETJV, 2008); Biological Assessment and Essential Fish Habitat Assessment for the Calaveras Dam Replacement Project;*[4]
- *Technical Memorandum: Calaveras Dam Replacement Project: Cumulative Impact Analysis – Central California Coast Steelhead. Appendix J Calaveras Dam Replacement Project FEIR;*[5]
- *Final Environmental Impact Report for the Calaveras Dam Replacement Project;*[6]
- *National Marine Fisheries Service Biological Opinion for the Calaveras Dam Replacement Project;*[7]
- *Streambed Alteration Agreement for the Calaveras Dam Replacement Project (Notification No. 1600-2010-0322-R3);*[8]
- *Evaluating Priority Life History Tactics for Reintroduced Alameda Creek Steelhead. Prepared for: Alameda Creek Fisheries Restoration Workgroup;*[9] and
- *Joint Lower Alameda Creek Fish Passage Improvements, Draft Initial Study with Mitigated Negative Declaration/Environmental Assessment with Finding of No Significant Impacts.*[10]

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[1] San Francisco Public Utilities Commission. 2016. *San Francisco Public Utilities Commission Alameda Creek Recapture Project, Alameda Creek Fisheries Habitat Assessment Report*. Prepared by ESA. November 2016. (See Appendix BIO2).

[2] Gunther, A.J., J.M. Hagar, and P. Salop, 2000. *An Assessment of the Potential for Restoring a Viable Steelhead Trout Population in the Alameda Creek Watershed*. Prepared for the Alameda Creek Fisheries Restoration Workgroup. February 7, 2000.

[3] Leidy, R.A., 2007. *Ecology, Assemblage Structure, Distribution, and Status of Fishes in Streams Tributary to the San Francisco Estuary, California.* San Francisco Estuary Institute, April 2007. Contribution No. 530.

[4] EDAW & Turnstone Joint Venture (ETJV), 2008. *Calaveras Dam Replacement Project Fisheries Technical Report*. Prepared by Hagar Environmental Science and Thomas R. Payne and Associates for EDAW & Turnstone Joint Venture and SFPUC.

[5] San Francisco Planning Department, 2011. *Technical Memorandum: Calaveras Dam Replacement Project: Cumulative Impact Analysis – Central California Coast Steelhead. Appendix J Calaveras Dam Replacement Project FEIR.* San Francisco Planning Department File No. 2005.0161E, State Clearinghouse No. 2005102102. Certified January 27, 2011.

[6] San Francisco Planning Department, 2011. *Final Environmental Impact Report for the Calaveras Dam Replacement Project*. San Francisco Planning Department File No. 2005.0161E, State Clearinghouse No. 2005102102. Certified January 27, 2011.

[7] National Marine Fisheries Service (NMFS), 2011. *Biological Opinion for the Calaveras Dam Replacement Project*. Santa Rosa, CA.

[8] California Department of Fish and Game (CDFG), 2011. *Streambed Alteration Agreement for Calaveras Dam Replacement Project.* Notification No. 1600-2010-0322-R3. June 28, 2011.

[9] McBain and Trush, 2012. *Evaluating Priority Life History Tactics for Reintroduced Alameda Creek Steelhead.* Prepared for: Alameda Creek Fisheries Restoration Workgroup.

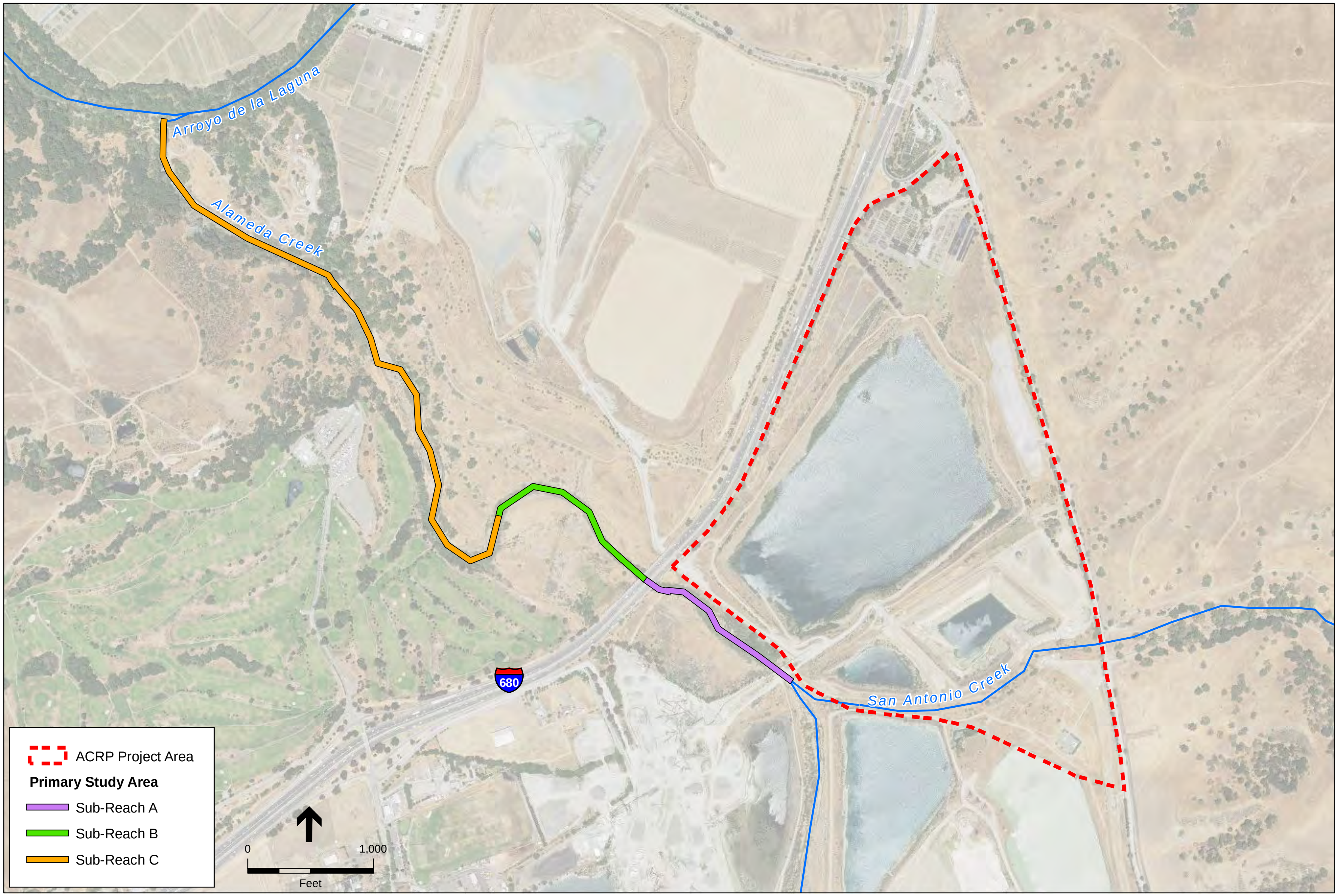
[10] Hanson Environmental, 2016. *Alameda County Water District and Alameda County Flood Control & Water Conservation District Joint Lower Alameda Creek Fish Passage Improvements, Draft Initial Study with Mitigated Negative Declaration/Environmental Assessment with Finding of No Significant Impacts*. October 2016.

SOURCE: ESA, 2016; Date of aerial photo is 2014.

SFPUC Alameda Creek Recapture Project

**Figure 5.14-5**

Fisheries and Aquatic Habitat Study Area



SOURCE: ESA, 2015; Date of aerial photo is 2014.

SFPUC Alameda Creek Recapture Project

**Figure 5.14-6**

Primary Study Area Sub-Reaches

### *Analysis of 2008 Habitat Characterization Study Survey Data*

In 2008, the SFPUC conducted a detailed habitat characterization of Alameda Creek from its confluence with Arroyo de La Laguna to its confluence with Calaveras Creek, then along Calaveras Creek upstream to Calaveras Dam. The habitat characterization was conducted during a series of experimental water releases from Calaveras Reservoir. Crews of five or more SFPUC biologists conducted the surveys. Continuous longitudinal measurements of habitat types were recorded, and at every tenth habitat unit, the first occurrence of a given habitat unit, and around potential migration barriers, a full habitat characterization was conducted, including measurements of width and depth, substrate and shelter, band and riparian characteristics, spawning and pool tailout characteristics, barrier assessment, and streamflow measurements. This method was repeated during four successive experimental water releases from Calaveras Reservoir between May 1, 2008 and July 3, 2008. The data collected along Alameda Creek from its confluence with Arroyo de La Laguna upstream to its confluence with San Antonio Creek were synthesized to characterize fish habitat conditions in the primary study area as part of this analysis.

### *2015 Fisheries Habitat Survey*

A focused visual survey of the primary study area and reconnaissance survey of the extended study area were conducted on May 27, 2015. Aquatic habitat types, riparian vegetation cover, and instream characteristics were noted and mapped. Potential habitat and barriers to movement for steelhead were also noted during the survey. The extended study area was surveyed via spot-checks at accessible locations along Niles Canyon and the Alameda Creek flood control channel.

### *Historical Hydrological Records Review*

The existing conditions have been characterized based on observation of conditions on the ground and review of historical records of stream discharge, water discharges, and water levels in surface and groundwater bodies. These sources include stream gages, monitoring wells, and quarry NPDES discharge records and are described in more detail in the *Surface Water Hydrology Report for Proposed Alameda Creek Recapture Project* (see Appendix HYD1) and in *Groundwater-Surface Water Interactions ACRP Biological Resources Study Area Technical Report* (see Appendix HYD2).

### *Alameda System Daily Hydrologic Model (ASDHM)*

Future hydrologic conditions in the Alameda Creek watershed were projected using the Alameda System Daily Hydrologic Model (ASDHM). The methods used to make the projections are described in the *Surface Water Hydrology Report for the SFPUC Alameda Creek Recapture Project* (see Appendix HYD1). The ASDHM is a spreadsheet model that enables estimation of mean daily discharge values at various locations on Alameda Creek and one of its tributaries. The ASDHM was first developed by the SFPUC in 2009 and has subsequently been expanded and refined. The model was further refined for the ACFRW, and the agencies and stakeholders that comprise the workgroup to provide the hydrology information.

The current version of the ASDHM enables estimation of mean daily discharge values at one location (or node) in Calaveras Creek below Calaveras Dam, and 11 locations (nodes) in Alameda Creek between the Alameda Creek Diversion Dam and Coyote Hills Regional Park, close to the point at which the flood control channel discharges into San Francisco Bay. The model is described fully in a draft technical memorandum entitled *Overview of Methods, Models and Results to Develop Unimpaired, Impaired and Future Flow and Temperature Estimates along Lower Alameda Creek for Hydrologic Years 1996-2019*.[11]

The SFPUC updated the model to include the ACRP and used the ASDHM to simulate the following scenarios in support of this analysis. The hydrology used in the analysis was for the 18-year period from Water Year 1996 to Water Year 2013.

- Conditions that exist in 2015 with restricted storage in Calaveras Reservoir by order of the California Department of Water Resources, Division of Safety of Dams (DSOD) (existing conditions).
- Conditions that will exist when construction of the CDRP is completed and in operation and the instream flow schedules are implemented (with-CDRP conditions).

Detailed description of the ASDHM application to the ACRP is provided in *Surface Water Hydrology Report for Proposed Alameda Creek Recapture Project* (see Appendix HYD1).

### *Surface and Subsurface Water Interactions*

Surface and subsurface water interactions have been assessed through the analysis of monitoring well and streamflow data to show how subsurface water (including pit water surface elevations) responds to flows in Alameda Creek and vice versa. A detailed description of these interactions is provided in Appendix HYD2, *Groundwater-Surface Water Interactions, ACRP Biological Resources Study Area*.

## 5.14.5.3 Alameda Creek Fish Habitat

### *Existing Conditions*

#### Alameda Creek Watershed

Appendix HYD1 provides a detailed description of the surface water hydrology of the project area, and specifically the Alameda Creek watershed, from its headwaters near Mount Hamilton northward all the way to San Francisco Bay. This information is also summarized in Section 5.16.2.4 of Section 5.16, Hydrology and Water Quality, and in Appendix BIO2.

Additional supporting information on the groundwater hydrology in the project area is included in Appendix HYD2.

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[11] Dhakal, Buckland and McBain, 2012. *Overview of Methods, Models and Results to Develop Unimpaired, Impaired and Future Flow and Temperature Estimates along Lower Alameda Creek for Hydrologic Years 1996-2009.*

### Past and Present Influences on Fisheries Habitat Conditions

As discussed above, the hydrologic and fisheries habitat conditions in Alameda Creek adjacent to and downstream from the proposed ACRP have been and are currently influenced by a number of historical and existing facilities and operations under the jurisdiction of the SFPUC, ACWD, Alameda County Flood Control and Water Conservation District (ACFCD), California Department of Water Resources (DWR), and Zone 7 Water Agency, among others. The natural and unimpaired flow conditions that existed pre-20th century have been substantially altered by the construction and operation of many of these facilities. Some of these facilities are direct barriers to fish migration, while other facilities pose various degrees of control/influence over habitat conditions. The major structures, facilities, and fish passage barriers or obstacles are listed below (see **Figure 5.14-7**):[12]

- Upstream from or adjacent to the proposed project area:
  - Calaveras Dam and Reservoir;
  - ACDD and diversion tunnel;
  - Sunol Valley aggregate mining operations;
  - Sunol Valley historic stream relocation and channelization;
  - Turner Dam and San Antonio Reservoir (barriers to fish passage in upper San Antonio Creek);
  - Sunol Valley infiltration galleries; and
  - Pacific Gas and Electric Company (PG&E) gas pipeline crossing protection covering (concrete mat).
- Downstream from the proposed ACRP:
  - Del Valle Dam and Reservoir/South Bay Aqueduct, including DWR SWP releases;
  - Quarry Lakes recharge facilities;
  - Various channelized and culverted stream segments;
  - Expanding urban development of the Tri-Valley Area;
  - USGS Niles gaging station (11179000) weir/apron;
  - ACWD's inflatable dams;
  - BART weir; and
  - ACFCD channelization project.

### Reach-by-Reach Habitat Characterization

This section summarizes the results of the 2015 field surveys and analysis of the 2008 SFPUC habitat characterization data in the primary study area, both of which are described in detail in Appendix BIO2. In general, the entire primary fisheries study area is a low-gradient alluvial valley

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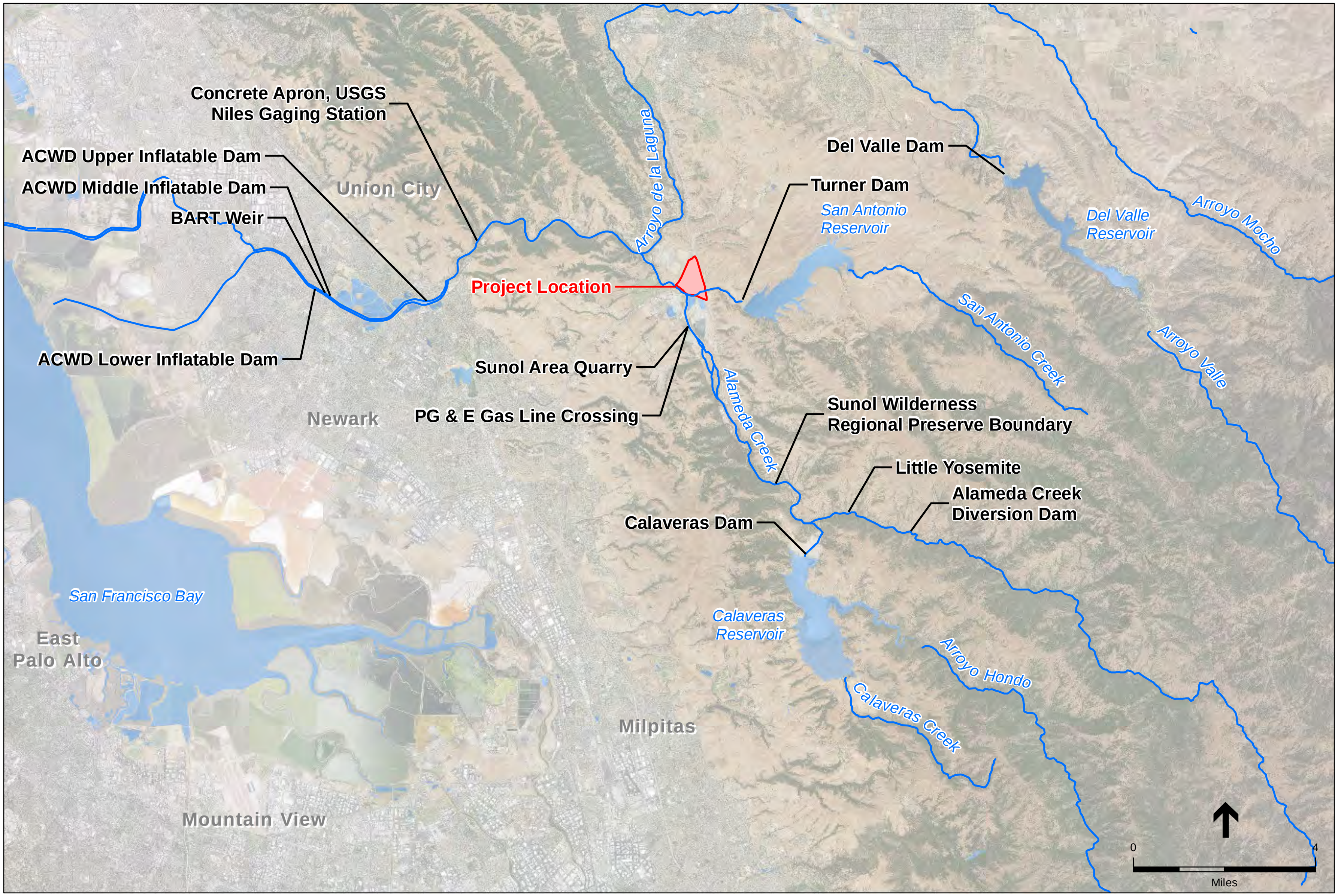
[12] Two historic structures—the Niles and Sunol Dams, both located on Alameda Creek downstream of the Sunol quarries, were removed in 2006 by the SFPUC, which improved fish movement conditions and increased the fish habitat. The East Bay Regional Park District also removed two small barriers from Sunol Wilderness Regional Preserve (Sunol Wilderness) in recent years.



SOURCE: ESA, 2015

SFPUC Alameda Creek Recapture Project

**Figure 5.14-7**
Major Facilities and Fish Passage Barriers/Obstacles in the Alameda Creek Watershed

in which Alameda Creek and its tributaries can have intermittent flows due to the hydrologic regime described in Section 5.16. In addition, this portion of the Sunol Valley has been heavily influenced by sand and aggregate mining activities, including relocation of the channel in some locations, discharges to the creek from dewatering of active mining areas, and the now inactive Sunol Infiltration Gallery (formerly used for golf course irrigation water supply through a lease with the SFPUC). More detailed descriptions of habitat conditions throughout the primary and extended study areas are provided in Appendix BIO2, *Alameda Creek Recapture Project, Alameda Creek Fisheries Habitat Assessment Report*.[13]

***Primary Study Area***

Subreach A extends from the confluence of San Antonio and Alameda Creeks to the I-680 culvert. During the May 2015 survey, both San Antonio and Alameda Creeks were dry at the confluence, but water was present in Alameda Creek approximately 50 feet below the confluence. This inflow of water was a result of discharges associated with the adjacent quarry operations, and generally, the quarry discharges do not follow a specific pattern, nor are they regulated to provide certain flows at any given time (although all discharges are authorized under permits issued by the RWQCB and there is a maximum discharge rate). In general, substrate was dominated by silt and fine sediment in pools and glide areas which had emergent vegetation, with some gravels and more complex channel structure in the isolated riffles interspersed throughout the subreach. Heavy riparian vegetation, wood debris flows, and debris dams in the channel combined to create pools, glides, and occasional riffles. During the 2008 SFPUC habitat characterization surveys, temperatures were near or above thermal limits for steelhead (approximately 23 to 25 degrees Celsius [°C])[14] during all experimental flow releases during May and June.

Subreach B extends from the I-680 culvert downstream approximately 1,700 feet. During the May 2015 survey, this reach of Alameda Creek was dominated by slow moving water (glide or pool habitat), had high levels of algal cover, dense riparian vegetation on banks, and was both lower gradient and wider than Subreach A. The 2008 surveys of this reach found no riffle habitat, less than 10 percent substrate greater than 2.5 inches, and a maximum recorded depth of 4.6 feet. Temperatures during the May-June 2008 surveys conducted by SFPUC in Subreach B were also sub-optimal for steelhead, and at lower flows were above thermal limits.

Subreach C begins where the primary channel of Alameda Creek becomes braided and there is intermittent inflow of subsurface water into the open creek channel. This reach is characterized by riffle, run, and pool complexes with less dense riparian vegetation on the margins, slightly greater gradient, and increased habitat complexity when compared with Subreaches A or B. The 2008 surveys conducted by SFPUC showed that riffles in this reach were a more dominant habitat feature than in either Subreach A or B, and that there was more habitat complexity in this reach with sections of braided channel and up to 15 percent boulders in some riffles, along with an

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[13] ESA. 2016. *Alameda Creek Recapture Project, Alameda Creek Fisheries Habitat Assessment Report*. Prepared for San Francisco Public Utilities Commission. Prepared by Environmental Science Associates. November 2016. (See Appendix BIO2)

[14] Gunther, A.J., J.M. Hagar, and P. Salop. 2000. An Assessment of the Potential for Restoring a Viable Steelhead Trout Population in the Alameda Creek Watershed. Prepared for the Alameda Creek Fisheries Restoration Workgroup. February 7, 2000.

overall greater abundance of cobbles. Flows in this reach were unpredictable, but in general were found to increase below Subreach B, where subsurface water appears to resurface into the channel, then decrease throughout the remainder of the reach to the confluence with Arroyo de la Laguna. This pattern was observed during the May 2015 survey, with flows midway through the reach and a completely dry channel at the Arroyo de la Laguna confluence. Temperatures varied widely in this reach, but tended to be lower than in Subreach A or B, likely the result of thermally buffered surface water inputs from the subsurface.

#### *Extended Study Area*

Niles Canyon begins downstream from the Arroyo de la Laguna confluence, Alameda Creek flows approximately 6.5 miles through Niles Canyon to Niles Junction (near the crossing of Highway 238). The stream channel is relatively confined within the steep walled canyon and, with the exception of Highway 84 and a rail line, there is little development on the narrow floodplain and surrounding hills. There is a relatively well developed riparian zone throughout Niles Canyon. There are two major tributaries in this reach, Sinbad Creek and Stonybrook Creek. The reach is a perennial stream characterized by large, moderately deep pools, and runs separated by short, shallow riffles. The substrate is highly variable, ranging from sand, gravel, and cobble-dominated riffles and glides to cobble-boulder and silt and sand pools.

Historically, Alameda Creek in Niles Canyon was likely an intermittent to perennial stream characterized by low flows during late summer and fall. Low dry season flows were derived primarily from upstream subsurface flows (shallow groundwater that enters the canyon below Sunol) that may have been relatively cool due to the limited exposure to warm atmospheric conditions in the shady canyon. Additionally, cool groundwater may have existed historically in the lower segments of Arroyo de la Laguna due to artesian flow from the Livermore Valley. During this low flow condition, some pools may have thermally stratified and provided critical thermal refuge (cool water layer on the bottom of pools) during summer months (June to August), but overall this reach likely would not have provided desirable habitat for juvenile steelhead to reside over the last half of summer and early fall.[15]

Alameda Creek through Niles Canyon now serves as a conveyance for imported water supply from the South Bay Aqueduct turnout in Vallecitos Creek, which is tributary to Arroyo de la Laguna just upstream from the Alameda Creek confluence. As a result, summer base flows in Niles Canyon have increased and become less variable, thereby increasing overall water temperatures, reducing thermal buffering that historically occurred with subsurface flows, reducing potential pool stratification, and subsequently reducing potential rearing habitat for steelhead.

Lower Alameda Creek begins downstream from the mouth of Niles Canyon, flowing approximately 10 miles across a broad low-gradient plain to San Francisco Bay. Historically, before extensive urbanization of the floodplain, the stream channel was relatively unconfined

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[15] McBain and Trush, 2008, *Alameda Creek Population Recovery Strategies and Instream Flow Assessment for Steelhead.* Prepared for the Alameda Creek Fisheries Restoration Workgroup.

and the creek would migrate and form different courses and distributary channels.[16,17] These channels were tidally influenced in their lower sections and likely provided valuable estuarine habitat function for rearing juveniles or for smolts during their transition to the higher salinity of bay water.[18]

The lower Alameda Creek channel was extensively modified beginning in the 1950s as a result of floods that inundated the surrounding urbanizing area and instream aggregate extraction, and the channel served increasingly as a flood control and water conveyance facility. Following floods in the 1950s, the lower reaches of Alameda Creek (i.e., downstream of Niles Canyon) were rerouted in the 1960s into a trapezoidal flood control channel confined between artificial levees. To maintain flood control capacity, sediment and vegetation has been periodically removed from the channel. The historical floodplain has been largely converted to residential, commercial, and industrial urban uses. Commercial salt production was carried out in an extensive system of evaporation ponds that removed historic wetlands and natural tidal channels – the ponds currently are being planned for restoration to those former conditions (South Bay Salt Ponds Restoration Project). Restoration activities have been ongoing at Coyote Hills Regional Park on the southern side of the channel for many years, and flood gates connect wetlands in the park to the channel in its lower reach. Water supply and flood control structures were incorporated into the channel, including a bank-to-bank grade control structure at the BART and Southern Pacific Railway rail crossings (i.e., the BART weir – see **Figure 5.14-5**) and a series of inflatable dams for water supply impoundment (including flows imported from the Sacramento – San Joaquin Delta via the South Bay Aqueduct). These features prevent fish migration and impair other habitat functions.

As discussed above, the BART weir is a complete barrier to all migrating anadromous fish species with the possible exception of Pacific lamprey (*Lampetra tridentata*).[19] The middle and upper ACWD inflatable dams are also major migration obstacles/barriers in lower Alameda Creek. The ACWD permanently removed the lower rubber dam from the Alameda Creek flood control channel in 2009. The concrete foundation was left in place for grade control stabilization and a low-flow fish ladder was installed in a notch through the foundation to allow continuous fish passage.

Aquatic habitat conditions in lower Alameda Creek are characterized by low summer flows, high summer water temperature, substrate with a large silt component, extensive stands of emergent vegetation, and tidal mixing with increased salinity in the lower sections near the Bay and

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[16] Gunther, A.J., J.M. Hagar, and P. Salop, 2000. *An Assessment of the Potential for Restoring a Viable Steelhead Trout Population in the Alameda Creek Watershed.* Prepared for the Alameda Creek Fisheries Restoration Workgroup. February 7, 2000.

[17] Leidy, R.A., 2007. Ecology, *Assemblage Structure, Distribution, and Status of Fishes in Streams Tributary to the San Francisco Estuary, California.* San Francisco Estuary Institute, April 2007. Contribution No. 530.

[18] Gunther, A.J., J.M. Hagar, and P. Salop, 2000. *An Assessment of the Potential for Restoring a Viable Steelhead Trout Population in the Alameda Creek Watershed.* Prepared for the Alameda Creek Fisheries Restoration Workgroup. February 7, 2000.

[19] Gunther, A.J., J.M. Hagar, and P. Salop, 2000. *An Assessment of the Potential for Restoring a Viable Steelhead Trout Population in the Alameda Creek Watershed.* Prepared for the Alameda Creek Fisheries Restoration Workgroup. February 7, 2000.

freshwater flows in the higher lying reaches above the BART weir. Some sections may be dry during the summer.[20]

### Quarry Pit F2

Quarry Pit F2 currently is not likely to provide habitat for native fish species. While there are no data on any fish species that may occur in the pit, there are no known stocking records and the pit has no surface connectivity to natural waterways, such as Alameda Creek or San Antonio Creek.[21]

## *With-CDRP Conditions*

The with-CDRP conditions reflect completion of the CDRP and implementation of the instream flow schedules required by the CDRP permit conditions.[22,23] See Section 5.16, Hydrology and Water Quality, for a discussion of the instream flow schedules and a comparison of the assumptions under the existing and with-CDRP conditions.

Future operation of Calaveras Reservoir and the ACDD will influence streamflow and will therefore also influence the aquatic habitat and fish community in Calaveras Creek and Alameda Creek downstream from these facilities. Under the CDRP, future operations of Calaveras Reservoir and Dam and the ACDD will include the following provisions designed to improve habitat conditions for steelhead and other native fishes in the watershed:

- Bypass flows at the ACDD and flow releases from Calaveras Reservoir pursuant to the flow schedule identified in the NMFS Biological Opinion (BO) and CDFW Streambed Alteration Agreement (Fish and Game Code 1600) for the CDRP; and
- Operational procedures for Calaveras Dam releases to avoid cone valve testing during spawning and egg incubation periods and implement flow release ramping criteria.

### Alameda Creek Streamflow Simulations

Estimates of daily flows in Alameda Creek under the with-CDRP conditions were made by using the ASDHM output as described in Appendix HYD1. Hydrographs of estimated flows are provided for Alameda Creek below the San Antonio Creek confluence (Node 6) and above the Arroyo de la Laguna confluence (Node 7) for Water Year (WY) 1996 to WY 2013. These hydrographs include the input of quarry NPDES discharges at Node 6, as well as the incorporation of a 7.5 cfs loss to the subsurface at Node 7. Additional hydrographs were also developed for a range of water year types[24] focusing on the specific period for steelhead migration in Alameda Creek (December through June), based on life stage timing described below

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[20] Hanson Environmental Inc., 2002. *Air and Water Temperature Monitoring Within Alameda Creek: 2001-2002.* Draft October 1, 2002.

[21] Note that several large fish, believed to be non-native largemouth bass, were observed in Pit F2 during the May 2015 reconnaissance survey.

[22] National Marine Fisheries Service (NMFS), 2011. *Biological Opinion for the Calaveras Dam Replacement Project*. Santa Rosa, CA.

[23] California Department of Fish and Game (CDFG), 2011. *Streambed Alteration Agreement for Calaveras Dam Replacement Project.* Notification No. 1600-2010-0322-R3. June 28, 2011.

[24] Water Year types were defined based on flow exceedance probabilities.

(see also, Table 5.14-4 below). **Figures 5.14-8** and **5.14-9** are December through June hydrographs for Very Wet (2006), Wet (2003), Dry (2008), and Very Dry (2007) water year types for Nodes 6 and 7, respectively.[25] Theses plots show predicted hydrologic conditions that migrating steelhead would be anticipated to experience in Alameda Creek in the primary study area under the with-CDRP condition. As depicted in the plots, precipitation-generated streamflows in Alameda Creek are predicted to regularly exceed several hundred cfs during the December through June migration period. It is important to note that streamflow simulations assume a 17 cfs loss upstream of the San Antonio Creek confluence (Node 6), the incorporation of quarry NPDES discharge at Node 6, and also a 7.5 cfs loss between San Antonio Creek and Arroyo de la Laguna (Node 7). In reality, the estimated 17 cfs and 7.5 cfs loss to the subsurface used in the simulation is probably a simplification of a complex phenomenon. That is, the subsurface loss may vary from day-to-day and year-to-year depending on the saturated conditions of the aquifer during wet or dry periods. Additional discussion of surface flow and subsurface flow interactions under the with-CDRP conditions are described in Appendices HYD1 and HYD2.

### Reach-by-Reach Habitat Characterization

#### *Primary Study Area (Subreaches A, B, and C)*

As described above, the fisheries impact analysis assumes that in addition to completion of the CDRP and implementation of the CDRP instream flow schedules, existing human-made barriers to anadromous steelhead migration would be removed or other measures would be taken to allow steelhead passage into the watershed. Due to limiting factors, specifically water temperatures, steelhead are not expected to spawn or rear within the primary or extended study areas, but would be expected to migrate through the study areas during winter spawning migrations and late spring outmigrations. Implementation of the instream flow schedules required by NMFS and CDFW permit requirements upon completion of the CDRP are anticipated to increase the suitability of migratory habitat throughout the primary study area.[26]

The main migration impediments for steelhead in the Sunol Valley are located upstream of the primary study area between the Welch Creek confluence and the San Antonio Creek confluence where wide channel areas create shallow riffles under low flow conditions. Passage assessments conducted as part of the NMFS BO for the CDRP indicate the most problematic riffles, given the current channel shape, could be passable and meet NMFS passage guidelines at 44 cfs for adult steelhead and 13 cfs for juvenile steelhead. Based on modeled simulations of streamflow in the Sunol Valley, implementation of the NMFS instream flow schedules will increase the annual percentage of time (dry and normal/wet years) that adult steelhead (immigrating and emigrating) can pass these shallow riffle locations.[27]

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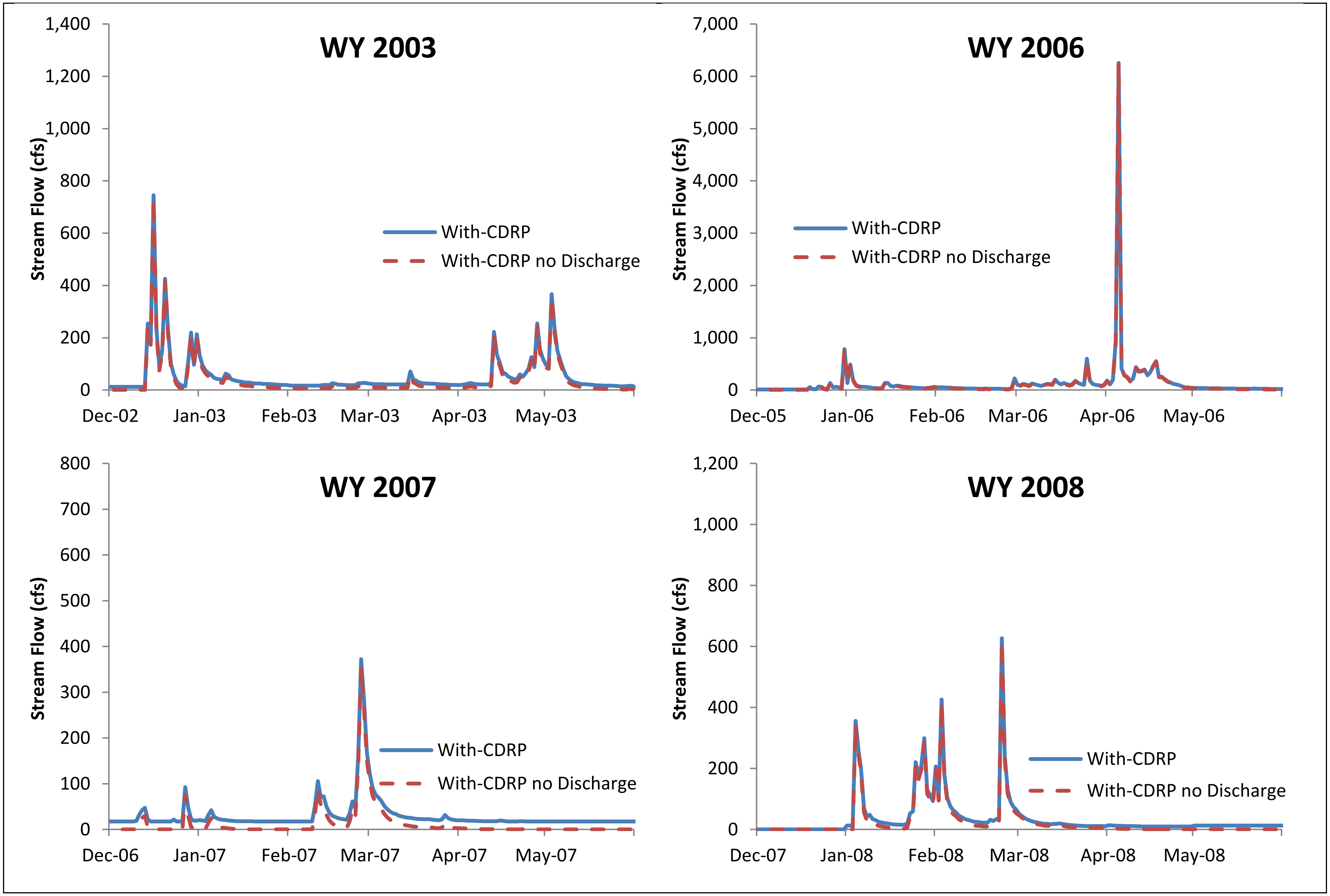
[25] Water year classifications: WY 2006 – Very Wet (24% percent flow exceedance), WY 2003 – Wet (53% percent flow exceedance), WY 2008 – Dry (65% percent flow exceedance) WY 2007 – Very Dry (82% percent flow exceedance).

[26] National Marine Fisheries Service (NMFS), 2011. *Biological Opinion for the Calaveras Dam Replacement Project*. Santa Rosa, CA.

[27] National Marine Fisheries Service (NMFS), 2011. *Biological Opinion for the Calaveras Dam Replacement Project*. Santa Rosa, CA.

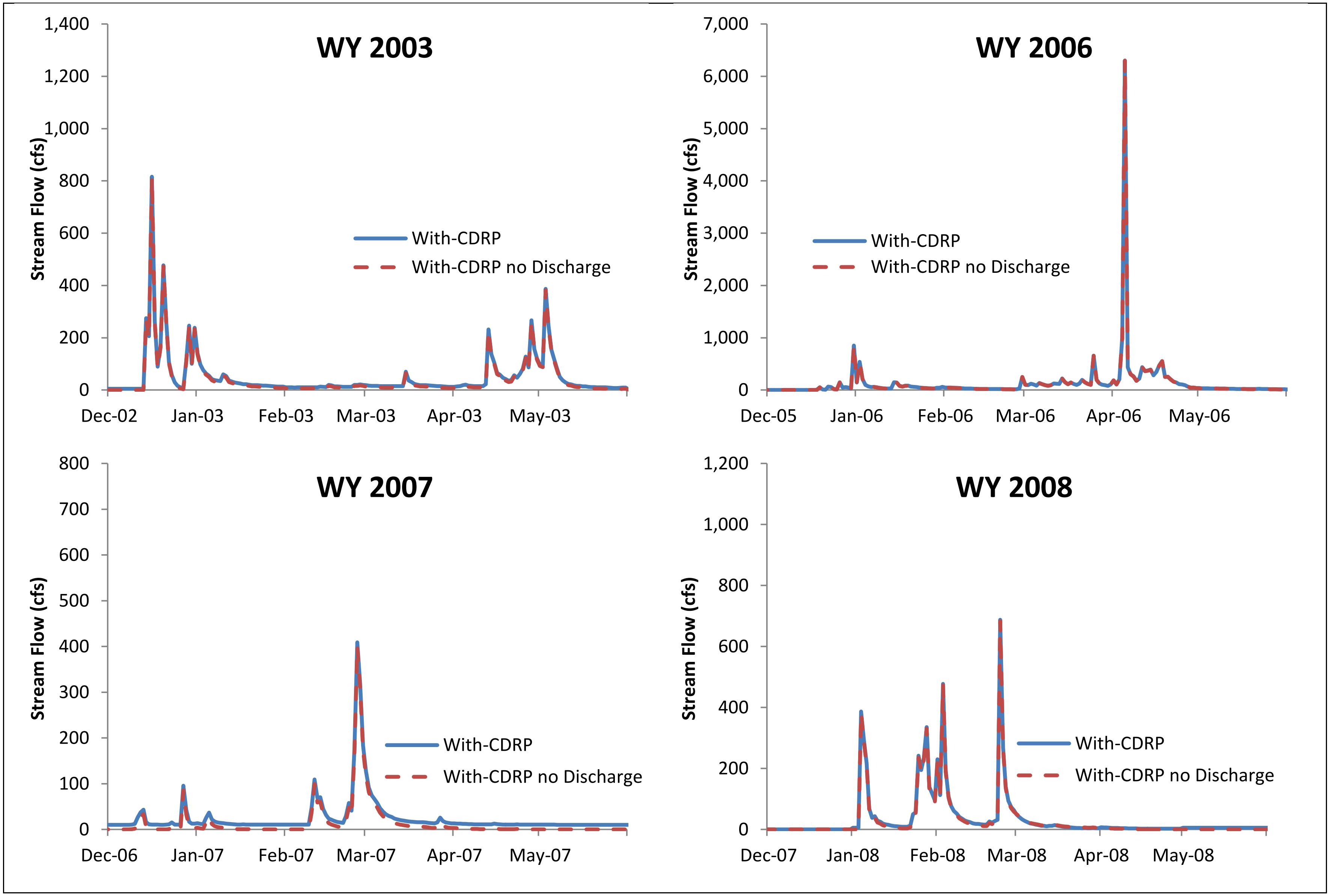


SOURCE: SFPUC, 2016. Simulated stream flows for different scenarios at 5 nodes and pond elevation for ACRP. Excel spreadsheet file provided by Amod Dhakal on July 7, 2016.

SFPUC Alameda Creek Recapture Project

**Figure 5.14-8**

Modeled Stream Flow During the Typical Migration Window
Alameda Creek Below San Antonio Creek (Node 6)



SOURCE: SFPUC, 2016. Simulated stream flows for different scenarios at 5 nodes and pond elevation for ACRP. Excel spreadsheet file provided by Amod Dhakal on July 7, 2016.

SFPUC Alameda Creek Recapture Project

**Figure 5.14-9**

Modeled Stream Flow During the Typical Migration Window
Alameda Creek Above Arroyo de la Laguna (Node 7)

To address these passage impediments in the Sunol Valley and the reduced migration opportunities caused by the historical operation of the SFPUC water system facilities in the Alameda Watershed, the SFPUC has committed, as part of the CDRP, to physically modifying locations within the Sunol Valley reach that require flows substantially greater than 40 cfs for adult steelhead passage. Physical modifications of these shallow areas are proposed to create conditions that would allow for adult upstream passage at flows of approximately 20 cfs. Because adult steelhead will not have access to upper Alameda Creek until the BART weir fish ladder is completed, the schedule for remediating these other barriers to passage is dependent on the completion of the BART weir fish ladder. With these future modifications, steelhead will have access to the upper watershed and it is expected that passage opportunities for immigrating and emigrating adults through the Sunol Valley will be improved. Therefore, NMFS has concluded that with the combination of ACDD bypasses to Alameda Creek, releases from Calaveras Reservoir to Calaveras Creek, and the proposed modifications to passage impediments in the Sunol Valley, the number of days available for steelhead adult and juvenile passage through the Sunol Valley to upstream and downstream habitats in Alameda Creek each year is expected to fall within the range of natural hydrological variability that steelhead would otherwise encounter during winter and spring migrations.[28]

### *Niles Canyon and Lower Alameda Creek*

As discussed above, in addition to completion of the CDRP and implementation of the CDRP instream flow schedules, it is also assumed that all fish passage barriers would be removed and steelhead would have access to upper portions of the watershed. But, the reaches of Alameda Creek within the extended study area would not be expected to provide necessary spawning or rearing habitat functions for steelhead; the tidally influenced habitats toward the mouth of the creek may provide only limited transition habitat for steelhead smolts that are emigrating to the Bay.[29,30,31]

With implementation of the CDRP instream flow schedules, minimum flows necessary to meet upstream and downstream passage objectives in Niles Canyon are likely to be achieved during the winter and spring, because it is assumed that no significant barriers will remain and the augmented flows, in combination with flows from the northern (Arroyo de la Laguna) watershed, would generally not limit passage opportunities.[32] In the Alameda Creek Flood Control Channel (the lowermost 13 miles of Alameda Creek), ACWD operates two inflatable dams and several water diversions. The water diversions have a combined capacity of approximately 370 cfs. Thus, fish passage through this reach is strongly dependent on the operation of ACWD facilities. CDRP

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[28] National Marine Fisheries Service (NMFS), 2011. *Biological Opinion for the Calaveras Dam Replacement Project*. Santa Rosa, CA.

[29] Gunther, A.J., J.M. Hagar, and P. Salop, 2000. *An Assessment of the Potential for Restoring a Viable Steelhead Trout Population in the Alameda Creek Watershed.* Prepared for the Alameda Creek Fisheries Restoration Workgroup. February 7, 2000.

[30] McBain and Trush, 2008, *Alameda Creek Population Recovery Strategies and Instream Flow Assessment for Steelhead.* Prepared for the Alameda Creek Fisheries Restoration Workgroup.

[31] National Marine Fisheries Service (NMFS), 2011. *Biological Opinion for the Calaveras Dam Replacement Project*. Santa Rosa, CA.

[32] National Marine Fisheries Service (NMFS), 2011. *Biological Opinion for the Calaveras Dam Replacement Project*. Santa Rosa, CA.

instream flows when combined with flows from Arroyo de la Laguna through Niles Canyon are expected to provide suitable conditions for adult upstream migration and smolt downstream migration. It is assumed that these flows will arrive at the upstream end of the Alameda Creek Flood Control Channel, and furthermore, it is assumed that ACWD will provide bypass flows at their water diversion facilities for fish passage through the Flood Control Channel.[33]

## 5.14.5.4 Alameda Creek Fish Community

Alameda Creek currently provides habitat for a diverse assemblage of native and non-native fishes. A total of 14 native and at least 13 non-native fish species have been observed in nontidal portions of the Alameda Creek watershed during the past century.[34’35] Several other species may have also occurred in the watershed based on collections in tidal portions, evidence from archaeological investigations, and other accounts.

Many collections from the watershed include widely distributed species typical of streams in the region, such as California roach (*Lavinia symmetricus*), Sacramento sucker (*Catostomus occidentalis*), pikeminnow (*Ptychocheilus grandis*), steelhead/rainbow trout (*Oncorhynchus mykiss*), Pacific lamprey (*Lampetra tridentata*), and prickly sculpin (*Cottus asper*). Non-native resident species present in the watershed include goldfish (*Carassius auratus*), carp (*Cyprinus carpio*), largemouth bass (*Micropterus salmoides*), smallmouth bass (Micropterus dolomieu), white catfish (*Ameiurus catus*), brown bullhead (*Ictalurus nebulosus*), black bullhead (*Ameiurus melas*), bluegill (*Lepomis macrochirus*), green sunfish (*Lepomois cyanellus*), western mosquitofish (*Gambusia affinis*), inland silverside (*Menidia beryllina*), and golden shiner (*Notemigonus crysaleucas*).[36,37]

### Primary Factors Limiting Fish Populations

The distribution and abundance of fish species within the Alameda Creek watershed appears to be largely consistent with the regional distribution of different species in habitat zones and habitat preferences of those species. The extent of fish habitat in the primary study area is limited by lack of streamflow during the summer. This is likely a natural condition, given the alluvial substrate in the Sunol Valley and low summer streamflow present in Alameda Creek under unimpaired conditions. During the May 2015 survey, several pools were noted in the primary study area and non-native predators (e.g., largemouth bass, bullfrogs) were also observed.

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[33] National Marine Fisheries Service (NMFS), 2011. *Biological Opinion for the Calaveras Dam Replacement Project*. Santa Rosa, CA.

[34] Gunther, A.J., J.M. Hagar, and P. Salop, 2000. *An Assessment of the Potential for Restoring a Viable Steelhead Trout Population in the Alameda Creek Watershed.* Prepared for the Alameda Creek Fisheries Restoration Workgroup. February 7, 2000.

[35] Leidy, R.A., 2007. Ecology, *Assemblage Structure, Distribution, and Status of Fishes in Streams Tributary to the San Francisco Estuary, California.* San Francisco Estuary Institute, April 2007. Contribution No. 530.

[36] Gunther, A.J., J.M. Hagar, and P. Salop, 2000. *An Assessment of the Potential for Restoring a Viable Steelhead Trout Population in the Alameda Creek Watershed.* Prepared for the Alameda Creek Fisheries Restoration Workgroup. February 7, 2000.

[37] Leidy, R.A., 2007. Ecology, *Assemblage Structure, Distribution, and Status of Fishes in Streams Tributary to the San Francisco Estuary, California.* San Francisco Estuary Institute, April 2007. Contribution No. 530.

Rainbow trout are currently limited to upper watershed areas (upstream of the primary study area) where they find suitable micro-habitat structure and substrate conditions along with adequately cool water temperatures. As discussed above, anadromous species including steelhead are excluded from the primary study area by passage obstacles downstream in the flood-control (lower Alameda Creek) reach and Niles Canyon. Chinook salmon (*Oncorhynchus tshawytscha*) are occasionally observed downstream of the BART weir, but they are not able to migrate above it.

### Special-status Fish Species

Special-status fish species are legally protected or are otherwise considered sensitive by federal, state, or local resource conservation agencies and organizations. Special-status fish species include:

- Species listed as threatened or endangered under the Federal Endangered Species Act (FESA) or California Endangered Species Act (CESA);
- Species identified by NMFS or CDFW as species of special concern; and
- Species fully protected in California under the California Fish and Game Code

Three special-status fish species have been identified as having the potential to occur in the Alameda Creek watershed. However, as described in **Table 5.14-3** below, all three species are unlikely to occur under existing conditions because of downstream passage obstacles and/or unsuitable habitat conditions.

## *With-CDRP Conditions*

As described above, the fisheries analysis assumes that in addition to completion of the CDRP and implementation of the CDRP instream flow schedules, the existing human-made barriers to anadromous steelhead migration would be removed or other measures would be taken to allow fish migration and steelhead access to the upper Alameda Creek watershed prior to or concurrent with ACRP operations. These conditions were determined to represent the worst-case scenario for fisheries resources in terms of identifying potential impacts of ACRP operations on fisheries and would provide the most conservative CEQA impact analysis.

Habitat conditions for the common native and non-native fish community in Alameda Creek are expected to improve under the with-CDRP conditions; however, conditions will remain altered and modified from the natural, unimpaired conditions and the common fish community is not expected to markedly change under this future condition.[38]

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[38] San Francisco Planning Department, 2011. *Final Environmental Impact Report for the Calaveras Dam Replacement Project*. San Francisco, CA. San Francisco Planning Department File No. 2005.0161E, State Clearinghouse No. 2005102102. Certified January 27, 2011.

**TABLE 5.14-3**
**SPECIAL-STATUS FISH SPECIES WITH POTENTIAL TO OCCUR IN THE ACRP FISHERIES STUDY AREAS**

| Species | Status[1] | | Habitat Requirements | Potential to Occur in the ACRP Fisheries Primary and Extended Study Areas Under Existing Conditions |
|---|---|---|---|---|
| | NMFS | CDFW | | |
| California Central Coast steelhead DPS *Oncorhynchus mykiss* | T | -- | Requires cold, freshwater streams with suitable gravel for spawning. Rears in rivers and tributaries and in the San Francisco Bay. | Not expected to occur in the study areas. Potential for occurrence in the primary study area is currently restricted by downstream barriers. Individuals periodically occur downstream of the BART weir (downstream-most fish barrier) in the extended study area. |
| River lamprey *Lampetra ayresi* | -- | SSC | Requires cool, freshwater streams with suitable gravel for spawning. | Not expected to occur in the study areas. A river lamprey was reported in the watershed in 1966, but there are no recent occurrences. Potential for occurrence in the study areas is limited by downstream barriers. |
| Sacramento perch *Archoplites interruptus* | -- | SSC | Spawning has been reported to extend from spring to late summer, depending on location and water temperature. Occurs among aquatic plants or congregating in shallow waters in schools among or near inshore vegetation. | Not expected to occur in the study areas. Records indicate that Sacramento perch historically occurred in Alameda Creek;[39] no recent known occurrences in the study areas. |

ACRONYMS:
CDFW = California Department of Fish and Wildlife; DPS = Distinct Population Segment; NMFS = National Marine Fisheries Service.

[1] Legal Status Definitions:

| *Federal Listing Categories (NMFS)*: | *State Listing Categories (CDFW)*: |
|---|---|
| T Threatened (legally protected) | SSC Species of Special Concern (no formal protection) |

SOURCE: ESA, 2016. *Alameda Creek Recapture Project, Alameda Creek Fisheries Habitat Assessment Report.* Prepared for San Francisco Public Utilities Commission. Prepared by Environmental Science Associates.

## Central California Coast Steelhead

As described above, this fisheries analysis provides a conservative impact evaluation and assumes the worst-case scenario for fisheries as part of the baseline conditions. This means that it is assumed that steelhead will have returned to the Alameda Creek watershed prior to or concurrent with ACRP operations. Therefore, as part of the Setting for the with-CDRP conditions, the regulatory status, life history, and status of steelhead in the primary and extended study areas are presented below.

### *Regulatory Status*

Central California Coast (CCC) steelhead distinct population segment (DPS) (*Oncorhynchus mykiss*) is listed as threatened under FESA, and at present occurs downstream of the BART weir in the ACRP extended study area.

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[39] Leidy, R.A., 2007. Ecology, *Assemblage Structure, Distribution, and Status of Fishes in Streams Tributary to the San Francisco Estuary, California.* San Francisco Estuary Institute, April 2007. Contribution No. 530.

### *Life History*

Steelhead have a highly flexible life history and may follow a variety of life-history patterns including residents (non-migratory) at one extreme and individuals that migrate to the open ocean (anadromous) at another extreme. Steelhead are unique among Pacific salmon in that ocean migrating individuals may return to the ocean after spawning and return to freshwater to spawn one or more times.

Eggs (laid in gravel nests called redds), alevins (gravel dwelling hatchlings), fry (juveniles newly emerged from stream gravels), and young juveniles all rear in freshwater until they become large enough to migrate to the ocean to finish rearing and maturing to adults. Status reviews of steelhead in California document much variation in life history.[40] Although variation occurs, in coastal California, steelhead usually live in freshwater for one to two years, then spend an additional two or three years in the ocean before returning to their natal stream to spawn. Adult steelhead typically immigrate to tributaries of San Francisco Bay between November and April, peaking in January and February.[41] Adult steelhead are generally not present in streams between May and October.

During the adult migration season, the timing of upstream immigration typically correlates with seasonal high flows and associated lower water temperatures. The minimum stream depth necessary for successful upstream migration is about 5 inches.[42] The preferred water velocity for upstream migration is in the range of 1 to 3 cfs, with a maximum velocity, beyond which upstream migration is not likely to occur, of 8 cfs.[43] Most spawning takes place from January through April. Steelhead may spawn more than one season before dying (iteroparity), in contrast to other species of the genus *Oncorhynchus*. Most adult steelhead in a run are first time spawners.

Steelhead select spawning sites with gravel substrate and with sufficient flow velocity to maintain circulation through the gravel and provide a clean, well-oxygenated environment for incubating eggs. Preferred flow velocity is in the range of 1 to 3 cfs for steelhead and preferred gravel substrate is in the range of 0.25 to 4 inches in diameter.[44] Typically, sites with preferred features for spawning occur most frequently in the pool tail/riffle head areas where flow accelerates out of the pool into the higher gradient section below. In such an area, the female will create a pit, or redd, by undulating her tail and body against the substrate.

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[40] Shapovalov, L. and A.C. Taft. 1954. *The Life Histories of the Steelhead Rainbow Trout and Silver Salmon*. State of California, Department of Fish and Game. Fish Bulletin No. 98.

[41] Fukushima L., and E.W. Lesh. 1998. Adult and juvenile anadromous salmonid migration timing in California streams. California Department of Fish and Game 84(3):133-145.

[42] Bell, M. C., 1991. *Fisheries handbook of engineering requirements and biological criteria.* U.S. Army Corps of Engineers, Office of the Chief of Engineers, Portland, OR.

[43] Bell, M. C., 1991. *Fisheries handbook of engineering requirements and biological criteria.* U.S. Army Corps of Engineers, Office of the Chief of Engineers, Portland, OR.

[44] Bjornn, T. C. and Reiser, D. W., 1979. Habitat Requirements of Anadromous Salmonids. In *Influences of Rangeland Management on Salmonid Fishes and Their Habitats* (Meehan), Ed., American Fisheries Society, Bethesda, MD.

Steelhead fry generally rear in edgewater habitats and move gradually into pools and riffles as they grow larger. Cover is an important habitat component for juvenile steelhead, both as a velocity refuge and as a means of avoiding predation. Steelhead, however, tend to use riffles and other habitats not strongly associated with cover during summer rearing more than other salmonids. Young steelhead feed on a wide variety of aquatic and terrestrial insects, and emerging fry are sometimes preyed upon by older juveniles.

Temperature is also an important factor for steelhead/rainbow trout, particularly during the over-summer rearing period.[45,46] The upper lethal temperature for Pacific salmonids is in the range 23.9 to 25 °C for continuous long-term exposure.[47] Some researchers indicate an upper lethal temperature for Pacific salmonids as low as 22.9°C;[48] however, steelhead can survive for short periods at elevated temperatures, especially if abundant food and dissolved oxygen exist. Temperature data suggest that summer and early-fall temperatures in Niles Canyon are within the range considered to be highly stressful or unsuitable for juvenile steelhead.[49]

Juvenile steelhead emigrate episodically from natal streams during fall, winter, and spring high flows, with peak migration occurring in April and May.[50] Emigrating CCC steelhead use tributaries of San Francisco Bay and portions of the San Francisco Bay for rearing and as a migration corridor to the ocean. Although data regarding the emigration timing of steelhead smolts from Alameda Creek is lacking, steelhead smolts in other streams within the DPS including those draining to San Francisco Bay, typically emigrate from March through June.[51] NMFS assumes that steelhead from Alameda Creek emigrate within this same time period.[52]

Based on information from other central California coastal steelhead streams, and SFPUC's studies of adfluvial[53] *O. mykiss* above Calaveras and San Antonio Reservoirs, the expected migration timing for each steelhead life stage is presented in **Table 5.14-4**.

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[45] Gunther, A.J., J.M. Hagar, and P. Salop. 2000. *An Assessment of the Potential for Restoring a Viable Steelhead Trout Population in the Alameda Creek Watershed.* Prepared for the Alameda Creek Fisheries Restoration Workgroup. February 7, 2000.

[46] Hanson Environmental Inc. 2002. *Air and Water Temperature Monitoring Within Alameda Creek: 2001-2002.* Draft October 1, 2002.

[47] Gunther, A.J., J.M. Hagar, and P. Salop. 2000. *An Assessment of the Potential for Restoring a Viable Steelhead Trout Population in the Alameda Creek Watershed.* Prepared for the Alameda Creek Fisheries Restoration Workgroup. February 7, 2000.

[48] Hanson Environmental Inc. 2002. *Air and Water Temperature Monitoring Within Alameda Creek: 2001-2002.* Draft October 1, 2002.

[49] Hanson Environmental Inc. 2002. *Air and Water Temperature Monitoring Within Alameda Creek: 2001-2002.* Draft October 1, 2002.

[50] Fukushima L., and E.W. Lesh. 1998. Adult and juvenile anadromous salmonid migration timing in California streams. California Department of Fish and Game 84(3):133-145.

[51] Fukushima L., and E.W. Lesh. 1998. Adult and juvenile anadromous salmonid migration timing in California streams. California Department of Fish and Game 84(3):133-145.

[52] National Marine Fisheries Service (NMFS), 2011. *Biological Opinion for the Calaveras Dam Replacement Project*. Santa Rosa, CA.

[53] Life history strategy in which adult fish spawn and juveniles subsequently rear in streams but migrate to lakes for feeding as subadults and adults.

**TABLE 5.14-4**
**EXPECTED MIGRATION TIMING FOR STEELHEAD IN ALAMEDA CREEK**

| Life Stage | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sept |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Adult Immigration | | | ■ | ■ | ■ | ■ | ■ | | | | | |
| Juvenile Emigration | | | | | | ■ | ■ | ■ | ■ | | | |
| Post-spawn Adult Emigration | | | | ■ | ■ | ■ | ■ | ■ | ■ | | | |

SOURCE: Gunther, A.J., J.M. Hagar, and P. Salop. 2000. *An Assessment of the Potential for Restoring a Viable Steelhead Trout Population in the Alameda Creek Watershed.* Prepared for the Alameda Creek Fisheries Restoration Workgroup. February 7, 2000.
National Marine Fisheries Service (NMFS), 2011. *Biological Opinion for the Calaveras Dam Replacement Project*. Santa Rosa, CA.

### *Status in the Primary and Extended Study Areas*

As discussed above, steelhead formerly inhabited the Alameda Creek watershed prior to construction of dams and other water resource and flood control infrastructure.[54,55] The presence of migratory barriers, notably a grade control weir at the BART crossing, prevents upstream movement of steelhead to potential spawning and rearing habitat, and currently, steelhead can no longer complete their lifecycle in the watershed. Sightings of migratory *O. mykiss* have been periodically reported downstream of the BART weir, adjacent to the inflatable dam operated by the ACWD.

Steelhead along the central California coast enter freshwater to spawn when winter rains have been sufficient to raise streamflows. Increased streamflow during runoff events also appears to provide cues that stimulate migration and allows better conditions for fish to pass obstructions and shallow areas on their way upstream. When anadromous steelhead become re-established in Alameda Creek, operation of the ACDD and Calaveras Dam will influence streamflow and water temperature in Alameda Creek, which in turn will influence steelhead during its various life history stages. Higher flows may enable upstream migrating adults and downstream migrating adult steelhead and steelhead smolts to pass critical riffles and other migration obstacles. Reduced streamflows may result in higher water temperature, while releases from a restored Calaveras Reservoir may result in lower water temperatures, and could affect steelhead migrating later in the spring.

Both the primary and extended study areas are anticipated to function only as migratory habitat for steelhead if they are restored to the upper watershed, with adults migrating through both study areas during winter months, and the majority of repeat spawners, young-of-year, or older smolt returning downstream during precipitation events in the spring. The primary limiting factors for all life stages of steelhead in Alameda Creek are flows, water temperature, and both

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[54] Gunther, A.J., J.M. Hagar, and P. Salop, 2000. *An Assessment of the Potential for Restoring a Viable Steelhead Trout Population in the Alameda Creek Watershed.* Prepared for the Alameda Creek Fisheries Restoration Workgroup. February 7, 2000.

[55] Leidy, R.A., 2007. Ecology, *Assemblage Structure, Distribution, and Status of Fishes in Streams Tributary to the San Francisco Estuary, California.* San Francisco Estuary Institute, April 2007. Contribution No. 530.

natural and man-made barriers. In both the primary and extended study areas, water temperatures are currently and are expected to continue to be under with-CDRP conditions generally too high during summer months (June to August) to support steelhead rearing and over-summering steelhead are not expected to occur in these portions of Alameda Creek.[56] This expectation has been supported by fisheries data which show that both the primary and extended study areas support a warm-water fish assemblage.[57]

Additional detailed discussion on steelhead life history and potential life history strategies in Alameda Creek is provided in Appendix BIO2, *Alameda Creek Fisheries Habitat Assessment Report*.

## 5.14.6 Regulatory Framework, Fisheries Resources

### 5.14.6.1 Federal Regulations

#### *Endangered Species Act*

Under FESA, the Secretary of the Interior and the Secretary of Commerce have joint authority to list a species as threatened or endangered (16 U.S. Code [USC] 1533[c]). USFWS has jurisdiction over plants, wildlife, and resident fish, while NMFS has jurisdiction over anadromous fish and marine fish and mammals. FESA is discussed in Subsection 5.14.2, Regulatory Framework, in Section 5.14, Biological Resources.

On January 5, 2006, the CCC steelhead DPS, including all naturally spawned anadromous steelhead populations below natural and manmade impassable barriers, were listed as threatened under FESA by NMFS (71 FR 834). If construction of ACRP were to require fill in federally jurisdictional waters, the SFPUC would be required to obtain a CWA Section 404 permit from the U.S. Army Corps of Engineers (USACE). Before issuing a Section 404 permit, the USACE is required under Section 7 of FESA to consult with NMFS and/or USFWS if a federally listed species may be affected by a proposed project to be permitted. No placement of fill in federally jurisdictional water is proposed as part of the ACRP.

#### *Magnuson-Steven Fisheries Conservation Act*

In response to growing concern about the status of U.S. fisheries, the Sustainable Fisheries Act of 1996 (Public Law 104-297) was passed by Congress to amend the Magnuson-Stevens Fishery Conservation and Management Act (Public Law 94-265), the primary law governing marine fisheries management in the federal waters of the United States. Under the Sustainable Fisheries Act, consultation is required by NMFS on any activity that might adversely affect designated Essential Fish Habitat (EFH). EFH includes those habitats that fish rely on throughout their life cycles. It encompasses habitats necessary to allow sufficient production of commercially valuable

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[56] EDAW & Turnstone Joint Venture (ETJV), 2008. *Calaveras Dam Replacement Project Fisheries Technical Report 2008*. Prepared by Hagar Environmental Science and Thomas R. Payne and Associates for EDAW & Turnstone Joint Venture and SFPUC.

[57] Leidy, R.A., 2007. Ecology, *Assemblage Structure, Distribution, and Status of Fishes in Streams Tributary to the San Francisco Estuary, California.* San Francisco Estuary Institute, April 2007. Contribution No. 530.

aquatic species to support a long-term sustainable fishery and contribute to a healthy ecosystem. Alameda Creek has been designated as EFH downstream of the primary study area, in the extended study area, and the CDRP BO (described above) includes conservation recommendation for EFH.

### 5.14.6.2 State Regulations

#### *California Endangered Species Act*

Pursuant to CESA and Section 2081 of the California Fish and Game Code, a permit from CDFW is required for projects that could result in take of a state-listed threatened or endangered species. CESA is described in Subsection 5.14.3, Regulatory Framework, Terrestrial Biological Resources. There are no fish species listed as threatened or endangered under CESA in the ACRP study area.

#### *California Fish and Game Code*

**Section 1602**

All diversions, obstructions, or changes to the natural flow or bed, channel, or bank of any river, stream, or lake in California that supports wildlife resources are subject to regulation by CDFW under Section 1602 of the California Fish and Game Code. It is anticipated that the ACRP will not require a 1600 permit.

### 5.14.6.3 Regional and Local Agreements, Plans, and Groups Relevant to the Protection of Fisheries Resources in the Alameda Creek Watershed

The following agreements and plans are applicable to the environmental setting for the ACRP or provide useful background information.

#### *Alameda Watershed Management Plan*

The Alameda Creek watershed is one of three major contributors of water to the SFPUC regional water system. As such, the primary watershed goal of the SFPUC is to maintain and improve source water quality to protect public health and safety. Secondary goals include the maximization of water supply and the preservation and enhancement of ecological resources.

The purpose of the *Alameda Watershed Management Plan*[58] (WMP) is to provide a policy framework for the SFPUC to make consistent decisions about the activities, practices, and procedures that are appropriate on SFPUC watershed lands. To aid the SFPUC in its decision-making, the plan provides a comprehensive set of goals, policies, and management actions, which integrate all watershed resources and reflect the unique qualities of the watersheds. The WMP remains the primary comprehensive plan and CCSF policy document for land and resource management of the SFPUC Alameda Creek watershed lands, including all SFPUC lands within the study area.

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[58] SFPUC, 2001. Final Alameda Watershed Management Plan.

WMP policies established for aquatic resources include the protection and enhancement of aquatic resources and habitat (AR1 – AR4), water quality (AR5), fisheries resources (AR6), impact assessment for future projects (AR7), and management and coordination (AR8 – AR10). WMP actions and guidelines are included for aquatic zone protection and fishery resources. Aquatic zone protection actions and guidelines are included for assessment prior to new activities (aqu1), stream channels and banks (aqu6 – aqu8). Fishery resources actions and guidelines are included for fish migration (fis1 – fis4), habitat management (fis5 – fis7), and future studies and monitoring (fis8).

### *SFPUC Alameda Watershed Habitat Conservation Plan*

See Section 5.14.3.3 above.

### *SFPUC Water Enterprise Environmental Stewardship Policy*

On June 27, 2006, the SFPUC established a mission and policy for long-term management of SFPUC-owned lands and their natural resources, including the Alameda Creek watershed, as a fundamental component of the Water Enterprise mission. The policy states that "the SFPUC is committed to responsible natural resources management that maintains the integrity of the natural resources, restores habitats for native species, and enhances ecosystem function. It is the policy of the SFPUC to operate the SFPUC water system in a manner that protects and restores native fish and wildlife downstream of SFPUC dams and water diversions, within SFPUC reservoirs, and on SFPUC watershed lands. Releases from SFPUC reservoirs will (consistent with the SFPUC mission…, existing agreements, and applicable state and federals laws), mimic the variation of the seasonal hydrology (e.g., magnitude, timing, duration, and frequency) of their corresponding watersheds in order to sustain the aquatic and riparian ecosystems upon which these native fish and wildlife species depend." The policy commits the SFPUC to monitoring of habitats, collaboration with interested and affected parties, and various strategies for implementation of the policy (e.g., updating the Alameda Watershed Management Plan, developing the HCP for the watershed, developing and implementing the Watershed and Environmental Improvement Program for the watershed, participating in local forums including the ACFRW). The policy commits the SFPUC to "ensure that the policy guides development of project descriptions, alternatives and mitigation for all SFPUC projects during the environmental review process under the CEQA and/or NEPA."

### *Alameda Creek Fisheries Restoration Workgroup*

The ACFRW is a multi-agency stakeholder group formed in 1999 to develop and implement a strategy to restore steelhead trout to Alameda Creek. The SFPUC is one of the agencies that have executed a Memorandum of Understanding (MOU) that have formally agreed to collaborate to pursue steelhead restoration in the Alameda Creek watershed while minimizing the impacts to water supply operations. Other participating agencies include ACFCD, Alameda County Resource Conservation District, Alameda Creek Alliance, ACWD, California State Coastal Conservancy, CDFW, EBRPD, NMFS, PG&E, and the Zone 7 Water Agency.

### 5.14.6.4 CDRP Regulatory Permit Requirements

#### *National Marine Fisheries Service Biological Opinion*

On March 5, 2011, NMFS issued a biological opinion (BO) for the construction and operation of the CDRP.[59] In the BO, NMFS concluded that the construction and future operation of the CDRP will not jeopardize the continued existence of CCC steelhead. The BO describes an operational plan for the replacement Calaveras Dam and ACDD, developed by SFPUC in coordination with NMFS and CDFW, which provides suitable instream flow conditions for CCC steelhead below these facilities. The BO also describes an adaptive management implementation plan (AMIP) that was prepared by SFPUC for the purpose of achieving specific goals that will support broader steelhead population targets within the entire watershed. Components of the AMIP will also assist in evaluating the performance of the future management scheme proposed as part of the CDRP and to address uncertainties within the watershed that will influence the recovery of steelhead within the Alameda Creek watershed. The proposed AMIP includes: (1) steelhead conservation measures (actions to protect and enhance future steelhead in the Alameda Creek watershed); (2) data collection, investigations, and analyses to inform future steelhead management decisions; and (3) a steelhead monitoring program. The steelhead monitoring program describes several parameters, including steelhead migration through the ACRP primary study area.

#### *California Department of Fish and Wildlife Streambed Alteration Agreement*

On June 28, 2011 CDFW issued a Streambed Alteration Agreement (SAA) for the construction and operation of the CDRP.[60] The SAA describes an operational plan for the replacement Calaveras Dam and ACDD, which was developed by SFPUC in coordination with NMFS and CDFW and which provides suitable instream flow conditions for CCC steelhead below these facilities. The SAA also describes a number of conditions that are required in order to avoid, minimize, and compensate for impacts to sensitive resources.

## 5.14.7 Impacts and Mitigation Measures — Fisheries Resources

### 5.14.7.1 Significance Criteria

The project would have a significant impact related to fisheries resources if the project were to:

- Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations or by the CDFW, USFWS, or NMFS;
- Interfere substantially with the movement of any native resident or migratory fish species; or
- Conflict with any local policies or ordinances protecting fisheries resources.

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[59] National Marine Fisheries Service (NMFS), 2011. *Biological Opinion for the Calaveras Dam Replacement Project*. Santa Rosa, CA.

[60] California Department of Fish and Game (CDFG), 2011. *Streambed Alteration Agreement for Calaveras Dam Replacement Project.* Notification No. 1600-2010-0322-R3. June 28, 2011.

### 5.15.7.2 Approach to Analysis

#### *Construction Impacts*

The evaluation of temporary, construction-related impacts considers the potential for the release and exposure of sediments and construction-related contaminants (e.g., concrete, fuel, hydraulic fluid, etc.) into the Alameda Creek drainage and the associated effects on the current fish community and their habitat. Substantial adverse effects could occur to the current fish community if construction activities result in the release and exposure of sediments and/or construction-related contaminants into the Alameda Creek drainage and degrade fish habitat to the level where it is no longer suitable (temporary or long-term).

Construction-related impacts in this section are evaluated against both existing conditions and with-CDRP conditions. The current construction schedule for the proposed project is from fall 2017 to spring 2019 (18 months), while construction of the CDRP is also anticipated to be completed in spring 2019. It is possible that operation of the CDRP will commence prior to completion of ACRP construction and that with-CDRP conditions could prevail during a portion of the construction period. Even though no construction activities are proposed within the Alameda Creek channel and construction would not affect the fish community or their habitat, the analysis acknowledges both possible baseline conditions.

#### *Operational Impacts*

The analysis of long-term, operational impacts is made relative to the with-CDRP conditions – the baseline conditions under which the ACRP would necessarily operate, because the ACRP is reliant on implementation of the CDRP instream flow schedules. The with-CDRP conditions in Alameda Creek include completion of the CDRP, restoration of the historical capacity of Calaveras Reservoir, and implementation of the instream flow schedules required by the CDRP permit conditions.[61,62] In addition, this impact analysis assumes that the existing human-made barriers to anadromous steelhead migration would be removed or other measures would be taken to allow fish migration and steelhead access to the upper Alameda Creek watershed prior to or concurrent with ACRP operations even though these actions have not occurred. But, these conditions are determined to represent the worst-case scenario for fisheries resources in terms of identifying potential impacts of ACRP operations on fisheries and, therefore, provide the most conservative CEQA impact analysis. In other words, the analysis assumes that steelhead will have returned to the Alameda Creek watershed prior to or concurrent with ACRP operations

For the analysis of long-term, operational impacts, the analysis compares Alameda Creek surface water flows in the study area under with-CDRP conditions to those that would occur under the proposed project and assesses the associated effects on the native fish community and future occurring CCC steelhead DPS. For the native fish community, the analysis considers basic habitat

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[61] National Marine Fisheries Service (NMFS), 2011. *Biological Opinion for the Calaveras Dam Replacement Project*. Santa Rosa, CA.

[62] California Department of Fish and Game (CDFG), 2011. *Streambed Alteration Agreement for Calaveras Dam Replacement Project.* Notification No. 1600-2010-0322-R3. June 28, 2011.

requirements for those species that are expected to occur within the reaches of Alameda Creek in the study area (downstream of the project site). For special status species, namely CCC steelhead DPS, the analysis considers the species life history tactics that are expected to be used in the Alameda Creek watershed and the associated life stage and seasonal habitat requirements for the reaches of Alameda Creek in the study area; specifically, the analysis focuses on migration requirements for adult and juvenile steelhead.

The analysis of long-term, operational impacts is based on hydrologic modeling conducted to simulate operational effects of the proposed project on Alameda Creek surface water flows (as described in Appendix HYD1) and analysis of surface and subsurface water interactions in the Sunol Valley (as described in Appendix HYD2). Impact conclusions are based on an assessment of project-related changes compared to the with-CDRP conditions in the context of the expected seasonal, life-stage specific habitat requirements of CCC steelhead DPS. Specifically, the project would be considered to result in a substantial adverse effect on fisheries resources if it altered habitat functions in a manner to which they no longer provided primary constituent elements (PCEs) for CCC steelhead (i.e., freshwater PCEs defined in 70 FR 52488; September 2, 2005), which are as follows:

**Freshwater Adult Upstream Migration Corridors and Spawning Habitat:**

- sufficient base flow for holding adults and for spawning;
- adequate stream flows during and following storms for adult attraction and upstream passage; and
- periodic high flow events that maintain channel form, geometry, and other geomorphic functions.

**Freshwater Smolt Outmigration Corridors:**

- sufficient base flow for downstream movement of juveniles adequate streamflows during and following storms (for smolt outmigration).

### *Quarry Pit F2*

Potential impacts to aquatic habitats in Pit F2 are not considered because the pit does not provide habitat for native fish species. While there are no data on any fish species that may occur in the pit, there are no known stocking records and the pit has no surface connectivity to natural waterways, such as Alameda Creek or San Antonio Creek, and under the ACRP, the pit would remain isolated from natural waterways.[63] Therefore, changes in conditions in Pit F2 would have no impact on native fish habitat or movement of native fish, and Pit F2 is not addressed in any of the impact discussions.

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[63] Note that several large fish, believed to be non-native largemouth bass, were observed in Pit F2 during the May 2015 reconnaissance survey.

### 5.14.7.3 Construction Impacts — Fisheries Resources

**Impact BI-9: Construction of the proposed project would not degrade the quality of habitat in Alameda Creek or interfere with the movement of common native fish species. (Less than Significant)**

Construction activities would disturb soils within and adjacent to Pit F2, which is upslope approximately 50 feet from Alameda Creek. These activities would include construction of the concrete piers for the mooring system for the floating barges, installation of pipes and valves, construction of electrical control facilities, and the use of staging areas. If any resulting erosion and/or runoff from the project site were to enter the Alameda Creek channel, it could temporarily increase turbidity and sedimentation, and potentially release and expose construction-related contaminants (e.g., concrete, fuel, hydraulic fluid, etc.) downstream of the construction area and into Alameda Creek in the primary study area. See the Impact HY-1 in Section 5.16, Hydrology and Water Quality, for additional discussion of this issue.

Fish species present in Alameda Creek downstream of construction activities could be adversely affected by construction if construction activities were to result in increased soil erosion and/or the inadvertent release of hazardous contaminants (e.g., concrete, fuel, hydraulic fluid, etc.) into Alameda Creek. This would apply to common native and non-native species, as well as to special-status steelhead if construction is in progress when CDRP begins operation and special-status steelhead are present. Fish population levels and survival have been linked to levels of turbidity and silt deposition. Prolonged exposure to high levels of suspended sediment would create a loss of visual capability in fish in the study area aquatic habitats, leading to a reduction in feeding and growth rates; a thickening of the gills, potentially causing the loss of respiratory function; clogging and abrasion of gills; and increases in stress levels, reducing the tolerance of fish to disease and toxicants.[64] High levels of suspended sediments may also cause the movement and redistribution of fish populations, and could diminish the character and quality of the physical habitat important to fish survival.

However, project construction activities would be subject to required water quality protection measures that would prevent stormwater from the project site from adversely affecting the Alameda Creek channel. Prior to construction, SFPUC (or its contractor) would be required to develop and submit an application for a Notice of Intent (NOI) of coverage under the National Pollution Discharge Elimination System (NPDES) Construction General Permit. The construction general permit requires the development and implementation of spill prevention plans and a stormwater pollution prevention plan (SWPPP) that includes best management practices (BMPs), water quality monitoring and reporting, post construction-period requirements, and other water quality pollutant-reduction techniques to protect degradation of beneficial uses. Applicable BMPs may include permanent and temporary erosion control measures, including the use of straw bales, mulch or wattles, silt fences, and filter fabric; spill remediation material such as absorbent booms,

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[64] Waters, T.F. 1995. *Sediment in Streams: Sources, Biological Effects, and Control.* American Fisheries Society Monograph 7. Bethesda, MD.

proper staging of fuel, out of channel equipment maintenance, and ultimately seeding and revegetating.

Mandatory adherence to the requirements of the construction general permit would avoid and/or minimize the risk of release of increased sediment loading and pollutants into Alameda Creek during construction activities and thereby avoid and/or minimize the risk of adverse impacts to fish habitat, populations, and movement. Furthermore, all construction-related materials would be stored on site consistent with regulatory requirements. As a result, construction impacts on fishery habitat in Alameda Creek or on movement of native fish species in Alameda Creek would be *less than significant*.

**Mitigation**: None required.

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## 5.14.7.4 Operational Impacts — Fisheries Resources

**Impact BI-10: Project operations would not degrade the quality of habitat in Alameda Creek or substantially interfere with the movement of common native fish species. (Less than Significant)**

Habitat conditions in the reaches of Alameda Creek in the primary study area and extended study area are highly altered as a result of past and present activities and are expected to continue to be highly altered under the with-CDRP condition.

As discussed in Section 5.14.5, Setting, Fisheries Resources, under the existing condition, the extent of fish habitat in the primary study area is limited by lack of streamflow during the summer months (June to August). This condition is expected to persist under the with-CDRP condition. During the dry, summer season, releases and bypassed water will largely percolate into the ground between Welch Creek and San Antonio Creek confluences. Downstream of the San Antonio Creek confluence, NPDES discharges from the quarries contribute water to Alameda Creek and maintain several permanent pools in the creek channel during the drier months. The NPDES discharges are unpredictable and variable in volume and timing and depend on quarry operations. Under with-CDRP conditions, the volume of the NPDES discharges from the quarries is expected to increase by several thousand acre-feet per year, compared to the existing condition because it is anticipated that the quarry operators will have additional water to manage as a result of the instream releases and bypasses. With the proposed project, the SFPUC would pump water collected in Pit F2 and transfer it to the regional water system. This recapture operation would be expected to reduce the volume of water that the quarry operators would need to manage and therefore reduce the NPDES discharges from the quarries compared to the with-CDRP conditions. Thus, during the dry, summer season (June to August) streamflow in the primary study area would be reduced from the estimated quarry NPDES discharges compared to with-CDRP conditions and would be expected to be similar to existing conditions (see Appendix HYD1 for detailed discussion).

The extended study area includes the Niles Canyon and lower Alameda Creek reaches. Habitat conditions in these reaches have been heavily modified and altered as a result of past human activities, as described above in Section 5.14.5, Setting, Fisheries Resources. Although several instream structures located in the extended study area are assumed to be modified to improve fish passage for the purposes of this analysis, there are various other features that alter and impair habitat functions and would be expected to continue to do so.

Based on hydrologic modeling that has been conducted to simulate effects of ACRP operations on Alameda Creek surface water flows, long-term operation of the proposed project may result in small changes to flows in Alameda Creek compared to with-CDRP conditions; however, these changes are predicted to be small, associated mainly with any changes in quarry operations (i.e., quarry NPDES discharges to Alameda Creek – see **Table HYD 6-2B**). These predicted changes in flows could result in associated small changes in habitat conditions in Alameda Creek. However, they would not be expected to result in changes to the extent to which habitat conditions are currently limited in Alameda Creek. For example, pool and glide habitat in the primary study area is expected to continue to be limited by intermittent summer flows with only seasonal use by common native species. Downstream of the primary study area, in the extended study area, these potential changes would be diminished by operations of other water resource management entities in the watershed that supplies the Arroyo de la Laguna and would not be expected to result in changes to the extent that habitat conditions are currently limited in lower Alameda Creek for the native fish community. It is important to note that changes in water management practices by the quarry operators or changes in NPDES discharges permit requirements could reduce the amount of water discharged to Alameda Creek by the quarry operators under their NPDES permits in any future scenario.

Predicted changes in the flow regime and associated changes in fisheries habitat conditions in Alameda Creek are expected to be small. These changes are not anticipated to adversely affect the extent of current or future fisheries habitat in Alameda Creek. As such, operation of the proposed ACRP would not be expected to result in changes to habitat conditions in Alameda Creek for common, native fish species of a magnitude that would substantially interfere with the movement of native fish species. The impact of project operations on native fish in Alameda Creek would, therefore, be *less than significant*.

**Mitigation**: None required.

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**Impact BI-11: Project operations would not substantially interfere with the movement or migration of special-status fish species, including CCC steelhead DPS. (Less than Significant)**

Physical barriers to fish movement, most notably the BART weir, currently prevent CCC steelhead DPS from accessing the upper Alameda Creek watershed. This analysis, however, assumes current efforts to remove fish passage barriers will be successful and CCC steelhead DPS will gain access to the upper watershed and be present throughout the reaches of Alameda Creek within the primary and extended study areas when ACRP operations commence.

Due to life history requirements and limiting factors (specifically, warm summer water temperatures), even with implementation of the CDRP instream flow schedules under the with-CDRP condition, steelhead are not expected to spawn or rear within the reaches of Alameda Creek within the primary and extended study areas. However, steelhead would be likely to migrate through the study areas during winter spawning migrations and spring outmigrations (approximately December through June). Implementation of the CDRP instream flow schedules, particularly the bypasses at the ACDD, are expected to increase the suitability of migratory habitat throughout the primary and extended study areas.

As described above, under the with-CDRP conditions, Calaveras Reservoir will operate at full capacity and instream flow requirements and bypassed flow at the ACDD will be implemented as scheduled. During winter (December to February) and spring (March to May) months, Alameda Creek streamflows (including bypasses at ACDD and releases from Calaveras Dam) would be expected to exceed seepage rates (maximum of 17 cfs between Welch and San Antonio Creeks and 7.5 cfs between San Antonio Creek and Arroyo de la Laguna) into the alluvium and mining pits and eventually exceed available storage space in the shallow alluvium (stream channel gravels). An active stream is expected to occur through all the subreaches with the bypass flows, with flows exceeding the capacity of the diversion at the ACDD serving as the primary flow source. Saturation of the alluvium and associated increases in surface flows during the winter and spring is expected to occur more regularly under the with-CDRP conditions because of implementation of the instream flow schedules.

Due to its location, operation of the proposed ACRP would not have an effect on flow in Alameda Creek above the San Antonio Creek confluence; therefore, fish habitat in that reach of Alameda Creek would be unaffected by the ACRP. However, the ACRP could affect flow in the creek downstream of Pit F2 (immediately downstream of the San Antonio Creek confluence), which could in turn affect conditions for steelhead migration. Because Pit F2 is physically disconnected from Alameda Creek surface water flows, the only way the ACRP could affect steelhead migratory habitat is if the recapture operations were to somehow reduce high flows in the creek, as discussed further below under Surface and Subsurface Water Interactions.

### Surface and Subsurface Water Interactions

Under ACRP operations, water that naturally seeps into Pit F2 would be stored from January to March for use primarily from April to December, which, with the exception of April through June, is outside the steelhead migration season. The connection between the pit and subsurface water would be expected to undergo hydraulic fluctuations according to water surface elevations in Pit F2, or available storage. During the winter and spring months (November through March), Pit F2 would be managed to fill up to a maximum elevation of 240 feet. During recapture pumping (April through December), the water elevation in the pit would be recaptured and could decline to as lows as 150 feet or, in extreme drought conditions, to 100 feet. The water stored in the pit would seep to the surrounding alluvium until the pit is drawn down to approximately 221 to 224 feet elevation, which corresponds to the base elevation of the shallow, stream channel gravels. When the groundwater elevation is the same as the pit level, no flow into or out of the pit would occur. When the pit level falls below the base of the shallow, stream channel gravels, subsurface flow in the Alameda Creek alluvium would seep into the pit (see Appendix HYD2 for detailed discussion).

The water stored and recovered in Pit F2 would be less than the amount bypassed at the ACDD and/or released from Calaveras Dam and would not exceed the amount that the SFPUC would otherwise have stored in the Calaveras Reservoir. The effects of recapturing those quantities by drawing down storage in Pit F2 would not be expected to have a change on Alameda Creek flows, except for the indirect effects of altering quarry NPDES discharges to Alameda Creek, discussed further below under Quarry Operations, Section 3 of Appendix HYD1, and Section 6 of Appendix HYD2.

The relationship of surface and subsurface water was examined by monitoring water surface elevations in Pit F2 during a large storm that occurred on December 2 and 3, 2012. Flow in the creek peaked at 733 cfs and 1,769 acre-feet of water passed by the quarries during the storm. While the two-day period of high flow in the creek influenced water surface elevations in the pit, accelerating the rate of rise, there was no sharp rise during the storm itself; indicating that substantial flow in the creek after a period of little or no flow does not result in an immediate rise in water level in the pit. Therefore, it appears that if operation of the ACRP draws Pit F2 levels down in the fall to a greater degree than would be expected under the with-CDRP condition, the project would not increase subsurface seepage rates such that it would have any discernable effect on high flows in Alameda Creek. For more information on this topic, see Section 6.2.1 of Appendix HYD1.

**Streamflow Simulations**

Hydrologic modeling[65] that was conducted to predict streamflows conservatively assumed that the 17 cfs loss rate between Welch Creek and San Antonio Creek confluences and the 7.5 cfs loss rate between the San Antonio Creek and Arroyo de la Laguna confluences (described above) occurred during all times, even during periods when the alluvium would be expected to become temporarily saturated and the loss rates in reality would temporarily decrease. Hydrographs of estimated flows are provided for Alameda Creek below the San Antonio Creek confluence (Node 6) and above the Arroyo de la Laguna confluence (Node 7), respectively, for Water Year 1996 to Water Year 2013. Additional hydrographs were also developed for a range of water year types[66] focusing on the specific period for steelhead migration in Alameda Creek (December through June) based on life stage timing described below (see also, Table 5.14-4 above). Figures 5.14-8 and 5.14-9 are December through June hydrographs under with-CDRP conditions for Very Wet (2006), Wet (2003), Dry (2008), and Very Dry (2007) Water Year Types for Nodes 6 and 7, respectively. These plots show predicted hydrologic conditions that migrating steelhead would be anticipated to experience in Alameda Creek in the primary study area. As depicted in the plots, precipitation-generated streamflows in Alameda Creek are predicted to regularly exceed several hundred cfs during the December through June migration period. It is important to note that streamflow simulations

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[65] Estimates of daily flows in Alameda Creek under the with-CDRP conditions were made by using the ASDHM output as described in Appendix HYD1, *Surface Water Hydrology Report for Proposed Alameda Creek Recapture Project*.

[66] Water Year types were defined based on flow exceedance probabilities.

assume a 17 cfs loss upstream of Node 6, consistent with the analysis included in the NMFS BO for CDRP.[67] However, the additional 7.5 cfs loss between Nodes 6 and 7, along with quarry NPDES discharges, were not included in the SFPUC's previous streamflow simulations as it was assumed that these accretions and depletions cancelled each other out. For the purposes of this EIR, the SFPUC's previous simulations were modified to include both these loses and gains to the system.[68]

As described above, the 17 cfs and 7.5 cfs loss rates represent a simplification of a complicated system, and actual losses may vary from day-to-day and year-to-year depending on the saturated conditions of the aquifer during wet or dry periods. However, these loss rates represent maximum conservative amount of groundwater storage (and associated loss of surface to subsurface) available in the system and would not be expected to change under the conditions of ACRP operation.

**Quarry Operations**

As discussed above under Setting (Section 5.14.6.3), the NPDES discharges from the quarries would be expected to increase by an average of several thousand acre-feet per year under with-CDRP conditions because more water would need to be managed by the quarry operators and it is assumed this additional water would be discharged to Alameda Creek under their NPDES permits. When the proposed ACRP is in operation, the SFPUC would pump an average of 7,178 acre-feet per year from Pit F2 to the regional water system for municipal use, theoretically making some of the NPDES discharges by the quarry operators unnecessary. Under with-project conditions, the volume of water discharged from the quarries in summer (June to August) and fall (September to November) months, under their NPDES permits, is expected to be less than what is expected under with-CDRP conditions but similar to the volume of water discharged under existing conditions because it is assumed less water will need to be managed by the quarry operators. Additionally, it is important to note that streamflow simulations included in the analysis in the NMFS BO for CDRP[69] did not assume any quarry NPDES discharges (or changes to quarry NPDES discharges). As a result, these variable quarry NPDES discharges were not considered an important contributing source for streamflows during and following storms for adult attraction and upstream passage, and juvenile outmigration through the primary and extended study areas. Thus, ACRP-caused changes in quarry NPDES discharges would not be expected to have adverse effects on migration flows for CCC steelhead DPS.

**Impact Summary and Significance Determination**

Based on hydrologic modeling that has been conducted to conservatively simulate operational effects to Alameda Creek surface water flows, analysis of historical flow data, and analysis of surface and subsurface water interactions (see Section 5.16, Hydrology and Water Quality, and Appendices HYD1 and HYD2), long-term operation of the proposed ACRP is not anticipated to

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[67] National Marine Fisheries Service (NMFS), 2011. *Biological Opinion for the Calaveras Dam Replacement Project*. Santa Rosa, CA.

[68] For a detailed discussion of ESA/Orion's modifications to the SFPUC's simulations see Section 4 of Appendix HYD1.

[69] National Marine Fisheries Service (NMFS), 2011. *Biological Opinion for the Calaveras Dam Replacement Project*. Santa Rosa, CA.

result in substantial changes to winter and spring flows or associated aquatic habitat conditions for migrating steelhead in Alameda Creek compared to the with-CDRP conditions. The 17 and 7.5 cfs loss rates included in the streamflow simulations are considered to be conservative for most years and ACRP operations are not expected to affect (or exacerbate) this loss rate. Under the with-CDRP conditions, precipitation-generated winter and spring flows bypassed at the ACDD (plus Calaveras Dam releases and local watershed accretions) would be expected to provide adequate streamflows during and following storms for adult attraction and upstream passage, and juvenile outmigration through the primary and extended study areas. The NMFS BO did not consider quarry NPDES discharges an important contributing source for streamflow conditions for steelhead, and therefore, any changes to the quarry NPDES discharges that could occur due to ACRP operations would not be expected to have adverse effects on migration flows. Thus, the proposed ACRP is not expected to affect these flows to an extent that would limit habitat functions for steelhead. Therefore, project operations would not substantially interfere with the movement or migration of special-status fish species, including CCC steelhead DPS, and this impact would be *less than significant*.

**Mitigation**: None required.

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**Impact BI-12: Construction and operation of the proposed project would not conflict with local policies or ordinances protecting fisheries resources. (Less than Significant)**

The relevant policies and ordinances protecting fisheries resources in the project area are the Alameda Watershed Management Plan (WMP) and the SFPUC Water Enterprise Environmental Stewardship Policy. In addition, the MOU among the participating agencies of the Alameda Creek Fisheries Restoration Workgroup (ACFRW) addresses steelhead restoration in Alameda Creek.

The WMP policies established for aquatic resources include the protection and enhancement of aquatic resources and habitat, fisheries resources. As described above in Impacts BI-10, BI-11, and BI-12, construction and operation the ACRP would not degrade the quality of habitat in Alameda Creek or substantially interfere with the movement fisheries resources in the Alameda watershed. Therefore, the project would not conflict with the Alameda WMP.

The SFPUC Water Enterprise Environmental Stewardship Policy is to operate the SFPUC water system in a manner that protects and restores native fish and wildlife downstream of SFPUC dams and water diversions, within SFPUC reservoirs, and on SFPUC watershed lands. The project would not affect streamflow, directly or indirectly (including quarry NPDES discharges) to such a degree that it would undermine this policy. As a result, the project would not conflict with this policy.

Similarly, the proposed project would not conflict with the objectives of the ACFRW to pursue steelhead restoration in the Alameda Creek watershed while minimizing the impacts to water supply operations.

Therefore, the project would have a *less-than-significant* impact with respect to conflicts with local policies protecting fisheries resources.

**Mitigation:** None required.

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## 5.14.7.5 Cumulative Impacts — Fisheries Resources

**Impact C-BI-2: The project, in combination with past, present, and probable future projects, would not substantially affect fisheries resources. (Less than Significant)**

The geographic scope of cumulative impacts on fisheries resources is the Alameda Creek watershed. Construction and operation of the ACRP could affect common native fish species and a special status fish species – the CCC steelhead DPS.

As discussed in Section 5.14.5, the Alameda Creek watershed historically contained populations of anadromous steelhead, resident rainbow trout, and several other native fish species. Water supply projects, gravel mining, urban development, and flood control modifications have resulted in altered habitat and reduced this historical fishery throughout the watershed. Major alterations to Alameda Creek and its tributaries include the channelization of the lower 12 miles of the creek for flood control; the construction of three diversion dams by ACWD in the flood control channel; the construction of the PG&E pipeline concrete apron drop structure; the construction of Calaveras Dam, the ACDD, Turner Dam, and Del Valle Dam for water supply; and the construction of the BART weir. These alterations have reduced the quality of habitat within the watershed for all native species and eliminated access for steelhead to the upper watershed.[70] Despite the SFPUC's removal of Sunol and Niles Dams in 2006, steelhead can migrate upstream only as far as the BART weir.

Some of the reasonably foreseeable cumulative projects in the Alameda Creek watershed (see Table 5.1-6) could affect stream, wetlands, and riparian areas and may also affect many of the same fish species potentially affected by the ACRP. In addition to the ACRP, other SFPUC projects that could affect habitats and fish species found within the Alameda Creek watershed include the CDRP, San Antonio Backup Pipeline Project, Alameda Siphons Seismic Reliability Upgrade, New Irvington Tunnel, San Antonio Pump Station Upgrade, and Alameda Creek Fish Passage Improvements. Other projects that could affect habitats and fish species found within the Alameda Creek watershed include BART Weir Fish Passage project, SMP-30 Cutoff Wall and Creek Restoration, PG&E Line 303 Alameda Creek Relocation project, PG&E Line 107 Pipeline Retirement project, ACWD and ACFCD Joint Lower Alameda Creek Fish Passage Improvements, Alameda Creek Watershed Steelhead Restoration (ACWD), and Stream Management Master Plan

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[70] Gunther, A.J., J.M. Hagar, and P. Salop, 2000. An Assessment of the Potential for Restoring a Viable Steelhead Trout Population in the Alameda Creek Watershed. Prepared for the Alameda Creek Fisheries Restoration Workgroup. February 7, 2000.

Improvements (Zone 7 Water Agency). See Table 5.1-6 in Section 5.1.5, Cumulative Impacts, for description of these projects that are considered in the cumulative impact analysis.

### *Construction Impacts*

Construction of the ACRP and nearly all the projects identified in Table 5.1-6 would include or have already included activities in proximity to Alameda Creek that could adversely affect water quality and associated aquatic habitats and fisheries resources in the watershed. Construction activities could result in temporary increases in sediments and turbidity, and temporary release and exposure of contaminants, which could adversely affect aquatic habitats and fish populations. Given the scale of construction of the CDRP, and the number of cumulative projects that would require instream construction activities, these projects could result in significant cumulative impacts on fisheries and aquatic habitat.

As described in Impact BI-10 above, construction of the ACRP would occur entirely outside of the Alameda Creek channel and would be conducted in accordance with a project-specific SWPPP that would require prior approval by the RWQCB. The SWPPP would require implementation of extensive BMPs to prevent the discharge of pollutants into Alameda Creek and other waterways during project construction as well as post-construction site restoration and stabilization to control erosion and sedimentation after construction. Implementation of these measures would minimize the proposed project's contribution to cumulative construction impacts to a less-than-significant level. Similarly, all other cumulative projects currently under construction or proposed to be constructed in the near future would be subject to the same regulatory requirements for implementation of water quality protection measures to prevent construction runoff from adversely affecting Alameda Creek. Therefore, assuming compliance with these regulatory requirements and effectiveness of water quality protection measures, the cumulative construction impact of the proposed project in combination with other identified projects on fisheries and aquatic resources would be *less than significant*.

### *Operations Impacts*

Many of the foreseeable future projects identified in Table 5.1-6 would improve conditions for the native fish community and CCC steelhead DPS through removal of fish migration barriers from Alameda Creek and its major tributaries and enhancement of fish and riparian habitats. In the southern portion of the watershed, the SMP-30 Cutoff Wall and Creek Restoration would include a slurry cutoff wall that is expected to reduce seepage from Alameda Creek to the quarry pits, thereby increasing surface water flows in the creek channels and benefiting downstream riparian and fish habitats and improving connectivity to the upper portions of the watershed. All of these projects would be subject to their respective project-specific environmental review and permitting processes, including documentation that would detail any potential significant environmental impacts and mitigation requirements related to fish habitat in Alameda Creek, the native fish community, and CCC steelhead DPS.

Overall, the combined long-term effect of future cumulative projects is expected to improve habitat conditions for steelhead compared to current conditions and allow for the migration of steelhead upstream of the BART weir. However, the environmental conditions in the Alameda Creek watershed for the native fish community and steelhead, even with these future projects, would remain limited. At present, steelhead do not have access to historical spawning and rearing habitat upstream of Calaveras Dam, Turner Dam, and Del Valle Dam. Flows in Calaveras, Alameda, and San Antonio Creeks and in Arroyo de la Laguna would continue to be modified by the operations of the various water supply and flood control systems in the watershed. Although improved by the identified cumulative projects, including the implementation of the CDRP, the modified flows would continue to present limitations to steelhead. Nevertheless, the combined effects of past, present, and reasonably foreseeable future projects would be an incremental improvement over both existing conditions and with-CDRP conditions, and this cumulative impact would be considered *less than significant*.

Furthermore, as described in Impacts BI-11 and BI-12 above, long-term operation of the proposed ACRP is not anticipated to result in substantial changes to winter and spring flows or associated aquatic habitat conditions for migrating steelhead in Alameda Creek. Specifically, precipitation-generated winter and spring flows bypassed at the ACDD (plus Calaveras Dam releases and local watershed accretions) would be expected to provide adequate streamflows during and following storms for adult attraction and upstream passage, and juvenile outmigration through the primary and extended study areas and the proposed ACRP is not expected affect these flows to an extent that would limit habitat functions for steelhead. Therefore, the proposed project's limited contribution to cumulative conditions relative to the native fish community and CCC steelhead DPS in the Alameda Creek watershed would not be cumulatively considerable.

**Mitigation:** None required.

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# 5.15 Geology and Soils

This section describes the existing geology and soils conditions in the vicinity of the proposed Alameda Creek Recapture Project (ACRP or proposed project) and evaluates the project's potential impacts relative to geology, paleontological resources, seismicity, and soils. Mitigation measures to avoid or reduce adverse impacts are identified, as appropriate.

## 5.15.1 Setting

### 5.15.1.1 Regional Physiography

The proposed ACRP area lies in the Sunol Valley within the Alameda Creek watershed, which is part of the Coast Ranges Geomorphic Province (Coast Ranges). The topography of the Coast Ranges is characterized by northwest-southeast-trending mountain ridges and intervening valleys that have formed over millions of years due to movements of the earth's crust. Most of the hills and mountains in the Coast Ranges are comprised of consolidated bedrock units. In the vicinity of the proposed project, geologically younger sediments deposited by Alameda and San Antonio Creeks overlie the bedrock.

### 5.15.1.2 Site Geology

The Sunol Valley is a northwest-trending rift valley following the Calaveras Fault and Alameda Creek. The valley is bounded on the east by the Calaveras Fault and on the west by the foothills of the Diablo Range. On the east side of the Calaveras Fault, the bedrock consists of the Briones Formation (*Tbr*) and Livermore Gravels (*QTl*), as shown in **Figure 5.15-1**.[1] Alluvial material[2] fills the valley floor, including older alluvium (*Qpa*), alluvial fan deposits (*Qha*), steam terrace deposits (*Qt*), gravel deposits of the Oliver De Silva, Inc. (Oliver De Silva) and Hanson Aggregates quarries (*gq*), and modern stream channel deposits (*Qhc*) of Calaveras and San Antonio Creeks. These regional units are described as follows:

- ***Unnamed Sandstone (Ks)*** – Cretaceous-age (65 million to 144 million years ago) coarse- to fine-grained sandstone, siltstone, and shale. In places, the sandstone contains fragments of preexisting rock and siltstone (Kss).

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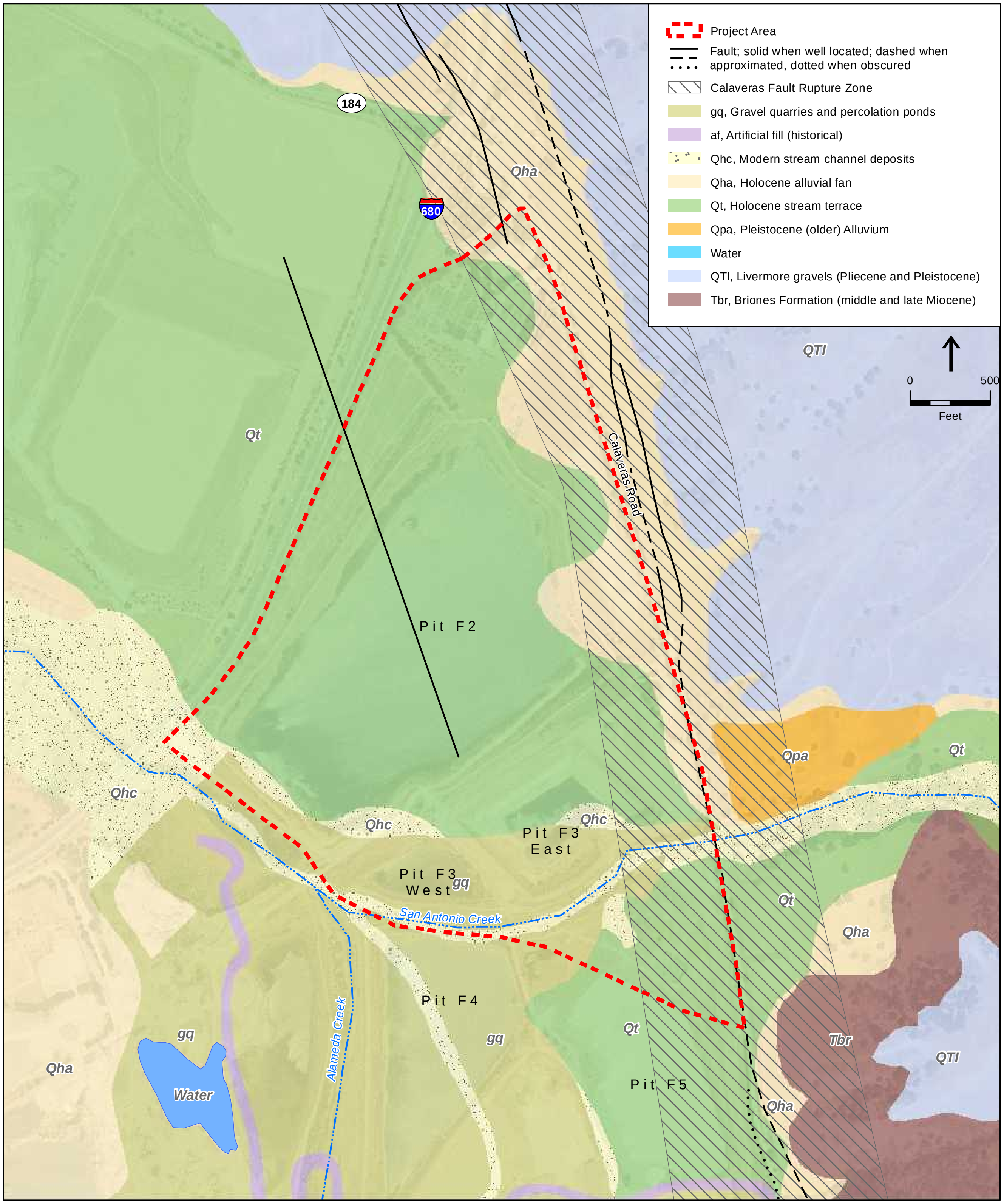
[1] U.S. Geological Survey (USGS), 1996. *Preliminary Geologic Map Emphasizing Bedrock Formations in Alameda County, California: a Digital Database*. Geology by R.W. Graymer, D.L. Jones, and E.E. Brabb. Open File Report 96-052. 1996; U.S. Geological Survey (USGS), 2006. *Maps of Quaternary Deposits and Liquefaction Susceptibility in the Central San Francisco Bay Region, California. Liquefaction Susceptibility.* Geology by Robert C. Witter, Keith L. Knudsen, Janet M. Sowers, Carl M. Wentworth, Richard D. Koehler, and Carolyn E. Randolph. Digital Database by Carl M. Wentworth, Suzanna K. Brooks, and Kathleen D. Gans. Open File Report 06-1037. 2006.

[2] Alluvial materials consist of unconsolidated mixtures of gravel, sand, clay, and silt typically deposited by streams. An alluvial fan is a fan-shaped deposit formed where a fast-flowing stream flattens, slows, and spreads, typically at the exit of a canyon onto a flatter plain.



SOURCE: Alameda County, 2006; CGS, 2002; USGS, 1996; USGS, 2006; ESA, 2015

SFPUC Alameda Creek Recapture Project

**Figure 5.15-1**
Geologic Map

- ***Briones Formation (Tbr)*** **–** Miocene-age (5.3 million to 23.7 million years ago) sandstone, siltstone, conglomerate,[3] and shell breccia.[4]

- ***Livermore Gravels (QTl)*** – Pliocene- to Pleistocene-age (10,000 to 5.3 million years ago) poorly to moderately consolidated cobble conglomerate and coarse-grained sandstone.

- ***Older Alluvium (Qpa)*** – Pleistocene-age (10,000 to 1.8 million years ago) poorly to moderately sorted, unconsolidated deposits of sand, silt, and gravel.

- ***Stream Terrace Deposits (Qt)*** **–** Late Pleistocene- to Holocene-age (0.8 million years ago to present) deposits on stream terraces, consisting of unconsolidated, moderately to well-sorted and moderately well-bedded deposits of sand, gravel, and silt with minor clay.

- ***Alluvial Fan Deposits (Qha)*** **–** Holocene-age (10,000 years ago to present) unconsolidated alluvial deposits of poorly to moderately sorted sand, silt, and gravel.

- ***Gravel Quarries and Percolation Pits (gq)*** **–** Consisting of excavations, associated soil piles, and disturbed ground in stream channels or alluvial deposits that were or are being used for the purposes of extracting sand and gravel. Recharge and percolation ponds are included in this map unit because many gravel pits are eventually used for these purposes.

- ***Modern Stream Channel Deposits (Qhc)*** **–** Historical (younger than 150 years old) unconsolidated deposits of poorly to well-sorted sand, gravel, and cobbles with minor silt and clay within existing streambeds.

In the majority of the proposed project area, fill and alluvial materials overlie the Briones Formation bedrock. The Briones Formation within the project area consists of olive to yellowish brown, fine-grained, very closely fractured sandstone; very closely fractured shale; very weak, intensely fractured silty sandstone and clayey siltstone; and olive gray to gray closely fractured siltstone. In the vicinity of Pit F2 the fill thickness ranges from 1 to 5 feet.[5] The fill thickness in the vicinity of Pits F3-East and F3-West is approximately 15 feet.[6] The thickness of the alluvium ranges from a minimum of 20 feet at Pit F2 to a maximum of 66 feet in the vicinity of Pits F3-East and F3-West. During subsurface explorations conducted during preparation of the geotechnical evaluation for the proposed ACRP, stream terrace deposits were encountered beneath the alluvial materials in the vicinity of Pits F3-East and F3-West.[7,8] Although no Pleistocene-age

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[3] Conglomerate is a type of rock consisting of rounded pebbles or rock fragments held together by silica or clay.

[4] Shell breccia is a sedimentary rock comprised of shell fragments cemented together.

[5] T&R/RYGC, 2014. *Geotechnical Evaluation for the Alameda Creek Recapture Project, Sunol California, SFPUC Project No. CUW 352.01.* December 23, 2014.

[6] T&R/RYCG, 2011. *Geotechnical Investigation Report, Cut-Off Wall for Pits F3 East and West, San Antonio Backup Pipeline, Sunol, California (CUW 374.03).* August 4, 2011.

[7] T&R/RYGC. 2014. *Geotechnical Evaluation for the Alameda Creek Recapture Project, Sunol California, SFPUC Project No. CUW 352.01.* December 23, 2014.

[8] The geotechnical evaluation for ACRP encompasses Pit F2 and the proposed electrical control building and electrical transformer site adjacent to Pit F2. The project area refers to the area within which all construction-related disturbance would occur, which encompasses a larger area than that included in the geotechnical evaluation.

alluvial materials (Qpa) have been mapped within the project boundaries, this unit may underlie the Holocene-age alluvial materials (Qt and Qha) in some areas.[9]

### *Mining Operations in the Sunol Valley*

Alluvial deposits in the Sunol Valley, including older stream terrace and active stream channel deposits, are an important source of aggregate mineral resources. Aggregate materials—primarily sand, gravel, and crushed rock—have been mined and processed in the Sunol Valley since the 1960s. Currently, aggregate mining in the Sunol Valley occurs in accordance with four Surface Mining Permits (SMPs): the SMP-24, SMP-32 and SMP-33 areas are operated by Hanson Aggregates and the SMP-30 area is operated by Oliver de Silva. All of the SMP-30 and SMP-32 areas and a portion of the SMP-24 area are located on SFPUC Alameda watershed lands[10] that the quarry operators lease from the City and County of San Francisco (CCSF) (see **Figure 3-2** in Chapter 3, Project Description). The Surface Mining Reclamation Plans for the SMP-30, SMP-32, and CCSF-owned lands of SMP-24 indicate that, upon completion of aggregate mining activities in these areas, the quarry pits will provide approximately 63,000 acre-feet of water storage for the SFPUC Alameda watershed.

## 5.15.1.3 Paleontological Setting

Paleontological resources are the fossilized remains of plants and animals, including vertebrates (animals with backbones), invertebrates (e.g., starfish, clams, ammonites, and marine coral), and fossils of microscopic plants and animals (microfossils). The age and abundance of fossils depend on the location, topographic setting, and particular geologic formation in which they are found. Fossil discoveries not only provide a historical record of past plant and animal life but can assist geologists in dating rock formations. In addition, fossil discoveries can expand our understanding of the time periods and the geographic ranges of existing and extinct flora or fauna.

### *Paleontological Assessment Standards*

The Society of Vertebrate Paleontology (SVP) has established guidelines for the identification, assessment, and mitigation of adverse impacts on nonrenewable paleontological resources.[11,12] Most practicing paleontologists in the United States adhere closely to the SVP's assessment, mitigation, and monitoring requirements as outlined in these guidelines, which were approved

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[9] U.S. Geological Survey (USGS), 1996. *Preliminary Geologic Map Emphasizing Bedrock Formations in Alameda County, California: a Digital Database.* Geology by R.W. Graymer, D.L. Jones, and E.E. Brabb. Open File Report 96-052. 1996.
U.S. Geological Survey (USGS), 2006. *Maps of Quaternary Deposits and Liquefaction Susceptibility in the Central San Francisco Bay Region, California. Liquefaction Susceptibility.* Geology by Robert C. Witter, Keith L. Knudsen, Janet M. Sowers, Carl M. Wentworth, Richard D. Koehler, and Carolyn E. Randolph. Digital Database by Carl M. Wentworth, Suzanna K. Brooks, and Kathleen D. Gans. Open File Report 06-1037. 2006.

[10] The SFPUC Alameda watershed refers to lands that are owned by the CCSF and managed by the SFPUC as part of the Hetch Hetchy regional water system.

[11] Society of Vertebrate Paleontology (SVP), 1995. Assessment and Mitigation of Adverse Impacts to Nonrenewable Paleontologic Resources: Standard Guidelines, Society of Vertebrate Paleontology News Bulletin, Vol. 163, pp. 22–27. 1995.

[12] Society of Vertebrate Paleontology (SVP), 1996. Conditions of Receivership for Paleontologic Salvage Collections, Society of Vertebrate Paleontology News Bulletin, Vol. 166, pp. 31–323. February 1996.

through a consensus of professional paleontologists and reflect the currently accepted standard practices. Many federal, state, county, and city agencies have either formally or informally adopted the SVP's standard guidelines for the mitigation of adverse construction-related impacts on paleontological resources. The SVP has helped define the value of paleontological resources and, in particular, indicates the following:

- Vertebrate fossils and fossiliferous (fossil-containing) deposits are considered significant nonrenewable paleontological resources and are afforded protection by federal, state, and local environmental laws and guidelines.
- A paleontological resource is considered to be older than recorded history, or 5,000 years before present, and is not to be confused with an archaeological resource.
- Invertebrate fossils are not significant paleontological resources unless they are present within an assemblage of vertebrate fossils or they provide undiscovered information on the origin and character of the plant species, past climatic conditions, or the age of the rock unit itself.
- A project paleontologist, special interest group, lead agency, or local government can designate certain plant or invertebrate fossils as significant.

In accordance with these principles, the SVP (1995) outlined criteria for screening the paleontological potential of rock units and established assessment and mitigation procedures tailored to such potential. **Table 5.15-1** lists the criteria for high-potential, undetermined, and low-potential rock units.

**TABLE 5.15-1**
**CRITERIA FOR DETERMINING PALEONTOLOGICAL POTENTIAL**

| Paleontological Potential | Description |
|---|---|
| High | Geologic units from which vertebrate or significant invertebrate or plant fossils have been recovered. Only invertebrate fossils that provide new information on existing flora or fauna or on the age of a rock unit would be considered significant. |
| Undetermined | Geologic units for which little to no information is available. |
| Low | Geologic units that are not known to have produced a substantial body of significant paleontological material. |

SOURCES: Society of Vertebrate Paleontology (SVP), 1995. Assessment and Mitigation of Adverse Impacts to Nonrenewable Paleontologic Resources: Standard Guidelines, Society of Vertebrate Paleontology News Bulletin, Vol. 163, pp. 22–27. 1995

Society of Vertebrate Paleontology (SVP), 1996. Conditions of Receivership for Paleontologic Salvage Collections, Society of Vertebrate Paleontology News Bulletin, Vol. 166, pp. 31–323. February 1996.

Although not discussed in the SVP standards, artificial fills, surface soils, and high-grade metamorphic rocks do not contain paleontological resources. While such materials were originally derived from rocks, they have been altered, weathered, or reworked such that the discovery of intact fossils would be rare.

### *Paleontological Potential*

The following discussion of paleontological resources divides the rock units underlying the project area into geologic units with a high and low potential to yield significant fossils. Information was compiled based on a review of the following: published geologic maps, geologic unit descriptions, previous geotechnical reports evaluating conditions in the project vicinity, and a fossil collections database at the University of California Museum of Paleontology. No new mapping or field study for paleontological resources was conducted during the preparation of this EIR.

The surface soils of the project area for the ACRP consist of Holocene-active alluvium and artificial fills. The older, Pleistocene-age alluvium (older alluvium), Livermore Gravels, and terrace deposits are present near the project area along valley margins, and underlies the Holocene alluvium (young alluvium) at variable depths ranging from about 15 to 20 feet along the San Antonio Creek channel. Bedrock units in the vicinity of the ACRP (i.e., the Briones Formation and the Panoche Siltstone) are present at shallow depths along the valley ridges and boundaries, but are found at depths as great as 500 feet in the vicinity of the quarries.[13] The paleontological potential of each of the geologic units within the project area is discussed below.

#### Holocene Deposits (Artificial Fill, Stream Channel Deposits, and Younger Alluvium)

The upper geologic units in the project area consists of loose deposits of sand, silt, and gravel and includes active stream channels, alluvial fans, and young stream terraces of the San Antonio Creek drainage. These geologic units form the flat base of the Sunol Valley and directly underlie the entire area that would be disturbed by the ACRP. In many places, these surficial materials have been moved, disturbed, or intentionally engineered and/or compacted to serve as berms, artificial channels, or roads. The number of utility corridors, roads, and aggregate quarry operations in the vicinity suggests that the entire area has been highly disturbed. Generally, for a fossil to have value as a cultural or scientific resource it must be identifiable (diagnostic) and found in place (i.e., in situ). Artificial fills and moved or otherwise disturbed soils have a low potential to yield unique or significant fossils because their original context can rarely be established and because earthmoving commonly destroys diagnostic features.

Information on fossil resources in the Holocene deposits of the Sunol Valley is not readily available, but known fossils from the Holocene of the greater East Bay are sparse and represent common taxa. The University of California Museum of Paleontology database contains only two fossil records from the Holocene of the greater East Bay—a specimen of the pine *Pinus attenuata* from a site in Oakland, and one of the oyster *Ostrea lurida* from a site offshore of Alameda.[14] Holocene units in California are typically considered to be of low sensitivity unless known otherwise. Based on the criteria in Table 5.15-1, the Holocene deposits in the project area are rated as having a *low* paleontological potential.

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[13] URS Corporation, *Final Conceptual Engineering Report, Upper Alameda Creek Filter Gallery Project*. CUW 352.01. June 30, 2010.

[14] University of California Museum of Paleontology (UCMP), Collections Database. Available online at http://www.ucmp.berkeley.edu/science/collections.php. Accessed May 17, 2011.

**Pliocene- to Pleistocene-Age Deposits (Older Alluvium and Livermore Gravels)**

In the Sunol Valley, the Holocene deposits are underlain by older alluvium and the non-marine sediments of the Livermore Gravels. In contrast to the Holocene deposits, these deposits are Pliocene to Pleistocene in age (5.3 million to 10,000 years old) and have undergone a greater degree of hardening and consolidation. These geologic units record episodes of fluvial (stream) deposition prior to 10,000 years ago that have since ceased. The fossil content (if any) of the older alluvium within the project boundaries is unknown. However, the Pleistocene units of central California are rich in vertebrate remains. The University of California Museum of Paleontology database contains more than 1,000 entries for fossil localities in the Pleistocene of Alameda County alone, the majority of which are from extinct vertebrate fauna.[15] Locally, a fossil of a mastodon from the Pleistocene epoch was discovered in Sunol (UCMP Locality No. V6535), while an unidentified vertebrate fossil was discovered at Calaveras Dam (UCMP Locality No. V3937).[16] In addition, geologic maps identify older alluvium as containing fossils of extinct vertebrate fauna.[17] Based on the criteria in Table 5.15-1, the Pliocene- to Pleistocene-age deposits are rated as having a *high* paleontological potential.

## 5.15.1.4 Geologic Hazards

### *Slope Failures*

Slope failures, commonly referred to as landslides, include many phenomena that involve the downslope displacement and movement of material, triggered either by static (i.e., gravity) or dynamic (i.e., earthquake) forces. Exposed rock slopes undergo rock falls, rockslides, or rock avalanches, while soil slopes experience soil slumps, rapid debris flows, and deep-seated rotational slides. Slope stability can depend on a number of complex variables, including the geology, structure, and amount of groundwater, as well as external processes such as climate, topography, slope geometry, and human activity. The factors that contribute to slope movements include those that decrease the resistance in the slope materials and those that increase the stresses on the slope. Landslides can occur on slopes of 15 percent or less[18], but the probability is greater on steeper slopes that exhibit old landslide features such as scarps, slanted vegetation, and transverse ridges.

The best available predictor of where slides and earth flows might occur is the distribution of past movements.[19] In 1997, the U.S. Geological Survey (USGS) released a preliminary map and geographic information system (GIS) database that provides a summary of the distribution of

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[15] University of California Museum of Paleontology (UCMP), 2011. Collections Database. Available online at http://www.ucmp.berkeley.edu/science/collections.php. Accessed May 17, 2011.

[16] University of California Museum of Paleontology (UCMP), 2009. Collections Database. Available online at http://www.ucmp.berkeley.edu/science/collections.php. Accessed July 24, 2009.

[17] Helley E.J., and Graymer R.W., 1997. *Quaternary Geology of Alameda County, and Parts of Contra Costa, Santa Clara, San Mateo, San Francisco, Stanislaus, and San Joaquin Counties, California*: a Digital Database. U.S. Geological Survey Open File Report 97-97. 1997.

[18] The ratio between the amount of vertical rise of a slope and horizontal distance as expressed in a percent. For example, one hundred feet of rise to 100 feet of horizontal distance equals 100 percent.

[19] Nilsen, T.H., and B.L. Turner, 1975. *Influence of rainfall and ancient landslide deposits on recent landslides (1950 71) in urban areas of Contra Costa County, California,* U.S. Geological Survey Bulletin 1388. 1975.

landslides evident in the landscape of the San Francisco Bay region.[20] The map is a digitized nine-county compilation of existing landslides that has been used to divide the area into four landslide zones, including "mostly landslides," "many landslides," "few landslides," and "flatland." Although portions of the hillslopes to the west of the project area are mapped as "mostly landslides," the project area is mapped as "flatland," which is defined as "areas of gentle slope at low elevations that have little or no potential for the formation of slumps, landslides, or earth flows, except along stream banks and terrace margins."

In the vicinity of the proposed project, the quarry pits operated by Hanson Aggregates in the SMP-24 area typically have steep sidewalls. The proposed mooring anchors would be installed generally along the crest of the existing slopes of Pit F2. The remaining improvements planned for the project would be set back between 50 to 100 feet from the crest of the existing slopes of Pit F2. The geotechnical evaluation for the proposed ACRP determined that under static conditions the slopes in Pit F2 are stable.[21]

### Corrosive and Expansive Soils

Problematic soils, such as those that are expansive and corrosive, can damage structures and buried utilities and increase maintenance requirements. The corrosivity of soils is commonly related to several key parameters, including soil resistivity, the presence of chlorides and sulfates, oxygen content, and pH. Typically, the most corrosive soils are those with the lowest pH and highest concentration of chlorides and sulfates. Wet/dry conditions can result in a concentration of chlorides and sulfates as well as movement in the soil, both of which tend to break down the protective corrosion films and coatings on the surfaces of building materials. High-sulfate soils are also corrosive to concrete and may prevent complete curing, reducing its strength considerably. Low pH and/or low-resistivity soils can corrode buried or partially buried metal structures. Depending on the degree of corrosivity of the subsurface soils, building materials such as concrete, reinforcing steel in concrete structures, and bare metal structures exposed to these soils can deteriorate, eventually leading to structural failure. The steel or concrete in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than the steel or concrete in installations that are entirely within one kind of soil or within one soil layer.

Expansive soils are characterized by their ability to undergo significant volume change (i.e., to shrink and swell) due to variations in moisture content. Changes in soil moisture can result from rainfall, landscape irrigation, utility leakage, roof drainage, and/or perched groundwater. Expansive soils are typically very fine grained and have a high to very high percentage of clay. Expansion and contraction of expansive soils in response to changes in moisture content can lead to differential and cyclical movements that can cause damage and/or distress to structures and equipment.

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[20] U.S. Geological Survey (USGS), 1997. *Summary Distribution of Slides and Earth Flows in the San Francisco Bay Region, California, GIS database for Open File Report 97 745 Part C*, by C.M. Wentworth, S.E. Graham, R.J. Pike, G.S. Beukelman, D.W. Ramsey, and A.D. Barron. 1997.

[21] T&R/RYGC, 2014. *Geotechnical Evaluation for the Alameda Creek Recapture Project, Sunol California, SFPUC Project No. CUW 352.01.* December 23, 2014.

Soil mapping performed by the Natural Resources Conservation Service (NRCS) provides information on surface and near-surface subsurface soil materials in the project area. **Table 5.15-2** lists each soil type identified in the project area, based on the NRCS web soil survey, and describes the key properties of each soil type, including erosion potential, corrosion potential to concrete and uncoated steel, and shrink/swell potential. As noted in Table 5.15-2, the soils identified in the project area generally include loams, which are soils typically composed of sand, silt, clay, and organic matter in evenly mixed particles of various sizes. **Figure 5.15-2** presents soil types in the project area.

**TABLE 5.15-2**
**SOIL TYPES IDENTIFIED IN THE PROJECT AREA AND KEY SOIL PROPERTIES**

| | **Risk of Corrosion**[a] | | **Shrink/Swell Potential** |
|---|---|---|---|
| **Map Symbol and Soil Name** | **Uncoated Steel**[b] | **Concrete**[c] | **Highest Value**[d] |
| *Lm*, Livermore very gravelly coarse sandy loam | Moderate | Low | Low |
| *PoF2*, Positas gravelly loam | High | Moderate | High |
| *Rh*, Riverwash | N/A | N/A | N/A |
| *Yo*, Yolo loam over gravel | High | Low | Low |
| *Yma*, Yolo loam | High | Low | Low |
| *Za*, Zamora silt loam | High | Low | Moderate |

NOTES: N/A = Not Available or Not Applicable.

[a] "Risk of corrosion" pertains to potential soil-induced electrochemical or chemical action that corrodes or weakens uncoated steel or concrete.

[b] For uncoated steel, the risk of corrosion—expressed as low, moderate, or high—is based on soil drainage class, total acidity, electrical resistivity near-field capacity, and electrical conductivity of the saturation extract.

[c] For concrete, the risk of corrosion is also expressed as low, moderate, or high. It is based on soil texture, acidity, and amount of sulfates in the saturation extract.

[d] The shrink/swell potential is based on the highest value for linear extensibility within the soil profile. The shrink/swell potential is low if the soil has a linear extensibility of less than 3 percent; moderate if 3 to 6 percent; high if 6 to 9 percent; and very high if more than 9 percent. If the linear extensibility is more than 3 percent, shrinking and swelling can cause damage to buildings, roads, and other structures and to plant roots, and special design is commonly needed.

SOURCE: Natural Resources Conservation Service (NRCS), U.S. Department of Agriculture, Soil Survey Geographic (SSURGO) database for Alameda Area, California (ca609). Survey Area Data Version 6, 7/26/10. Available online at http: http://websoilsurvey.nrcs.usda.gov/app/ Accessed October 16, 2011.

As summarized in Table 5.15-2, soils in the project area exhibit a moderate to high corrosivity to uncoated steel and a low to moderate corrosivity to concrete.[22] Moderate to high shrink-swell potentials were noted for the Zamora silt loam (moderate) and the Positas gravelly loam (high). Based on an analysis of soils samples conducted recently for the San Antonio Backup Pipeline Replacement Project (which is located within the same vicinity as the ACRP) for resistivity, pH, chloride, and sulfates, soils in the Sunol Valley exhibit a low to moderate risk of corrosion to buried iron, steel, mortar-coated steel, and reinforced-concrete structures.[23]

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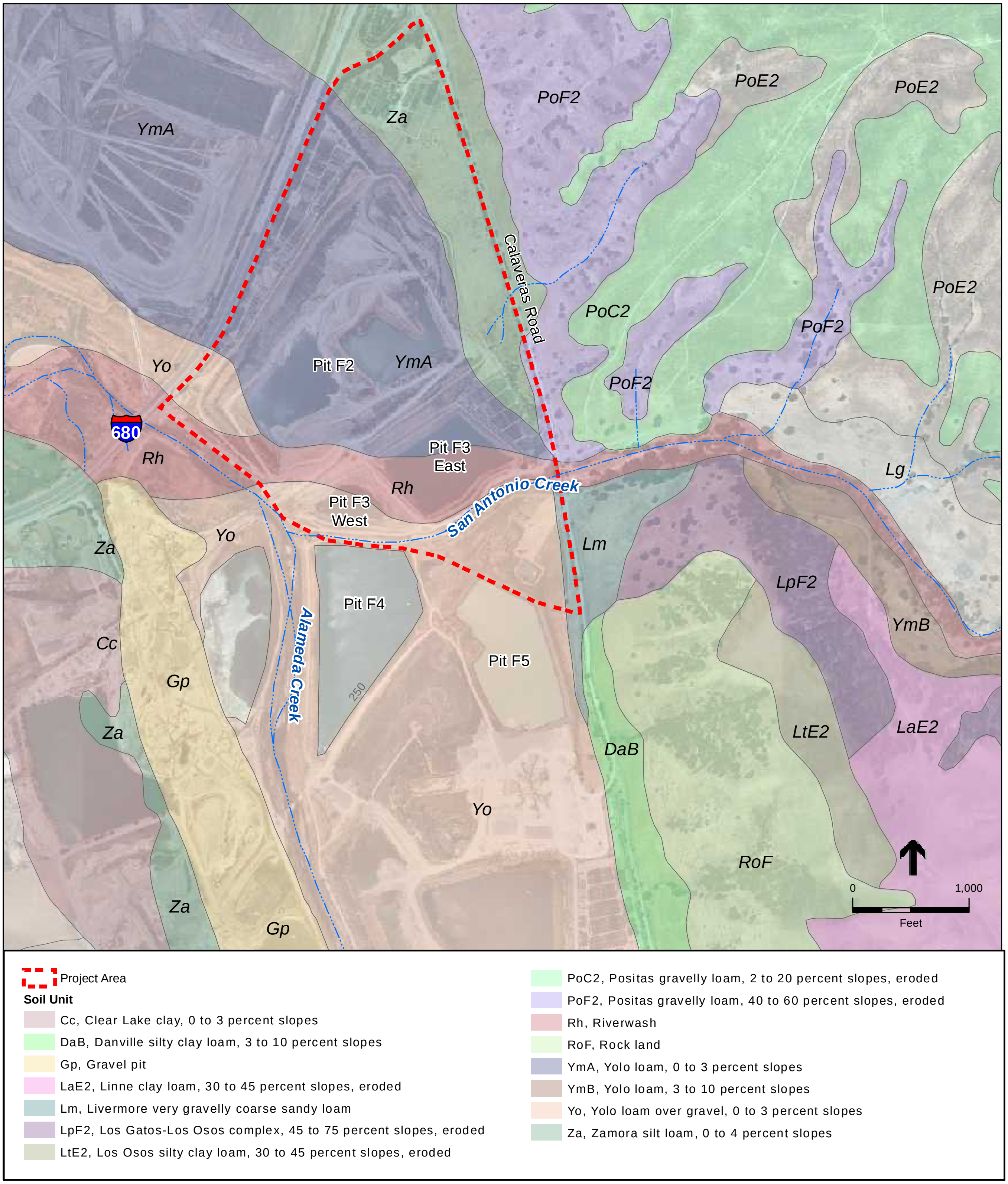
[22] Natural Resources Conservation Service (NRCS), 2015. *U.S. Department of Agriculture, Soil Survey Geographic (SSURGO) database for Alameda Area, California (ca609). Survey Area Data Version 6, 7/26/10*. Available online at http: http://websoilsurvey.nrcs.usda.gov/app/ Accessed October 16, 2011.

[23] URS Corporation, 2009. *Geotechnical Report, San Antonio Backup Pipeline Replacement Project.* February 25, 2009.



SOURCE: Alameda County, 2006; NRCS, 2009; ESA, 2015

SFPUC Alameda Creek Recapture Project

**Figure 5.15-2**

Soils Map

## 5.15.1.5 Regional Faulting and Seismic Hazards

### *Seismicity*

The San Francisco Bay Area is situated near the boundary between two major tectonic plates, the Pacific Plate to the southwest and the North American Plate to the northeast. Since the Miocene epoch (approximately 23 million years ago), about 200 miles of right-lateral movement has occurred along the San Andreas Fault Zone[24] to accommodate the relative movement between these two plates. The movement between the Pacific Plate and the North American Plate generally occurs across a 50-mile-wide zone extending from the San Gregorio Fault in the southwest to the Great Valley Thrust Belt in the northeast. In addition to the right-lateral slip movement between the two tectonic plates, portions of the North American Plate have moved toward each other during the last 3.5 million years, resulting in compressional forces at the latitude of San Francisco Bay.[25]

**Figure 5.15-3** shows the locations of major active[26] and potentially active[27] faults in the San Francisco Bay region. The San Andreas, San Gregorio, Hayward, Rodgers Creek, Calaveras, and Greenville strike-slip faults[28] are active faults of the San Andreas Fault system that predominantly accommodate lateral movement between the North American and Pacific tectonic plates. Active blind- and reverse-thrust faults[29] in the San Francisco Bay region that accommodate compressional movement include the Monte Vista–Shannon and Mount Diablo Faults. The major active faults closest to the ACRP area are the Calaveras and Hayward Faults, located approximately 0.2 miles and 4 miles from the site, respectively.[30]

The USGS estimates that there is a 72 percent probability of a strong earthquake (magnitude 6.7 or higher) occurring on one of the regional faults in the 30-year period between 2014 and 2043.[31] The northern Calaveras Fault, which is approximately 28 miles long, extends from Calaveras Reservoir south of the project area to the town of Danville to the north. In the project area, the fault lies along the eastern side of the Sunol Valley, roughly following Calaveras Road, along the eastern side of the project area. Although only one historical earthquake—a magnitude 5.6 event

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[24] A "fault" is a fracture in the earth's crust along which movement has occurred, and a "fault zone" is an area of numerous fractures. The San Andreas Fault Zone extends along the coastline of California from northern California to the Gulf of California.

[25] Fenton, C.H., and C.S. Hitchcock, 2001. *Recent geomorphic and paleoseismic investigations of thrust faults in Santa Clara Valley, California, in H. Ferriz and R. Anderson (eds.), Engineering Geology Practice in Northern California: California Division of Mines and Geology Bulletin 210*. 2001.

[26] An active fault is one that shows geologic evidence of movement within Holocene time (approximately the last 11,000 years).

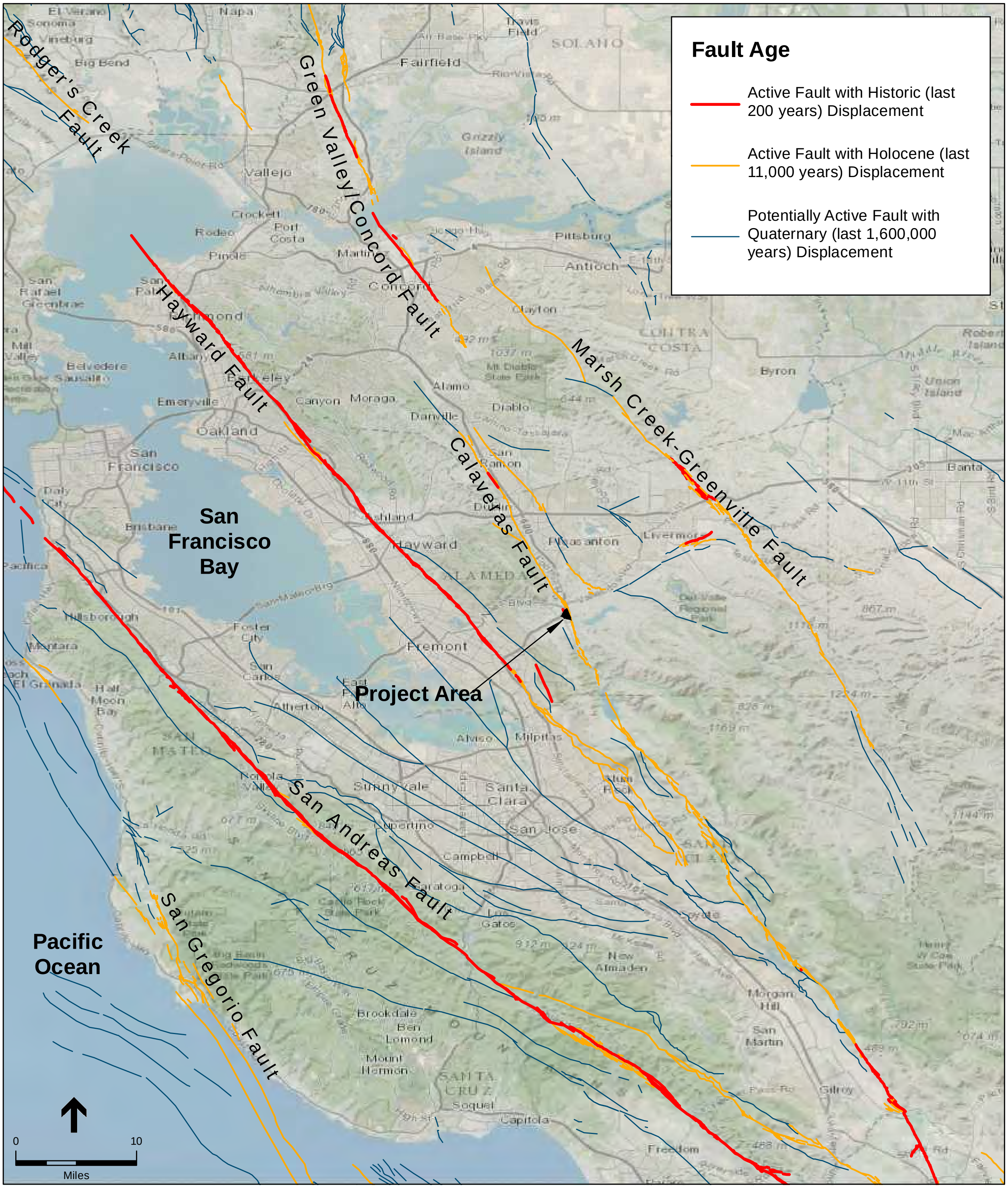
[27] A potentially active fault is one that shows geologic evidence of movement during the Quaternary (approximately the last 1.6 million years).

[28] Strike-slip faults involve the two blocks moving parallel to each other without a vertical component of movement.

[29] A reverse fault is one with predominantly vertical movement in which the upper block moves upward in relation to the lower block; a thrust fault is a low-angle reverse fault. Blind-thrust faults are low-angled subterranean faults that have no surface expression.

[30] T&R/RYGC, 2014. *Geotechnical Evaluation for the Alameda Creek Recapture Project, Sunol California, SFPUC Project No. CUW 352.01.* December 23, 2014.

[31] U.S. Geological Survey (USGS), 2015. *The Uniform California Earthquake Rupture Forecast, Version 3 (UCERF 3), prepared by the Working Group on California Earthquake Probabilities. Fact Sheet 2015-3009*. March 2015.



SOURCE: ESRI, 2008; Bryant, 2005

SFPUC Alameda Creek Recapture Project

**Figure 5.15-3**

Major Regional Faults

in the San Ramon Valley—has occurred on the northern Calaveras Fault, this fault is considered to have a seven percent probability of generating large earthquakes (greater than magnitude 6.7), over the next 30 years.[32]

Fault rupture could occur within the project area as a result of movement on the Calaveras Fault, and strong groundshaking and other earthquake-related phenomena could also occur in the project area due to a major earthquake on this fault or one of the other regional faults, including the Hayward, Greenville, and San Andreas Faults—each of which parallels the Calaveras Fault and is capable of generating large (greater than magnitude 6.7) earthquakes. The Hayward Fault lies approximately four miles to the west of the project area; the Greenville Fault is approximately 12 miles to the northeast; and the San Andreas Fault is approximately 23 miles to the west (see Figure 5.15-3).

### *Fault Rupture*

As stated above, fault rupture could occur in the project area as a result of movement on the Calaveras Fault. Surface rupture occurs when movement on a fault deep within the earth breaks through to the surface. Surface ruptures associated with the 1906 San Francisco earthquake extended for more than 260 miles, with displacements of up to 21 feet. However, not all earthquakes result in surface rupture. The Loma Prieta earthquake of 1989 caused major damage in the San Francisco Bay Area, but the fault movement did not break through to the ground surface.

Fault rupture almost always follows preexisting faults, which are zones of weakness. Rupture can occur suddenly during an earthquake or slowly in the form of fault creep. Sudden rupture is more damaging because it can displace structures and is accompanied by shaking. Fault creep is the slow rupture of the earth's crust. In developed areas, fault creep can offset and deform curbs, streets, buildings, and other structures that lie on the fault trace.

Historically, ground surface ruptures closely follow the trace of geologically young faults. The Calaveras Fault exists along Calaveras Road, approximately 0.2 miles (1,000 feet) to the east of the project area. In a seismically active area, the remote possibility exists for future faulting in areas where no faults previously existed; however, the risk of surface faulting and consequent secondary ground failure is low.[33]

### *Groundshaking*

The intensity of seismic shaking, or strong ground motion, during an earthquake is dependent on the distance from the epicenter of the earthquake, the magnitude of the earthquake, and the geologic conditions underlying and surrounding the project area. Earthquakes occurring on faults closest to the project area would most likely generate the largest ground motions.

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[32] T&R/RYGC, 2014. *Geotechnical Evaluation for the Alameda Creek Recapture Project, Sunol California, SFPUC Project No. CUW 352.01.* December 23, 2014.

[33] T&R/RYGC, 2014. *Geotechnical Evaluation for the Alameda Creek Recapture Project, Sunol California, SFPUC Project No. CUW 352.01.* December 23, 2014.

The intensity of earthquake-induced ground motions and the potential forces affecting structures within the project area can be described in terms of "peak ground acceleration," which is represented as a fraction of the acceleration of gravity (g).[34] **Table 5.15-3** presents peak ground accelerations in the project vicinity for the ten percent, five percent, and two percent probabilities of exceedance in 50 years (475-, 975-, and 2,475-year return periods, respectively), based on a site-specific seismic analysis conducted for the San Antonio Backup Pipeline Replacement Project project area, which overlaps geographically with the ACRP area.[35] All of the peak ground accelerations are greater than 0.75 g and could cause widespread damage, such as severe structural and foundation damage and slope failure. Because of its proximity, the Calaveras Fault is the primary contributor to the ground motions that would be experienced in the project area. The Hayward and San Andreas Faults could also contribute to the ground motions because of their proximity to the project area and because the Hayward and San Andreas Faults can generate large-sized (greater than magnitude 7) earthquakes.

**TABLE 5.15-3**
**SUMMARY OF PROBABILISTIC PEAK GROUND ACCELERATIONS**

| Return Period (years) | Percent probabilities of Exceedance in 50 years | Peak Ground Acceleration (g)[a] | |
|---|---|---|---|
| | | Rock Site Conditions | Soil Site Conditions |
| 475 | 10 | 0.72 | 0.78 |
| 975 | 5 | 0.90 | 0.96 |
| 2,475 | 2 | 1.16 | 1.21 |

[a] The values presented in the table represent the fraction of the acceleration due to gravity that would be expected to occur within the project area for the given return period.

SOURCE: URS Corporation, Geotechnical Report, San Antonio Backup Pipeline Replacement Project. August 18, 2009.

### *Liquefaction*

Liquefaction is a phenomenon in which saturated granular sediments (those below the water table) temporarily lose their shear strength during periods of earthquake-induced strong groundshaking. The susceptibility of a site to liquefaction is a function of the depth, density, and water content of the granular sediments and the magnitude of earthquakes likely to affect the site. Saturated, unconsolidated silts, sands, silty sands, and gravels within 50 feet of the ground surface are most susceptible to liquefaction. Liquefaction-related phenomena include vertical settlement from densification, lateral spreading, ground oscillation, flow failures, loss of bearing strength, subsidence, and buoyancy effects.

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[34] 1 g = 980 centimeters per second squared and is a rate of increase in speed equivalent to a car traveling 328 feet from rest in 4.5 seconds.

[35] URS Corporation, 2009. *Geotechnical Report for the San Antonio Backup Pipeline Replacement Project*. February 25, 2009.

The USGS has mapped the Pleistocene-age alluvial materials in the Sunol Valley (*Qpa*) as having a low liquefaction potential, Holocene-age alluvial materials (*Qt* and *Qha*) and gravel quarry deposits (*gq*) as having a moderate liquefaction potential, and the modern stream channel deposits associated with Calaveras and San Antonio Creeks (*Qhc*) as having a very high liquefaction potential.[36] The USGS estimates that about two percent of future liquefaction effects would occur within geologic units assigned a low liquefaction potential; 20 to 30 percent of future liquefaction effects would occur within geologic units assigned a moderate liquefaction potential; and 20 to 30 percent of future liquefaction effects would occur within geologic units assigned a very high liquefaction potential.

The USGS maps liquefaction susceptibility based on the general characteristics of the geologic formations in the region. However, the geotechnical evaluation prepared for the ACRP indicates that the overall potential for liquefaction within the project area is low.[37]

### *Lateral Spreading*

Of the liquefaction hazards, lateral spreading generally causes the most damage. This phenomenon occurs when large blocks of intact, non-liquefied soil move downslope on a liquefied substrate of large areal extent.[38] The mass moves toward an unconfined area, such as a descending slope or stream-cut bluff, and this movement can occur on slope gradients as gentle as 0.3 percent. Drainages and swales between hill slopes are generally filled by unconsolidated alluvium, colluvium,[39] landslide debris, and slope wash and can experience lateral spreading. The potential for lateral spreading in the project vicinity is low.[40]

### *Earthquake-Induced Settlement*

Compaction settlement, or cyclic densification, occurs when loose, granular soils above the water table increase in density due to earthquake-induced seismic shaking. Settlement can result from the relatively rapid rearrangement, compaction, and settling of dry subsurface materials above the water table (particularly loose, non-compacted, and variable sandy sediments). Settlement can occur both uniformly and differentially (i.e., where adjoining areas settle at different rates). Areas are susceptible to differential settlement if underlain by compressible sediments such as poorly engineered artificial fill or bay mud. The ACRP Final Geotechnical Evaluation indicates that ground

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[36] U.S. Geological Survey (USGS), 2006. *Maps of Quaternary Deposits and Liquefaction Susceptibility in the Central San Francisco Bay Region, California. Liquefaction Susceptibility. Geology by Robert C. Witter, Keith L. Knudsen, Janet M. Sowers, Carl M. Wentworth, Richard D. Koehler, and Carolyn E. Randolph. Digital Database by Carl M. Wentworth, Suzanna K. Brooks, and Kathleen D. Gans. Open File Report 06-1037*. 2006.

[37] T&R/RYGC, 2014. *Geotechnical Evaluation for the Alameda Creek Recapture Project, Sunol California, SFPUC Project No. CUW 352.01.* December 23, 2014.

[38] Youd, T.L., and D.M. Perkins, 1978. *"Mapping Liquefaction Induced Ground Failure Potential," Proceedings of the American Society of Civil Engineers, Journal of the Geotechnical Engineering Division.* 1978.

[39] Loose material deposited at the base of a slope, mainly by gravity.

[40] T&R/RYGC, 2014. *Geotechnical Evaluation for the Alameda Creek Recapture Project, Sunol California, SFPUC Project No. CUW 352.01.* December 23, 2014.

settlement resulting from differential compaction (also referred to as cyclic densification) would be small (i.e., less than ¼ inch).[41]

### *Seismic Slope Instability and Ground Cracking*

Earthquake motions can also induce substantial stresses in slopes, causing earthquake induced landslides or ground cracking when the slope fails. Earthquake induced landslides can occur in areas with steep slopes that are susceptible to strong ground motion during an earthquake. The 1989 Loma Prieta earthquake triggered thousands of landslides over an area of 770 square miles.

The California Geological Survey (CGS) develops inventory maps of earthquake-induced landslide zones as part of the Landslide Inventory Map Series. Earthquake-induced landslide zones have not been mapped for the project area. However, with the exception of the quarry pits located in the project area (Pits F2, F3-East, and F3-West), the project area is relatively flat. Further, USGS landslide distribution mapping indicates little or no potential for landslides in the immediate project vicinity, including the quarry pits.[42] Therefore, the potential for earthquake induced landslides or ground cracking to occur in the project area is low.

## 5.15.2 Regulatory Framework

### 5.15.2.1 Federal Regulations

No federal regulations related to geology and soils are applicable to the proposed project.

### 5.15.2.2 State Regulations

There are two state laws that regulate the construction of structures intended for human habitation in seismic zones, the Alquist-Priolo Earthquake Fault Zoning Act, and the Seismic Hazards Mapping Act. The project improvements would be located within the Alquist-Priolo Earthquake Fault Zone for the Calaveras Fault (indicated as the Calaveras Fault Rupture Zone on Figure 5.15-1). However, neither of these laws are applicable to the proposed project because it does not include any structures that meet the criterion for human occupancy.

### *Building Code*

The California Building Code (CBC), which is codified in CCR Title 24, Part 2, was promulgated to safeguard the public health, safety, and general welfare by establishing minimum standards related to structural strength, egress facilities, and general building stability. The purpose of the CBC is to regulate and control the design, construction, quality of materials, use/occupancy, location, and maintenance of all buildings and structures within its jurisdiction.

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[41] T&R/RYGC, 2014. *Geotechnical Evaluation for the Alameda Creek Recapture Project, Sunol California, SFPUC Project No. CUW 352.01.* December 23, 2014.

[42] U.S. Geological Survey (USGS), 1997. *Summary Distribution of Slides and Earth Flows in the San Francisco Bay Region, California, GIS database for Open File Report 97 745 Part C, by C.M. Wentworth, S.E. Graham, R.J. Pike, G.S. Beukelman, D.W. Ramsey, and A.D. Barron.* 1997.

The 2013 CBC is based on the 2009 International Building Code. In addition, the CBC contains necessary California amendments that are based on the American Society of Civil Engineers (ASCE) Minimum Design Standards 7-05. ASCE 7-05 provides requirements for general structural design and includes means for determining earthquake loads as well as other loads (flood, snow, wind, etc.) for inclusion in building codes. The provisions of the CBC apply to the construction, alteration, movement, replacement, and demolition of every building or structure or any appurtenances connected or attached to such buildings or structures throughout California, and the SFPUC uses the CBC for the design, construction, and maintenance of all its projects.

The earthquake design requirements take into account the occupancy category of the structure, site class, soil classifications, and various seismic coefficients, all of which are used to determine a Seismic Design Category (SDC) for a project. The SDC is a classification system that combines the occupancy categories with the level of expected ground motions at the site, and ranges from SDC A (very small seismic vulnerability) to SDC E/F (very high seismic vulnerability and near a major fault). Design specifications are then determined according to the SDC.

Construction of the aboveground facilities (i.e., pumps, floating barges, electrical control building, electric transformer, power poles) proposed under the ACRP project would be subject to the applicable provisions of the CBC.

Other components of the project would not be subject to the CBC, such as (mooring system, pipelines, throttle valve and flow meter). The Building Seismic Safety Council (BSSC) acknowledges that structures that require special considerations, such as hydraulic structures, buried utility lines, and their appurtenances, are not typical structures regulated by the CBC.[43] These types of structures require technical considerations beyond the scope of the CBC. Industry design criteria such as those published by the American Water Works Association identify standards for design and installation of steel pipe as well as pipe welding and flanges;[44] the American Society of Mechanical Engineers[45]and the American Welding Society[46] publishes standards for structural welding.

### *Public Resources Code (PRC)*

Section 5097.5 of the PRC prohibits "knowing and willful" excavation, removal, destruction, injury, and defacement of any paleontological feature on public lands (lands under state, county, city, district, or public authority jurisdiction, or the jurisdiction of a public corporation), except where the agency with jurisdiction has granted express permission.

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[43] Building Seismic Safety Council of the National Institute of Building Sciences (BSSC), 2009. *NEHRP Recommended Seismic Provisions for New Buildings and Other Structures (FEMA P-750).* 2009 Edition.

[44] American Water Works Association (AWWA), 2004. *Steel Pipe-A Guide for Design and Installation AWWA Manual M11 Fourth Edition.* 2004.

[45] American Society of Mechanical Engineers (ASME), 2016. *STP-NU-078 - 2016 Comparison Report on Welding Qualification and Welding Quality Assurance.* 2016.

[46] America Welding Society (AWS), 2016. *Welding Handbook Ninth Edition, Volumes 1 to 4.*

### 5.15.2.3 Local Policies

#### *Alameda Watershed Management Plan*

The *Alameda Watershed Management Plan* (Alameda WMP) provides a policy framework that allows the SFPUC to make consistent decisions about the activities, practices, and procedures that are appropriate on SFPUC-owned Alameda watershed lands, in which the ACRP would be located. A number of policies are intended to reduce risks from geologic and seismic hazards, including:

- ***Policy S4*****:** Minimize damage from future seismic hazards by avoiding construction of facilities in active fault zones and traces, where feasible.
- ***Policy S5*****:** Minimize damage from potential mass movement hazards by avoiding construction or other disturbances in known dormant landslides and on slopes greater than 30 percent, without proper engineering.
- ***Policy S6*****:** Conduct (for City-owned) and require (for easements) inspection of facilities and utilities near active landslide areas and fault traces following earthquakes and slope failures to assess their stability and integrity, and complete repairs or further monitoring as needed to prevent geohazards.
- ***Policy S7*****:** Require adequate seismic and static geohazards engineering studies for proposed facilities, infrastructure, and utilities easements within the watershed.
- ***Policy S8*****:** Require that utility pipelines within the watershed meet current seismic standards and comply with applicable hazardous materials regulations.

As described in Chapter 4, Plans and Policies, as part of implementation of the Alameda WMP, the SFPUC reviews all plans, projects, and activities that occur within the Alameda watershed for conformity with the management plan and for compliance with environmental codes and regulations. To accomplish this, the SFPUC has established a project review team with members from various SFPUC departments as well as the City Attorney's office. Appropriate SFPUC personnel review proposals for new facilities, structures, roads, trails, projects, and leases or for improvements to existing facilities. Projects subject to this review include those that involve construction, digging or earthmoving, clearing, installation, use of hazardous materials, or other disturbance to watershed resources.

## 5.15.3 Impacts and Mitigation Measures

### 5.15.3.1 Significance Criteria

The proposed project would have a significant impact related to geology and soils if the project were to:

- Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:

  - Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the state geologist for the area or based on other substantial evidence of a known fault (refer to Division of Mines and Geology Special Publication 42),
  - Strong seismic groundshaking,
  - Seismic-related ground failure, including liquefaction, or
  - Landslides;
- Result in substantial soil erosion or the loss of topsoil;
- Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in an onsite or offsite landslide, lateral spreading, subsidence, liquefaction, or collapse;
- Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code, creating substantial risks to life or property;
- Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater;
- Change substantially the topography or any unique geologic or physical features of the site; or
- Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature.

### 5.15.3.2 Approach to Analysis

Based on the findings of the *California Building Industry Association (CBIA) v. Bay Area Air Quality Management District (BAAQMD)* 62 Cal.4th 369 (2015), this approach to analyzing impacts determines if the proposed project would substantially exacerbate any existing environmental hazards or conditions, and then evaluates the potential for such exacerbated hazards to affect future residents or users associated with the proposed project. The analysis does not consider the effects of existing environmental conditions on the project's future users or residents. In these specific instances, it is the project's impact on the environment, and not the environment's impact on the project, that compels an evaluation of how future residents or users could be affected by exacerbated conditions.[47]

Due to the nature of the proposed project, there would be no impacts related to the following criteria; therefore, no impact discussion is provided for these topics for the reasons described below:

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[47] Special CEQA exceptions, such as those in Pub. Res. Code Sections 21096, 21151.8, 21155.1 and 21159.22-21159.24 that apply to certain airport, school, and housing construction projects, may require agencies to evaluate a project site's environmental conditions regardless of whether the project risks exacerbate existing conditions. That these exceptions exist, however, does not alter the Supreme Court’s finding that CEQA’s general rule requires consideration only of a project's impact on the environment, not the environment's impact on project users or residents.

- ***Have Soils Incapable of Supporting the Use of Septic Tanks or Alternative Wastewater Disposal Systems.*** Construction and operation of the proposed project would not result in the disposal of wastewater via infiltration to soils. Therefore, the significance criterion related to the capacity of soils in the project area to support septic tanks or alternative wastewater disposal systems is not applicable to construction or operation of the proposed project and is not discussed further.

- ***Expose People or Structures to Risk of Loss, Injury, or Death Involving Rupture of a Known Earthquake Fault, Seismic Groundshaking, Seismic-Related Ground Failure, or Landslides During Project Construction.*** This significance criterion is intended to address facility siting and design impacts and does not apply to temporary construction impacts. Therefore, this significance criterion is not applicable to project construction activities and is only discussed below as it relates to long-term operational impacts related to siting and design.

- ***Be Located on an Expansive Soil, Creating Substantial Risks to Life or Property During Project Construction.*** This significance criterion is intended to address facility siting and design impacts and does not apply to temporary construction impacts. Therefore, this significance criterion is not applicable to project construction activities and is only discussed below as it relates to long-term operational impacts related to siting and design.

- ***Substantially Change the Topography or Any Unique Geologic or Physical Features of the Site During Project Construction.*** Like the two significance criteria above, this criterion is intended to address facility siting and design impacts and does not apply to temporary construction impacts. Therefore, this significance criterion is not applicable to project construction activities and is only discussed below as it relates to long-term operational impacts related to siting and design.

### *Seismic Hazards and Other Geologic Conditions*

The SFPUC would incorporate applicable seismic criteria and procedures provided in the International Building Code, CBC, and Uniform Building Code (described above in Section 5.15.2.2, State Regulations) into the design of the project. Therefore, impacts related to seismic hazards, including ground motions generated by earthquakes (groundshaking), seismic-related ground failure (liquefaction and settlement), and landslides, would generally be less than significant, as discussed below. These design requirements specify that the project proponent must comply with the design criteria in the project-specific geological investigation to address site-specific geologic and seismic hazards. The SFPUC would adhere to the requirements of the CBC, which is the governing building code in the State of California. Furthermore, consistent with the SFPUC standard construction measures and practices, (see Project Description, Section 3.5.9.2) the SFPUC would implement the recommendations made in the project-specific ACRP Final Geotechnical Evaluation. For other impact topics (landsliding, soil erosion, loss of topsoil, expansive and corrosive soils, and alteration of topography), the section below evaluates the potential for significant effects based on the site-specific geologic conditions and the proposed project improvements.

### *Paleontological Resources*

For this analysis, "unique paleontological resource" is deemed to include resources that qualify as significant under SVP criteria (see Section 5.15.1.3, above). Potential project effects on paleontological resources could occur only during the construction period; project operation and maintenance activities would not involve ground excavation or subsurface disturbance and thus would not affect paleontological resources.

### *Baseline Conditions*

As described in Section 5.1.2 regarding baseline conditions for evaluation of project impacts, construction-related impacts in this section are were evaluated against the existing conditions. The current construction schedule for the proposed project is from fall 2017 to spring 2019 (18 months), and construction of the Calaveras Dam Replacement Project (CDRP) is also anticipated to be completed in spring 2019. It is possible that operation of the CDRP will commence prior to completion of ACRP construction, and that with-CDRP conditions could occur while ACRP is still under construction. However, operation of the CDRP is not expected to change any of the baseline geology and soils conditions analyzed in this section. Therefore, no change in approach to the impact analysis is necessary to account for the with-CDRP conditions. More specifically, the construction-related impacts of the ACRP presented in this section would be the same regardless of the implementation of bypass flows at the Alameda Creek Diversion Dam and instream flow releases from Calaveras Reservoir and all other aspects of CDRP operations that characterize the with-CDRP conditions.

## 5.15.3.3 Construction Impacts and Mitigation Measures

**Impact GE-1: The project would not be located on a geologic unit that could become unstable as a result of project construction. (Less than Significant)**

This impact addresses the potential for project construction to cause slope instability in the sidewalls of Pit F2 and along the earthen berm containing the Department of Water Resources (DWR) South Bay Aqueduct.

Natural or constructed slopes can become destabilized during construction-related excavation and/or grading operations. Although the majority of the project area is relatively flat and is classified as "flatland" in USGS landslide maps,[48] project construction could destabilize the sidewalls of Pit F2.

The mooring anchors for the floating barges and HDPE pipeline would require the installation of six drilled pier anchors at the crest of Pit F2. These piers would require excavations of approximately 2.5 feet wide and 30 feet deep at the edge of the quarry pit slope. Approximately

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[48] U.S. Geological Survey (USGS), 1997. *Summary Distribution of Slides and Earth Flows in the San Francisco Bay Region, California, GIS database for Open File Report 97 745 Part C, by C.M. Wentworth, S.E. Graham, R.J. Pike, G.S. Beukelman, D.W. Ramsey, and A.D. Barron*. 1997.

80 feet of the HDPE discharge pipelines would require excavation of approximately 3 feet wide by 7 feet deep, where it would transition from aboveground to underground near the crest of Pit F2. Without proper precautions, the excavations for installation of the piers for the mooring anchors and the HDPE discharge pipelines could destabilize the adjacent slope of Pit F2.

As described in Chapter 3, Project Description, the construction contractor(s) would implement the recommendations made in the ACRP Final Geotechnical Evaluation, which is consistent with the SFPUC standard construction measures and practices, further described below. The geotechnical report determined that, under static conditions, the slopes in Pit F2 are stable. However, where temporary cut slopes are needed to facilitate construction of the below-grade structures, the geotechnical report recommends that the construction contractor slope the sides of the excavation in accordance with the Occupational Safety and Health Administration (OSHA) standards (29 CFR Part 1926). Where space permits, the geotechnical report recommends that the construction contractor slope the sides of excavations above groundwater and less than 20 feet in depth. To prevent sloughing of surficial soils, temporary construction slopes should not exceed inclinations greater than 1.5:1.[49] With implementation of the recommendations in the geotechnical report, impacts related to slope instability during construction of the mooring anchors and HDPE pipelines would be less than significant. In addition, the construction contractors would also adhere to the SFPUC standard construction measures that are implemented as part of the execution of every SFPUC project, including those for seismic and geotechnical considerations (see Section 3.5.9.2 in Chapter 3, Project Description). The SFPUC requires that all projects prepare a characterization of the soil types and potential for liquefaction, subsidence, landslide, fault displacement, and other geological hazards at the project site and that the projects will be engineered and designed as necessary to minimize risks to safety and reliability due to such hazards.[50]. Furthermore, as described in Chapter 4, Plans and Policies, the SFPUC reviews all plans, project and activities that occur with the Alameda watershed for conformity with the Alameda WMP. This SFPUC standard practice would apply to the ACRP, and specifically, as part of the proposed project, the SFPUC would review the project construction for consistency with the WMP policies related to geologic and seismic hazards described in Section 5.15.2.3 above to ensure that the project is engineered and designed to minimize risks to safety and reliability due to such hazards.

As described in Section 3.5.9.1 in Chapter 3, Project Description, it is anticipated that construction workers would encounter water in construction excavations for the drilled piers and pipeline trenches. If lowering the water level in Pit F2 is necessary to facilitate construction in open excavations, the construction contractor would implement the recommendations made in the Final Geotechnical Evaluation Report regarding acceptable drawdown rates to address the potential for slope instability in the quarry pit walls.[51] If needed, the construction contractor would lower the water levels in accordance with the drawdown rates specified in the

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[49] T&R/RYGC, 2014. *Geotechnical Evaluation for the Alameda Creek Recapture Project, Sunol California, SFPUC Project No. CUW 352.01.* December 23, 2014.

[50] SFPUC, 2015. *SFPUC Standard Construction Measures*. July 1, 2015.

[51] T&R/RYGC, 2014. *Geotechnical Evaluation for the Alameda Creek Recapture Project, Sunol California, SFPUC Project No. CUW 352.01.* December 23, 2014.

geotechnical report. Therefore, impacts related to slope instability during construction-related drawdown of Pit F2 water elevations would be less than significant.

The DWR South Bay Aqueduct runs east-to-west between Pits F2 and Pits F3-East and F3-West. The South Bay Aqueduct consists of an 84-inch-diameter concrete pipeline that is buried along the approximate centerline of an approximately 60-foot-wide easement. The top of the 84-inch-diameter pipeline is at a depth of about eight feet below the existing ground surface.[52] The proposed project would require encroaching on the DWR easement to install the 100-foot-long pipeline connection to the existing Sunol Pump Station Pipeline. DWR requires all pipe crossings be performed using the jack-and-bore tunneling method. The ACRP Final Geotechnical Evaluation Report confirmed that, based on the subsurface conditions at the site, jack-and-bore tunneling methods would be an acceptable means of crossing the South Bay Aqueduct and would not result in slope instability or affect the integrity of the South Bay Aqueduct. Therefore, with implementation of the recommendations in the ACRP geotechnical report, the potential for project construction to destabilize the berm surrounding the South Bay Aqueduct is a less-than-significant impact.

Excavation and earthwork for all other project components would be set back between 50 to 100 feet from the edge of the slopes in Pit F2 and would not encroach on the DWR easement for the South Bay Aqueduct. Excavation for these components would not create unstable slopes. Thus, impacts related to slope instability during construction of all project components would be less than significant.

**Mitigation:** None required.

**Impact GE-2: Project construction would not result in substantial soil erosion or loss of topsoil. (Less than Significant)**

### *Soil Erosion*

During construction, vegetation and groundcover that serve to stabilize site soils would be removed from portions of the project area. Excavation, backfilling, grading, and other earthwork during construction would increase the potential for wind- and water-borne soil erosion. In compliance with the NPDES General Permit for Storm Water Discharges Associated with Construction Activity, the SFPUC or its contractor(s) would be required to submit a Notice of Intent (NOI) to the State Water Resources Control Board (SWRCB) Division of Water Quality, develop a SWPPP, and implement site-specific Best Management Practices (BMPs) during, and upon completion of, construction activities. In addition to protecting water quality, the BMPs are intended to stabilize soils and minimize soil erosion. The San Francisco Bay Regional Water Quality Control Board (RWQCB) would review the SWPPP to ensure compliance with the

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[52] T&R/RYGC. 2014. *Geotechnical Evaluation for the Alameda Creek Recapture Project, Sunol California, SFPUC Project No. CUW 352.01.* December 23, 2014.

construction general permit. (For additional information regarding the construction general permit requirements see Section 5.16, Hydrology and Water Quality). Mandatory adherence to the construction general permit requirements would prevent substantial short-term and long-term soil erosion and loss of topsoil from areas disturbed during construction. Therefore, compliance with the NPDES Construction General permit and the implementation of its requirements would ensure that the impact related to increased soil erosion and loss of topsoil during construction would be less than significant.

**Mitigation:** None required.

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**Impact GE-3: Project construction could result in a substantial adverse effect by directly or indirectly destroying a unique paleontological resource or site or unique geologic feature. (Less than Significant with Mitigation)**

The project area is underlain by Holocene deposits, including stream channel deposits, younger alluvium, and artificial fill. Older alluvium is present in the project vicinity and may underlie the younger alluvium at shallow depths. No paleontological resources are known to exist within the project area, but such resources have been found in the Sunol Valley and in the Alameda Creek watershed. Fossils are typically a buried resource, and impacts on them are therefore determined based on the probability or potential that fossils may be present within a rock unit. **Table 5.15-4** summarizes the geologic units in the project area, their paleontological potential, and their potential to be disturbed by project construction activity.

**TABLE 5.15-4**
**POTENTIAL TO DISTURB SIGNIFICANT PALEONTOLOGICAL RESOURCES**

| Geologic Unit | Paleontological Potential | Project Components that Could Disturb the Geologic Unit | Potential to Disturb Significant Paleontological Resource? |
|---|---|---|---|
| Holocene Deposits (Modern Stream Channel Deposits - *Qhsc*, Alluvial Fan Deposits - *Qha*, Stream Terrace Deposits - *Qt*) | Low | All components that involve trenching and excavation | No |
| Pliocene- to Pleistocene-Age Deposits (Older Alluvium - *Qpa*, Stream Terrace Deposits – *Qt*, and Livermore Gravels - *QTl*) | High | Mooring anchors for floating barges | Yes |

Holocene deposits in the project area includes active stream channels, alluvial fans, and young stream terrace deposits. These geologic units form the flat base of the Sunol Valley and directly underlie the entire area to be disturbed by the proposed project. All project-related earthmoving activities are likely to disturb Holocene deposits; however, this unit has a low paleontological potential. Therefore, it is unlikely that construction within this geologic unit would disturb or destroy a unique or significant paleontological resource.

Pliocene- to Pleistocene-age alluvium (older alluvium) and Livermore Gravels have been mapped along the outer margins of the Alameda Creek drainage east of Calaveras Road and west of Alameda Creek.[53] Because the Holocene deposits thin out toward valley margins, in some portions of the project area the older alluvium in the project area may occur at relatively shallow depths. Soil borings conducted in the vicinity of Pit F3-East did not distinguish between the younger and older alluvium.[54] Along the Alameda Creek corridor, the older alluvium and Livermore Gravels have been found at variable depths ranging from 15 to 20 feet below the surface.[55] In the absence of site-specific stratigraphic information demonstrating otherwise, it is assumed that the older alluvium could be encountered in excavations greater than 10 feet in depth. Any project component involving excavations beyond this depth could result in disturbance of older alluvium and possibly the Livermore Gravels.

Of the proposed project components that would involve subsurface excavation during construction, only the four mooring pier anchors for the floating barges would require excavations that could potentially penetrate the older alluvium and Livermore Gravels. Because these Pliocene- to Pleistocene-age deposits have a high paleontological potential, disturbance or destruction of a unique paleontological resource could occur if these units are encountered during drilling activities associated with the mooring pier anchors. The construction-related impact on paleontological resources is considered potentially significant. However, implementation of **Mitigation Measure M-GE-3, Accidental Discovery of Paleontological Resources,** would reduce the impact on paleontological resources to a less-than-significant level. Implementation of Mitigation Measure M-GE-3 would address the proposed project's construction-related impacts on paleontological resources by requiring adherence to appropriate protocols for assessing and salvaging any potential fossil finds. Therefore, this impact would be less than significant with mitigation.

**Mitigation Measure M-GE-3: Accidental Discovery of Paleontological Resources.**

If construction workers discover potential fossils, all earthwork associated with the mooring piers shall stop immediately until a qualified professional paleontologist can assess the nature and importance of the find. Based on the scientific value or uniqueness of the find, the paleontologist may record the find and allow work to continue, or recommend salvage and recovery of the fossil. The paleontologist may also propose modifications to the stop-work radius based on the nature of the find, site geology, and the activities occurring on the site. Recommendations for any necessary treatment shall be consistent with the SVP 1995 Guidelines and currently accepted scientific practices. If required, treatment for fossil remains may include preparation and recovery of fossil materials so that they can be housed in an appropriate museum or university collection, and may also include preparation and publication of a report describing the finds. The paleontologist's recommendations shall be

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[53] Helley E.J., and Graymer R.W., *Quaternary Geology of Alameda County, and Parts of Contra Costa, Santa Clara, San Mateo, San Francisco, Stanislaus, and San Joaquin Counties, California: a Digital Database*. U.S. Geological Survey Open File Report 97-97. 1997.

[54] URS Corporation, *Geotechnical Report for the San Antonio Backup Pipeline Replacement Project*. August 18, 2009.

[55] URS Corporation, *Final Conceptual Engineering Report for the Upper Alameda Creek Filter Gallery Project.* Prepared for San Francisco Public Utilities Commission. June 30, 2010.

subject to review and approval by the ERO or designee. The SFPUC shall be responsible for ensuring that treatment is implemented and reported to the San Francisco Planning Department. If no report is required, the SFPUC shall nonetheless ensure that information on the nature, location, and depth of all finds is readily available to the scientific community through university curation or other appropriate means.

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## 5.15.3.4 Operational Impacts and Mitigation Measures

**Impact GE-4: The project would not be located on a geologic unit that could become unstable as a result of project operations. (Less than Significant)**

During ACRP operations, Pit F2 water elevations would generally range from 240 to 150 feet above mean sea level (msl). In extreme drought conditions, however, Pit F2 water elevations could be lowered from 150 to 100 feet. When the water elevation in Pit F2 is drawn down rapidly, a combination of seepage forces and asymmetrical groundwater loading is experienced by the slopes, resulting in a reduction of the factor of safety against the stability of the slopes. The ACRP Final Geotechnical Evaluation determined that if the extreme operating condition (drawdown from 150 feet to 100 feet) is performed immediately following the normal operating condition, the side slopes of Pit F2 may become unstable. Slope instability could damage the proposed facilities that would be located immediately adjacent to Pit F2 (i.e., electrical control building, electrical transformer). However, the SFPUC would comply with the requirements of the CBC, which is the governing building code in the State of California, and all ACRP structures need to comply with the most recent CBC. In addition, and the SFPUC would also implement the recommendations made in the ACRP Final Geotechnical Evaluation during construction of the proposed facilities that would be located immediately adjacent to Pit F2. The ACRP Final Geotechnical Evaluation recommends a staged drawdown to limit the potential for deep-seated slope instability of the quarry pit slope during the extreme pumping operation. As described in Chapter 3, Project Description, Section 3.6.1.2, below 150 feet above msl, the maximum rate of drawdown would be reduced from 30 cfs to about 5 cfs (about 3 inches per day or slower) to reduce the potential for deep-seated slope instability on the side slopes of Pit F2. This reduction in rate of drawdown between elevations 150 to 100 feet would be implemented immediately following the drawdown to elevation 150 feet. Pit F2 could be drawn down at a rate of 6 inches per day (or slower) below 150 feet, provided that the drawdown is first held at elevation 150 feet for at least 110 days. The SFPUC facility operators would use the drawdown rates recommended in the final geotechnical evaluation for ACRP. Therefore, the impact related to instability of a geologic feature during project operations would be less than significant.

**Mitigation:** None required.

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### Impact GE-5: Project operations would not result in substantial soil erosion or loss of topsoil. (Less than Significant)

Newly constructed and compacted engineered slopes can undergo substantial erosion through dispersed sheet-flow runoff. More concentrated runoff can cause the formation of small erosional channels and larger gullies, each compromising the integrity of the slope and potentially resulting in substantial soil loss. A portion of the excess spoils generated during construction of the proposed project would be permanently placed in existing earthen berms at either the Permanent Spoils Site A or Permanent Spoils Site B(see Figure 3-3 in Chapter 3, Project Description). Permanent Spoils Site A encompasses approximately 3.4 acres and is located south of I-680, adjacent to the west side of Calaveras Road, and Permanent Spoils Site B encompasses approximately 5.5 acres immediately east of Pit F3-East and west of Calaveras Road. These sites were used for the permanent placement of spoils generated by other SFPUC facility improvement projects in the Sunol Valley, including the San Antonio Backup Pipeline project, Alameda Siphons Seismic Reliability Upgrade project, and New Irvington Tunnel project. The addition of construction spoils from the ACRP to the berms would involve alteration of a slope. As described in Chapter 3, Project Description, Section 3.5.2, Spoils Management and Disposal, the berms would be maintained with 2:1 (horizontal:vertical) slopes and a maximum heights of 20 and 25 feet for the Permanent Spoils Site A and Permanent Spoils Site B, respectively. Further, the berm at Permanent Spoils Site A would be set back 20 feet from Calaveras Road. At both sites, the spoils would be lightly compacted and revegetated to stabilize the newly placed spoils and protect the berms from erosion. As described above under Impact GE-2, site-specific Best Management Practices (BMPs) during, and upon completion of, construction activities would be implemented as part of the construction general permit requirements, including stabilization and revegetatation of disturbed areas as soon as possible after construction by planting, seeding, and/or using mulch (e.g., straw or hay, erosion control blankets, hydromulch, or other similar material). The BMPs would stabilize soils and minimize soil erosion (For additional information regarding these requirements see Section 5.16, Hydrology and Water Quality). Mandatory adherence to the construction general permit requirements would prevent substantial short-term and long-term soil erosion and loss of topsoil. In addition, the ACRP Final Geotechnical Evaluation Report recommended that soils be compacted to at least 90 percent relative compaction.[56] Thus, with the specified slope characteristics and revegetation of areas disturbed during spoils placement, the impact related to the long-term erosion of the berms would be less than significant.

**Mitigation:** None required.

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[56] Relative compaction refers to the in-place dry density of soil expressed as a percentage of the maximum dry density of the same material, as determined by the ASTM D1557-07 laboratory compaction procedure.

**Impact GE-6: The project would not expose people or structures to substantial adverse effects related to the risk of property loss, injury, or death due to rupture of a known earthquake fault. (Less than Significant)**

A portion of the ACRP project area is within an Earthquake Fault Zone, as defined by the Alquist-Priolo Earthquake Fault Zoning Act. The Calaveras Fault, the nearest fault to the project area, roughly runs along Calaveras Road, approximately 0.2 miles (1,000 feet) to the east of the project area. While Pit F2 is not within the Earthquake Fault Zone, and the project is not subject to the Alquist-Priolo Earthquake Fault Zoning Act because it contains no structures intended for human habitation, some of the project components (namely, overhead powerlines) would be located within the earthquake fault hazard zone for the Calaveras Fault, as shown on Figure 5.15-1. The proposed pumping and associated operation of the proposed project would not alter the seismic environment or increase the risk of fault rupture. Implementation of the project would not cause or worsen rupture of a known earthquake fault; therefore, there would be no change in the exposure of people or structures to risk of loss, injury, or death from fault rupture compared to the existing conditions.

For the reasons described above, the impacts to people and structures related to the risk of property loss, injury, or death from fault rupture associated with project operations would be less than significant.

**Mitigation:** None required.

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**Impact GE-7: The project would not expose people or structures to substantial adverse effects related to the risk of property loss, injury, or death due to seismically-induced groundshaking. (Less than Significant)**

Groundshaking is the most widespread effect of earthquakes. Depending on the level of groundshaking, an earthquake on the Calaveras Fault or one of the regional faults could damage the proposed facilities. As stated above in Section 5.15.1.5 and shown in Table 5.15-3, the project area could experience peak ground accelerations of 72 to 121 percent of gravity (0.72 g to 1.21 g). All of the peak ground accelerations are greater than 0.70 g, which would result in very strong groundshaking that could cause widespread damage to the proposed project components, including pipelines. As described above, the proposed pumping and associated operation of the proposed project would not alter the seismic environment or affect the risk of seismically-induce groundshaking. Implementation of the project would not cause or worsen seismically-induced groundshaking; therefore, there would be no change regarding the exposure of people or structures to substantial adverse effects related to the risk of property loss, injury, or death due to seismically-induced groundshaking compared to existing conditions.

Further, all of the aboveground project improvements are designed per the recommendations of the ACRP Final Geotechnical Evaluation Report and comply with the seismic design provisions of 2013 California Building Code (CBC). In the event that seismic groundshaking were to damage the proposed facilities, it is unlikely that human lives would be put at risk because the project would not construct habitable structures, and because the proposed facilities would typically be operated remotely. There is no private property in the immediate project vicinity that could be jeopardized by seismically-induced damage to the proposed facilities. Because the proposed facilities would be designed to comply with current seismic standards, and damage to the facilities would expose few people, if any, to adverse effects, the impact to people and structures from seismically-induced groundshaking would be less than significant.

**Mitigation:** None required.

**Impact GE-8: The project would not expose people or structures to substantial adverse effects related to the risk of property loss, injury, or death due to seismically-induced ground failure, including liquefaction, lateral spreading, or settlement. (Less than Significant)**

Liquefaction-related phenomena can include lateral spreading, ground oscillation, loss of bearing strength, subsidence, and buoyancy effects, all of which can cause damage to structures. As described in Section 5.15.1.2, above, the USGS has mapped the Pleistocene-age alluvial materials in the project area (*Qpa*) as having a low liquefaction potential, the Holocene-age alluvial materials (*Qt* and *Qha*) and gravel quarry deposits (*gq*) as having a moderate liquefaction potential, and the modern stream channel deposits associated with Calaveras and San Antonio Creeks (*Qhc*) as having a very high liquefaction potential.[57] However, the results of the project-specific field investigations and laboratory testing done as part of the ACRP Final Geotechnical Evaluation Report found that that the overall potential for liquefaction within the project area is low.[58] The geotechnical report also found that the potential for lateral spreading would be low. The proposed pumping and associated operation of the proposed project would not alter the seismic environment or affect the risk of seismically-induce ground failure, including liquefaction, lateral spreading, or settlement. Implementation of the project would not cause or worsen seismically-induced groundshaking; therefore, there would be no change regarding the exposure of people or structures related to the risk of property loss, injury, or death due to seismically-induced ground failure, including liquefaction, lateral spreading, or settlement, compared to existing conditions. Therefore, impacts related to liquefaction and related phenomena would be less than significant.

**Mitigation:** None required.

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[57] U.S. Geological Survey (USGS), 2006. *Maps of Quaternary Deposits and Liquefaction Susceptibility in the Central San Francisco Bay Region, California. Liquefaction Susceptibility. Geology by Robert C. Witter, Keith L. Knudsen, Janet M. Sowers, Carl M. Wentworth, Richard D. Koehler, and Carolyn E. Randolph. Digital Database by Carl M. Wentworth, Suzanna K. Brooks, and Kathleen D. Gans. Open File Report 06-1037.* 2006.

[58] T&R/RYGC, 2014. *Geotechnical Evaluation for the Alameda Creek Recapture Project, Sunol California, SFPUC Project No. CUW 352.01.* December 23, 2014.

**Impact GE-9: The project would not expose people or structures to substantial adverse effects related to the risk of property loss, injury, or death due to seismically-induced landslides or other slope failures. (Less than Significant)**

As described in Section 5.15.1.3, above, the majority of the project area is relatively flat and is located in an area designated by the USGS as “flatland”.[59] However, the existing sidewalls of Pit F2 could become destabilized during strong groundshaking. The proposed pumping and associated operation of the proposed project would not alter the seismic environment or affect the risk of seismically-induce other slope failures at Pit F2. Implementation of the project would not cause or worsen seismically-induced landslides or other slope failures at Pit F2; therefore, there would be no change regarding the exposure of people or structures to substantial adverse effects related to the risk of property loss, injury, or death due to seismically-induced landslides or other slope failures compared to existing conditions.

As described in Chapter 3, Project Description, a portion of the excess spoils generated during construction of the proposed project would be permanently placed in existing earthen berms at either Permanent Spoils Site A or Permanent Spoils Site B. The placement of additional spoils in the berms would have no potential to cause or exacerbate the risk of seismically-induced slope failure. Nevertheless, the placement of construction spoils from the ACRP in the existing berms would be performed in accordance with the original berm designs with limited fill height and modest slopes to minimizes slope instability hazards. The ACRP Final Geotechnical Evaluation Report recommended temporary construction slopes not exceed inclinations greater than 1.5:1 and 20 feet in height.[60] In accordance with these recommendation, the Permanent Spoils Site A berm would be set back 20 feet from Calaveras Road and would be constructed with 2:1 (horizontal:vertical) slopes to a maximum height of 20 feet above ground level. The berm at the Permanent Spoils Site B would be piled to a maximum height of 25 feet and with 2:1 (horizontal:vertical) slopes. At either permanent spoils disposal site, the spoils would be placed and lightly compacted by the equipment used for hauling and spreading, and the berm would be vegetated and protected from erosion. This limited fill height and modest slope inclination are designed to be stable in the event of an earthquake. In addition, the newly-disturbed areas on the berms would be stabilized through revegetation. Thus, the impact related to seismically-induced landslides or other slope failures would be less than significant for all project components, including at the Permanent Spoils Site A and Permanent Spoils Site B.

**Mitigation:** None required.

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[59] U.S. Geological Survey (USGS), 1997. *Summary Distribution of Slides and Earth Flows in the San Francisco Bay Region, California, GIS database for Open File Report 97 745 Part C, by C.M. Wentworth, S.E. Graham, R.J. Pike, G.S. Beukelman, D.W. Ramsey, and A.D. Barron.* 1997.

[60] T&R/RYGC, 2014. *Geotechnical Evaluation for the Alameda Creek Recapture Project, Sunol California, SFPUC Project No. CUW 352.01.* December 23, 2014.

**Impact GE-10: The project would not create substantial risks to life or property due to expansive or corrosive soils. (Less than Significant)**

Problematic soils, such as expansive and corrosive soils, can cause damage to structures and buried utilities and can also increase required maintenance. As described in Section 5.15.1.4 and presented in Table 5.15-2, above, soils in the project area generally exhibit a low to high shrink/swell potential. The proposed project would result in minor modifications to the soils at the project site, associated with site clearing, grading, paving and backfilling, but it would not alter the properties of the soils at the project site. Implementation of the project would not cause or worsen the risks associated with expansive or corrosive soils; therefore, there would be no change regarding substantial risks to life or property due to expansive or corrosive soils compared to existing conditions.

Further, all of the aboveground project improvements would be designed per the recommendations of the ACRP Final Geotechnical Evaluation Report. In the event that expansive soils were to damage the proposed facilities, it is unlikely that human lives would be put at risk because the project would not construct habitable structures, and because the proposed facilities would typically be operated remotely. There is no private property in the immediate project vicinity that could be jeopardized by expansive or corrosive soil damage to the proposed facilities. Because the proposed facilities would be designed to comply with current standards, and damage to the facilities would expose few people, if any, to adverse effects, the impact to people and structures from expansive or corrosive soils would be less than significant.

**Mitigation:** None required.

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**Impact GE-11: The project would not substantially change the topography or any unique geologic or physical features of the project area. (Less than Significant)**

Substantial alteration of topography (defined as changes in the character of the slope and gradient due to grading, excavation, or cut and fill) could result in unstable slopes or increased wind or water erosion due to drainage pattern changes and/or slope changes.

The permanent placement of spoils at the existing Permanent Spoils Site A or Permanent Spoils Site B would alter topography in portions of the project area. Excess spoils generated during construction of other SFPUC projects in the Sunol Valley have previously been placed in earthen berms at the Permanent Spoils Site A and Permanent Spoils Site B, and the estimated 224 cubic yards of excess spoils from ACRP construction would also be placed at one of these two sites. Although the topography of the permanent spoils placement sites would be altered by the berms, impacts related to changes in topography would be less than significant because of the limited fill height, adequate setback from neighboring properties, modest slope inclination, and stabilization of the berms through revegetation, which would limit erosion (as described above in Impact GE-5. Thus, impacts related to changes in topography would be less than significant.

**Mitigation:** None required.

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### 5.15.3.5 Cumulative Impacts and Mitigation Measures

**Impact C-GE: The project, in combination with past, present, and probable future projects, could substantially affect paleontological resources. (Less than Significant with Mitigation)**

#### *Geological Resources*

The geographic scope for potential cumulative geology, soils, and seismicity impacts consists of the project area and immediate vicinity. Such impacts are generally site-specific and depend on the local geology and soil conditions. Past projects, including ongoing mining operations as well as previous SFPUC water supply projects, have modified the topographic and geologic landscape in the project vicinity.

Because of the localized nature of the impacts, the projects listed in **Table 5.1-6** and shown in **Figure 5.1-1** (in Section 5.1, Overview) would not contribute to potential cumulative geology, soils, and seismicity impacts associated with the ACRP, including fault rupture (Impact GE-6), groundshaking (Impact GE-7), liquefaction (Impact GE-8), and expansive or corrosive soils (Impact GE-10). For this reason, and because all the project components would be designed to address seismic hazards and expansive and corrosive soils, cumulative impacts related to these issues would be less than significant.

As described under Impact GE-1 (slope instability during construction) and Impact GE-9 (seismically-induced landslides or other slope failures), installation of the mooring anchors and HDPE pipelines for the ACRP would require excavation within the southern sidewall of Pit F2. Cumulative impacts related to slope stability could occur as a result of multiple excavations in one location and/or at adjacent slopes. Therefore, cumulative slope stability impacts are limited in geographic scope to the immediate project vicinity. Portions of the San Antonio Backup Pipeline Project facilities required excavation within the southern sidewall of Pit F3-East. Like the ACRP, the excavations for the San Antonio Backup Pipeline Project components were designed to prevent slope instability, and thus were appropriately sloped or shored during construction. Because construction-related impacts associated with these facilities would only occur at the time of each project's individual construction schedule, no other cumulative projects are expected to cause slope instability in this area during the ACRP construction period. Therefore, there would be no cumulative impacts associated with instability of a geologic unit.

With mandatory compliance with the construction general permit requirements and preparation of a SWPPP that includes BMPs to control soil erosion during and after construction, the ACRP would have a less-than-significant impact related to soil erosion. All of the cumulative projects listed in Table 5.1-6 could also result in soil erosion during construction. However, since all of the cumulative projects have more than one acre of construction disturbance and, like the ACRP, are subject the construction general permit requirements, there would be no significant cumulative impact associated with soil erosion.

The ACRP and other SFPUC projects in the Sunol Valley would place construction spoils within the earthen berms at the Permanent Spoils Site A and Permanent Spoils Site B, resulting in a cumulative impacts related to long-term soil erosion and substantial alteration of the topography. As discussed above under Impact GE-5, the berms would be lightly compacted and revegetated to protect the new slopes from soil erosion. As discussed under Impact GE-11, because of the limited height of the berms (20 feet and 25 feet), setback from Calaveras Road, and modest slope inclinations, significant impacts related to alteration of the topography would not result. Thus, cumulative impacts associated with alteration of topography and long-term soil erosion from permanent placement of spoils at the Permanent Spoils Site A and Permanent Spoils Site B would be less than significant.

**Mitigation:** None required.

### *Paleontological Resources*

As discussed in Impact GE-3, the proposed project could have a significant impact related to the potential to encounter paleontological resources during excavation within the Pleistocene alluvium and Briones Formation, both of which have a high paleontological potential. Cumulative projects in the proposed project vicinity that involve excavation in the same geologic units include the New Irvington Tunnel, San Antonio Backup Pipeline, SMP-30 Quarry Expansion, and SMP-30 Cutoff Wall and Creek Restoration projects. These cumulative projects could also encounter paleontological resources during construction, which in combination with the ACRP would result in a potentially significant cumulative impact on paleontological resources, and unless mitigated, the proposed project's contribution to this impact would be cumulatively considerable.

As discussed in Impact GE-3, the proposed project's impact on paleontological resources would be site-specific and limited to the project construction areas where the six mooring pier anchors for the floating barge and HDPE pipeline would be constructed, and this impact would be reduced to a less-than-significant level with implementation of **Mitigation Measure M-GE-3 (Accidental Discovery of Paleontological Measures)** (see Impact GE-3, above, for description). This measure requires the SFPUC to provide training to all construction personnel on potential paleontological resources that could be encountered and to ensure proper procedures are followed in the event that potentially significant resources are unearthed. Implementation of this mitigation measure would ensure that any paleontological resources encountered during construction would be recovered and appropriately managed. Implementation of this measure would effectively avoid damage to or loss of resources, and little to no residual impact would remain after mitigation. Therefore, with implementation of Mitigation Measure M-GE-3, the proposed project's contribution to any cumulative impact would not be cumulatively considerable (less than significant with mitigation).

**Mitigation Measure M-GE-3: Accidental Discovery of Paleontological Resources.** (see Impact GE-3, above)

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# 5.16 Hydrology and Water Quality

## 5.16.1 Introduction

This section describes the environmental impacts of the proposed Alameda Creek Recapture Project (ACRP or proposed project) on surface water, groundwater resources, and water quality. The section is divided into four subsections. Following this introduction, Section 5.16.2 characterizes the environmental setting; that is, the hydrologic, geo-hydrologic,[1] and water quality conditions in the Alameda Creek watershed that could potentially be affected by the proposed project. Section 5.16.3 describes the regulatory framework within which the proposed project would be implemented. Section 5.16.4 describes the potential impacts of the ACRP on water resources, including cumulative impacts of the proposed project combined with the impacts of other past, present, and reasonably foreseeable future projects that could affect the same environmental resources. Detailed technical information supporting the surface water and groundwater hydrology analyses are provided in Appendices HYD1 and HYD2, respectively, and this section draws extensively from those appendices.

Section 5.16.2, Environmental Setting, describes conditions in the Alameda Creek watershed at the time of publication of the Notice of Preparation (2015), as well as conditions that will prevail at the time the ACRP would begin to operate. As described in detail in Section 2.3 of Chapter 2 and Section 3.2 of Chapter 3, the ACRP would not begin operating until the Calaveras Dam Replacement Project (CDRP) is completed, and the instream flow schedules that are part of the CDRP are implemented.[2] Consequently, the hydrologic, geo-hydrologic, and water quality conditions that are expected to exist in Alameda Creek when the proposed ACRP is operated will be substantially different from the conditions that exist in 2015. To account for this, Section 5.16.2 includes separate descriptions of conditions in 2015 and conditions that are expected to prevail at the time the proposed project would be operated. The 2015 conditions are referred to in this chapter as the "existing conditions" and the conditions that are expected to prevail at the time the proposed project would be implemented are referred to as the "with-CDRP conditions." A comparison of the attributes of the two conditions is shown in **Table 5.16-1**. The table also shows the attributes of two other scenarios analyzed, pre-2001 and with-project (see Appendix HYD1 for further discussion).

Hydrological data presented in this section include measured data and estimated data. Measured data are based on in-situ stream gage or monitoring well information. Estimated data are based on modeling. To compare flows in Alameda Creek under existing and with-CDRP conditions a mathematical model was needed that can simulate the flows that would occur under the two conditions in a variety of hydrologic circumstances. The mathematical model used to simulate flows was the Alameda System Daily Hydrologic Model (ASDHM). Hydrologic data from Water Year 1996 to Water Year 2013 was used in the simulations to develop the estimated flow data.

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[1] *Geo-hydrology* is the science that deals with the character, source, and mode of occurrence of underground water.

[2] As described in Chapter 2, Introduction and Background, and Chapter 3, Project Description, the instream flow schedules are required by the CDRP's California Department of Fish and Game (CDFG) Streambed Alteration Agreement (CDFG, 2011) and National Marine Fisheries Service (NMFS) Biological Opinion (NMFS, 2011).

## TABLE 5.16-1
## ATTRIBUTES OF FOUR SCENARIOS ANALYZED

| Parameter | Pre-2001 Conditions | Existing Conditions | With-CDRP Conditions | With-Project Conditions |
|---|---|---|---|---|
| Representative year | 2000 | 2015 | 2019 to 2020 (following completion of the CDRP and the reservoir refill period) | |
| Hydrologic period used in analysis | WY 1996 to WY 2013 | | | |
| Calaveras Reservoir and Dam | - Historical capacity of Calaveras Reservoir = 96,850 acre-feet<br>- Maximum pool elevation = 756 feet | - New dam under construction downstream of existing dam<br>- Storage in Calaveras Reservoir restricted to one-third capacity with usable storage at 13% or 12,400 acre-feet by DSOD<br>- Maximum pool elevation = 705 feet<br>- Minimum pool elevation = 690 feet | - New dam completed<br>- Historical capacity of Calaveras Reservoir restored to nominal capacity = 96,850 acre-feet<br>- Maximum pool elevation = 756 feet | |
| In-stream flow releases/ spills from Calaveras Reservoir below Calaveras Dam | None, other than spill from Calaveras Reservoir. | Frequent releases from low-flow valve or cone valve to manage water levels in the reservoir and from low flow valve for experimental purposes. Represented in ASDHM by observed flow at the USGS gage located downstream of Calaveras Reservoir | Implementation of instream flow schedule:<br>- Dry year releases: May –Oct: 7 cfs; Nov - Dec: 5 cfs; Jan –April: 10 cfs annual average<br>Wet/normal year releases: May – Sept: 12 cfs, Oct: 7 cfs; Nov –Dec: 5 cfs, Jan – April: 12 cfs | |
| Alameda Creek Diversion Dam (ACDD) | - No fish ladder or bypass tunnel<br>- Maximum diversion of Alameda Creek water to Calaveras Reservoir = 650 cfs | | - Fish ladder and bypass structure operational<br>- Minimum and Maximum diversion rates of Alameda Creek water to Calaveras Reservoir = 30 cfs to 370 cfs | |
| ACDD bypass flows | - When the gates on the diversion tunnel are open, only stream discharge greater than 650 cfs passes over the ACDD (Note: Operations at the ACDD between WY 2002 and WY 2010 were influenced by limitations on storage at Calaveras Reservoir. As a result, the gates on the diversion tunnel were closed more frequently than they had been previously).<br>- Under Existing Condition, the ACDD tunnel has been closed since 5/23/2012. Prior to 2012 during the DSOD-restricted period, SFPUC operated ACDD very infrequently. For example, they were not operated at all between 10/24/2004 to 3/7/2007. When the gates on the diversion tunnel are closed, all flow in Alameda Creek passes over the ACDD | | - Gate on diversion tunnel closed from April 1 to Nov 30, and all flow in Alameda Creek passes over ACDD.<br>- Diversion of up to 370 cfs from December 1 to March 31.<br>- Minimum bypass flow of 30 cfs whenever there is 30 cfs or more; if less than 30 cfs is present, entire flow passes over the ACDD | |

## TABLE 5.16-1 (Continued)
## ATTRIBUTES OF FOUR SCENARIOS ANALYZED

| Parameter | Pre-2001 Conditions | Existing Conditions | With-CDRP Conditions | With-Project Conditions |
|---|---|---|---|---|
| Quarry pit operations<br>Hanson Aggregates:<br>- SMP-24 (Pits F2, F3-East, F3-West)<br>- SMP-32<br>- SMP-33<br>Oliver de Silvia<br>- SMP-30 (Pits F4, F5, F6) | - SMP-24 in active use for aggregate extraction until 2006<br>- SMP-32 not yet in operation<br>- SMP-30 Pit F6 in active use<br>- Excess water discharged under NPDES permit to Alameda Creek at an average annual rate of 2,796 acre-feet per year | - SMP-24 pits used only to store and manage water to support active mining on SMP-32 and aggregate processing, with excess water discharged under NPDES permit to Alameda Creek at an average annual rate of 3,436 acre-feet per year1 In 2015, this volume of regulated discharge was 1,206.<br>- SMP-30 Pit F6 in active use for aggregate extraction, with infrequent discharges from SMP-30 to Alameda Creek | The same as existing conditions except that as a result of the releases and bypasses it is assumed more water infiltrates to the quarries and more water is available to the quarry operators for water management and subsequent NPDES discharge. It is assumed the average amount of water available for quarry NPDES discharge is an annual average of 6,620 acre-feet per year. | The same as existing conditions except that the ACRP would reduce the amount of water assumed to be available to the quarry operators and therefore less water for NPDES discharge. The average amount of water available to the quarry operators for NPDES discharge is estimated to decrease from pre-2001, existing, and with-CDRP conditions to an annual average of 2,532 acre-feet per year. |
| Loss of surface flow in Alameda Creek to subsurface between Welch Creek and Arroyo de la Laguna confluences | 0 to 17 cfs (maximum) between Welch Creek and San Antonio Creek confluences, and<br>0 to 7.5 cfs (Maximum) between San Antonio and Arroyo de la Laguna confluences, depending on stream flow | | | |
| Alameda Creek Recapture Project | Not in operation | | | Pumping of water from Pit F2 by SFPUC and transfer to SVWTP or San Antonio Reservoir for municipal water supply |

The period of analysis includes a variety of wet, dry and normal years, so that the estimated flow data reflect conditions over a range of site-specific meteorological conditions. It should be noted that estimated data derived from using the ASDHM are expressed to several significant figures. This level of precision is retained throughout this report so that the values reported in different tables of data remain consistent. However, the estimated data should be regarded as approximate and less precise than measured data.

The ASDHM, its use as an analytical tool for this EIR, and other technical analyses undertaken in the support of the EIR are described fully in **Appendix HYD1**. This hydrology chapter contains a summary of the technical analyses that underpin the determinations of impact significance as a preface to the significance determinations themselves.

# 5.16.2 Environmental Setting

## 5.16.2.1 Topography

### *Existing Conditions*

The proposed project area lies within the Alameda Creek watershed. The watershed is shown in **Figure 5.16-1**. The Alameda Creek watershed encompasses an area of approximately 700 square miles, extending from Mount Diablo in the north, Altamont Pass in the east, Mount Hamilton in the south, and San Francisco Bay in the west. Elevations in the watershed range from about 4,000 feet near the headwaters to sea level at the point where the creek flows to San Francisco Bay.[3]

### *With-CDRP Conditions*

Topography will be the same under with-CDRP conditions as it is under existing conditions.

## 5.16.2.2 Climate and Precipitation

### *Existing Conditions*

The climate of the Alameda Creek watershed is characterized by warm, dry summers and mild, rainy winters. Average temperatures range from the mid-50s in winter to the high 70s in summer (in degrees Fahrenheit [°F]). Average annual precipitation in the watershed is 20 inches, but is higher (26 inches) in the headwaters.[4]

### *With-CDRP Conditions*

Climate and precipitation will be the same under with-CDRP conditions as they are under existing conditions.

## 5.16.2.3 Regional Surface Water Hydrology

### *Existing Conditions*

The Alameda Creek watershed can be divided into four drainages the larger northern and southern drainages, and the smaller middle and lower drainages. About 65 percent of the Alameda Creek watershed lies within the northern drainage. Most of the northern drainage is occupied by rangeland, cropland, and wildland, but it also contains the cities of Livermore, Pleasanton, Dublin, and San Ramon. The northern basin is drained by Arroyo de la Laguna and its tributaries.

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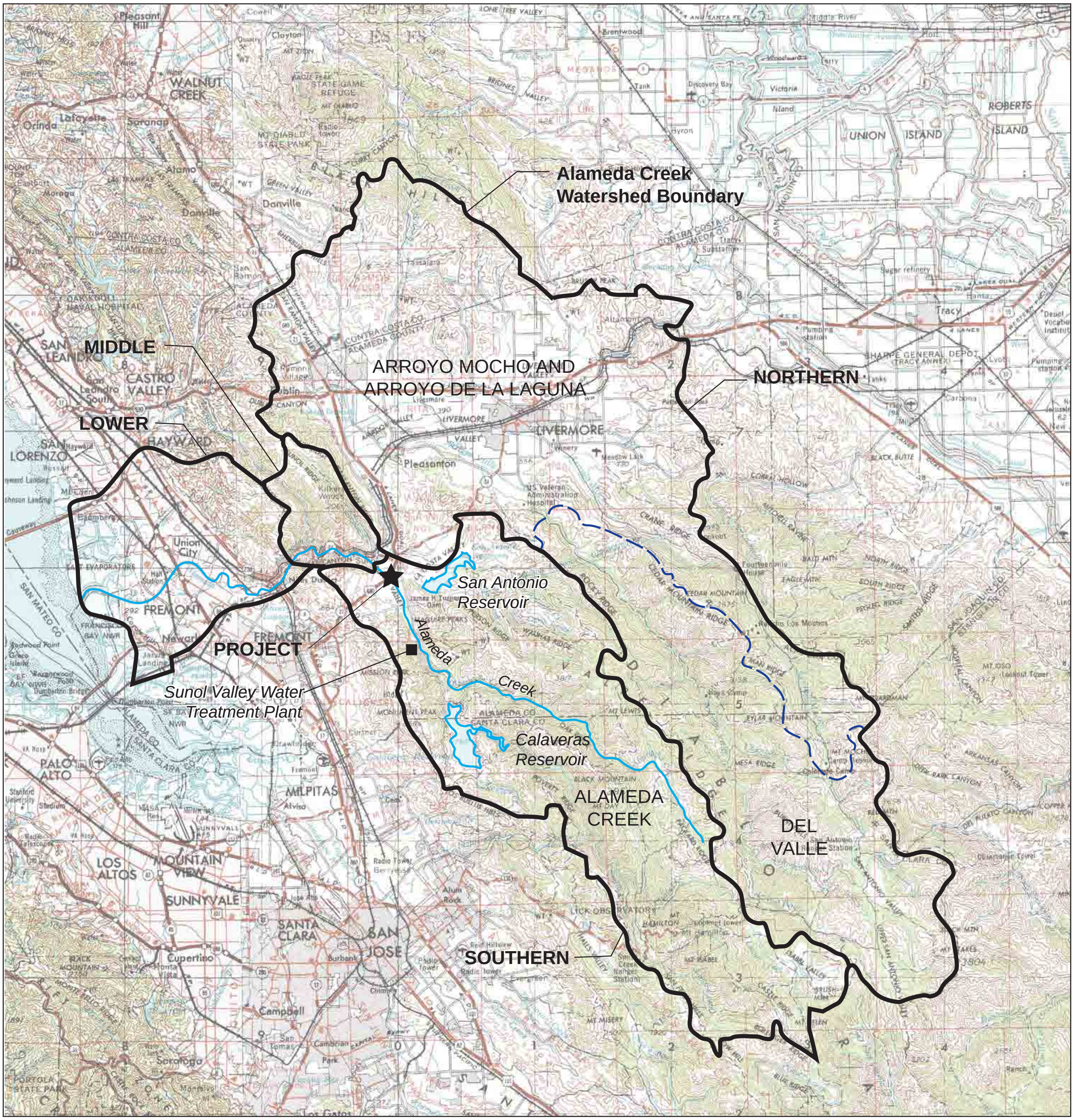
[3] San Francisco Planning Department, 2011. *Final Environmental Impact Report for the San Francisco Public Utilities Commission Calaveras Dam Replacement Project*. San Francisco Planning Department File No. 2005.0161E, State Clearinghouse No. 2005102102. Certified January 27, 2011.

[4] San Francisco Planning Department, 2012. *Final Environmental Impact Report for the San Francisco Public Utilities Commission San Antonio Backup Pipeline Project*. San Francisco Planning Department File No. 2007.0039E, State Clearinghouse No. 2007102030. Certified September 20, 2012.



SOURCE: EDAW & Turnstone JV

SFPUC Alameda Creek Recapture Project

**Figure 5.16-1**
Alameda Creek Watershed and Sub-watershed Areas

The southern drainage consists almost entirely of undeveloped wildland and rangeland. About 25 percent of the Alameda Creek watershed lies within the southern drainage. The drainage includes the Sunol-Ohlone Regional Wilderness, the SFPUC's Alameda watershed lands, and the Sunol Valley. It is drained by Arroyo Hondo, upper Alameda Creek, and Alameda Creek's tributaries. The small middle and lower drainages comprise the remaining 10 percent of the Alameda Creek watershed.

The northern and southern drainages meet at the northern end of the Sunol Valley at the confluence of Arroyo de la Laguna and Alameda Creek. The middle drainage consists of the lands that drain to Alameda Creek as it flows through Niles Canyon. The lower drainage consists of the lands that drain to Alameda Creek as the creek flows across the San Francisco Bay Plain. In the lower drainage, much of the creek is confined between levees and receives runoff from urban storm drains.

Over the last century, the natural hydrology of Alameda Creek watershed has been altered by water supply system operations, gravel mining, urban development, and flood reduction measures. However, almost all of the urban development and flood reduction projects are located in the northern and lower drainages. The primary anthropogenic factors affecting the natural hydrology of Alameda Creek in the southern drainage are water supply system operations and gravel mining.

The proposed project area lies at the northern end of the southern drainage, about two miles upstream of Alameda Creek's confluence with Arroyo de la Laguna. The following description of water resources in the vicinity of the proposed project area focuses on the southern, middle, and lower drainages because that is where the potential effects of the proposed project would occur. The northern drainage would not be affected by the proposed project.

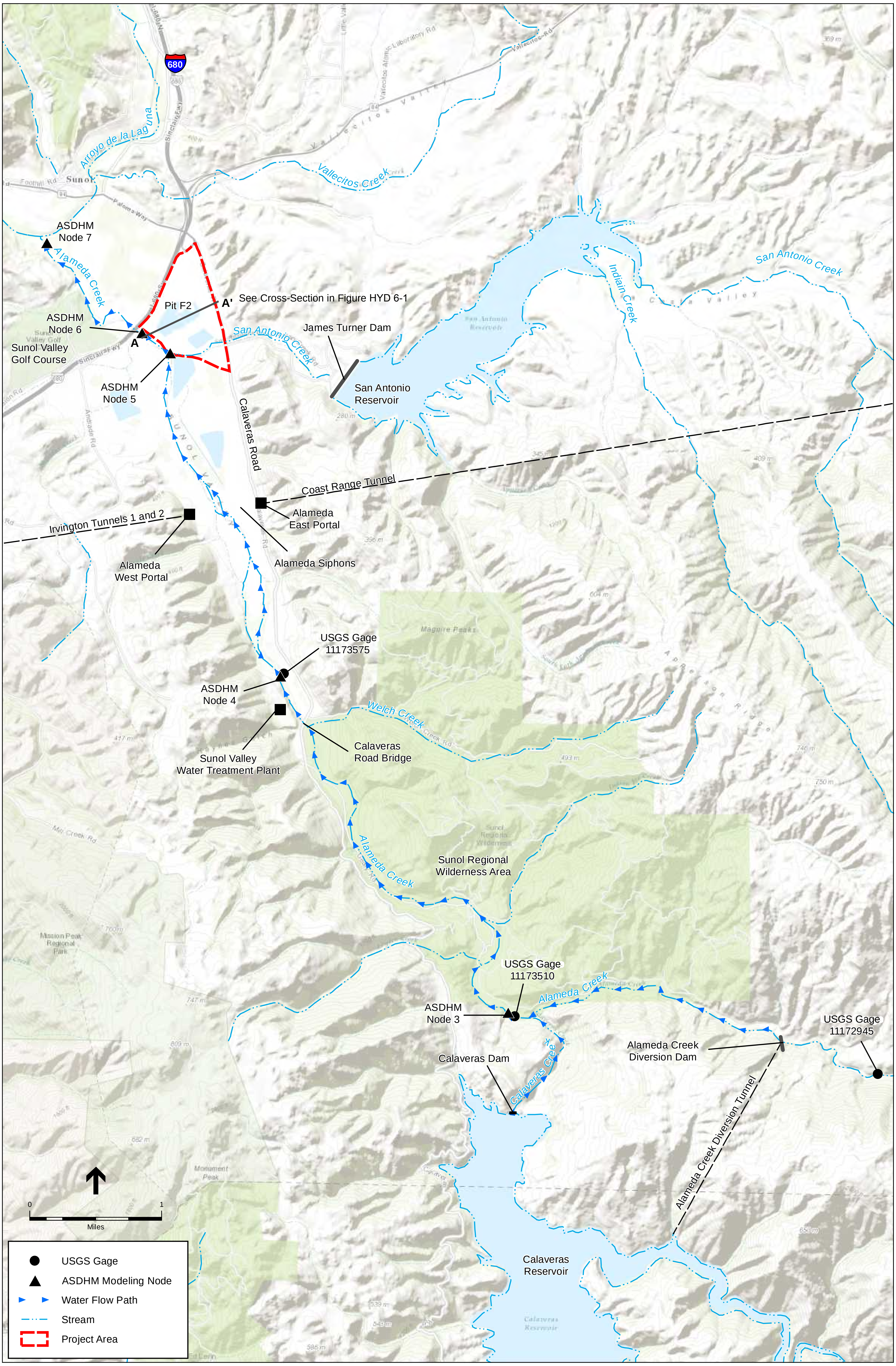
#### *With-CDRP Conditions*

Regional surface water hydrology will be the same under with-CDRP conditions as it is under existing conditions.

### 5.16.2.4 Surface Water Bodies

The major surface water bodies in the southern drainage are Calaveras Reservoir, San Antonio Reservoir, Alameda Creek and its tributaries, including San Antonio Creek, and several large water-filled quarry pits (see **Figure 5.16-2**). Calaveras Reservoir and San Antonio Reservoir are components of the SFPUC's regional water supply system.

The major surface water bodies in the middle and lower drainages are Alameda Creek and the Quarry Lakes. Quarry Lakes are former gravel quarries used by Alameda County Water District for groundwater recharge.



SOURCE: SFPUC, 2015. Modeling node and monitoring well locations. KMZ files provided by Amod Dhakal on August 6, 2015.

SFPUC Alameda Creek Recapture Project

**Figure 5.16-2**

Surface water bodies in the Alameda Creek watershed between the Alameda Creek Diversion Dam and Arroyo de la Laguna

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### *Calaveras Reservoir and the Alameda Creek Diversion Dam*

#### Existing Conditions

Calaveras Reservoir is located on Calaveras Creek about one mile upstream of the Calaveras Creek/Alameda Creek confluence. It collects water from Calaveras Creek and Arroyo Hondo as well as from local drainages along the western perimeter of the reservoir. Calaveras Reservoir also receives water from the upper reaches of Alameda Creek. Water from Alameda Creek is diverted at the Alameda Creek Diversion Dam (ACDD) and flows through a 1.8 mile long tunnel to Calaveras Reservoir. The SFPUC draws water from Calaveras Reservoir and conveys it by pipeline to the Sunol Valley Water Treatment Plant (SVWTP) for treatment and distribution to customers or to San Antonio Reservoir for storage. When it first went into service, Calaveras Reservoir had a storage capacity of 96,850 acre-feet at a pool elevation of 756 feet, although the storage capacity has been reduced somewhat as a result of siltation. [5] In 2001, the DSOD determined that Calaveras Dam was vulnerable to damage in an earthquake and required that the SFPUC not fill the reservoir above elevation 705, except briefly during high flow events. A pool elevation of 705 feet corresponds with a capacity of 38,100 acre-feet.[6] With storage limited to that which can be accommodated below elevation 705 feet and a minimum elevation requirement of 690 feet, the reservoir's usable storage became 12,400 acre-feet. The SFPUC has been operating Calaveras Reservoir with usable storage limited to 12,400 acre-feet since 2001. In 2011, the SFPUC began constructing the CDRP, which includes a new Calaveras Dam immediately downstream of the existing dam, and modifications to the ACDD. The CDRP is scheduled for completion in spring 2019. Diversion of water from Alameda Creek to Calaveras Reservoir is controlled by gates on the tunnel entrance at the ACDD. When the gates are open, up to 650 cfs can be diverted through the tunnel to Calaveras Reservoir; when the gates are closed, water passes over the ACDD and continues downstream in Alameda Creek. Because of DSOD-imposed limitations on storage in Calaveras Reservoir, the gates have remained closed most of the time since 2001. During construction of Calaveras Dam, the SFPUC is required to keep the tunnel closed in accordance with its Streambed Alteration Agreement with the California Department of Fish and Wildlife. It has done so since May 2012.

#### With-CDRP Conditions

Once the CDRP is commissioned, the SFPUC will operate Calaveras Reservoir much as it did historically before the DSOD's restrictions were imposed, except that releases of water will be made to improve habitat for fish and other aquatic life in Calaveras and Alameda Creeks. The release schedule for Calaveras Reservoir is shown in **Table 5.16-2**. The release schedule is different for dry (Schedule B) and normal/wet (Schedule A) years. Total annual releases in dry years will average approximately 5,540 acre-feet; in normal/wet years they will average 7,545 acre-feet. In setting the

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[5] San Francisco Planning Department, *Final Environmental Impact Report for the San Francisco Public Utilities Commission Calaveras Dam Replacement Project*, San Francisco Planning Department File No. 2005.0161E, State Clearinghouse No. 2005102102. Certified January 27, 2011a.

[6] San Francisco Planning Department, *Final Environmental Impact Report for the San Francisco Public Utilities Commission Calaveras Dam Replacement Project*, San Francisco Planning Department File No. 2005.0161E, State Clearinghouse No. 2005102102. Certified January 27, 2011a.

release schedule, the SFPUC assumed based on past history that 60 percent of the years would be normal/wet years, and 40 percent of the years would be dry years.

**TABLE 5.16-2**
**SUMMARY OF PROPOSED INSTREAM FLOW SCHEDULES BELOW CALAVERAS DAM**

| | | Dry (Schedule B) | | Normal/Wet (Schedule A) | |
|---|---|---|---|---|---|
| **Flow Schedule Decision Date** | **Flow Schedule Application Period** | **Cumulative Arroyo Hondo flows for water year classification (MG)** | **Flow Release (cfs)** | **Cumulative Arroyo Hondo flows for water year classification (MG)** | **Flow Release (cfs)** |
| N/A | October | N/A | 7 | N/A | 7[a] |
| N/A | Nov 1 thru Dec 31 | N/A | 5 | N/A | 5 |
| Dec 29 | Jan 1 thru Apr 30 | ≤ 360 | 10[a] | > 360 | 12[a] |
| Apr 30 | May 1 thru Sept 30 | ≤ 7,246 | 7 | > 7,246 | 12 |

NOTE:

[a] Flows would be ramped in accordance with Table 3 of the NMFS BO.

SOURCE: National Marine Fisheries Service (NMFS), 2011. Southwest Region. Biological Opinion for Calaveras Dam Replacement Project in Alameda and Santa Clara Counties. Tracking No. 2005/07436. March 5, 2011.

The modifications at the ACDD that are part of the CDRP will affect the diversion of water from Alameda Creek to Calaveras Reservoir. The installation of fish screens on the entrance to the tunnel at the ACDD will reduce the maximum capacity of the diversion tunnel. A bypass tunnel and fish ladder will be added to the diversion dam. The fish ladder and bypass facility will enable water to be released from the diversion dam to improve habitat for fish and other aquatic life in Alameda Creek. The bypass schedule for the ACDD[7] under the with-CDRP condition will be as follows:

- Diversion shall be restricted to the period between December 1 and March 31;
- No diversion from April 1 to November 30;
- Diversion rates shall not exceed 370 cfs; and
- Minimum bypass flow of 30 cfs will be provided immediately below the ACDD when water is present in upper Alameda Creek above the Alameda Creek Diversion Dam. Water will be bypassed using the bypass tunnel, fish ladder, and/or across the dam crest.

Based on 18 years of hydrologic data from October 1995 to September 2013 (as shown in Chapter 3, Table 3-5), the releases from Calaveras Reservoir, together with the bypasses at the Alameda Creek Diversion Dam are estimated to average a total of 14,695 acre-feet per year. In dry years, the releases and bypasses are estimated to average 10,133 acre-feet per year. In wet years, they are estimated to average 18,345 acre-feet per year.

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[7] National Marine Fisheries Service (NMFS), 2011. Southwest Region. Biological Opinion for Calaveras Dam Replacement Project in Alameda and Santa Clara Counties. Tracking No. 2005/07436. March 5, 2011.

When the CDRP is completed, the nominal capacity of Calaveras Reservoir will be restored to its original value of 96,850 acre-feet, and following the fill period, the SFPUC will operate the reservoir similar to the way it did prior to the DSOD-imposed restrictions in 2001. This will include using the reservoir's full capacity to maximize carryover storage in the Alameda Watershed.

### *San Antonio Creek and Reservoir*

#### Existing Conditions

San Antonio Creek is an intermittent stream with its headwaters about nine miles east of Alameda Creek. It joins Alameda Creek about 1,500 feet upstream of the Interstate 680 (I-680) bridge and in the reach of the creek adjacent to a number of quarry pits. San Antonio Reservoir is located on San Antonio Creek about 1.5 miles upstream of the creek's confluence with Alameda Creek. The reservoir has a storage capacity of 50,500 acre-feet and collects and stores runoff from the upper San Antonio Creek watershed. In addition to storing local runoff, San Antonio Reservoir can be used to store Calaveras Reservoir water, Hetch Hetchy (Tuolumne River) water, and subsurface water from Alameda Creek. Water from Calaveras Reservoir is transferred to San Antonio Reservoir as described above, and Hetch Hetchy water and Alameda Creek subsurface water is transferred to San Antonio Reservoir as described below.

#### With-CDRP Conditions

When the DSOD imposed restrictions on storage in Calaveras Reservoir in 2001, the SFPUC adjusted the operation of its other facilities to allow for the reduction in overall water system storage. Under with-CDRP conditions, the SFPUC will operate San Antonio Reservoir much as it did before 2001.

### *Alameda Creek*

#### Existing Conditions

Alameda Creek flows from its headwaters near Mount Hamilton northward through Sunol-Ohlone Regional Wilderness and the Sunol Valley to its confluence with Arroyo de la Laguna. Just downstream of the confluence it turns and flows westward through Niles Canyon and across the Bay Plain to San Francisco Bay. Its total length is 46 miles.

The uppermost reach of Alameda Creek flows through rugged and underdeveloped terrain from its headwaters to the ACDD, which is located about 2 miles upstream of Alameda Creek's confluence with Calaveras Creek. Water that passes over the diversion dam continues through a steep channel, including the gorge known as Little Yosemite, to Alameda Creek's confluence with Calaveras Creek at the southern end of the Sunol Valley. Calaveras Dam and Reservoir are located on Calaveras Creek about 1 mile upstream of the creek's confluence with Alameda Creek. Flow in Alameda Creek downstream of the ACDD and the Calaveras Creek confluence is strongly influenced by the SFPUC's municipal water supply operations at the ACDD and Calaveras Reservoir.

From the confluence, Alameda Creek flows for several miles in a well-defined channel contained within the valley bottom to the Calaveras Road bridge. From the Calaveras Road bridge to the

Alameda Siphons, the creek flows in a broad sometimes braided channel. Downstream of the Alameda Siphons, levees confine the channel until the creek reaches the I-680 bridge. About 40 years ago, this section of Alameda Creek was relocated westward to facilitate gravel quarrying in the area occupied by the creek's historical channel.

Downstream (north) from I-680, the creek flows along the west side of the Sunol Valley to its confluence with Arroyo de la Laguna. Beyond the confluence, the channel steepens as Alameda Creek flows through Niles Canyon, before flattening again as the creek flows across the Bay Plain. The most downstream reach of Alameda Creek flows through an urbanized area and is confined between levees.

The proposed project lies adjacent to the reach of Alameda Creek between the Alameda Siphons and I-680, commonly referred to as the "quarry reach."

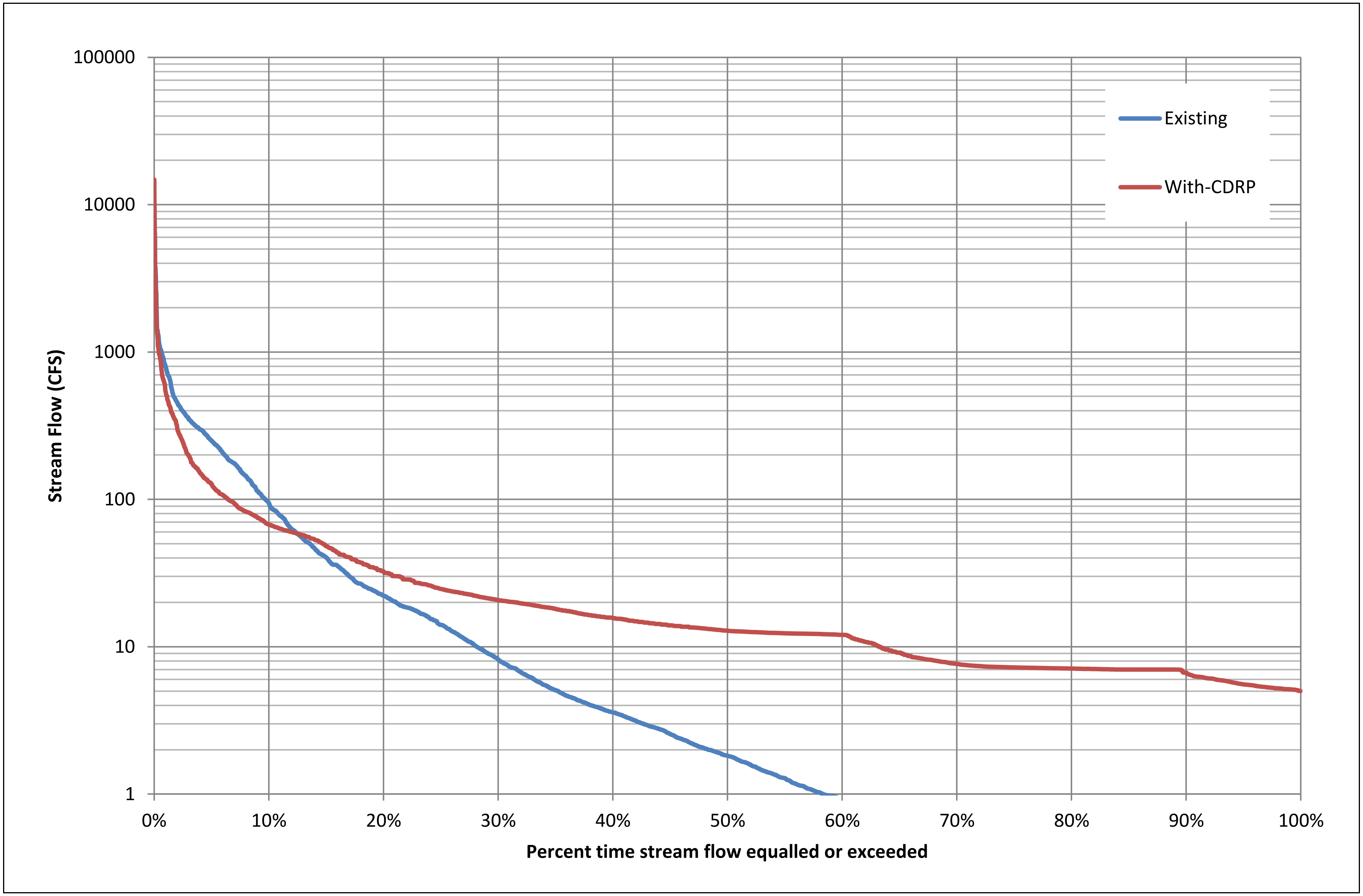
The U.S. Geological Survey (USGS) measures flow in Alameda Creek at several locations. The gages closest to the proposed project are the Welch Creek gage, located about three miles upstream of the proposed project and the Niles gage located about ten miles downstream from the proposed project. Average annual flow volume at the Welch Creek gage for the period Water Year (WY) 2000 to WY 2013 was 22,972 acre-feet. The highest daily peak flow observed at Welch Creek is about 1,450 cfs.

Average annual flow volume for the Niles gage, located where Alameda Creek flows out of Niles Canyon, for the period WY1996 and WY2013 was 103,661 acre-feet. Stream flow at this point on the creek is greatly increased because of the magnitude of natural flow contributed by Arroyo de la Laguna and State Water Project water released into the Arroyo de la Laguna watershed. The highest daily peak flow observed at Niles is about 9,800 cfs.

#### With-CDRP Conditions

Under the with-CDRP conditions, the CDRP will be completed and commissioned. The nominal storage capacity of Calaveras Reservoir of 96,850 acre-feet will be restored and the SFPUC will operate the reservoir to take advantage of its full capacity. Release of water at Calaveras Reservoir and bypass of water at the ACDD in accordance with the instream flow schedules described earlier will alter flow in Alameda Creek below the Calaveras Creek confluence. The releases from Calaveras Reservoir and the bypasses at the ACDD are estimated to average 14,695 acre-feet per year. This is in contrast to existing conditions under which the SFPUC is operating Calaveras Reservoir with its storage capacity restricted and with no releases or bypasses.

The ASDHM was used to estimate daily flow under existing and with-CDRP conditions at several locations along Alameda Creek. One location (Node 4) is just downstream of the Welch Creek confluence and about three miles upstream of the proposed project. **Figure 5.16-3** shows flow duration curves for existing and with-CDRP conditions for that location constructed from estimated daily flows. For the existing condition, flow exceeds one cfs about 58 percent of the days; for the with-CDRP condition, it always exceeds one cfs. The different flow patterns between the two conditions are attributable to a combination of the releases and bypasses at Calaveras Reservoir and the ACDD, and to restoration of the full capacity of the reservoir.



SOURCE: SFPUC, 2016. Simulated stream flows for different scenarios at 5 nodes and pond elevation for ACRP. Excel spreadsheet file provided by Amod Dhakal on July 7, 2016. Adjusted by ESA/Orion.

NOTE: Data presented are derived from the Alameda System Daily Hydrologic Model (ASDHM) using from Water Years (1996 – 2013)

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**Figure 5.16-3**

Flow Duration Curves for Node 4 (Alameda Creek below Welch Creek) for Existing and with-CDRP Conditions

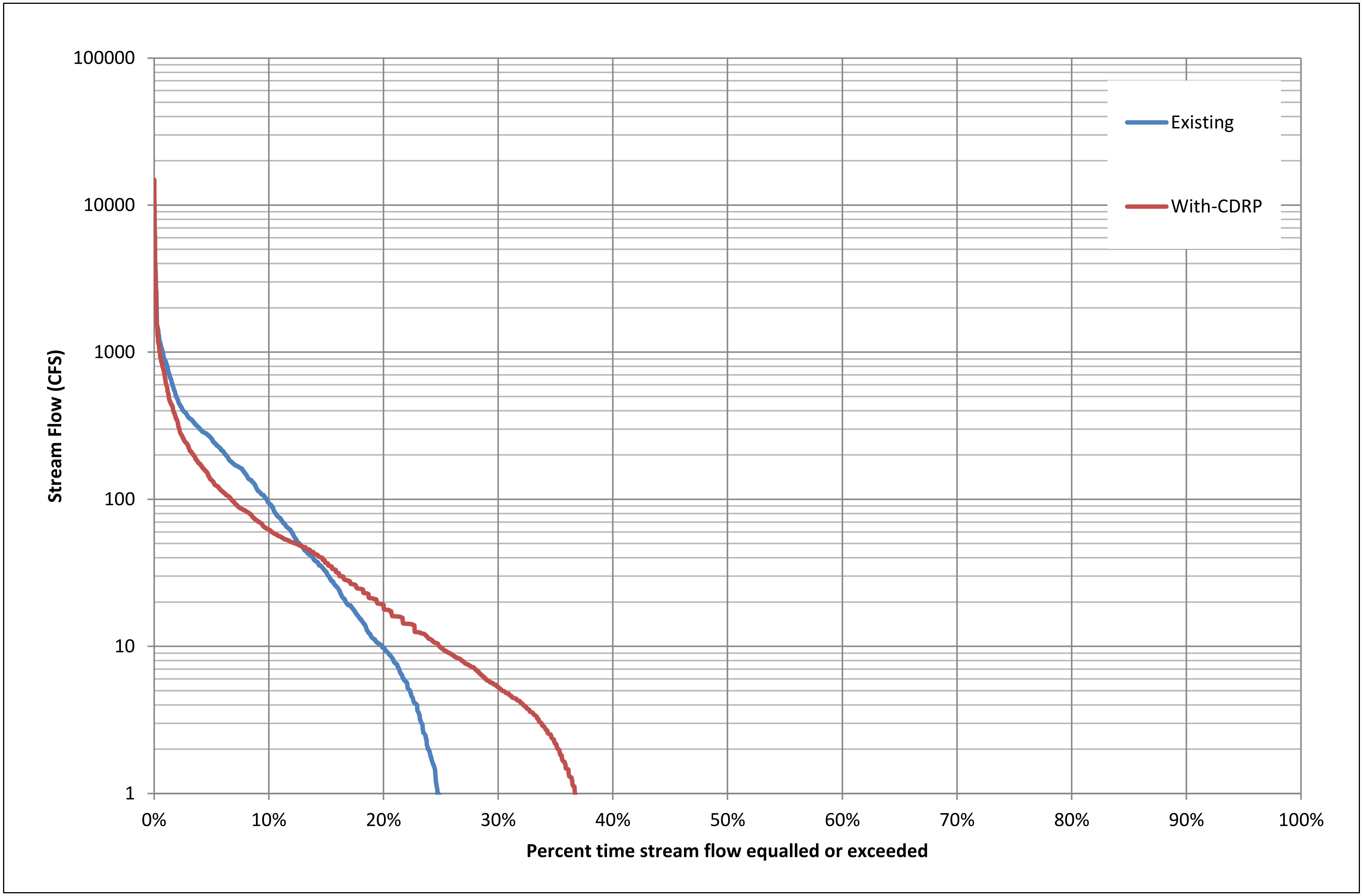
Estimated annual average flow volumes can be calculated from the estimated daily flows. The average annual flow volume at the location downstream of Welch Creek for the existing condition is estimated to be 36,007 acre-feet; for the with-CDRP condition, it is estimated to be 33,157 acre-feet. The flow-increasing effects of the releases and bypasses are more than offset by the flow-reducing effect of restoration of full capacity in Calaveras Reservoir.

Daily flow estimates were also made at a location just upstream of San Antonio Creek and a few hundred feet upstream of the proposed project. **Figure 5.16-4** shows flow duration curves for existing and with-CDRP conditions for that location (Node 5). For existing conditions, flow exceeds one cfs about 24 percent of the days; for with-CDRP conditions, it exceeds one cfs about 37 percent of the days. The estimated average annual flow volumes for existing and with-CDRP conditions at this location are respectively, 34,999 acre-feet and 27,637 acre-feet. It is notable that although the location near the San Antonio Creek confluence is about three miles downstream of the location near the Welch Creek confluence, flow volume at this downstream location is less because, under both scenarios, Alameda Creek loses surface water to the subsurface in the reach of the creek between the Welch Creek and San Antonio Creek confluences.

**Figure 5.16-5** shows flow duration curves for Alameda Creek just above the Arroyo de la Laguna (Node 7) for existing and with-CDRP conditions. Under existing conditions, flow exceeds one cfs about 27 percent of the days. Under with-CDRP conditions, flow exceeds one cfs for about 65 percent of the days. Under existing conditions, flow exceeds 10 cfs for about 20 percent of the days; under with-CDRP conditions, flow exceeds 10 cfs about 35 percent of the days. The estimated average annual flow volumes for existing and with-CDRP conditions at this location are respectively, 38,274 acre-feet and 32,752 acre-feet.

Between the location upstream of the San Antonio Creek confluence and the location upstream of the Arroyo de la Laguna confluence Alameda Creek gains water from runoff from San Antonio Creek, runoff from other small drainages, and water discharged by the quarry operators under NPDES permits. Surface water is also lost to the subsurface between San Antonio Creek and Arroyo de la Laguna Creek. The ASDHM does not include either the gain from water discharged by the quarries under their NPDES permits or the loss to the subsurface between the San Antonio and arroyo confluences. ASDHM output flows were adjusted by ESA/Orion to include the NPDES discharges and the losses to the subsurface to produce the flow duration curves for Node 7. It was assumed that the volume of water discharged by the quarries under existing conditions was an annual average of 3,436 acre-feet, the same as the historical average. Under with-CDRP conditions, it is estimated to be an annual average of 6,620 acre-feet. (See Appendix HYD1 and following section entitled "Quarry Pits" for an explanation.)

**Table 5.16-3** compares estimated monthly average flows in Alameda Creek at three locations for the period WY 1996 to WY 2013, for existing and with-CDRP conditions. The locations are just downstream of Welch Creek (Node 4), just upstream of San Antonio Creek (Node 5), and just upstream of the Arroyo de la Laguna (Node 7).



SOURCE: SFPUC, 2016. Simulated stream flows for different scenarios at 5 nodes and pond elevation for ACRP. Excel spreadsheet file provided by Amod Dhakal on July 7, 2016. Adjusted by ESA/Orion.

NOTE: Data presented are derived from the Alameda System Daily Hydrologic Model (ASDHM) using from Water Years (1996 – 2013)

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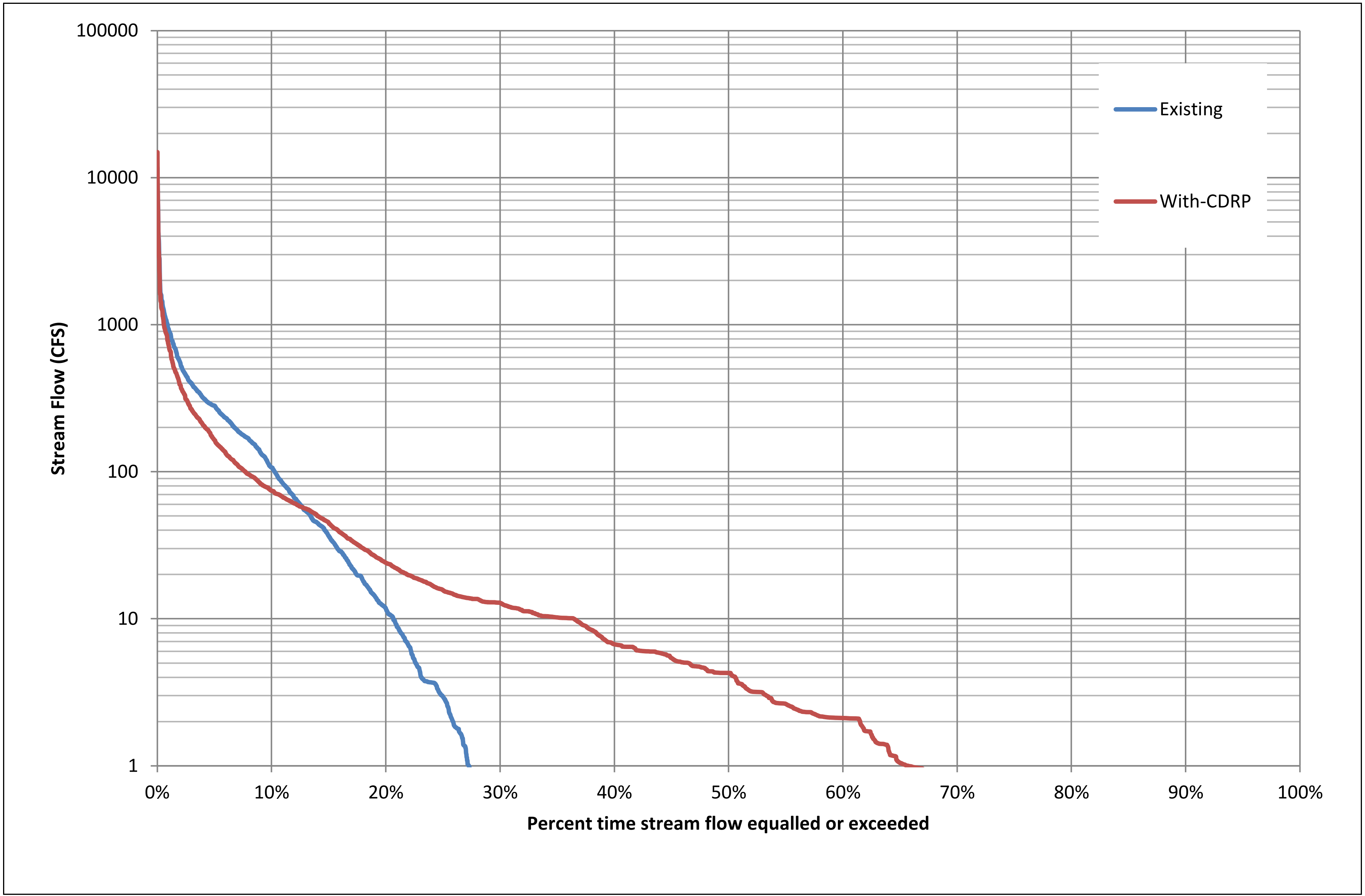
**Figure 5.16-4**

Flow Duration Curves for Node 5 (Alameda Creek above San Antonio Creek) for Existing and with-CDRP Conditions



SOURCE: SFPUC, 2016. Simulated stream flows for different scenarios at 5 nodes and pond elevation for ACRP. Excel spreadsheet file provided by Amod Dhakal on July 7, 2016. Adjusted by ESA/Orion.

NOTE: Data presented are derived from the Alameda System Daily Hydrologic Model (ASDHM) using from Water Years (1996 – 2013)

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**Figure 5.16-5**

Flow Duration Curves for Node 7 (Alameda Creek above Arroyo de la Laguna) for Existing and with-CDRP Conditions

### TABLE 5.16-3
### ESTIMATED AVERAGE MONTHLY FLOW AT THREE LOCATIONS ON ALAMEDA CREEK FOR EXISTING AND WITH-CDRP CONDITIONS FOR WY 1996 TO WY 2013 (CFS)

| Node | Scenario | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4 | Existing Conditions | 1.4 | 1.8 | 40.3 | 125.4 | 182.0 | 120.5 | 86.8 | 33.5 | 11.3 | 1.2 | 0.4 | 0.3 |
| | With-CDRP Conditions | 7.3 | 8.4 | 33.0 | 99.9 | 184.4 | 87.1 | 71.9 | 21.8 | 13.7 | 11.0 | 10.2 | 10.0 |
| | Difference in flow between with CDRP and existing conditions (With- CDRP Conditions minus Existing Conditions) | 5.9 | 6.6 | -7.3 | -25.5 | 2.4 | -33.4 | -14.9 | -11.7 | 2.4 | 9.8 | 9.8 | 9.7 |
| 5 | Existing Conditions | 0.5 | 1.1 | 40.5 | 127.9 | 186.8 | 117.9 | 80.6 | 26.1 | 7.1 | 0 | 0 | 0 |
| | With-CDRP Conditions | 0 | 2.6 | 28.6 | 97.5 | 186.3 | 81.6 | 60.8 | 9.1 | 1.4 | 0.1 | 0 | 0 |
| | Difference in flow between with CDRP and existing conditions (With-CDRP Conditions minus Existing Conditions | -0.5 | 1.5 | -11.9 | -30.4 | 0.5 | -36.3 | - 19.8 | -17.0 | -5.7 | 0.1 | 0 | 0 |
| 7 | Existing Conditions | 0.6 | 1.2 | 43.6 | 138.4 | 202.1 | 130.8 | 92.2 | 27 | 7.3 | 0.1 | 0 | 0.1 |
| | With-CDRP Conditions | 1.7 | 4.2 | 33.9 | 111.2 | 206.0 | 97.5 | 72 | 14.2 | 5.1 | 2.9 | 2.3 | 2.7 |
| | Difference in flow between with CDRP and existing conditions (With-CDRP Conditions minus Existing Conditions | 1.1 | 3.0 | -9.7 | -27.2 | 3.9 | -33.3 | -20.2 | -12.8 | -2.2 | 2.8 | 2.3 | 2.6 |

SOURCE SFPUC, 2016. Simulated stream flows for different scenarios at 5 nodes and pond elevation for ACRP. Excel spreadsheet file provided by Amod Dhakal on July 7, 2016. Adjusted by ESA/Orion.

Just downstream of the Welch Creek, average monthly flow in Alameda Creek under with-CDRP conditions (Calaveras Reservoir restored and releases and bypasses implemented), is greater than under existing conditions (Calaveras Down) in seven months. Average monthly flow is considerably greater with implementation of the CDRP in the summer and fall because of the minimum releases from Calaveras Reservoir and, if there is any stream flow, the bypasses at the ACDD.

Just upstream of the San Antonio Creek confluence, average monthly flow under with-CDRP conditions is greater than, or the same as, under existing conditions in five months. There is no flow in Alameda Creek under either existing conditions or with-CDRP conditions in July, August, September, and October. Much of the water that arrives at the Welch Creek confluence under with-CDRP conditions as a result of releases and bypasses at Calaveras Reservoir and the ACDD is expected to be lost to the subsurface between the Welch Creek confluence and the San Antonio Creek confluence due to the natural hydrology of this reach of the creek.

Flows in Alameda Creek just upstream of the Arroyo de la Laguna confluence (Node 7) are influenced by NPDES discharges from the quarries and losses of surface water to the subsurface between the San Antonio Creek confluence and the arroyo. At Node 7, average monthly flows under with-CDRP conditions are estimated to be considerably greater in six months than under existing conditions. Flow in Alameda Creek at this location under both existing conditions and with-CDRP conditions in July, August, September, and October is attributable entirely to NPDES discharges from the quarries.

Flows in Alameda Creek at Niles, just upstream of ACWD's diversion point are influenced to some extent by the NPDES discharges from the quarries and the losses of surface water to the subsurface described above, but the primary influence on flow at Niles is the addition of large volumes of water from the Arroyo de la Laguna watershed. Average annual flow in Alameda Creek at Niles for with-CDRP and with-project conditions were calculated from the daily flow estimates made using the ASDHM and adjusting output with accretions and depletion. Under with-CDRP conditions, average annual flow is estimated to be 101,846 acre-feet per year. Under with-project conditions, it is estimated to be 103,632 acre-feet per year about, 1.8 percent greater than under with-CDRP conditions.

### *Quarry Pits*

#### Existing Conditions

Commercial gravel quarries operated by Hanson Aggregates and Oliver de Silva (ODS) are located at the north end of Sunol Valley, between the Alameda Siphons to the south and the confluence with Arroyo de la Laguna to the north. Quarry pits lie adjacent to and on both sides of Alameda Creek. Some of the pits are active; that is, quarry operators are currently extracting aggregate from the pits. Aggregate extraction has been completed in some pits and the inactive pits are now used for water management in support of active mining operations.

Quarry pit depths vary, but several pits reportedly approach 250 feet below grade.[8] **Figure 5.16-6** shows the layout of the gravel quarries and their location relative to Alameda Creek. The quarries occupy four plots of land, which are either owned by Hanson Aggregates or leased from the City and County of San Francisco. The four plots are designated SMP-24, SMP-30, SMP-32, and SMP-33. Hanson Aggregates operates quarries and aggregate processing facilities on the SMP-24, SMP-32, and SMP-33 areas. Quarries and aggregate processing facilities in the SMP-30 area are operated by ODS.

The operational schedule of the aggregate mines and processing facilities depends on market demand and weather conditions and may occur year round. Operations are usually suspended during wet weather. These and other factors make the quarry operations highly variable. Water seeps into the quarry pits from Alameda Creek and the surrounding areas through a band of stream channel gravels that underlies the northern Sunol Valley (for more information, see subsequent section entitled "Subsurface Water"). If needed to create a dry work area for aggregate

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[8] URS, 2009. *Final Updated Alternatives Analysis Report, Alameda Creek Fishery Enhancement Project, SFPUC Project CUW352.01.* January 30, 2009.

SOURCE: ESA, 2015; Date of aerial photo is 2014.

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**Figure 5.16-6**
Quarry Reach of Alameda Creek

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extraction, the quarry operators remove water that seeps into the active pits by pumping it into inactive pits, inactive areas of active pits, and other storage ponds. For example, ODS recently began mining in an expansion area, allowing more water to accumulate in inactive portions of Pit F6.

The operators use some of that water to wash aggregate and produce concrete and asphalt. Wash water is returned to inactive pits and ponds where silt settles out. If the water level in a pit rises too high (but still much lower than the Alameda Creek stream bed in the vicinity), the quarry operators pump the excess water into a pit or pond with available storage capacity or into Alameda Creek in accordance with the terms of National Pollutant Discharge Elimination System (NPDES) permits issued by the San Francisco Bay Regional Water Quality Control Board (SF Bay RWQCB General Permit # CAG982001). The NPDES permits are intended to regulate the quality of the water that is discharged to Alameda Creek. The quarry operators have no requirements to discharge a minimum amount of water; however, their permits do restrict the maximum volume of water that can be discharged. The permits are updated from time to time. Future permits could include additional restrictions that may affect the quarry operators' ability to discharge water to Alameda Creek (see Section 5.16.3.1 for more information on the quarry discharge permits).

Water that seeps into the pits generally has no outlet unless pit levels rise above the boundary between the stream channel gravels/younger alluvium and the underlying older alluvium/ Livermore gravels, as explained in Appendices HYD1 and HYD2. Thus, water that seeps into a pit is stored unless it is removed by pumping, lost through evaporation, or seeps out of the pit when water levels rise above the boundary between the stream channel gravels/younger alluvium and the older alluvium/Livermore Gravels and above the groundwater elevation in the shallow aquifer.

The quarry operators' general practice is to conserve water within the pits for use in aggregate processing and discharge water to the creek under their NPDES permits only when absolutely necessary. When discharge is necessary, it generally occurs for about 11 hours during the night when lower cost off-peak power rates are available for pumping. However, during active mining, NPDES discharges can occur around the clock. The volume of water reported to the Regional Water Quality Control Board as discharged from the quarries between WY 2002 and WY 2014 is shown in **Table 5.16-4**. The reported amounts of water discharged by the quarry operators are estimates rather than precise values. Most of the amounts of water reported are estimated from pump manufacturer rating curves rather than measured amounts. Some of the amounts reported by ODS are estimated from flow over a weir at Pit F4. Further, the reported amounts are a reflection of the quarry operations in place as of the reported years and may not reflect future operations.

The quarry operators do not record water levels in their various pits. Because the proposed project would affect water levels in Pit F2 and could affect water levels in other pits and ponds, the SFPUC has been measuring water surface elevations in six quarry pits—Pit F2, Pit F3-East, Pit F3-West, Pit F4, Pit F6 and the Ready Mix Pond—since early 2011.

TABLE 5.16-4
REPORTED NPDES DISCHARGE FROM QUARRIES TO ALAMEDA CREEK

| Water Year | Hanson Aggregates Mean Discharge (cfs) | Hanson Aggregates Annual Volume (acre-feet) | ODS Mean Discharge (cfs) | ODS Annual Volume (acre-feet) | Year Type |
|---|---|---|---|---|---|
| 2002 | 6.9 | 4,973 | 0 | 0 | Dry |
| 2003 | 6.3 | 4,581 | 0 | 0 | Dry |
| 2004 | 3.7 | 2,683 | 0 | 0 | Dry |
| 2005 | 5.4 | 3,930 | 0.3 | 236 | Normal/Wet |
| 2006 | 6.8 | 4,956 | 1.7 | 1,252 | Normal/Wet |
| 2007 | 6.3 | 4,545 | 0.2 | 140 | Dry |
| 2008 | 5.1 | 3,710 | 0.2 | 149 | Dry |
| 2009 | 3.2 | 2,304 | 0.3 | 208 | Normal/Wet |
| 2010 | 7.4 | 5,328 | 1.2 | 893 | Normal/Wet |
| 2011 | 6.2 | 4,483 | 4.4 | 3,181[1] | Normal/Wet |
| 2012 | 0.1 | 103 | 0 | 0 | Dry |
| 2013 | 1.5 | 1,070 | 0 | 0 | Dry |
| 2014 | 1.4 | 1,023 | 0 | 0 | Dry |
| 2015 | 1.7 | 1,206 | 0 | 0 | Dry |

[1] The high discharge volume in 2011 resulted because of a discharge of water by the SFPUC into one of the pits managed by ODS.

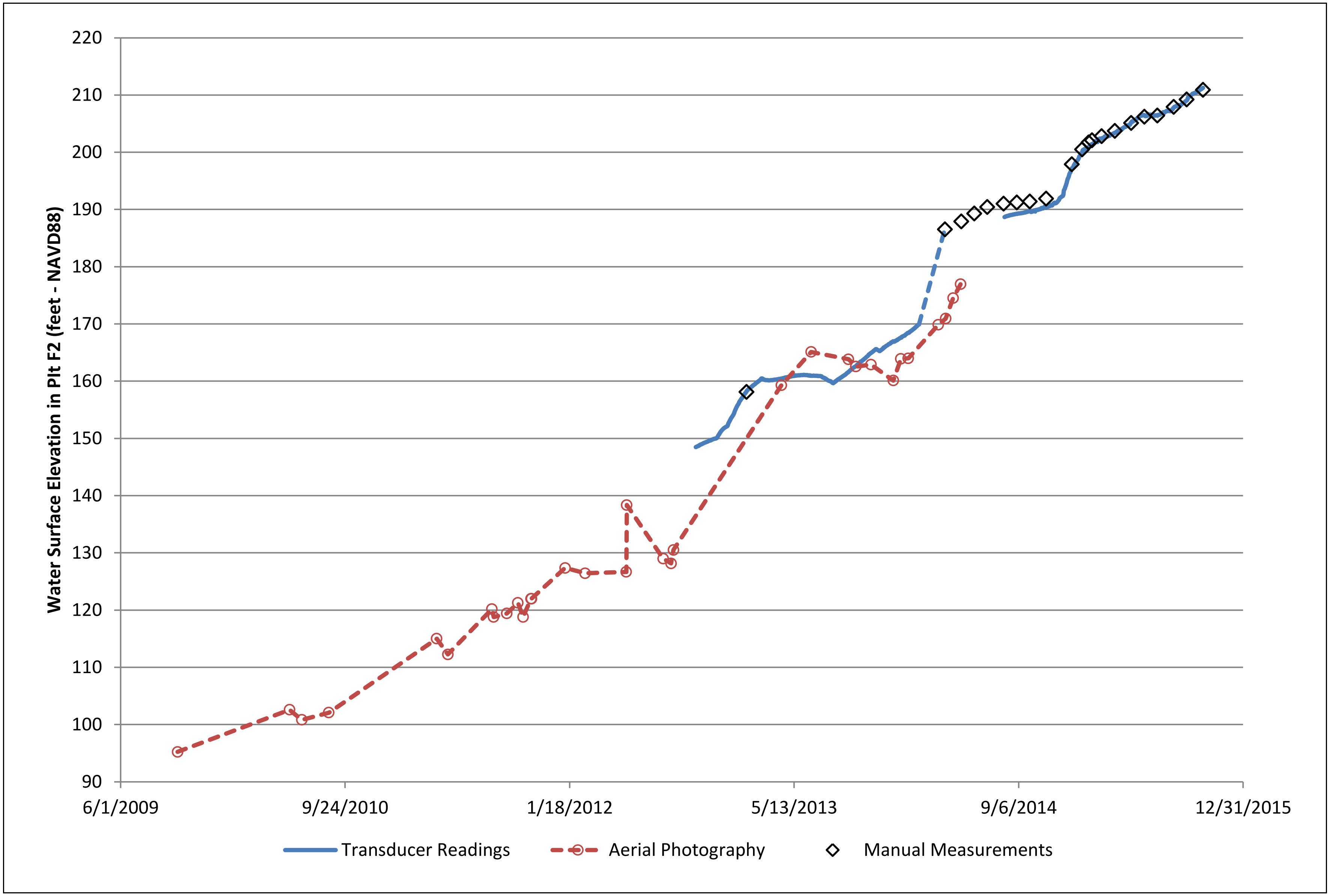
SOURCE: Hanson Aggregates and Oliver De Silva, Quarterly Reports to the SF Bay RWQCB, 2002 -2014.

A plot of water surface elevations in Pit F2 is shown in **Figure 5.16-7**. Although water surface elevation monitoring in the pit did not begin until late 2012, the record of water levels was extended back to October 2009 using satellite imagery. In October 2009, the water surface elevation in Pit F2 was estimated to be about 95 feet. By late spring in 2010, it was at elevation 102 feet. By October 2011, the water surface elevation had risen to elevation 122 feet and a year later when measurements began, it had reached elevation 148 feet and has risen gradually since then. By February 2016, it had reached elevation 223 feet before falling back to elevation 210 feet in June 2016. Hanson Aggregates stopped pumping water into Pit F2 temporarily in April 2014, but may resume pumping water into the pit if it wishes until the time that the ACRP is commissioned. After the ACRP is commissioned, Hanson Aggregates is expected to stop pumping water into Pit F2. Information on water surface elevations in the other pits can be found in Appendix HYD1.

### With-CDRP Conditions

The Hanson Aggregates and ODS gravel quarries operate in accordance with surface mining permits granted by Alameda County. At the time that the CDRP is scheduled for completion, both quarry operators are expected to continue mining gravel in the area beside Alameda Creek. The operators would continue to discharge water to Alameda Creek under NPDES discharge permits if necessary to maintain safe water levels in the pits and to keep their active mining pits dry. However, as is evident from the change in water management by ODS in 2012 regarding Pit F4, it is difficult to predict how the quarry operators may adjust their operations to avoid discharges.

As noted above, surface water in Alameda Creek percolates into the streambed between the Welch Creek confluence and the San Antonio Creek confluence. The annual loss to the subsurface



SOURCE: SFPUC, 2015. Pond F2 depth estimation from photo-images during different times. Excel spreadsheet file provided by Amod Dhakal on April 1, 2015; Luhdorff & Scalmanini, 2015; USGS 2015
Data last downloaded 06/2016

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**Figure 5.16-7**

Historical Water Surface Elevations in Pit F2

will be greater under with-CDRP conditions than under existing conditions because of different seasonal patterns of flow. Under existing conditions, there is little or no flow in Alameda Creek at the Welch Creek confluence for much of the summer and fall, as shown in Figure 5.16-3. Under with-CDRP conditions, there will be a small flow at that location through the summer and fall. Consequently, under with-CDRP conditions there is much more opportunity for water to percolate into the subsurface than there is under existing conditions.

The ASDHM estimates that the loss of Alameda Creek surface water to the groundwater between the Welch Creek and San Antonio Creek confluences under existing conditions (WY 1996-WY 2013) averages 4,526 acre-feet per year; the corresponding value for the with-CDRP condition will be 9,033 acre-feet per year, or 4,507 acre-feet per year greater. Because more of the water flowing in Alameda Creek will percolate into the ground in the vicinity of the gravel pits under with-CDRP conditions, more water will seep into the pits. There is a proportional relationship between the amount of water that percolates into the ground and the amount that the quarries discharge to Alameda Creek under their discharge permit. This relationship was used to estimate that the average annual quarry NPDES discharges under with-CDRP conditions will be 6,620 acre-feet. This compares to an annual average of 3,436 acre-feet under existing conditions (see Appendix HYD1 for information on how future quarry NPDES discharge volumes were estimated, including assumptions used and limitations of those assumptions).

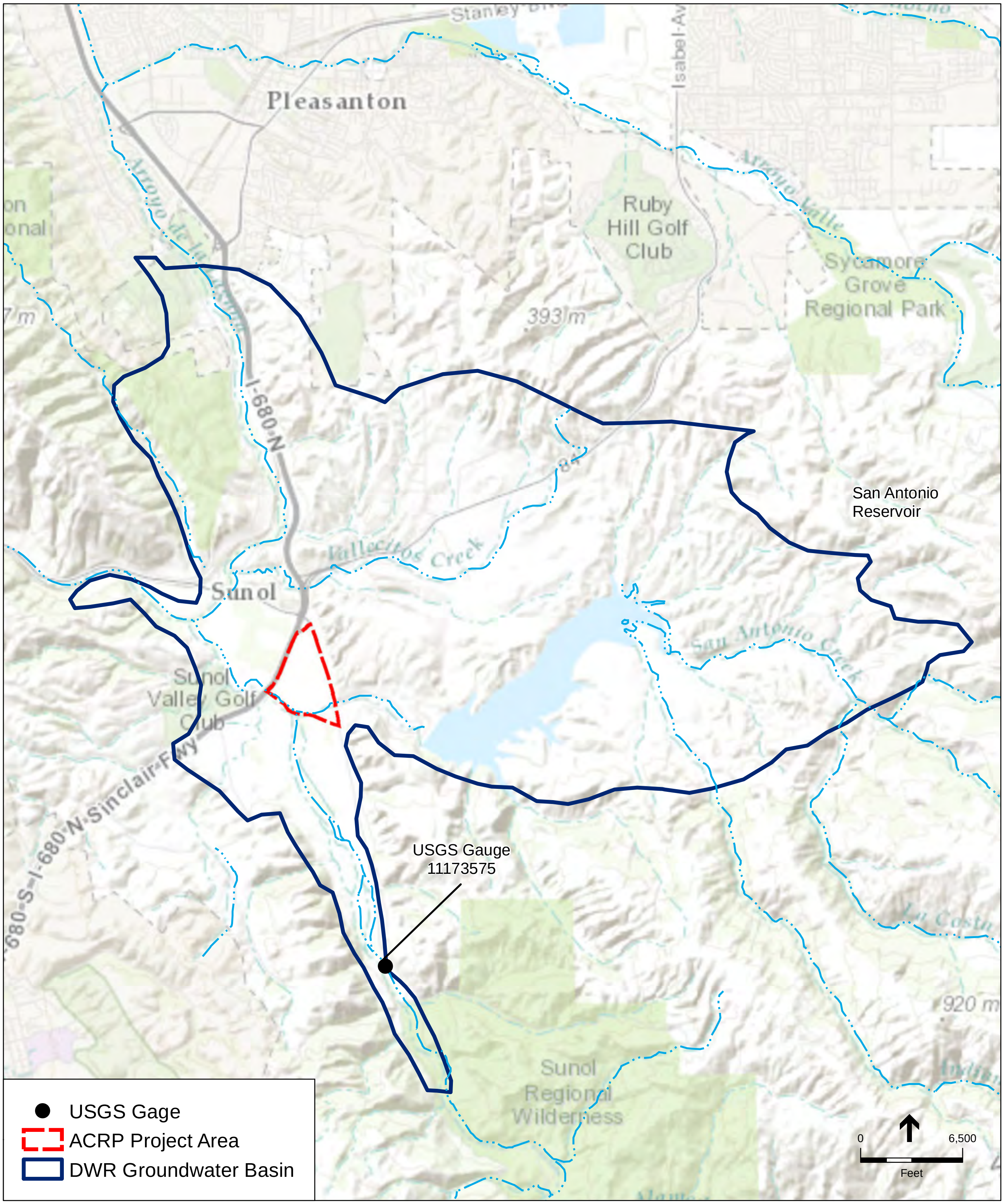
It is recognized that several factors affect the actual amount of water that the quarry operators will discharge to Alameda Creek under with-CDRP condition. As is evident from recent changes in practice by ODS, quarry operators will seek to minimize NPDES discharges and the associated costs. As excavation proceeds the total capacity of the pits to store water would be expected to increase, which could reduce the quarry operators need to discharge water to Alameda Creek under their NPDES permits. If markets for aggregate, concrete and asphalt are robust, the quarry operators may use more water consumptively, thus reducing their need to discharge water to Alameda Creek under their NPDES permits. NPDES permit conditions could also change in a way that may restrict the quarry operators ability to discharge water to Alameda Creek.

## 5.16.2.5 Subsurface Water

### *Existing Conditions*

#### Sunol Valley Groundwater Basin and Water Supply Wells

The project area lies within the Sunol Valley Groundwater Basin as delineated in the California Department of Water Resources (DWR) Bulletin 118, 2003 Update (see **Figure 5.16-8**). It is approximately 26 square miles with a population of 808 (2010 census). Information obtained from the local well permitting authority, Zone 7 Water Agency, indicates that groundwater is used locally for small-scale domestic and irrigation purposes with the highest number of supply wells in two areas of concentrated single family residences; the locations and types of wells in the Sunol Valley Groundwater Basin from Zone 7 records are shown in **Figure 5.16-9**. Within the ACRP project vicinity, there are no supply wells located along Alameda Creek from below Welch Creek to Arroyo de la Laguna (see project area detail in **Figure 5.16-10**).



SOURCE: SFPUC, 2015. Modeling node and monitoring well locations. August 6, 2015

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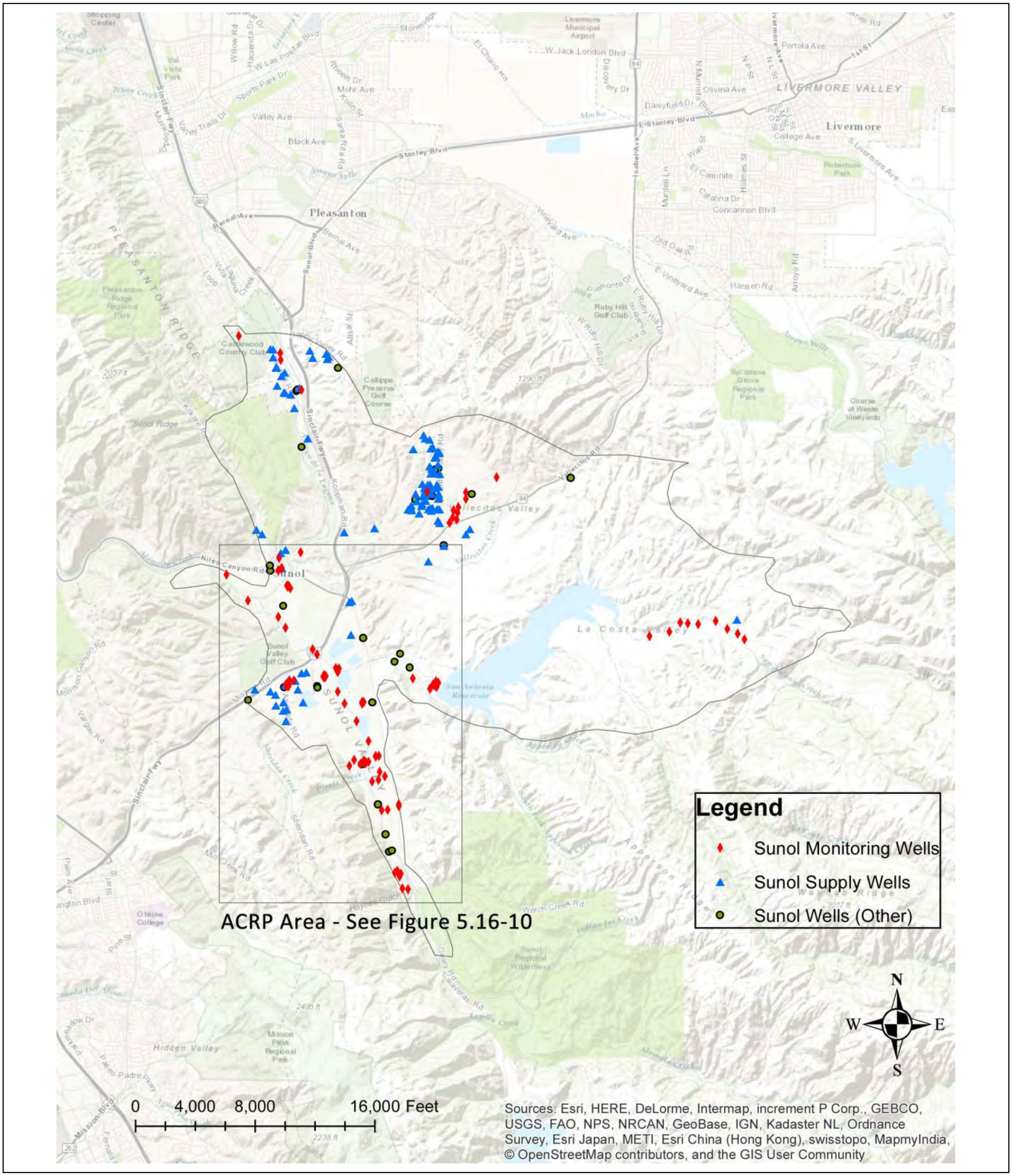
**Figure 5.16-8**

Location Map for Sunol Valley Groundwater Basin



Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

SOURCE: Zone 7 Water Agency (2015)

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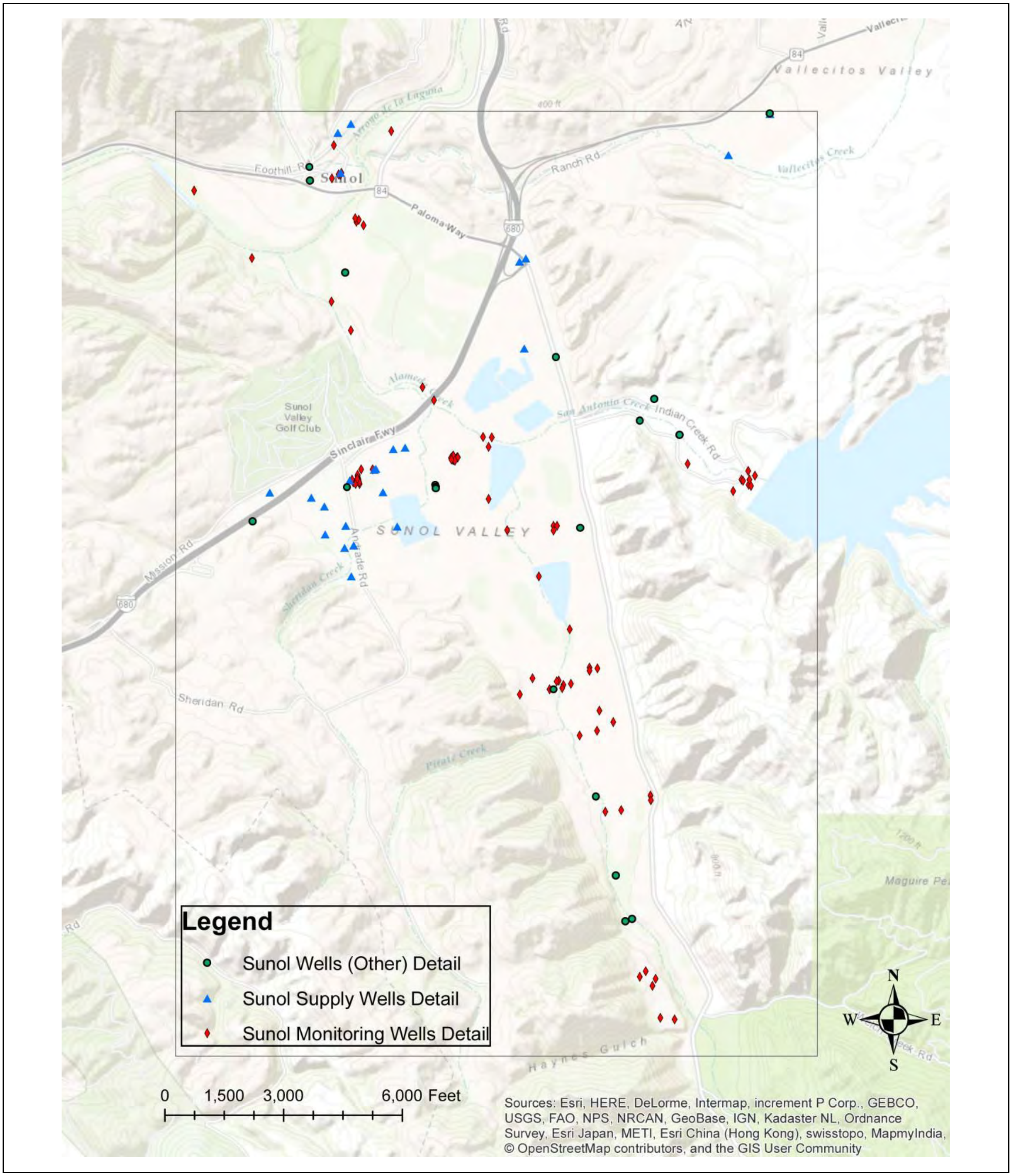
**Figure 5.16-9**
Location Map for Wells in the Sunol Valley Groundwater Basin



SOURCE: Zone 7 Water Agency (2016)

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**Figure 5.16-10**

Location Map for Wells in the ACRP Vicinity

While the lower elevations of Sunol Valley are overlain by alluvial deposits with apparent high transmitting capacity, practically all known supply wells in the project vicinity are completed at depths that tap older bedrock formations (see compiled data for supply wells from Zone 7 in **Table 5.16-5**). As discussed below, this is because the alluvial materials are not suitable for most beneficial uses due to their occurrence as thin surficial deposits that are seasonally influenced by local streams. Notably, shallow groundwater in these alluvial materials was produced from horizontal infiltration galleries immediately above the Sunol Water Temple. The galleries intercepted underflow from Alameda Creek and were constructed by the Spring Valley Water Company prior to San Francisco's acquisition of the Alameda Creek watershed property and facilities. Yield from the off-stream galleries was augmented by impounding water in overlying basins to increase infiltration rates.

### TABLE 5.16-5
### DATA FOR WATER SUPPLY WELLS IN ACRP VICINITY

| Well Number | Use | Date Completed | Depth | Diameter | Screen Top | Screen Bottom |
|---|---|---|---|---|---|---|
| 4S/1E 8K 1 | irrigation | 03/13/1997 | 420 | 4.5 | 100 | 420 |
| 4S/1E 8K 2 | irrigation | 09/17/1996 | 300 | 5 | 0 | 0 |
| 4S/1E 10P 2 | domestic | 06/15/1974 | 100 | 8 | 45 | 96 |
| 4S/1E 10P 3 | supply | 06/15/1978 | 328 | 10 | 30 | 324 |
| 4S/1E 16F 2 | domestic | 01/07/1980 | 315 | 12 | 45 | 275 |
| 4S/1E 16F 3 | domestic | 04/12/1990 | 420 | 6 | 60 | 420 |
| 4S/1E 16L 1 | industrial | 09/10/1963 | 442 | 12 | 25 | 442 |
| 4S/1E 20A 1 | supply | 02/17/1981 | 250 | 6 | 40 | 250 |
| 4S/1E 20A 2 | irrigation | 12/04/1973 | 140 | 10 | 25 | 126 |
| 4S/1E 20B 1 | domestic | 05/22/1962 | 152 | 10 | 23 | 141 |
| 4S/1E 20E 1 | irrigation | 10/07/1985 | 430 | 6 | 60 | 410 |
| 4S/1E 20G 1 | domestic | 06/24/1976 | 244 | 10 | 48 | 236 |
| 4S/1E 20G 2 | supply | no data | no data | | | |
| 4S/1E 20G 3 | irrigation | 11/09/2001 | 240 | 5 | 0 | 0 |
| 4S/1E 20G 4 | supply | - | 131 | 4 | 80 | 125 |
| 4S/1E 20G23 | supply | 12/12/2002 | 153 | 10 | 60 | 0 |
| 4S/1E 20H 2 | domestic | 02/03/1977 | 240 | 12 | 46 | 208 |
| 4S/1E 20K 1 | supply | 04/03/1989 | 314 | 0 | 74 | 304 |
| 4S/1E 20K 2 | domestic | 11/08/1981 | 260 | 6 | 100 | 260 |
| 4S/1E 20K 3 | domestic | 05/14/1999 | 133 | 6 | 42 | 133 |
| 4S/1E 20K 4 | domestic | 08/28/2001 | 450 | 6 | 180 | 450 |
| 4S/1E 20K 5 | domestic | 09/26/2011 | 210 | 6 | 50 | 210 |
| 4S/1E 8Q 6 | domestic | no data | no data | | | |

SOURCE: Zone 7 Water Agency, Figures showing wells located in Sunol Valley Groundwater Basin, April 2016

The numerous supply wells used for small-scale domestic and irrigation purposes are low yielding due to the nature of the older geologic bedrock formations in which they are completed. These formations, which are exposed locally above the valley floor, are compacted, low permeability, and structurally deformed yielding water through fractures and joints. Groundwater recharge is mainly from precipitation and groundwater flow is through connected fracture networks. A bedrock source is classified by DWR as a hard-rock environment and characterized as low-yielding and highly variable in occurrence and reliability. For most municipal, agricultural, and industrial uses, bedrock formations are considered non-water bearing.

Under the state 2014 Sustainable Groundwater Management Act (SGMA)[9], the legislature directed DWR to rank all groundwater basins and subbasins according to criteria reflecting current and future sustainability. DWR used the California Statewide Groundwater Elevation Monitoring (CASGEM) basin prioritization process to rank basins as High, Medium, Low, or Very Low priority.[10] High and Medium ranked basins are required to be managed under Groundwater Sustainability Plans by 2020 and 2022, depending on whether critical conditions of overdraft are present. The Sunol Valley Groundwater Basin was ranked Very Low priority and is exempt from SGMA regulations. CASGEM ranking criteria were scored and weighted based on available information for each basin. The Sunol basin scored low for all CASGEM criteria reflecting the small magnitude of available groundwater resources. The ranking criteria are listed below:

1. Population
2. Population Growth
3. Public Supply Wells
4. Total Wells
5. Irrigated Acreage
6. Groundwater Reliance
7. Impacts
8. Other Information

Consistent with its Very Low CASGEM ranking, there appears to be little potential for increased groundwater development and use in the Sunol Valley Groundwater Basin. This is due to the characteristics of the older geologic bedrock formations that are the primary sources of local supply. The state has not previously monitored local groundwater conditions nor is it currently monitoring wells in the basin (DWR Water Data Library[11]). By contrast and as discussed in the following sections, the ACRP project taps water from Pit F2 which is fed by subsurface flow within shallow alluvial deposits at lower elevations along the Alameda Creek alignment. Both SFPUC and local aggregate companies have conducted detailed geotechnical and water resources investigations focusing on the shallow alluvial materials and underlying aggregate resources in the project vicinity. SFPUC has continuously monitored groundwater conditions in the shallow alluvial materials for over 10 years while more limited monitoring has been performed by local quarry operators.

### Younger Geologic Units

A sequence of younger alluvial fan and stream-deposited alluvium units occur in the Sunol Valley along stream channels. These units consist of unconsolidated gravel, sand, silt, and clay

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[9] http://www.water.ca.gov/groundwater/sgm/index.cfm, Accessed April 4, 2016.
[10] http://www.water.ca.gov/groundwater/casgem/basin_prioritization.cfm, Accessed April 4, 2016.
[11] http://www.water.ca.gov/waterdatalibrary, Accessed April 4, 2016.

beds. Because of its loose nature, the alluvium has high porosity and permeability, and has favorable transmitting properties. Evidence of this includes substantial water flow encountered in shallow excavations in quarry areas, which in some cases necessitate installation of cutoff walls to control influx into active pits.

The alluvium has been mapped in the Sunol Valley based on topographic expression, relative elevations, soil development, and interpretation of relative age relationships. The most common mapping subdivisions include four subunits: Stream Channel Gravels (Qg); Younger Alluvium (Qa); Older Alluvium (Qoa); and Terrace Deposits (Qt).[12]

***Stream Channel Gravels (Qg)***

This unit consists of sand and gravel along the lowest elevations of stream channels of Alameda Creek and San Antonio Creek, and other tributary streams.[13] Its occurrence and properties are important because it comprises the Alameda Creek stream bed and serves as a conduit between surface water and groundwater. The distribution of Stream Channel Gravels is shown in **Figure 5.16-11**.

***Younger Alluvium (Qa)***

Younger Alluvium underlies the Stream Channel Gravels and occurs on surfaces of slightly higher elevation adjacent to streams and on the valley floor. The unit consists of unconsolidated sand and gravel with interbedded clay and silt and represents floodplain, stream channel and alluvial fan deposits. The Stream Channel Gravels and Younger Alluvium comprise a shallow aquifer system in the project area. The Stream Channel Gravels and Younger Alluvium are up to 30 feet in thickness in the quarry reach just upstream of the ACRP project area, decreasing to less than 15 feet near the Arroyo de la Laguna. By virtue of their thin nature, this shallow aquifer has limited storage capacity.

***Older Alluvium (Qoa)***

Older Alluvium occurs on slightly steeper slopes marginal to the valley sides and extending as gently rising alluvial fan surfaces. These deposits appear to consist of slightly older alluvial fan deposits of sand and gravel possibly with a thin soil development at the surface. The Older Alluvium appears to have higher clay and fines content from weathering and other processes reducing its ability to transmit groundwater.

***Terrace Deposits (Qt)***

Terrace deposits occur at slightly higher topographic elevations above the older alluvium surface, and show a generally deeper dissection by erosion. Terrace Deposits occur as isolated benches above the stream channels to the south. By its limited occurrence within the project area, this unit is not part of the shallow aquifer conceptualization used to describe the ACRP project conditions and potential impacts.

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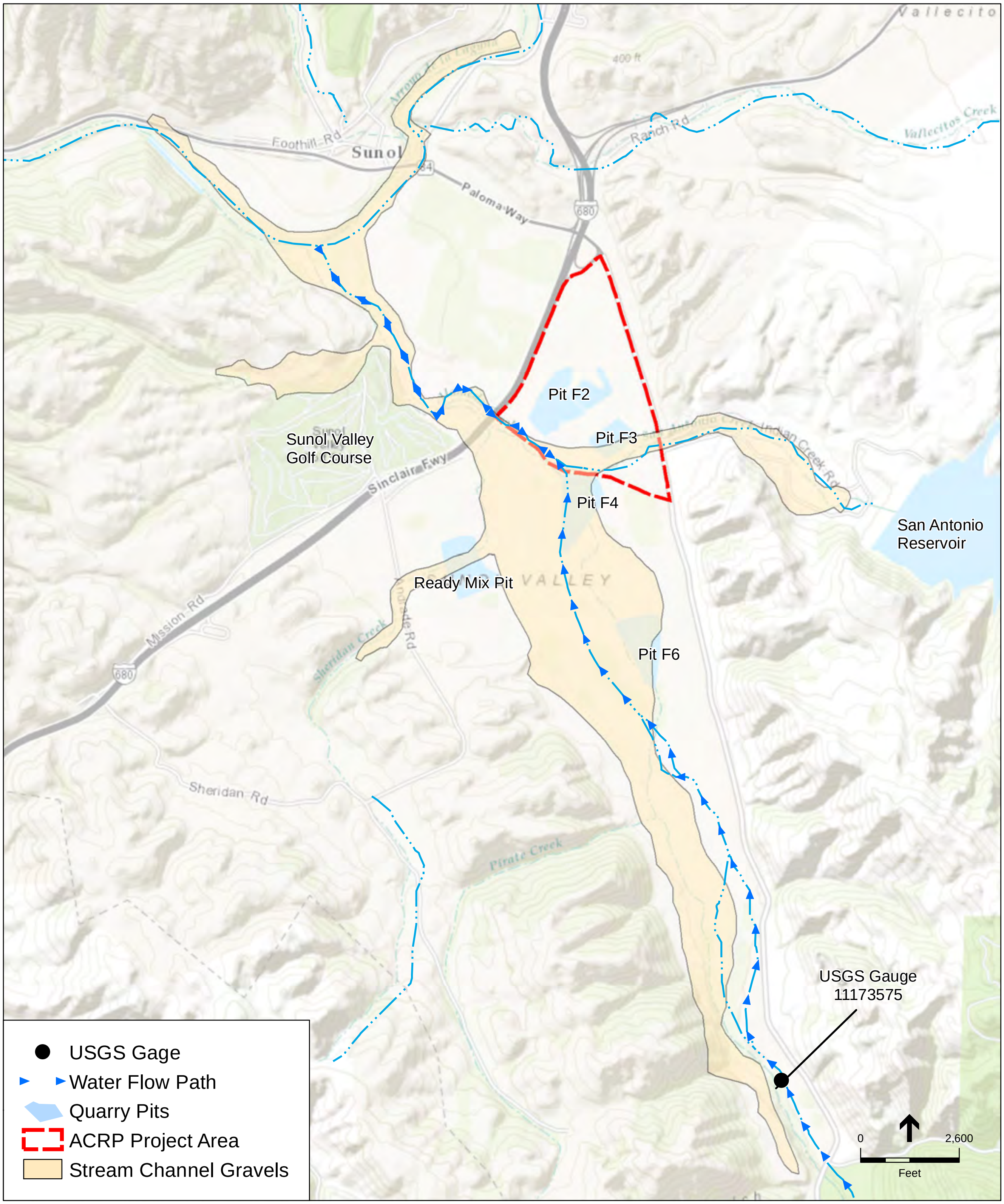
[12] These are consistent with the alluvium units in Section 5.15, Geology and Soils where Qhc and Qha are equal to Qg and Qa in this section, respectively.

[13] LSCE. 1993. *Ground-Water and Aggregate Resources, Sunol Valley*. Prepared for San Francisco Water Department. December 1993. Prepared by Luhdorff & Scalmanini Consulting Engineers.



SOURCE: SFPUC, 2015. Modeling node and monitoring well locations. August 6, 2015

SFPUC Alameda Creek Recapture Project

**Figure 5.16-11**

Distribution of Stream Channel Gravels (Qg) in the Project Area

Underlying the alluvium is the older Livermore Gravels (QTl). This unit is dominated by weakly compacted, thick, cobble to pebble gravel beds interlayered with sand and mudstone beds. The gravel and sand beds have variable quantities of clay matrix that reduce their porosity and permeability. The Livermore Gravels are exposed to the east of the Calaveras Fault north of San Antonio Creek and extensively around the Livermore Valley. West of the Calaveras Fault, outcrop exposures are more limited around Sunol Valley. The Livermore Gravels may extend to depths greater than 500 feet and is the primary target of aggregate mining in the valley.

Differentiation of the various alluvium deposits in Sunol Valley is uncertain due to their similar lithologic character. The uncertainty is complicated by similarities between the alluvium and underlying Livermore Gravels, where present. The contact between the alluvium and the more consolidated terrace deposits and Livermore Gravels are sometimes evident in exposures in quarry pits. LSCE (1993 and 2009)[14,15] found limited available groundwater level data for the underlying Older Alluvium and Livermore Gravels. Testing of a deep well at SMP 30 indicated very low yield similar to fractured bedrock formations and water levels from deeper wells suggested either confinement and/or limited deep percolation of recharge into these formations. Within the project area, groundwater data from monitoring wells discussed in this section and in Appendix HYD2 provide a clear boundary for the base of the Stream Channel Gravels and Younger Alluvium units that comprise a shallow aquifer system connected to Alameda Creek. This boundary is the maximum depth to which surface water can percolate and move as underflow and is relevant to the evaluation of the project hydraulic processes. **Figure 5.16-12** shows the younger geologic units described above in relation to the project area.

### Shallow Groundwater System

Groundwater systems are characterized through hydrogeologic factors, which embody the structure and characteristics of an aquifer, and processes of recharge, storage, and discharge. A hydrogeologic conceptualization is a fundamental description of a groundwater system that serves as a basis for evaluating groundwater resources in general and, for the ACRP project, a means to describe groundwater-surface water interactions that are integral to the ACRP project operations. The term "conceptualization" is used because many attributes of a groundwater system are inferred or interpreted from related observations or measurements. For the study area setting, groundwater levels and surface water elevations in quarry pits, plus Alameda Creek streamflow provide a basis to describe existing conditions and with-CDRP conditions from elements of a hydrogeologic conceptualization.

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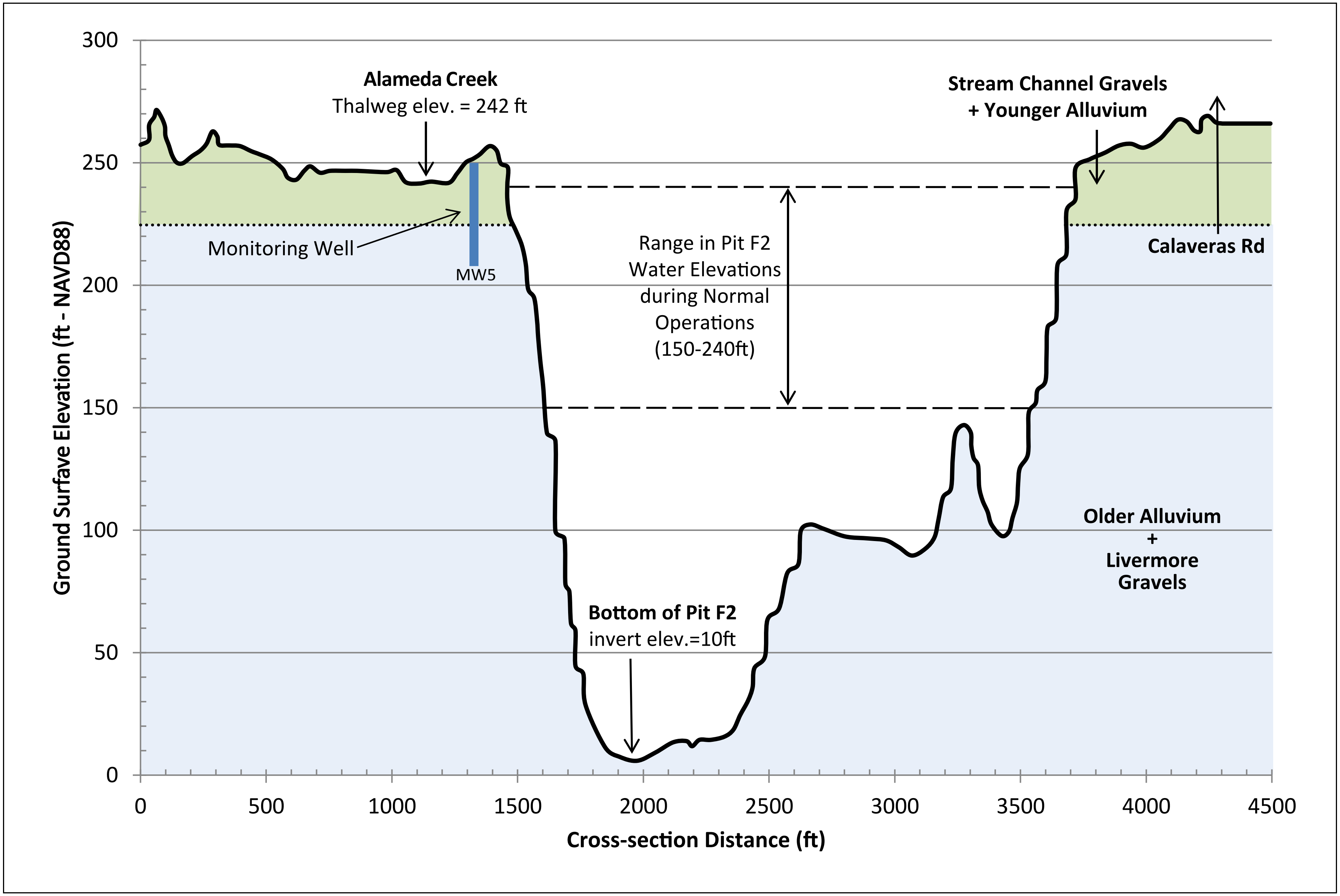
[14] LSCE. 1993. *Ground-Water and Aggregate Resources, Sunol Valley*. Prepared for San Francisco Water Department. December 1993. Prepared by Luhdorff & Scalmanini Consulting Engineers.

[15] LSCE. 2009. *Final Report, Feasibility to Recapture Reservoir Releases, Alameda Creek*. Prepared for San Francisco Public Utilities Commission. April 22, 2009. Prepared by Luhdorff & Scalmanini Consulting Engineers.



SOURCE: Dhakal, 2015; Luhdorff & Scalmanini, 2015

NOTES: Hanson survey data extracted from a presentation given by Dhakal on February 4, 2015.

SFPUC Alameda Creek Recapture Project

**Figure 5.16-12**

Geologic Cross-Section for ACRP Project Vicinity

### *Groundwater and Surface Water Data*

The primary groundwater dataset consists of water levels from 10 monitoring wells installed in the project vicinity (see **Figure 5.16-13**). The data span 2006 to present. Other groundwater data from previous SFPUC water resources investigations by LSCE (1993 and 2009) and recent monitoring by the SMP 30 operator were also reviewed. **Figure 5.16-14** presents a representative hydrograph for a monitoring well along Alameda Creek near the confluence of San Antonio Creek in the project area. A complete set of hydrographs is included in Appendix HYD2. A similar dataset for quarry pit water elevations was also used to assess the relationship between shallow groundwater and impounded water in the quarry reach where ACRP Pit F2 is located and is also included in Appendix HYD2. All hydrographs incorporate Alameda Creek streamflow data from a USGS gage (1173575) located below Welch Creek.

The monitoring data span variable water-year types, seasonal variations in streamflow, and reflect influences of water management practices by quarry operators in the ACRP project vicinity.

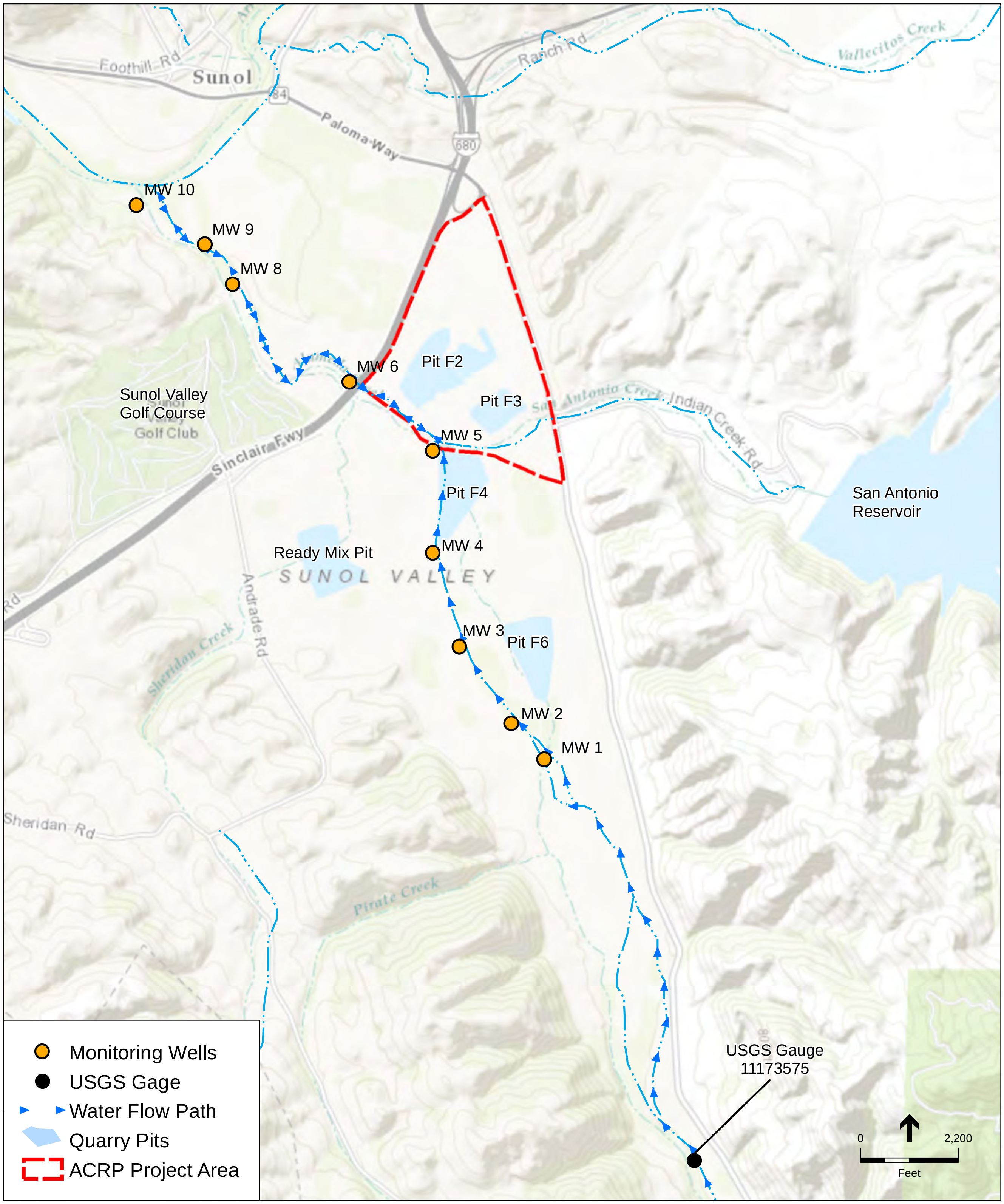
### *Aquifer Structure and Characteristics*

As detailed in Appendix HYD2, groundwater hydrographs were used to infer the base of the shallow aquifer and the boundary with the Older Alluvium and Livermore Gravels units along the valley floor below Welch Creek to Arroyo de la Laguna. By its depth and occurrence, the shallow alluvial aquifer materials, consisting of Stream Channel Gravels and Younger Alluvium, is the only groundwater source that could potentially be influenced by ACRP construction or operations. Peak water levels indicate the maximum groundwater storage capacity of the aquifer. As seen in the monitoring well hydrographs, these features are generally evident on a seasonal basis.

Groundwater monitoring data also indicate that the aquifer system has decreasing volume in the lower reaches of the study area to Arroyo de la Laguna. This is reflected in lower amplitude of groundwater fluctuations as seen through a comparison of the hydrograph in Figure 5.16-14 for MW5 located near the confluence of San Antonio and Alameda Creeks with that for a monitoring well in the lower reach in **Figure 5.16-15, MW8** located along Alameda Creek just upstream of the confluence with Arroyo de la Laguna.

### *Recharge, Storage, and Discharge Processes*

The monitoring well data reflect processes of groundwater recharge, storage, and discharge in the project area. Recharge is seen in the strong correlation between Alameda Creek flow and groundwater levels. The rapid recession of groundwater after peak streamflow events indicates limited available aquifer storage and that discharge from the system occurs continuously as evident in the steep drop off in water levels after streamflow/recharge declines in the late spring to early summer months. **Figure 5.16-16** shows a detail of a monitoring well hydrograph exhibiting recharge, storage, and discharge processes. **Figure 5.16-17** shows conceptual cross sections depicting the relationship between streamflow and groundwater levels for the project area. As concluded from analysis presented in Appendix HYD2, there is little evidence that other sources, such as the older bedrock formations tapped for local domestic and irrigation supply, provide significant recharge to the shallow aquifer in the project area.

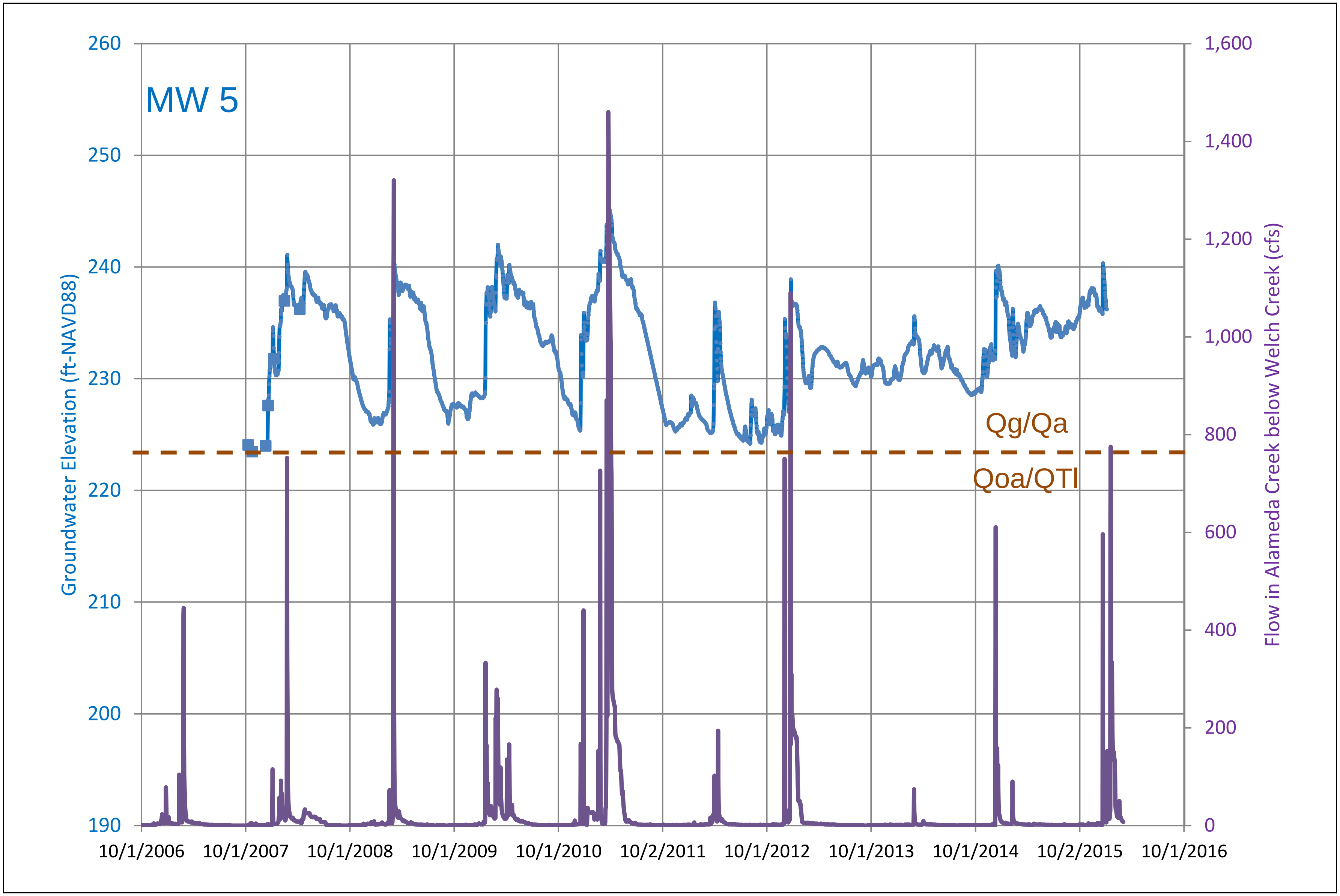


SOURCE: SFPUC, 2015. Modeling node and monitoring well locations. August 6, 2015

SFPUC Alameda Creek Recapture Project

**Figure 5.16-13**

Location Map for Monitoring Wells in the ACRP Vicinity

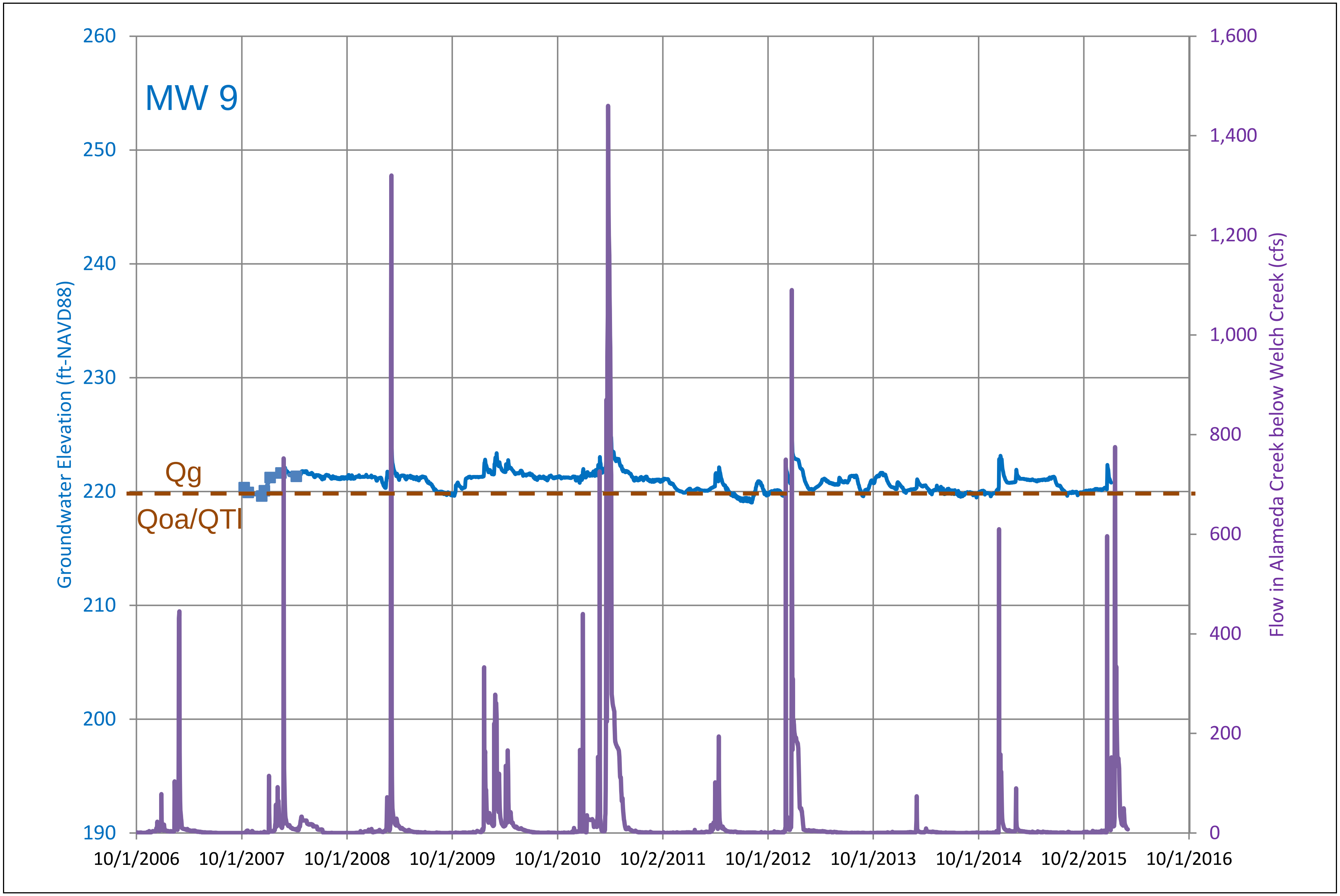


SOURCE: SFPUC, 2015. MW-4-6 and 8-10 Piezometric data. Excel spreadsheet file provided by Amod Dhakal 6/17/2015.

SFPUC Alameda Creek Recapture Project

**Figure 5.16-14**

Representative Groundwater Hydrograph for MW 5
Near Confluence of San Antonio and Alameda Creeks



SOURCE: SFPUC, 2015. MW-4-6 and MW 8-10 Piezometric Data. Excel spreadsheet file provided by Amod Dhakal 6/17/2015.

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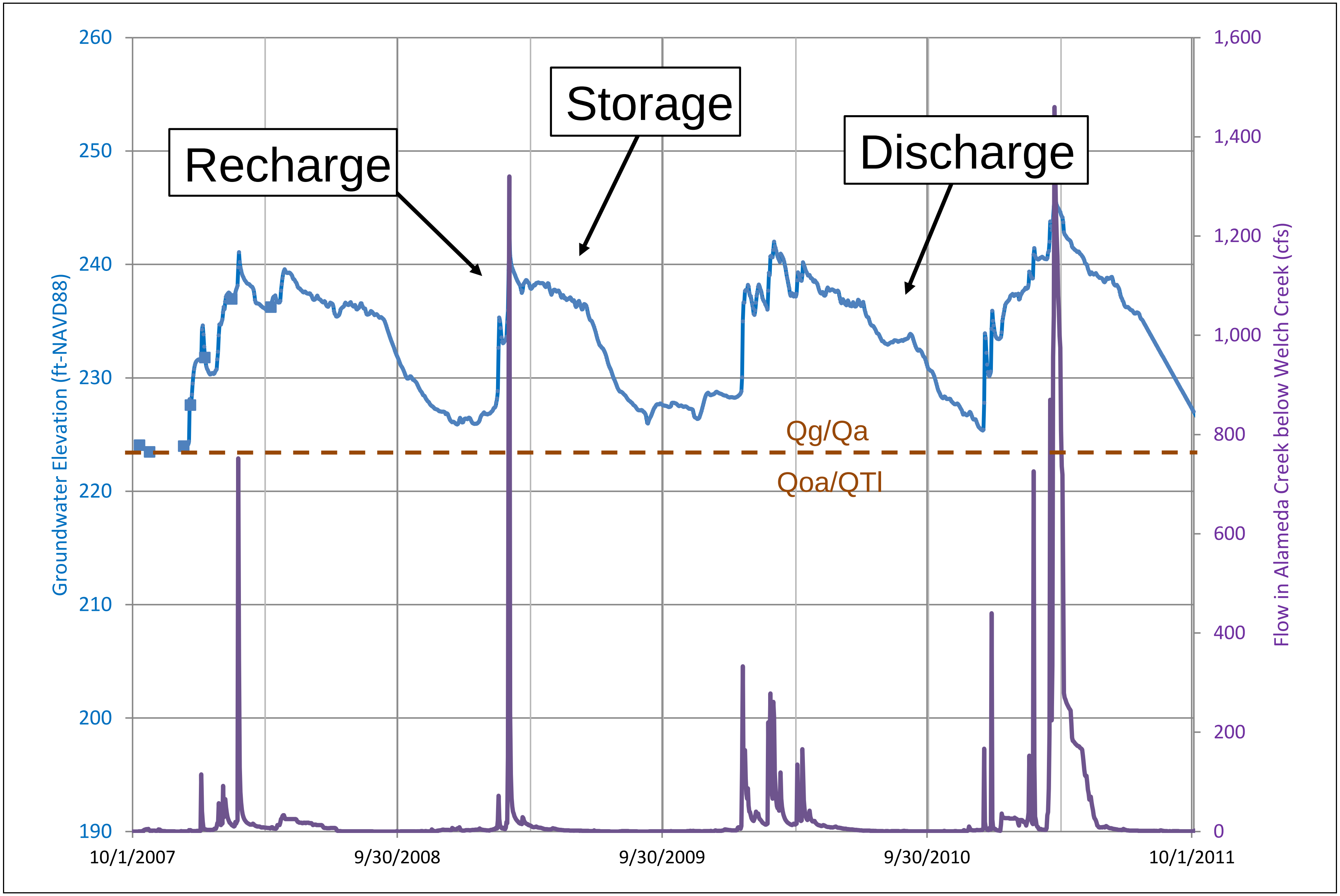
**Figure 5.16-15**

Representative Groundwater Hydrograph for MW 8, Lower Reach, Near Confluence with Arroyo del la Laguna



SOURCE: SFPUC, 2015. MW-4-6 and MW 8-10 Piezometric data. Excel spreadsheet file provided by Amod Dhakal 6/17/2015.

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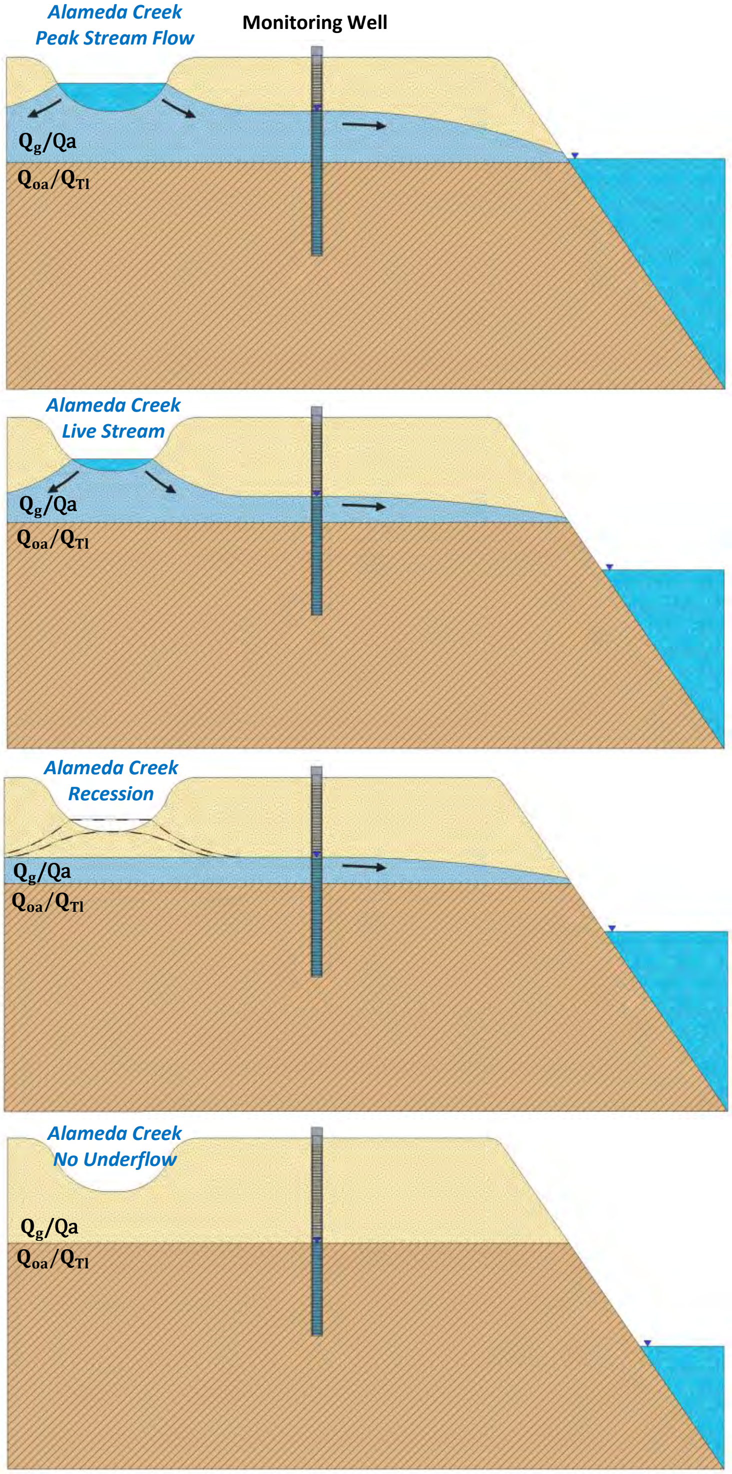
**Figure 5.16-16**

Hydrograph showing Recharge, Storage, and Discharge Processes



SOURCE: Luhdorff & Scalmanini (2016)

SFPUC Alameda Creek Recapture Project

**Figure 5.16-17**

Conceptual Cross Section Showing Groundwater-Surface Water Interaction

### *Groundwater and Surface Water Interactions*

The interaction of groundwater and surface water is evident in the monitoring well hydrographs and streamflow data from the USGS gage below Welch Creek. In the reach between the Welch Creek and San Antonio Creek confluences, Alameda Creek streamflow splits into subsurface and surface components as surface water percolates through the Stream Channel Gravels and into unsaturated alluvium. Based on the hydrogeologic conceptualization for the project area, percolation is only within the Stream Channel Gravels and Younger Alluvium units and does not have significant influences within the underlying Older Alluvium and Livermore Gravels. Water in the saturated portion of the shallow aquifer then flows under the prevailing down-valley gradient governed by the hydraulic properties of the sand and gravel aquifer materials. For this component of flow, the terms groundwater, subsurface flow, and underflow are interchangeable.

The component of streamflow that enters the subsurface in Alameda Creek above the quarry reaches follows two pathways through the project area. First, a fraction seeps into quarry pits through the Stream Channel Gravels as shown conceptually in **Figure 5.16-18**. This pathway is evident through seepage faces of quarry excavations and is measurable through the rise in water levels in pits in wet months when groundwater and surface water flows peak. Seepage has also been well documented through numerous fishery studies including Trihey & Associates (2003)[16] and McBain and Trush (2008)[17] and SFPUC, ACWD, and McBain and Trush (2012).[18]

Water that seeps into the quarry pits generally has no outlet unless pit levels rise above the base of the shallow aquifer. Therefore, water that seeps into a quarry pit is stored unless it is removed by pumping through operator NPDES discharges to the creek and/or consumptive use through processing, with some fraction lost through evaporation, and/or seepage out of the pits when levels rise above the groundwater elevation in the shallow aquifer.

The second pathway for the subsurface component of total flow follows the stream channel as underflow past the quarry reaches and ultimately to the confluence of Alameda Creek and Arroyo de la Laguna. Below Interstate 680, groundwater may be consumptively used by riparian vegetation and some is intercepted in the historical infiltration gallery system. The flow pathways described above are shown schematically in **Figure 5.16-19**.

Existing subsurface water conditions in 2015 can be directly observed using monitoring well data located upstream from the ACRP project area to Arroyo de la Laguna (see complete set of hydrographs in Appendix HYD2). Groundwater levels peaked in early and late 2015 in response to seasonal precipitation and runoff via Alameda Creek. In dry months, the existing conditions reflect

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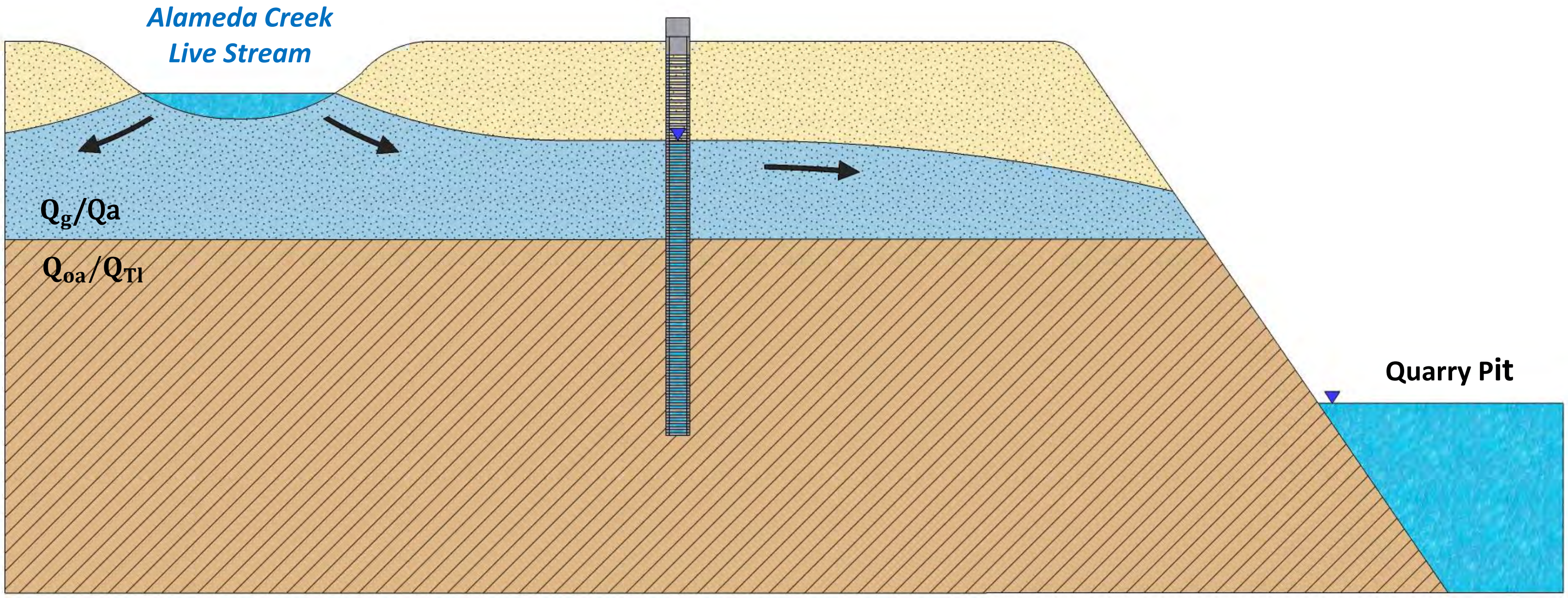
[16] Trihey & Associates, Inc., 2003. *Sunol Valley Surface Flow Study, Fall 2001,* Prepared for the Office of the City Attorney, City and County of San Francisco.

[17] 2008. McBain & Trush, Inc. *Alameda Creek Population Recovery Strategies and Instream Flow Assessment for Steelhead Trout, Final Study Plan*. Prepared for Alameda Creek Fisheries Restoration Workgroup. January 2008.

[18] SFPUC, ACWD, and McBain & Trush, Inc. 2012. *Draft Technical Memorandum, Overview of Methods, Models, and Results to Develop Unimpaired, Impaired, and Future Flow and Temperature Estimates along Lower Alameda Creek for Hydrogeologic Years 1996 to 2009*. Prepared for Alameda Creek Fisheries Workgroup – Flows Subcommittee. April 13, 2012.

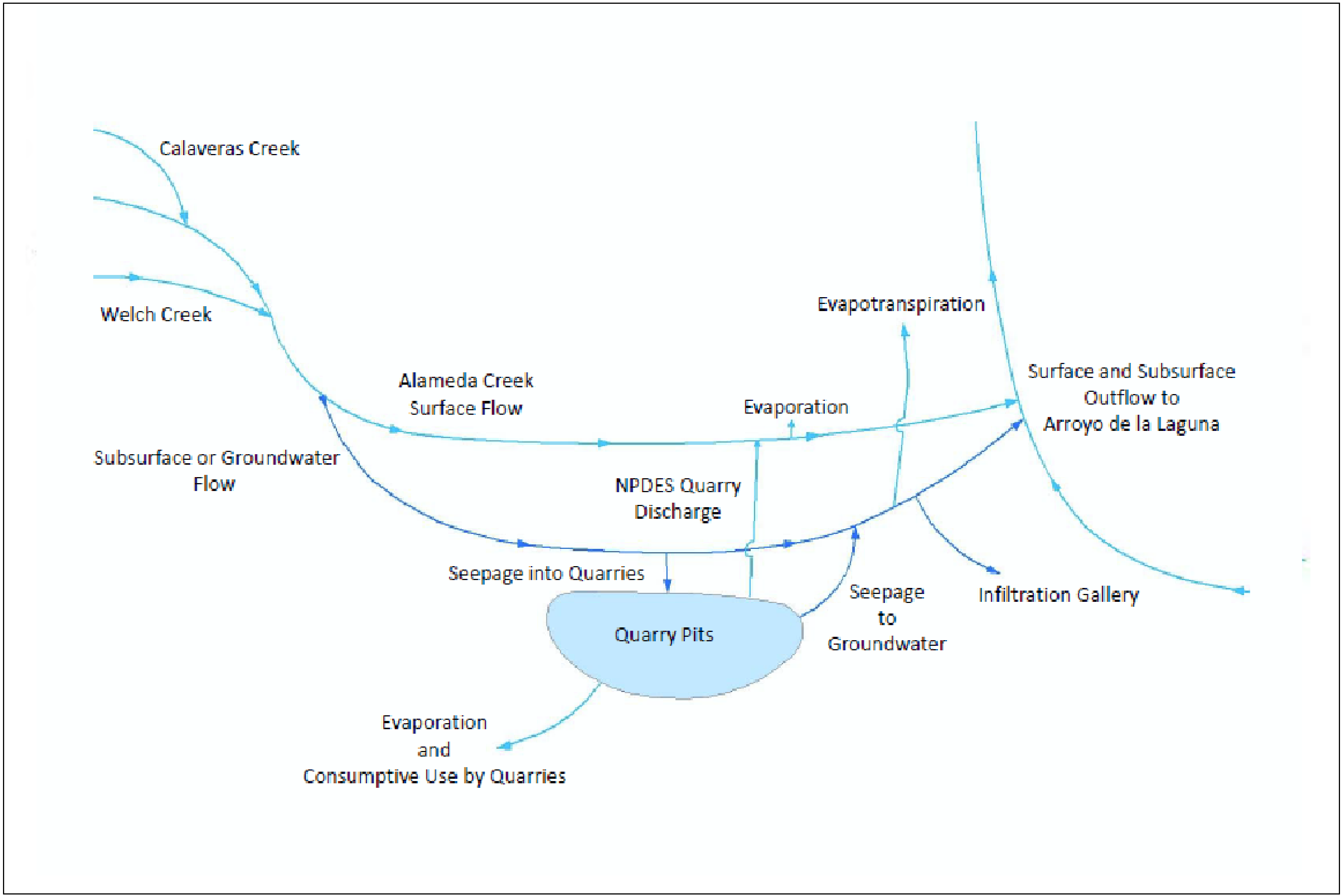


SOURCE: Luhdorff & Scalmanini (2016)

SFPUC Alameda Creek Recapture Project

**Figure 5.16-18**

Seepage from Shallow Aquifer into Quarry Pits



SOURCE: Luhdorff & Scalmanini (2016)

**Figure 5.16-19**
Groundwater-Surface Water Pathways in the Project Area

higher groundwater levels than in previous years. As detailed in Appendix HYD2, the higher levels were induced by recently changed water management practices at SMP 30, which included no NPDES discharges to the creek and resulted in continuously elevated storage levels in Pit F4 and Pit F3 West. The higher groundwater levels through the project area to below Interstate 680 through the summer and fall indicate continuous seepage from these pits into the shallow aquifer, which otherwise would have drained to the Older Alluvium/Livermore Gravels boundary as observed in previous years. The hydraulic connection between impounded surface water in quarry pits and groundwater is shown in **Figure 5.16-20**, which depicts the similarity in patterns between measured water levels in Pit F3 West and groundwater levels in MW5 and detailed in Appendix HYD2.

### *With-CDRP Conditions*

Under the with-CDRP conditions, the Sunol Valley Groundwater Basin, water supply wells, and Younger Geologic Units will be same as under existing conditions. However, there will be some changes in the shallow groundwater system.

Under the with-CDRP conditions, Calaveras Dam will operate at full capacity and instream flow requirements and bypassed flow at the Alameda Creek Diversion Dam will be implemented (see detailed descriptions in Section 5.16.4, above). During wet months (November to April), peak Alameda Creek flows will exceed available storage space in the shallow aquifer and will also exceed seepage rates into mining pits (see Appendix HYD1). A live stream will prevail through all the subreaches with bypass flows at the ACDD serving to attenuate groundwater recession between storm events.

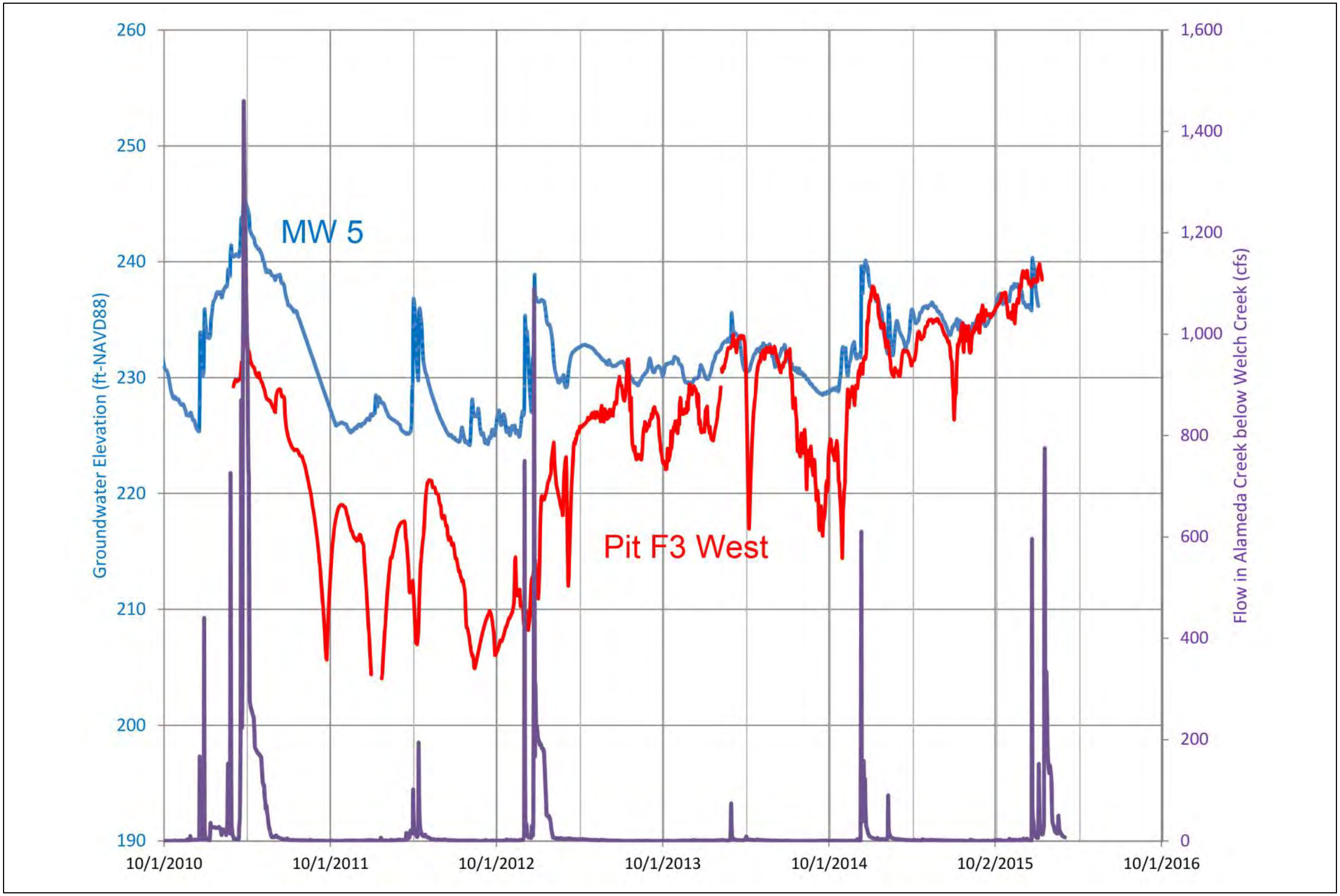
From May 1 through September 30 of each year, instream releases from Calaveras Reservoir will range from 7 to 12 cfs for dry and normal/wet schedules, respectively. At these release rates, the instream releases would induce higher groundwater levels, and seepage into the quarry pits would be rejected if high surface water levels are present in the quarry pits. The higher groundwater levels represent greater underflow through the quarry reach to Arroyo de la Laguna. The maximum possible increase in underflow is equal to the instream release schedule when there is no seepage to pits because they are full, and assuming no consumptive or evaporative losses associated with that flow stream.

## 5.16.2.6 Water Quality

### *Alameda Creek*

#### Existing Conditions

Data on water quality in Alameda Creek upstream of its confluence with the Arroyo de la Laguna are limited, but the available data are sufficient to conclude that water quality is generally good and consistent with what would be expected from a watershed that consists of undeveloped rangeland, parkland and land set aside as a water supply catchment. Upstream of the quarry reach, there are no point sources of wastewater discharge to Alameda Creek and water primarily enters the creek as surface runoff during storms.



SOURCE: SFPUC, 2016. Alameda Creek Recapture Project (ACRP) Monitoring Well Data

SFPUC Alameda Creek Recapture Project

**Figure 5.16-20**
Hydraulic Connection between Pit F3 West and Groundwater at MW5

There are three permitted discharges of wastewater to Alameda Creek within the quarry reach. Two of the discharges, Hanson Aggregates and ODS, are permitted to discharge water from the quarries at several locations on Alameda Creek. Most of the discharges from the quarries to Alameda Creek occur just downstream of the San Antonio Creek confluence. The volumes of water discharged by the two quarry operators in the recent past are shown in Table 5.16-4, above.

Hanson Aggregates and ODS have monitored the quality of the water that they discharge for several years in accordance with the terms of their general discharge permit (SF Bay RWQCB Order No. R2-2008-0011, NPDES General Permit No. CAG982001). The permits require that the discharges must contain no more than 40 NTU of turbidity and no more than 500 mg/l of total dissolved solids. No violations of these limits have occurred in the last five years. As the water pumped from the pits is essentially subsurface water from Alameda Creek, the discharge to Alameda Creek probably has little effect on the chemical quality of creek water.

The third permitted discharge is planned discharges of water from the SFPUC's regional water system. Planned discharges occur infrequently during maintenance of water supply facilities. SF Bay RWQCB Order No. R2-2008-0102 (Waste Discharge Requirements for the SFPUC Drinking Water Transmission System) regulates discharges of altered water from the SFPUC Drinking Water Transmission System. The Order serves as an NPDES permit for point-source discharges from the SFPUC regional water system to surface waters of the United States or of the state. For planned and emergency discharges of treated water from the regional water system to waters of the United States or waters of the state, including discharges to San Antonio Creek and San Antonio Reservoir, the Order mandates that the treated water be dechlorinated and pH-adjusted prior to discharge. Because any water discharged to Alameda Creek by the SFPUC is untreated water from Alameda Creek or the Tuolumne River in the Sierra Nevada, it is not expected to have an adverse effect on water quality in Alameda Creek.

Very little ambient water quality data are available for Alameda Creek in the immediate vicinity of the proposed project. In March 2008, SFPUC biologists measured turbidity in Alameda Creek at three locations close to the proposed project area: just above the San Antonio Creek confluence; at the confluence; and just below the confluence. The measurements all range between 0.84 and 2.7 NTU, indicating that creek water at these locations was fairly free of suspended material.[19]

Fairly extensive water quality data were gathered by the SFPUC at several locations along Alameda Creek between 1998 and 2007 as part of a multi-year monitoring program to characterize conditions in the creek. The monitoring program was a provision of a Memorandum of Understanding (MOU) between the SFPUC and the California Department of Fish and Wildlife (CDFW), then the California Department of Fish and Game (See Section 5.16.4 for more information on the MOU). Although the sampling locations were several miles upstream of the proposed project area, data obtained from the sampling program provide useful information on the general character of Alameda Creek water quality.

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[19] SFPUC, 2008. *San Antonio Creek Pre-discharge Monitoring Technical Memorandum*. March 2008.

Water quality data were obtained in the course of electro-fishing surveys that were a part of the multi-year monitoring program. The surveys were conducted in October of each year. **Table 5.16-6** shows average data from a sampling station in Alameda Creek located about 500 feet downstream of the Calaveras Creek confluence and about six miles upstream of the proposed project area. Data were taken in two fish habitat types, a pool flowing into a glide and a low-gradient riffle. **Table 5.16-7** shows average data from a sampling station located just downstream of the Calaveras Road Bridge and about three miles upstream of the proposed project area. Data were taken from three habitat types; a glide flowing into a deep pool that flowed back into a glide, a low gradient riffle flowing into a run, and a continuous run. Data from these two stations provide some insight into water quality in the fall when average daily flow in the creek is low, typically only 1 or 2 cubic feet per second. However, the data are the result of instantaneous measurements and offer no information on temporal variation of water quality characteristics.

### TABLE 5.16-6
### WATER QUALITY IN ALAMEDA CREEK BELOW CALAVERAS CREEK CONFLUENCE

| Year | Temperature (Celsius) | Turbidity (NTU) | pH | Dissolved Oxygen Content (mg/l) | Conductivity (mmhos/cm) |
|---|---|---|---|---|---|
| 1998 | NR[1] | 1.0 | 7.9 | 9.5 | 664 |
| 1999 | 15.0 | 2.0 | 7.3 | NR | 619 |
| 2000 | 10.2 | 0.6 | 8.1 | 8.1 | NR |
| 2001 | NR | NR | NR | NR | NR |
| 2002 | 16.1 | 1.3 | 8.1 | 8.1 | NR |
| 2003 | 14.9 | 0.4 | 7.9 | 8.4 | 580 |
| 2004 | 13.9 | 0.7 | 7.4 | 6.1 | 1,030 |
| 2005 | 13.6 | 0.5 | 8.0 | 9.0 | 793 |
| 2006 | 14.2 | 0.4 | 8.2 | 8.2 | 599 |
| 2007 | 13.9 | 0.8 | 8.1 | NR | 828 |

[1] NR = Not recorded.

SOURCE: SFPUC, 1998-2007. Alameda Creek Aquatic Resource Monitoring Reports, 1998 -2007. San Francisco Public Utilities Commission Water Quality Bureau. Sunol, CA.

### TABLE 5.16-7
### WATER QUALITY IN ALAMEDA CREEK BELOW CALAVERAS ROAD BRIDGE

| Year | Temperature (Celsius) | Turbidity (NTU) | pH | Dissolved Oxygen Content (mg/l) | Conductivity (mmhos/cm) |
|---|---|---|---|---|---|
| 1998 | NR[1] | NR | 7.1 | 9.4 | NR |
| 1999 | 16.6 | 1.0 | 7.0 | NR | 515 |
| 2000 | 14.8 | 0.6 | 7.9 | 8.5 | NR |
| 2001 | 15.7 | 1.1 | 7.4 | 4.3 | NR |
| 2002 | 13.4 | 2.0 | 7.7 | 6.3 | NR |
| 2003 | 17.5 | 0.4 | 7.3 | 6.4 | 978 |
| 2004 | 16.0 | 0.4 | 7.4 | 6.8 | 596 |
| 2005 | 17.5 | 1.2 | 7.4 | 6.4 | 538 |
| 2006 | 16.3 | 0.7 | 7.7 | 5.5 | 566 |
| 2007 | 13.7 | 0.9 | 7.7 | NR | 522 |

[1] NR = Not recorded.

SOURCE: SFPUC, 1998-2007. Alameda Creek Aquatic Resource Monitoring Reports, 1998 -2007. San Francisco Public Utilities Commission Water Quality Bureau. Sunol, CA.

Alameda Creek water was fairly free of turbidity (suspended material) at both sampling stations and pH was in the normal range for natural waters, and in compliance with state objectives (see Section 5.16.3, below, for a description of San Francisco Bay Basin Plan water quality objectives). Dissolved oxygen content was higher at the upstream station and usually in compliance the state's objective for cold-water fish. At the downstream station, dissolved oxygen content was usually in compliance with the state's objective for warm-water fish but was rarely in compliance with the cold-water fish objective. Electric conductivity of surface water at the upper station averaged 752 millimhos per centimeter (mmhos/cm); at the downstream station it averaged 629 mmhos/cm. These values correspond roughly with total dissolved solids contents of 500 mg/l and 420 mg/l, respectively, which exceed the state's water quality objective of 250 mg/l. Alameda Creek water was warmer at the downstream sampling station than it was at the upstream one.

As part of the monitoring program, the SFPUC installed continuously-recording water temperature measuring devices at several locations along Alameda Creek. The highest water temperatures at all locations on Alameda Creek were recorded in the months of July, August, and September. **Table 5.16-8** summarizes water temperature data obtained from a device located in Alameda Creek about 500 feet downstream of the Calaveras Creek confluence. Temperatures were measured every 15 minutes and exhibited considerable fluctuations during the day. The greatest fluctuations occurred in the warmest months.

**TABLE 5.16-8
WATER TEMPERATURE AND DIURNAL TEMPERATURE FLUCTUATION
IN ALAMEDA CREEK BELOW CALAVERAS CREEK CONFLUENCE (degrees C)**

| Year | Water Temperature | | | Diurnal Water Temperature Fluctuation | | |
|---|---|---|---|---|---|---|
| | Average | Maximum | Minimum | Average | Maximum | Minimum |
| 2000 | 17.9 | 24.0 | 7.3 | 8.0 | 12.7 | 1.7 |
| 2001 | 19.6 | 24.2 | 10.6 | 8.6 | 13.5 | 0.7 |
| 2002 | 15.4 | 21.3 | 6.6 | 7.1 | 13.4 | 1.1 |
| 2003 | 18.0 | 23.0 | 9.2 | 7.0 | 10.2 | 2.0 |
| 2004 | 19.2 | 23.7 | 9.6 | 8.4 | 12.0 | 2.0 |
| 2005 | 18.4 | 26.1 | 10.2 | 6.0 | 8.2 | 1.7 |
| 2006 | 18.0 | 24.1 | 18.0 | 5.4 | 9.9 | 1.8 |
| 2007 | 16.8 | 29.3 | 4.2 | 4.7 | 7.8 | 1.0 |

SOURCE: SFPUC, 1998-2007. Alameda Creek Aquatic Resource Monitoring Reports, 1998 -2007. San Francisco Public Utilities Commission Water Quality Bureau. Sunol, CA.

Several years ago, temperature measuring devices were installed at the USGS gages on Alameda Creek below the Calaveras Creek and Welch Creek confluences. The measurements made at the gage below the Calaveras Creek confluence between 2009 and 2014 were fairly consistent with the data shown in Table 5.16-8, although minimum water temperatures were a little lower. From 2008 to 2014, maximum temperatures at the gage below Welch Creek were in the range of 24 to 25 degrees C and minimums were in the range of 5 to 7 degrees C.

### With-CDRP Conditions

It is expected that water quality in Alameda Creek in the future will be very similar to current water quality. The only water quality characteristic that is expected to change from the existing condition is water temperature. Water temperature depends on a number of factors including the temperature of water released from reservoirs, solar radiation, shading, and stream flow, velocity, and depth. Completion of the CDRP will reduce the temperature of water available for release from the reservoir. Under the existing condition, the SFPUC can only store water up to elevation 705 feet; under with-CDRP conditions Calaveras Reservoir will store water up to elevation 756 feet. Water stored at depth will remain cool during the summer and will provide a source of cool water for release from the reservoir.

Completion of the CDRP will also alter stream flow in Alameda Creek as described in an earlier section. Assuming no change in shading, solar radiation or channel geometry, an increase in flow can be expected to reduce water temperature during warm weather, and a decrease in flow can be expected to increase it.

The net effect of the restoration of capacity at Calaveras Reservoir, the releases at Calaveras Reservoir, and the bypasses at the ACDD that are a part of the CDRP, will be a reduction in flow in Alameda Creek below the Welch Creek confluence under with-CDRP conditions compared to existing conditions on an average annual basis (see Appendix HYD1, Section 5). However, there will be more water in Alameda Creek between the Calaveras Creek confluence and the Welch Creek confluence under with-CDRP conditions than under the existing condition in July through November. This increase in stream flow during the hotter months combined with the availability of cool water from Calaveras Reservoir will likely result in a substantial reduction of water temperature in this reach of the creek compared to the existing condition. A greater proportion of the reach will likely be in compliance with the state's water quality objectives for cold-water fish.

There will be less water in the reaches of Alameda Creek downstream of the San Antonio Creek confluence under with-CDRP conditions than under existing conditions on an average annual basis. As in the reach above the San Antonio Creek confluence, there will be more water downstream of the San Antonio Creek confluence in the hotter months under with-CDRP conditions than under existing conditions. However, most of the increase in flow is attributable to the increase in estimated NPDES discharges from the quarries under with-CDRP conditions.

The increased NPDES discharge from the quarries under with-CDRP conditions would not be expected to have much effect on water quality in Alameda Creek. Water quality in the creek downstream of the San Antonio Creek confluence is already subject to the erratic and discontinuous influence of the quarry discharges. The increased quarry discharges will also occur erratically and discontinuously under with-CDRP conditions but with a greater magnitude. Any effect of the NPDES discharges on water quality is not likely to extend beyond the Arroyo de la Laguna confluence, where upper Alameda Creek waters are diluted with large quantities of water from the arroyo's watershed.

Because the water in the quarry pits is essentially Alameda Creek underflow, water discharged from the quarries is similar in chemical quality to creek water. The total dissolved solids concentrations of the NPDES discharges from the quarries would be expected to be similar to those of creek water. The NPDES discharge from the quarries usually contains more suspended material, measured as turbidity, than typical creek water, but concentrations are usually low and considerably below the discharge permit limit of 40 NTU.[20] Water pumped from near the surface of the pits to the creek would be expected to have fairly high dissolved oxygen content.

The temperature of water pumped from the uppermost layers of water in the pits to Alameda Creek probably reflects the average daily air temperature at the time the discharge is made. During the cooler high flow months, water temperature in the quarries is likely to be similar to the temperature of creek water under both existing and with-CDRP conditions. In the warmer months, there is no flow in the creek in the vicinity of the quarries, except that provided by the quarry discharges. The temperature of water pumped from the quarries in the warmer months will be essentially the same under existing and with-CDRP conditions.

### *Quarry Pits*

#### Existing Conditions

The SFPUC sampled water quality in Pit F3-East every month for a two-year period from 2012 to 2014.[21] The purpose of the sampling was to determine the suitability of water in Pit F3-East as a supplementary source of raw municipal water. The water quality characteristics measured were primarily those with relevance to human health and for which there are national drinking water standards. The study concluded that water in the pit was a suitable source of raw water for municipal use. Characteristics with relevance to Alameda Creek water quality that were measured included total dissolved solids and turbidity. The average total dissolved solids content was 369 mg/l and the maximum value was 434 mg/l. The average turbidity was 1.1 NTU and the maximum value was 7.2 NTU. The average values for both characteristics are similar to measured values for water samples taken from Alameda Creek near the quarries.

In addition, as described in Chapter 3, Project Description, in support of the ACRP, the SFPUC has conducted water quality monitoring in Pit F2 and in general, water quality data meet Title 22 standards. No pretreatment would be required prior to conveying the water to the Sunol Valley Water Treatment Plant or to San Antonio Reservoir.

No information is available on the quality of water in the other quarry pits, but it is expected that it is similar to water in Pit F3-East. The water in all the pits is probably chemically similar to the quality of Alameda Creek water because most of the water that percolates into the pits is subsurface water from Alameda Creek. The turbidity of water in some of the pits is temporarily increased when the gravel pit operators discharge wash water into them, but most of the suspended material

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[20] EMKO Environmental, Inc. 2011. Hydrology and Water Quality Analysis Report, SMP-30 Revised Use Permit, Alameda County, California. Prepared for Oliver de Silva, Inc. October 12, 2011.

[21] SFPUC, 2014. *Quarry Pond F3 East Water Quality Summary*. SFPUC Water Quality Engineering. August, 2014.

probably settles out in a matter of days after the discharge is discontinued. The quarry operators do not discharge water to Alameda Creek unless it is fairly silt free because they must meet discharge standards for turbidity.

**With-CDRP Conditions**

It is not expected that completion and commissioning of the CDRP will have any effect on water quality in the quarries.

## 5.16.2.7 Flood Hazard

### *Existing Conditions*

Flood hazard in the Sunol Valley is reduced by the operation of SFPUC's Calaveras and San Antonio Reservoirs. The purpose of the reservoirs is to store water for municipal supply, and although neither reservoir has a formal flood control obligation, the operation of the reservoirs incidentally reduce downstream flood hazard by damping the peak flood flows in Arroyo Honda and Alameda, Calaveras, and San Antonio Creeks.

Flood hazard has also been altered by floodplain modifications made to facilitate gravel mining. The presence of multiple inactive channels in the relatively flat alluvial floodplain near the proposed project area indicates that this reach of Alameda Creek is dynamic and prone to lateral migration.

The Federal Emergency Management Agency delineates regional flooding hazards as part of the National Flood Insurance Program. The Federal Emergency Management Agency's flood insurance rate maps for the Sunol Valley were most recently updated in August 2009. As delineated in the 2009 maps, and as shown in **Figure 5.16-21**, western portions of Pit F2 and Pit F6 and most of Pit F3-West and Pit F4 are within the designated 100-year flood hazard zone of Alameda Creek.[22]

Water supply reservoirs in the Alameda Creek watershed pose a remote risk of downstream inundation in the event of dam failure. Dam failure inundation maps prepared by the Association of Bay Area Governments indicate that the proposed project area is within the dam failure inundation zone for Calaveras Dam and may be within the dam failure inundation zones for Turner and Del Valle Dams.[23] Although unlikely, dam failure could occur during a major earthquake or major flood event.

Calaveras Dam, located approximately six miles south of the proposed project, is near the seismically active Calaveras Fault Zone. In 2001, the DSOD determined that this fault zone posed a threat to the stability of Calaveras Dam and that the risk of dam failure was higher than DSOD deemed to be acceptable. The DSOD ordered the SFPUC to limit storage in Calaveras Reservoir

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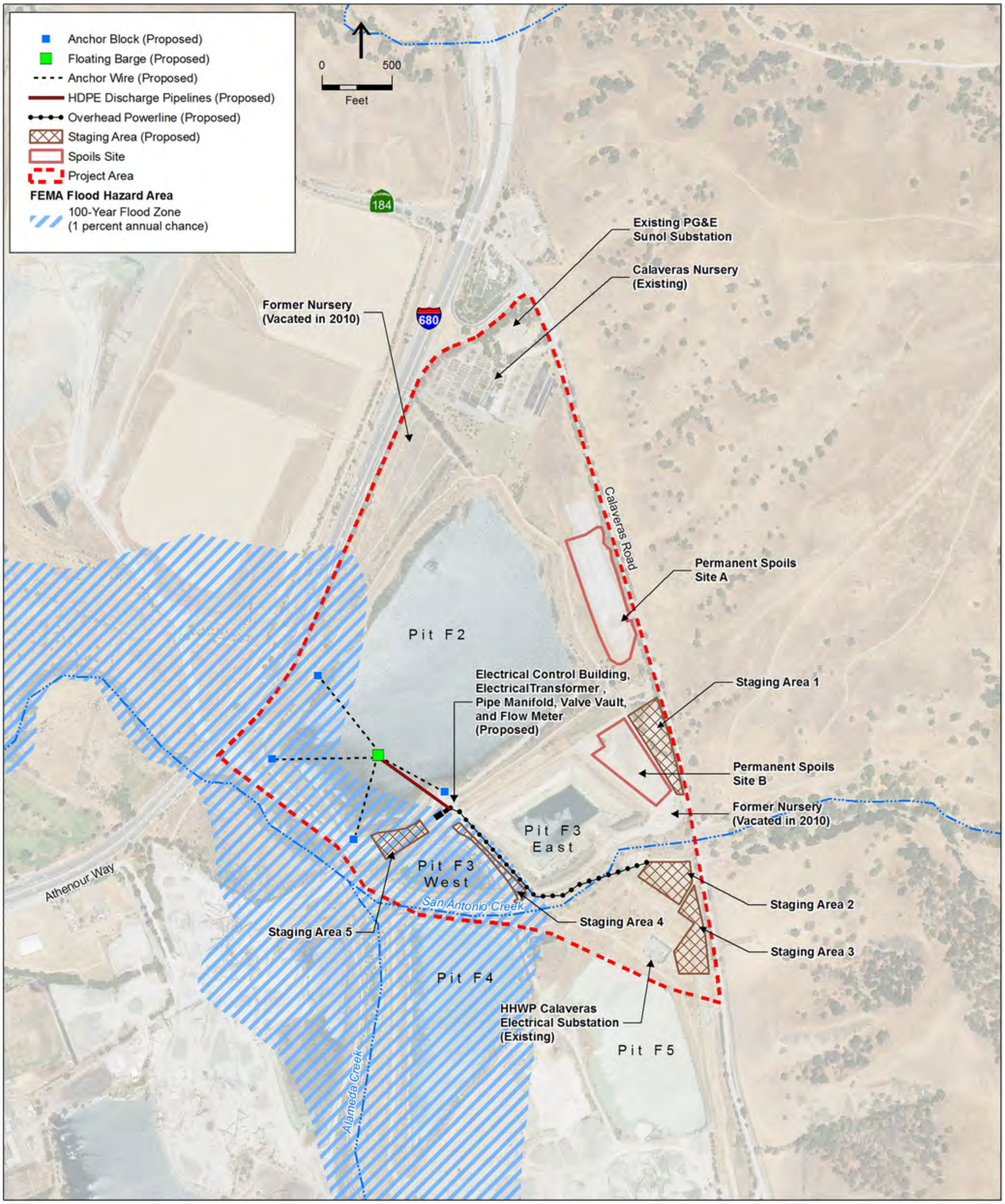
[22] Federal Emergency Management Agency (FEMA), 2009. Digital Flood Insurance Rate Map Database, Alameda County, California. FEMA Case No. 07-09-1015s. Published August 3, 2009.

[23] Association of Bay Area Governments (ABAG), 2009. Association of Bay Area Governments, Interactive GIS Maps Showing Dam Failure Inundation Areas. Available online at http://gis.abag.ca.gov/website/dam_inundation/viewer.htm. Accessed September 29, 2009.



SOURCE: FEMA, 2009

SFPUC Alameda Creek Recapture Project

**Figure 5.16-21**

100-year FLood Hazard Zone

until the dam had been repaired or replaced. In early 2011, the SFPUC approved the CDRP and construction of the new dam began that same year. To ensure the safety of the new dam, the DSOD has approval authority over the construction plans and specifications and, once construction is completed, jurisdiction over storage and operations.

### *With-CDRP Conditions*

When the CDRP is completed, flood hazard in the vicinity of the proposed project will be reduced compared to existing conditions. As noted earlier, although the sole purpose of Calaveras Reservoir is to provide storage for municipal water, it also provides some incidental flood protection. Restoration of the reservoir's full capacity will increase the incidental flood protection that it provides.

The inundation zones that would result from the failure of Turner and Del Valle Dams would be the same under the with-CDRP condition as they are under the existing condition. The inundation zone that would result from the failure of Calaveras Dam would be the larger under with-CDRP conditions than it is under existing condition because storage in the reservoir is currently limited by DSOD-imposed restrictions. It would be the same as it was before the DSOD's restrictions were imposed.

The probability that any of the three dams would fail is very low but in the case of Calaveras Dam it was deemed great enough to necessitate improvement. The risk of failure of Calaveras Dam would be substantially reduced by the CDRP, given that the new dam is being constructed consistent with current seismic standards and up-to-date technology.

## 5.16.2.8 Downstream Water Users

### *Existing conditions*

The Alameda County Water District (ACWD) is the only downstream user of Alameda Creek water that could potentially be affected by the proposed project. ACWD obtains its water from three sources: local supplies, the State Water Project, and the San Francisco regional water system. The primary source of the local supplies, which represent 40 percent of the district's total supply, is Alameda Creek.

ACWD diverts water from Alameda Creek at two inflatable rubber dams near the downstream end of Niles Canyon about 4 miles downstream of the proposed ACRP. Diverted water is routed to lakes and ponds, where it percolates into and recharges the Niles Cone, a large groundwater basin underlying a portion of the San Francisco Bay Plain. Water can be diverted from October 1 to May 31 of each year, with a maximum permissible diversion volume set by ACWD's water rights. The maximum permissible diversion volume does not constrain ACWD's operations because it is higher than the amount of water available. During the period the rubber dams are in place, ACWD is required to make releases of water to the downstream reaches of Alameda Creek to support aquatic life but there is no set minimum flow rate. Currently, ACWD deflates the dams when instantaneous flow in Alameda Creek exceeds 1,200 cfs to protect the integrity of the dams and diversion structures and the dams remain deflated while average daily flows exceed 700 cfs.

### *With-CDRP Conditions*

After the CDRP is commissioned, ACWD will continue to operate its water supply facilities as described above.

## 5.16.3 Regulatory Framework

### 5.16.3.1 Federal Regulations – Clean Water Act

The Water Pollution Control Act Amendments, later referred to as the Clean Water Act, were enacted by Congress in 1972 and amended several times in subsequent years. The Clean Water Act is the primary federal law regulating water quality in the U.S. Its objective is to reduce or eliminate water pollution in the nation's rivers, streams, lakes, and coastal waters. The Clean Water Act gave the U.S. Environmental Protection Agency the authority to implement federal pollution control programs such as setting water quality standards for contaminants in surface water, establishing effluent limits for wastewater discharges from municipalities and industries, and imposing requirements for controlling nonpoint-source pollution. In many states, including California, the U.S. Environmental Protection Agency delegates much of its authority to enforce the Clean Water Act to state agencies. In California, the act is administered by the California State Water Resources Control Board and the nine Regional Water Quality Control Boards.

Three years before Congress passed the Clean Water Act, the California legislature passed the Porter-Cologne Water Quality Control Act. At the time of its passage, the Porter-Cologne Act was the nation's most comprehensive water pollution control law. The Porter-Cologne Act greatly influenced Congress when it drafted the amendments to existing federal water pollution law that became the Clean Water Act. As a result, the two laws have many similarities and overlapping requirements. The State Water Resources Control Board and the nine Regional Water Quality Control Boards meld federal and state requirements as they administer the Clean Water Act and the Porter-Cologne Act in concert (the Porter-Cologne Act is described below under State Regulations).

### *Basin Plan—Beneficial Uses and Water Quality Objectives*

The Water Quality Control Plan for the San Francisco Bay Region, or Basin Plan, was first prepared by the Regional Water Quality Control Board, San Francisco Bay Region, in the 1970s and then periodically updated. The most recent update was published in 2015.[24] The plan designates the beneficial uses that the surface water bodies in the proposed project area must support. The designated beneficial uses of surface water bodies and groundwater in the Sunol Valley are shown in **Table 5.16-9**. The beneficial uses of Alameda Creek include agricultural water supply, warm and cold freshwater habitat, migratory habitat for fisheries, fish spawning, groundwater recharge, body-contact and non-body-contact recreation and preservation and

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[24] SF Bay Regional Water Quality Control Board (SF Bay RWQCB), 2015. *San Francisco Bay Basin (Region 2) Water Quality Control Plan (Basin Plan).* March 20, 2015.

enhancement of wildlife.[25] The beneficial uses of the quarry pits include groundwater recharge, commercial and sports fishing, warm and cold freshwater habitat, wildlife habitat, and body-contact and non-body-contact recreation.

**TABLE 5.16-9**
**DESIGNATED BENEFICIAL USES OF WATER BODIES IN THE SUNOL VALLEY**

| Water Body | Designated Beneficial Uses |
|---|---|
| Alameda Creek | AGR, COLD, GWR, COMM, MIGR, RARE, REC-1, REC-2, SPWN, WARM, WILD |
| Arroyo de la Laguna | GWR, COLD, MIGR, SPWN, WARM, WILD, REC-1, REC-2 |
| Calaveras Reservoir | MUN, COLD, RARE, SPWN, WARM, WILD, REC-1 (limited), REC-2 |
| San Antonio Reservoir | MUN, COLD, RARE, SPWN, WARM, WILD, REC-1 (limited), REC-2 |
| Sunol Valley Groundwater Basin | MUN, PROC, IND, AGR |
| Alameda Creek Quarry Pits | GWR, COMM, COLD, WARM, WILD, REC-1, REC-2 |

BENEFICIAL USES KEY:

MUN (Municipal and Domestic Supply); AGR (Agriculture); IND (Industrial Service Supply); REC-1 (Water Contact Recreation); REC-2 (Noncontact Water Recreation); WARM (Warm Freshwater Habitat); COLD (Cold Freshwater Habitat); FRSH (Freshwater Replenishment); MIGR (Fish Migration); SPWN (Fish Spawning); WILD (Wildlife Habitat); GWR (Groundwater Recharge); PROC (Industrial Process Supply); COMM (Commercial and Sport Fishing); RARE (Preservation of Rare and Endangered Species)

SOURCE: SF Bay Regional Water Quality Control Board (SF Bay RWQCB), 2015. *San Francisco Bay Basin (Region 2) Water Quality Control Plan (Basin Plan)*. March 20, 2015. (Tables 2-1 and 2-2)

The Basin Plan also establishes water quality standards or objectives for surface water bodies in the Alameda Creek watershed that, if complied with, will allow the beneficial uses to occur. The water quality objectives are shown in **Table 5.16-10**.

### *Section 303(d) List and Total Daily Maximum Loads*

Section 303(d) of the Clean Water Act requires the periodic preparation of a list of "impaired water bodies", defined as those water bodies that do not meet water quality standards, even after point sources of pollution have been equipped with required levels of pollution control technology. The list is prepared by the Regional Water Quality Control Board, San Francisco Bay Region.

Placement of a water body on the Section 303(d) list of impaired water bodies acts as the trigger for developing a total maximum daily load (TMDL) pollution control plan for each water body and associated pollutant or stressor on the list. The TMDL is the quantity of a pollutant that can be safely assimilated by a water body without violating water quality standards. The TMDL pollution control plan specifies how discharge of the pollutant must be reduced so that the water body can support the beneficial uses identified in the Basin Plan.

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[25] Ibid.

**TABLE 5.16-10**
**BASIN PLAN OBJECTIVES FOR THE ALAMEDA CREEK WATERSHED ABOVE NILES**

| Parameter | Concentration |
|---|---|
| **Surface Water Quality Objectives (Alameda Creek and Tributaries)** | |
| Total Dissolved Solids (TDS) | 250 mg/L (90 day-arithmetic mean)<br>360 mg/L (90 day-90th percentile)<br>500 mg/L (daily maximum) |
| Chlorides | 60 mg/L (90 day-arithmetic mean)<br>100 mg/L (90 day-90th percentile)<br>250 mg/L (daily maximum) |
| **Groundwater Quality Objectives**[a] | |
| Central Basin | |
| TDS | Ambient or 500 mg/L, whichever is lower |
| Nitrate ($NO_3$) | 45 mg/L |
| Fringe Subbasins | |
| TDS | Ambient or 1,000 mg/L, whichever is lower |
| Nitrate ($NO_3$) | 45 mg/L |
| Upland and Highland Areas | CA domestic water quality standards set forth in California Code of Regulations, Title 22, and current county standards |

NOTES:
[a] Concentration not to be exceeded more than 10 percent of the time during one year.

SOURCE: SF Bay Regional Water Quality Control Board (SF Bay RWQCB), 2015. *San Francisco Bay Basin (Region 2) Water Quality Control Plan (Basin Plan)*. March 20, 2015. (Table 3-7)

The Section 303(d) list designates Alameda Creek and all other Bay Area urban creeks as impaired by diazinon. Diazinon is a commonly used insecticide. The SWRCB approved the TMDL for diazinon in 2007.[26] No other surface waters in the Sunol Valley are listed as impaired in the Section 303(d) List.

### *Section 401 Water Quality Certification*

Section 401 of the Clean Water Act provides the State Water Resources Board with the authority to waive, certify, or deny any proposed activity that could result in a discharge of pollutants to the waters of the United States. To waive or certify an activity, the state must find that the proposed pollutant discharge would comply with state water quality standards and protect designated beneficial uses. If the state denies certification the proposed activity cannot proceed. If the proposed activity is the subject of a federal permit, the permit cannot be issued without the water quality certification. A water quality certification is required for projects involving the discharge of dredged or fill material to wetlands or other water bodies because these activities require a federal permit issued by the U.S. Army Corps of Engineers, pursuant to Section 404 of

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[26] SWRCB, 2010. State Water Resources Control Board (SWRCB), *National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities*, Order No. 2009-0009. July 1, 2010.

the Clean Water Act. It is not expected that the proposed ACRP will need a Clean Water Act, Section 401 water quality certification.

### *Section 404 Discharge of Dredged or Fill Materials*

Section 404 of the Clean Water Act authorizes the U.S. Army Corps of Engineers to issue permits to control the discharge of dredged or fill materials into waters of the United States. The waters of the United States include wetlands as well as rivers and lakes. The proposed ACRP does not include dredging or filling of the waters of the United States and would not require a Clean Water Act Section 404 permit.

### *National Pollutant Discharge Elimination System*

The primary implementation mechanism for the Clean Water Act is the National Pollutant Discharge Elimination System (NPDES). Under the NPDES, all entities that discharge pollutants to the waters of the United States must obtain a permit to do so. The permits, issued in California by the Regional Water Quality Control Boards, specify the conditions under which a permit-holder may discharge pollutants to the waters of the United States. Permits typically contain numerical limits on pollutant discharge, referred to as effluent limits, and non-numerical conditions. Permits may be written for a single discharger or for a class of dischargers. Permits written for a class of dischargers are referred to as general permits.

Two existing dischargers to Alameda Creek in the vicinity of the proposed project are holders of general NPDES permits, Hanson Aggregates and ODS. The SFPUC holds the state equivalent of an NPDES permit to discharge excess water from its municipal water supply system to the creek (see description of state regulations, below). If the proposed project is built it would be subject to the conditions contained in the NPDES general permit for stormwater discharges from construction sites during the construction period. Once built, it would not need an NPDES permit to operate because the proposed project does not involve discharge of pollutants to the waters of the United States.

The regulations pertaining to the two existing permitted discharges and the potential discharge from the proposed project construction site are described below.

#### NPDES General Permit for Aggregate Mining, Sand Washing, and Sand Offloading

Discharges of water from Hanson Aggregates' and ODS' commercial quarry operations to Alameda Creek are regulated under SF Bay RWQCB No. R2-2008-0011, NPDES General Permit No. CAG982001 (Aggregate Mining, Sand Washing, and Sand Offloading). This general permit covers discharges from treatment facilities such as settling ponds, sand and gravel filter systems, stormwater runoff from the aggregate mining and sand washing facilities commingled with other wastewater from the facilities, water used for sand screening and washing, and flows returned during hydraulic sand dredging and reclamation for commercial purposes. To comply with the general permit discharges from Hanson Aggregates and ODS to Alameda Creek must meet certain effluent limits and the two companies must prepare self-monitoring reports and submit them to the SF Bay RWQCB. Discharges of water from one pit to another are not subject to the conditions in the general permit because the pits are not considered waters of the United States or waters of the state.

### NPDES Construction General Permit

The Clean Water Act prohibits discharges of stormwater from construction projects unless the discharge is in compliance with an NPDES permit. The State Water Resources Control Board adopted an NPDES General Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities (Order No. 2009-0009, as amended by Order No. 2010-0014). Order No. 2009-0009 became effective on July 1, 2010 and was amended on February 14, 2011. The order applies to construction sites that involve one or more acres of soil disturbance. Construction activities include clearing, grading, grubbing, excavation, stockpiling, and reconstruction of existing facilities involving removal or replacement.

The construction general permit requires that the landowner and/or contractor file permit registration documents prior to commencing construction, and then pay an annual fee. These documents include a notice of intent, risk assessment, site map, stormwater pollution prevention plan (SWPPP), and signed certification statement. The permit specifies a risk-based permitting approach that includes requirements specific to three overall levels of risk, which are determined based on the potential for the project to cause sedimentation as well as the sensitivity of the receiving water to sedimentation. The three risk levels are used to determine specific numeric action levels and effluent limitations for pH and turbidity, and the requirements for a rain event action plan, best management practice (BMP) implementation, monitoring and reporting.

The SWPPP must include measures to ensure that: all pollutants and their sources are controlled; non-stormwater discharges are identified and eliminated, controlled, or treated; site BMPs are effective and result in the reduction or elimination of pollutants in stormwater discharges and authorized non-stormwater discharges; and BMPs installed to reduce or eliminate pollutants after construction are completed and maintained. The SWPPP must demonstrate that calculations and design details as well as BMP controls for site runoff are complete and correct. Non-stormwater discharges include those from improper dumping, accidental spills, and leakage from storage tanks or transfer areas. The construction general permit specifies minimum BMP requirements for stormwater control based on the risk level of the site. Post-construction stormwater runoff reduction requirements must be implemented at project areas not covered by a Phase I or Phase II municipal stormwater permit. The post-construction stormwater standards address water quality, runoff reduction, drainage density, and channel protection requirements for the receiving water. Alameda County, including the ACRP project area, is covered under a Phase I municipal stormwater permit. Thus, the proposed ACRP project is not subject to the post-construction stormwater standards specified in the construction general permit.

The construction general permit stipulates that effluent and receiving water monitoring must demonstrate compliance with permit requirements, and that project proponents must take corrective action if these limitations are exceeded. The results of the monitoring and corrective actions must be reported annually to the State Water Resources Control Board. The construction general permit specifies minimum qualifications for a qualified SWPPP developer and qualified SWPPP practitioner.[27]

### *Endangered Species Act Biological Opinion*

In 1997, the SFPUC entered into a memorandum of understanding (MOU) with the CDFW, then the California Department of Fish and Game. In the memorandum, the SFPUC agreed to release water from Calaveras Reservoir to supplement flow in Alameda Creek below the Calaveras Creek confluence when natural flows fell below defined minimums. The purpose of the releases was to maintain suitable conditions in Alameda Creek for native rainbow trout and warm water fish in certain reaches of Alameda Creek below its confluence with Calaveras Creek. The memorandum also required the SFPUC to conduct a five-year monitoring program to characterize conditions in the creek before the releases were made. The SFPUC conducted the pre-release monitoring program between 1998 and 2007. The 1997 MOU has been superseded by the 2011 NMFS Biological Opinion and CDFW 1602 agreements related to CDRP, described below.

The SFPUC did not begin the release program as scheduled because before the pre-release monitoring program was completed the DSOD restricted storage in Calaveras Reservoir. The SFPUC decided to build a new seismically-safe dam immediately downstream of the existing dam. The new Calaveras Dam incorporates the facilities needed to make fish releases from the reservoir to Calaveras Creek, and ultimately to Alameda Creek. It also includes facilities that enable water to bypass the Alameda Creek Diversion Dam and add flow to the creek below the dam.

The permitting process for the CDRP involved discussions with the CDFW, the U.S. Fish and Wildlife Service (USFWS), and the National Marine Fisheries Service (NMFS), that led to the development of a final fish release schedule. The release schedule for Calaveras Reservoir is shown in Table 5.16-2, above. The schedule for the ACDD requires that natural flows up to 30 cfs bypass the diversion dam at all times and restricts diversion periods and diversion flow.

The water release schedule was incorporated into the CDRP and was the subject of a federal Endangered Species Act biological assessment. In 2011, NMFS issued a Biological Opinion indicating that, with implementation of the two instream flow schedules and other fish passage improvements specified in the Biological Opinion, the CDRP would not jeopardize rainbow trout/steelhead in Alameda Creek.[28]

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[27] SWRCB, 2010. State Water Resources Control Board (SWRCB), *National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities*, Order No. 2009-0009. July 1, 2010.

[28] National Marine Fisheries Service (NMFS), 2011. Southwest Region. Biological Opinion for Calaveras Dam Replacement Project in Alameda and Santa Clara Counties. Tracking No. 2005/07436. March 5, 2011.

## 5.16.3.2 State Regulations

### *Porter-Cologne Water Quality Control Act*

The California legislature passed the Porter-Cologne Water Quality Control Act in 1969. It revised and strengthened existing state water pollution control legislation and established procedures for protecting water quality. The State Water Resources Control Board and the nine Regional Water Quality Control Boards regulate water quality under the act through the regulatory standards and objectives set forth in Water Quality Control Plans (also referred to as Basin Plans) prepared for each region.

At the time of its passage, the Porter-Cologne Act was the nation's most comprehensive water pollution control law. The Porter-Cologne Act greatly influenced Congress when it began drafting amendments to existing federal water pollution law in the early 1970s.

### *Waste Discharge Requirements for the SFPUC Drinking Water Transmission System*

San Francisco Bay Regional Water Quality Control Board Order No. R2-2008-0102 (Order) regulates discharges of altered water from the SFPUC drinking water transmission system. The order regulates planned discharges resulting from routine operations and maintenance that can be scheduled in advance, as well as unplanned and emergency discharges resulting from system failures or natural disasters. Planned discharges include draining pipelines and tunnels to allow for inspection, repair, and/or replacement, and flushing disinfection water from the system before bringing pipelines back online. The order serves as an NPDES permit for point-source discharges from the SFPUC regional water system to surface waters of the United States or of the state. The order requires that any treated water be dechlorinated and its pH adjusted before it is discharged. The order does not apply to discharges to quarry pits that are part of active mining operations because quarry pits are not classified as waters of the United States or waters of the state. The order also does not apply to transfers of raw water by the SFPUC's regional water system.

## 5.16.3.3 Local and Regional Regulations

### *SFPUC Alameda Watershed Management Plan*

The SFPUC adopted the Alameda Watershed Management Plan[29] to provide a policy framework for the SFPUC to make decisions about activities that are appropriate on SFPUC-owned lands within the Alameda Creek watershed. The plan considers water quality protection as the first and foremost goal for its watershed lands, and the goals and policies of the plan are organized around the primary goal of water quality protection. As described in Chapter 4, Plans and Policies, the SFPUC reviews all plans, projects, and activities that occur within the Alameda watershed—including the proposed ACRP—for conformity with the management plan as well as for compliance with environmental codes and regulations.

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[29] San Francisco Public Utilities Commission, 2001. *Final Alameda Watershed Management Plan*. April 2001.

### *Alameda Countywide Clean Water Program*

The Alameda Countywide Clean Water Program is a consortium of Alameda County agencies that have Phase I municipal stormwater systems that discharge stormwater to San Francisco Bay. Consistent with Section 402(p) of the federal Clean Water Act, stormwater discharges are conducted in accordance with San Francisco Bay RWQCB Order No. R2-2008-0011, NPDES General Permit No. CAS612008 (San Francisco Bay Region Municipal Regional Stormwater NPDES Permit). The Alameda County agencies prepared a stormwater quality management plan that describes the Alameda Countywide Clean Water Program's approach to reducing stormwater pollution. The program maintains compliance with RWQCB requirements by ensuring that new development and redevelopment projects mitigate, to the maximum extent practicable, water quality impacts related to stormwater runoff both during construction and operational periods of projects.

#### Numeric Sizing Criteria for Pollutant Removal Treatment Systems

A development project creating more than 10,000 square feet of new impervious cover must include source controls, site design measures, and treatment controls to minimize stormwater pollutant discharges. Pollution treatment controls shall be sized to treat the volume of annual runoff required to achieve 80 percent or more capture of average annual runoff (in the Bay Area, this is equivalent to having the capacity to treat storm events of about one inch of precipitation). Because the proposed ACRP would create less than 10,000 square feet of new impervious cover, the numeric sizing criterion does not apply.

#### Limitation on Increase of Peak Stormwater Runoff Discharge Rates

Hydromodification is a general term that encompasses the effects of projects on the natural hydrologic, geochemical, and physical functions of streams and wetlands that maintain or enhance water quality. Urbanization creates impervious surfaces that reduce the landscape's natural ability to absorb water and release it slowly to creeks. These impervious surfaces increase peak flows in creeks and can cause erosion and other hydromodification impacts. Projects that create more than one acre of new impervious cover must evaluate the potential for these types of effects and provide mitigation, as necessary. Because the proposed ACRP would create less than 1 acre of new impervious cover, requirements related to hydromodification effects do not apply.

### *San Francisco Floodplain Management Program*

The City and County of San Francisco's Floodplain Management Ordinance (San Francisco Administrative Code, Chapter 2A) requires new or substantially improved structures in flood hazard areas be protected against flood damage, and prohibits uses that would increase flood risks. The ordinance requires that all construction on City and County of San Francisco-owned property located outside the boundaries of San Francisco, and in areas designated by the Federal Emergency Management Agency as flood-prone, be consistent with the requirements of the ordinance and applicable federal and state floodplain management regulations. The ordinance applies to construction on CCSF-owned property located outside the boundaries of San Francisco.[30]

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[30] City and County of San Francisco (CCSF), Office of the City Administrator, 2016. *San Francisco Floodplain Management Program Fact Sheet*. Revised March 1, 2016.

### *Zone 7 Water Agency Groundwater Protection Ordinance*

Zone 7 Water Agency (Zone 7) maintains jurisdiction over activities that involve drilling new wells, conducting soil borings, and destroying existing wells in the Sunol Valley, including in the proposed project area. Zone 7's Groundwater Protection Ordinance requires that Zone 7 authorize any planned new well, soil boring, or well destruction before the work is started (Zone 7, 2011). Because the proposed ACRP does not include a new well, soil boring, or well destruction this ordinance does not apply to it.

## 5.16.4 Impacts and Mitigation Measures

### 5.16.4.1 Significance Criteria

The project would have a significant impact related to hydrology and water quality if the project were to:

- Violate any water quality standards or waste discharge requirements;
- Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of preexisting nearby wells would drop to a level that would not support existing land uses or planned uses for which permits have been granted);
- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner that would result in substantial erosion or siltation on or off the site;
- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner that would result in flooding on or off the site;
- Create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff;
- Otherwise substantially degrade water quality;
- Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or FIRM or other authoritative flood hazard delineation map;
- Place within a 100-year flood hazard area structures that would impede or redirect flood flows;
- Expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam; or
- Expose people or structures to a significant risk of loss, injury, or death involving inundation by seiche, tsunami, or mudflow.
- Cause downstream water users, as a result of project-induced flow changes, to alter their operations in a way that would result in significant environmental impacts.

The following criteria were not analyzed in the project operations impacts section for the reasons discussed below.

- ***Violate waste discharge requirements.*** This criterion is not applicable to project operations because the proposed project would not involve discharge of wastewater. The criterion is applicable to project construction and is discussed under construction impacts below.

- ***Alter the existing drainage pattern of the site or area in a manner that would result in substantial erosion or siltation on or off the site or substantially increase the rate or amount of surface runoff.*** These criteria are not applicable to project operations because the proposed project would not alter drainage patterns or result in an increase in impermeable surfaces in the project area. The criteria are applicable to project construction and are discussed under construction impacts below.

The following criteria were not analyzed in either the projects operations or construction impact sections for the reasons discussed below.

- ***Create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems.*** This criterion is not applicable because there are no existing or planned stormwater drainage systems in the project area, and the project would not provide additional sources of runoff.

- ***Place housing within a 100-year flood hazard zone.*** This criterion is not applicable because the proposed project does not include housing.

- ***Inundation by seiche, tsunami or mudflow.*** This criterion is not applicable because tsunamis and mudflows do not occur in the Sunol Valley. Seiches could occur in enclosed bodies of water but because the proposed project would neither increase nor decrease the probability of seiches, the criterion does not apply.

## 5.16.4.2 Approach to Analysis

### *Construction Impacts*

Construction of the proposed project could have impacts on hydrology and water quality during the construction period. As described in Chapter 3, Project Description, ACRP construction is scheduled to occur from fall 2017 through spring 2019 (18 months), while CDRP construction is also scheduled to be completed in spring 2019. Thus, it is possible that operation of the CDRP will commence prior to completion of ACRP construction and that with-CDRP conditions could occur while ACRP is still under construction. Therefore, as described in Section 5.1.2, regarding baseline conditions for evaluation of project impacts, construction impacts could occur under both existing conditions and with-CDRP conditions. However, operation of the CDRP is not expected to change any of the baseline hydrology and water quality construction conditions analyzed in this section. Construction impacts would be the same under either baseline condition because flow-related changes that will occur under with-CDRP conditions would not alter the impact analysis of ACRP construction impacts on hydrology and water quality. Therefore, no change in the approach to the construction impact analysis is necessary to account for the with-CDRP conditions. More specifically, the construction-related impacts of the ACRP presented in this section would be the same regardless of the implementation of bypass flows at ACDD and instream flow releases from Calaveras Reservoir, and all other aspects of CDRP operations that characterize the with-CDRP operations.

The construction impact analysis assumes that the proposed project would include all water quality control measures required to achieve compliance with applicable regulations for these activities. The applicable regulatory requirements are contained in the NPDES Construction General Stormwater Permit issued by the State Water Resources Control Board pursuant to the Clean Water Act. These regulations would apply equally under both the existing and with-CDRP conditions.

### *Operational Impacts*

The baseline conditions used in the hydrology and water quality analysis of operational impacts, for the reasons provided in Section 5.1.2, is with-CDRP conditions. By comparing the with-project conditions to with-CDRP conditions, the impact analysis of flow-related resources, such as hydrology and water quality, identifies the specific operational impacts of the ACRP itself, independent of effects of the CDRP.

#### Use of Models

The model used in the analysis, the ASDHM, is described in Appendix HYD1.

#### Analytical Methods for Assessment of Project Impacts

***Project Operations Assumptions.*** The ACRP would consist of four pumps mounted on barges that would float on the water surface in Pit F2, one of several quarry pits that lie adjacent to the Alameda Creek channel. A site plan of the ACRP is shown in Figure 3-3, in Chapter 3, Project Description. The pits, and their locations relative to the creek, are shown above in Figure 5.16-6. The pumps would be used to withdraw water from Pit F2 and convey it to San Antonio Reservoir or to the SVWTP for treatment and use for municipal water supply. The rafts supporting the pumps would rise and fall as water levels change in Pit F2 in response to the SFPUC’s pumping of water from the pit, water percolating into the pit from its surroundings, and water falling directly into it as rain.

The following section contains an assessment of the potential impacts of proposed project operations on subsurface or groundwater hydrology, water quality, flood hazards and other water users. The assessment was made by comparing with-project conditions to the baseline conditions that will be in effect when the project begins operation, namely with-CDRP conditions. With-CDRP conditions are described above in Section 5.16.2 and in Appendix HYD1. The significance of the impacts was determined with reference to the significance criteria listed in Section 5.16.4.1. For informational purposes, a comparison of with-project hydrological conditions and existing hydrological conditions is provided in Appendix HYD1 and Appendix HYD2.

Consistent with the CEQA Guidelines (e.g., Appendix G), the significance of changes in hydrological conditions (that is, surface water flow and quarry pit water levels) are assessed based on whether the change affects environmental resources—such as biological resources—that are dependent on streamflow and/or pit water levels where the resource could be affected by physical changes to stream flow or pit water levels. The effects of the proposed project on streamflow and pit water levels are described in detail in Appendix HYD1, and those effects provide the technical basis for analysis of the project's potential effects on fish, vegetation, and wildlife associated with project-related changes to hydrologic conditions. Those impact analyses and significance conclusions are not presented here but instead are presented in Section 5.14, Terrestrial Biology and Fishery Resources, with respect to the impacts on fish, vegetation, and wildlife that result from proposed project-caused changes in water levels in Pit F2 and stream flow in Alameda Creek.

***Groundwater.*** Characterization of groundwater conditions is based on a conceptualization of the aquifer system and empirical relationships between surface water and subsurface water based on an extensive dataset from a monitoring well network in the project area. Groundwater impacts associated with project operations were analyzed with respect to the potential for the project to substantially deplete groundwater supplies or to interfere substantially with groundwater recharge. This analysis was done by determining the effect that recapture activities from project operations would have on groundwater wells in the Sunol Valley Groundwater Basin.

In addition, project operations could result in changes to subsurface water conditions, which could in turn result in additional secondary effects on fish, vegetation, and wildlife. The effects of the proposed project on subsurface water conditions downstream of the project area are described in detail in Appendix HYD2. Impact analysis and significance conclusions are presented in Section 5.14, Terrestrial Biology and Fishery Resources, with respect to the impacts on fish, vegetation, and wildlife that result from proposed project-caused changes in subsurface water conditions downstream of the project area.

***Water Quality and Flood Hazard.*** The effects of proposed project operation on water quality were evaluated with respect to the potential for the project to substantially degrade water quality conditions and/or result in a violation or exceedance of water quality standards or objectives. The effects of proposed project operation on flood hazard were evaluated with respect to their potential to expose people or structures to a significant risk of loss, injury or death due to flooding.

***Other Water Users.*** The effects of proposed project operation on other water users were evaluated with respect to the potential for the project to cause downstream water users, as a result of proposed project-induced flow changes, to alter their operations in a way that would result in significant environmental impacts.

### *Cumulative Impacts*

The cumulative analysis utilizes a list-based approach to analyze the effects of the project in combination with past, present, and probable future projects in the Sunol Valley. The cumulative impact analysis assumes that construction and operation of other projects in the geographical area would have to comply with the same regulatory requirements as the project. The analysis then considers whether or not there would be a significant, adverse cumulative impact associated with project implementation in combination with past, present, and probable future projects in the geographical area, and if so, whether or not the project's contribution to the cumulative impact would be significant (i.e., cumulatively considerable).

## 5.16.4.3 Project Impacts

### *Construction Impacts*

**Impact HY-1: Project construction would not substantially degrade water quality as a result of dewatering effluent discharges, increased soil erosion and sedimentation of downstream water bodies, or an accidental release of hazardous materials. (Less than Significant)**

Earthmoving activities associated with project construction would include vegetation removal, grading, excavation, soil stockpiling, and backfilling. Prior to construction mobilization, the contractor would prepare construction work areas and staging areas by removing vegetation and debris, and grading these areas to provide a relatively level surface for the movement of construction equipment. Approximately 13 acres of ground surface would be disturbed in the course of construction of the proposed ACRP.

New pipelines, including the HDPE discharge pipelines and the 36-inch-diameter pipeline connection to the Sunol Pump Station Pipeline, would be installed using open-trench construction methods. Open excavations would also be required for construction of the underground powerlines and earthwork would be required for the mooring anchors, power poles, throttle valve vault, electrical control building, and electrical transformer. Soil exposed during these earthmoving activities could migrate outside of the construction work areas and, without proper control measures, could degrade water quality in Alameda and San Antonio Creeks.

Proposed excavation and construction activities would generate excess soil and rock material (spoils) totaling approximately 944 cubic yards. It is anticipated that most of the excess excavated material generated during project construction could be placed at one of two permanent spoils placement sites along Calaveras Road (shown on Figure 3-3 in Chapter 3, Project Description).

Construction activities could also result in the accidental release of hazardous construction materials such as adhesives, solvents, fuels, and drilling and petroleum lubricants that, if not managed appropriately, could adhere to soil particles become mobilized by rain or runoff, and degrade water quality. Hazardous construction materials could also infiltrate into groundwater, potentially degrading groundwater quality.

As described in Chapter 3, Section 3.4.9.1, construction dewatering could be required if surface water or subsurface water is encountered in excavations. Depending on the site-specific conditions and construction methods, high levels of suspended sediment and/or trace amounts of construction-related chemicals (e.g., fuels, lubricants, cement products) could be present in the dewatering effluent. Without proper controls, the discharge of polluted dewatering effluent to water bodies could degrade water quality and violate water quality standards.

The proposed project is subject to regulatory requirements protecting water quality, and project construction activities would include implementation of protection measures required to comply with these requirements. Consistent with the requirements of the NPDES General Permit for Storm Water Discharges Associated with Construction Activity, the SFPUC or its contractor(s) would submit a notice of intent to the SWRCB's Division of Water Quality, develop and submit a SWPPP, and implement site-specific best management practices (BMPs) to prevent discharges of pollutants in construction-related stormwater runoff or from dewatering activities into downstream water bodies, including Alameda and San Antonio Creeks. The San Francisco Bay RWQCB, the primary agency responsible for protecting water quality in the project area, would review the SWPPP to ensure compliance with the general permit.

The SWPPP is subject to review and approval by the RWQCB. The BMPs listed below are measures that may be included in the SWPPP. However, the measures themselves may be altered, supplemented, or deleted during the review process, since the RWQCB has final authority over the terms of the project-specific SWPPP.

*Scheduling*

- Schedule construction to minimize ground disturbance during the rainy season.
- Stabilize all disturbed soils as soon as possible following the completion of soil-disturbing work in the project area.
- Provide plans to stabilize soil with vegetation or physical means in the event rainfall is expected.
- Install erosion and sediment control BMPs prior to the start of any ground-disturbing activities.

*Erosion and Sedimentation*

- Preserve existing vegetation in areas where no construction activity is planned or where construction activity will occur at a later date.
- Stabilize and revegetate disturbed areas as soon as possible after construction by planting, seeding, and/or using mulch (e.g., straw or hay, erosion control blankets, hydromulch, or other similar material) except in actively cultivated areas. The following bank stabilization materials shall not be used below the mean high water mark: hydraulic mulch, tackifiers, hydroseeding, soil binders, and straw mulch.
- Install silt fences or fiber rolls or implement other suitable measures around the perimeters of the construction zone, staging areas, temporary stockpiles, spoil areas, stream channels, and swales, as well as down-slope of all exposed soil areas and in other locations determined necessary to prevent offsite sedimentation.
- Install temporary slope breakers during the rainy season on slopes greater than 5 percent where the base of the slope is less than 50 feet from a water body, wetland, or road crossing at spacing intervals required by the RWQCB.
- Use filter fabric or other appropriate measures to prevent sediment from entering storm drain inlets.
- Detain and treat water produced by construction site dewatering using sedimentation basins, sediment traps (when water is flowing and there is sediment), or other measures to ensure that discharges to receiving waters meet applicable water quality objectives.

*Tracking Controls*

- Grade and stabilize construction site entrances and exits to prevent runoff from the site and to prevent erosion.
- Install a track-out control device (e.g., gravel pad, grizzlie, wash facility, etc.) at site access points to allow for carry-out and track-out prevention when vehicles exit the site. This provision may be omitted if the RWQCB determines that vacuum sweepers, as required by Mitigation Measure M-AQ-1a (BAAQMD Basic Construction Measures), are sufficient to prevent trucks from tracking dirt.
- Remove any soil or sediment tracked off paved roads during construction by employing street sweeping.

*Non-stormwater Control*

- Keep construction vehicles and equipment clean; do not allow excessive buildup of oil and grease.
- Check construction vehicles and equipment daily at startup for leaks, and repair any leaks immediately.
- Do not refuel vehicles and equipment within 100 feet of surface waters.
- Conduct all refueling and servicing of equipment with absorbent material or drip pans underneath to contain spilled fuel. Collect any fluid drained from machinery during servicing in leak-proof containers and deliver to an appropriate disposal or recycling facility.
- Contain fueling areas to prevent run-on and runoff and to contain spills.
- Cover all storm drain inlets when paving or applying seals or similar materials to prevent the offsite discharge of these materials.

*Construction Dewatering Plan*

- Identify methods and locations for collecting and handling water onsite prior to discharge, determine treatment requirements, and determine the capacity of settling basins, treatment ponds, and/or holding tanks.
- Identify methods for treating water onsite prior to discharge, such as filtration, coagulation, sedimentation settlement areas (i.e., settling tanks or filter bags), oil skimmers, pH adjustment, and other BMPs.
- Establish procedures and methods for maintaining and monitoring dewatering operations to ensure that no breach in the process occurs that could result in an exceedance of applicable water quality objectives.
- Identify discharge locations and include details regarding how the discharge will be conducted to minimize erosion and scour.

*Waste Management and Hazardous Materials Pollution Control*

- Remove trash and construction debris from the project area regularly. Provide an adequate number of waste containers with lids or covers to keep rain out of the containers and to prevent trash and debris from being blown away during high winds.
- Locate sanitary facilities a minimum of 200 feet from Alameda and San Antonio Creeks.
- Ensure the containment of sanitation facilities (e.g., portable toilets) to prevent discharges of pollutants to receiving water bodies.

- Maintain sanitary facilities regularly.
- Store all hazardous materials in an area protected from rainfall and stormwater run-on and prevent the offsite discharge of leaks or spills.
- Minimize the potential for contamination of surface water bodies, including Pit F2 and Alameda and San Antonio Creeks, by maintaining spill containment and cleanup equipment onsite, and by properly labeling and disposing of hazardous wastes.
- Locate waste collection areas close to the construction entrance and away from Alameda and San Antonio Creeks, and Pit F2.
- Inspect dumpsters and other waste and debris containers regularly for leaks, and remove and properly dispose of any hazardous materials and liquid wastes placed in these containers.
- Train construction personnel in proper material delivery, handling, storage, cleanup, and disposal procedures.

***BMP Inspection, Maintenance, and Repair***

- Inspect all BMPs on a regular basis to confirm proper installation and function.
- Inspect all stormwater BMPs daily during storms.
- Inspect sediment basins, sediment traps, and other detention and treatment facilities regularly throughout the construction period.
- Provide sufficient backup materials (e.g., silt fence, fiber rolls, erosion blankets, etc.) throughout project construction to enable immediate repair or replacement of failed BMPs.
- Inspect all seeded areas regularly for failures, and remediate or repair as soon as feasible.

***Permitting, Monitoring, and Reporting***

- Provide the required documentation for SWPPP inspections, maintenance, and repair requirements.
- Maintain written records of inspections, spills, BMP-related maintenance activities, corrective actions, and visual observations of any offsite discharge of sediment or other pollutants, as required by the RWQCB.
- Monitor water quality to assess the effectiveness of control measures.
- Notify the RWQCB and other agencies as required (e.g., California Department of Fish and Wildlife) if the criteria for turbidity, oil/grease, or foam are exceeded, and undertake corrective actions.
- Immediately notify the RWQCB and other agencies as required (e.g., California Department of Fish and Wildlife) of any spill of petroleum products or other organic or earthen materials, and undertake corrective action.

***Post-construction BMPs***

- Revegetate all temporarily disturbed areas after construction activities are completed.
- Remove any remaining construction debris and trash from the project area and staging areas upon project completion.
- Phase the removal of temporary BMPs as necessary to ensure stabilization of the site.

- Maintain post-construction site conditions to avoid any unintended drainage channels, erosion, or areas of sedimentation.
- Correct post-construction site conditions as necessary to comply with the SWPPP and any other pertinent RWQCB requirements.

Preparation and implementation of a SWPPP would avoid significant water quality impacts during and after project construction activities. Therefore, this impact would be *less than significant*.

**Mitigation:** None required.

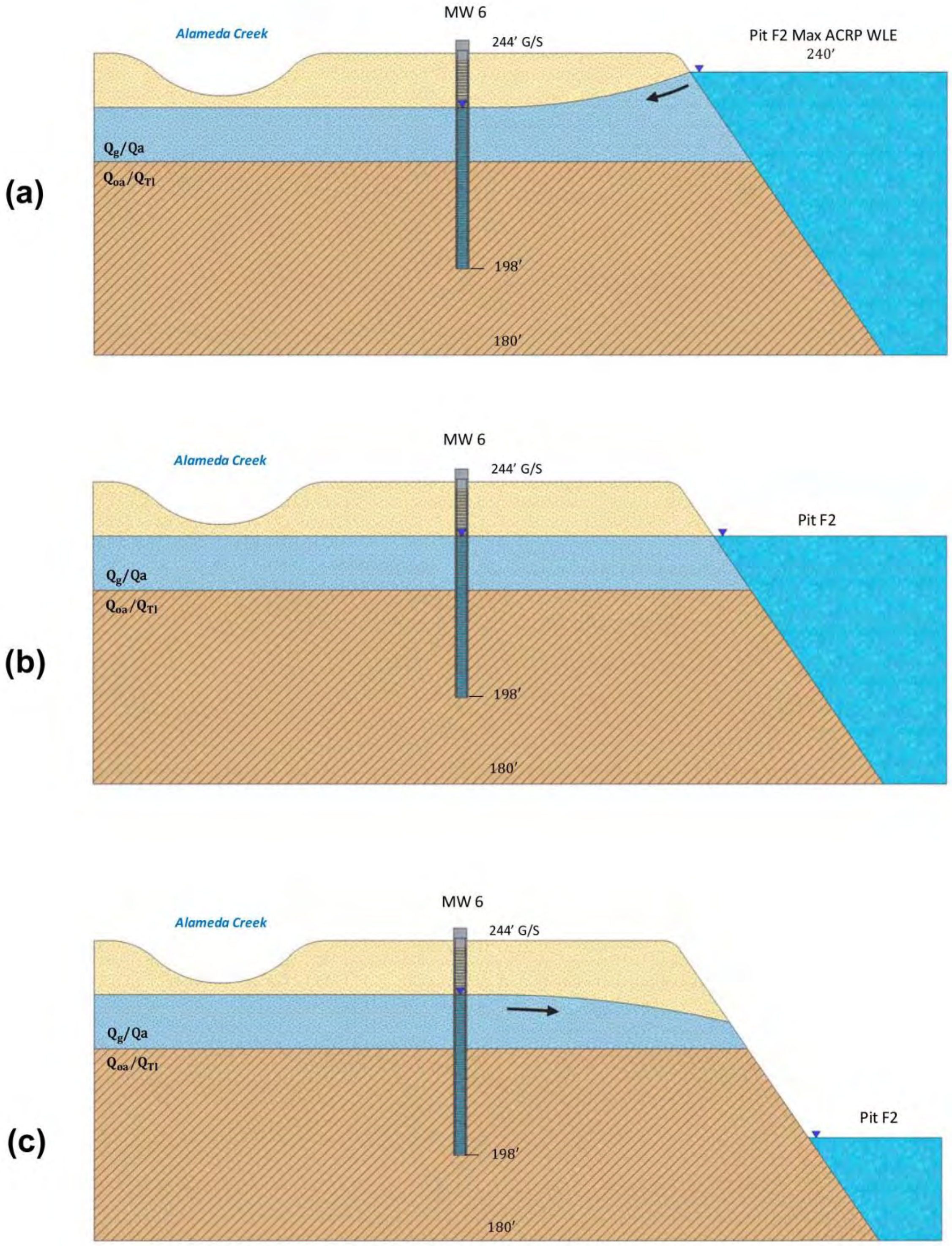
### *Operational Impacts*

Operation of the ACRP could affect the movement of subsurface water in the stream channel gravels underlying Alameda Creek in the vicinity of the quarries. These effects are described in Impact HY-2. Potential impacts on water quality, flood hazards, and other water users are described in Impacts HY-3, HY-4, and HY-5 respectively.

**Impact HY-2: Operation of the ACRP would not substantially alter the movement of subsurface water or substantially affect groundwater recharge in the Sunol Valley such that it would affect the production rate of pre-existing nearby wells. (Less than Significant)**

Under the ACRP operating plan, water that naturally seeps into Pit F2 would be stored in wet months and recaptured by pumping in dry months. The connection between the quarry pit and shallow aquifer would undergo changes in gradient between groundwater and surface water in the pit through cycles of storage and recovery. The maximum storage elevation in Pit F2 is 240 feet. During recapture pumping, the water elevation in the pit would decline to as much as 150 feet or, in extreme drought, to 100 feet. A conceptualization of this process is shown in **Figure 5.16-22**.

The main difference in groundwater conditions between with-project and either the existing or with-CDRP conditions is the systematic storage and pumping of water in Pit F2 that would occur under ACRP operations. Storage in Pit F2 under the ACRP would be indiscernible from natural seepage into the quarry pit that occurs each winter under any scenario (either existing or with-CDRP), and recapture from Pit F2 would have effects on the shallow aquifer system similar to historical and ongoing quarry dewatering activities each spring. The recent water management practices at SMP-30 have created a wetter condition in the upper subreaches that would not be expected to be changed by ACRP operation. Based on the hydrogeologic conceptualization, the project operation relies on movement of water solely through the shallow aquifer system that is remote and disconnected from other formations that serve as sources of supply elsewhere in the Sunol Valley Groundwater Basin. The narrow and shallow extent of this aquifer, its limited storage capability, and its drainage pattern to Arroyo de la Laguna make the shallow groundwater system an infeasible source of supply for any beneficial use.



SOURCE: Luhdorff and Scalmanini (2016)

SFPUC Alameda Creek Recapture Project

**Figure 5.16-22**

Conceptual Cross Section showing ACRP Operating Stages

There are no known active wells that draw water from the shallow alluvial aquifer along the Alameda Creek alignment between the project area and Arroyo de la Laguna confluence downstream of the project site. Local supply wells in the Sunol Valley Groundwater Basin are completed in deep bedrock formations that are recharged from other sources, and therefore the project has no potential to affect movement and recharge in any area. Operation of the ACRP would have a *less-than-significant* impact on subsurface water flow in the Sunol Valley and would not substantially affect groundwater recharge in the Sunol Valley.

**Mitigation:** None required.

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**Impact HY-3: Operation of the ACRP would not substantially alter water quality in Alameda Creek. (Less than Significant)**

Operation of the ACRP does not involve the direct discharge of water by the SFPUC into Alameda Creek. As result, the ACRP would have no direct effect on water quality in the creek. The ACRP could have an indirect effect on water quality if the ACRP altered flow in Alameda Creek. The ACRP would result in changes in flow in Alameda Creek downstream of the Calaveras Creek confluence as a result of altered operations of the SFPUC's Alameda System, particularly Calaveras Reservoir, and as a result of ACRP-caused changes in NPDES discharge practices by the quarry operators. As summarized below, the differences in flow between with-project and with-CDRP conditions are too small to have a substantial effect on water quality (see Appendix HYD1 for a discussion of the flow changes that result from altered Calaveras Reservoir operations).

As described previously, under existing conditions, the quarry operators currently discharge water from the quarry pits to Alameda Creek in accordance with their NPDES discharge permits from the RWQCB. Under existing conditions, the quarry operators discharge an estimated average of 3,436 acre-feet per year of water to Alameda Creek. More water would percolate into the subsurface in the vicinity of the quarries under with-CDRP conditions, and so the quarry operators would increase their NPDES discharges to Alameda Creek to an estimated average of 6,620 acre-feet per year. With the ACRP in operation, the SFPUC would pump water from Pit F2 and transfer it to the regional water system for municipal use. This would reduce the amount of water the quarry operators would need to manage and therefore, the quarry operators would reduce the amount of water the quarry operators would have to discharge to Alameda Creek under their NPDES permit to an estimated average of 2,532 acre-feet per year, but there would be no change in the water quality of the quarry NPDES discharges. The change in discharge volume would be too small to have any discernible water quality consequences on the overall water quality in Alameda Creek downstream of the project area.

Operation of the ACRP would not involve direct discharge of water to Alameda Creek that could affect water quality nor would it result in a change in flow in Alameda Creek that could change water quality. Accordingly, operation of the ACRP would have a *less-than-significant* impact on water quality in Alameda Creek.

**Mitigation**: None required.

**Impact HY-4: Operation of the ACRP would not alter flood hazards. (Less than Significant)**

Flooding can occur when a large storm passes over a watershed and produces very high flows in the surface streams that drain the watershed. As described above, the proposed ACRP would have no effect on the very large flows in Alameda Creek that could cause flooding.

Flooding can also be caused by the failure of dams in the watershed. Some areas near the proposed project area could be inundated in the unlikely event of a failure of Calaveras Dam, Turner Dam, or Del Valle Dam. The ACRP does not include any features that would have an effect on the stability of the three dams in earthquakes, extreme floods, or any other emergencies.

A proposed project can increase flood hazard if it occupies sufficient volume within a flood plain to cause a rise in the elevation of the water surface in a flood. As shown in Figure 5.16-9, western portions of Pit F2 and most of Pit F3-West are within the designated 100-year flood hazard zone of Alameda Creek. Some components of the proposed project, the pumps and the rafts that support them, the anchor blocks, the electrical control building and transformer, and poles supporting the power supply to the pumps, all lie within Alameda Creek’s 100-year flood zone, or are close to it.

The proposed ACRP control building is located in a FEMA flood zone according to FEMA's mapping data, but the lowest elevation of the new building would be about 3 feet above the 100-year flood zone (1 percent-annual-chance-flood) elevation of approximately 252 feet calculated by FEMA. SFPUC's on-ground land surveys show the ground elevation at the location of the new control building is higher than FEMA's flood elevation level. The control building could not be located outside of the flood plain due to the limited space, but based on the land surveys, the project does not require fill for construction of the control building or to maintain the existing site access roads.[31] Placement of fill within the flood plain can raise flood water levels and increase flood hazard for existing structures. As noted above, fill is not required for the control building.

The components that are in the 100-year flood zone are separated from the channel by a levee. In most high flow events, the levee would protect the project components from flooding and would exclude them from the Alameda Creek floodplain. However, a large flood, approaching the 100-year event, would overtop the levee and proposed project components would be within the flood plain. Some components, the pumps and the rafts that support them, would float on the surface of the flood waters and would not occupy space in the flood plain. Other components, the electrical control building for example, would occupy space in the flood plain but the space would be too small to have a measurable effect on flood levels.

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[31] Engineering Management Bureau, 2014. *Alameda Creek Recapture Project Conceptual Engineering Report.* November 21, 2014.

The quarry pits provide some unintended, incidental flood reduction benefits to areas downstream of the quarry reach in large storms. If a storm is large enough to overtop the levees that separate the quarry pits from Alameda Creek, then the pits act as flood water storage, reducing peak flows downstream of the pits. Because the SFPUC would maintain the water level in Pit F2 under with-project conditions at about the same level that it is under existing conditions, and at about the same level as it will be under with-CDRP conditions, there would be no change in available flood water storage during very large floods and no reduction in incidental flood reduction benefits to downstream areas.

The ACRP would have no effect on flood hazard because it would have no effect on the size of floods produced by storms over the watershed, the size of floods caused by dam failure, or on water levels in the area subject to flooding. The ACRP would have a *less-than-significant* impact on flood hazards.

**Mitigation**: None required.

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**Impact HY-5: Operation of the ACRP would not cause downstream water users, as a result of project-induced flow changes, to alter their operations in a way that would result in significant adverse environmental impacts. (Less than Significant)**

Alameda County Water District (ACWD) is the only downstream user of Alameda Creek water that could potentially be affected by the proposed project. ACWD obtains its water from three sources: local supplies, the State Water Project, and the San Francisco regional water system. The primary source of the local supplies, which represent 40 percent of the district's total supply, is Alameda Creek. The project could impact ACWD if it would cause ACWD to change its operations or the way it uses its sources of water in a manner that would result in adverse environmental effects.

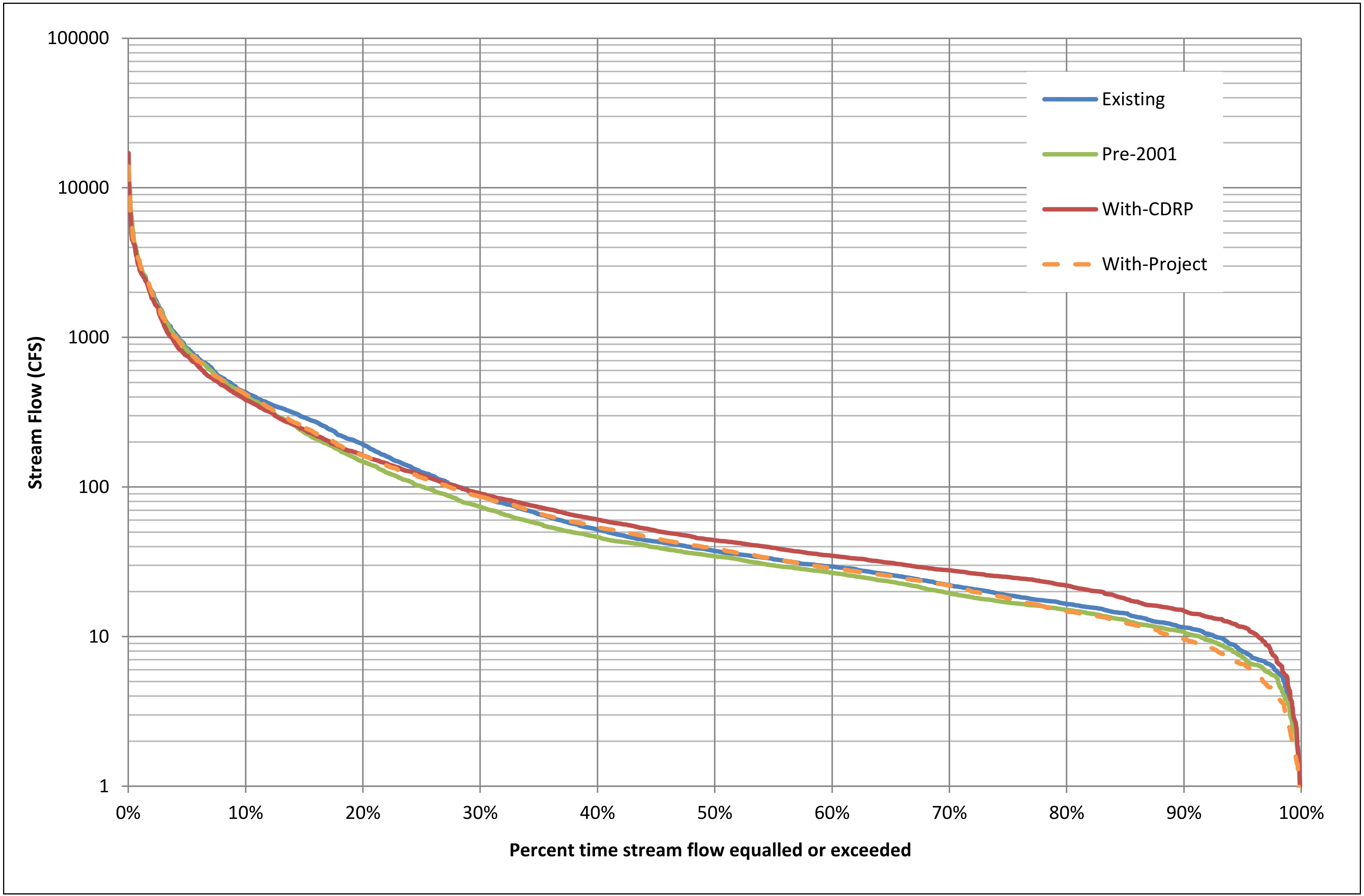
Flow that reaches ACWD in Alameda Creek is influenced by the way the SFPUC operates Calaveras Reservoir. For decades before 2001, the SFPUC operated its Alameda System in a manner that took full advantage of Calaveras Reservoir's full storage capacity. In 2001, the DSOD imposed restrictions on storage in Calaveras Reservoir and from 2001 until the present the SFPUC has operated the reservoir with a fraction of its pre-2001 storage capacity. When the CDRP is commissioned, the SFPUC will again utilize Calaveras Reservoir's full capacity but it will also release water at Calaveras Reservoir and bypass water at the ACDD to meet instream flow schedules.

Operation of the ACRP would affect flow in Alameda Creek. Once the ACRP is commissioned, the SFPUC would alter operations of its Alameda System facilities to include the ACRP recapture operations. The altered operations would affect flow in Alameda Creek from the Calaveras Creek confluence downstream to San Francisco Bay compared to existing conditions and with-CDRP conditions. Under existing conditions, the SFPUC operates the Calaveras Reservoir at less than full capacity; it has not implemented the instream flow schedules but makes releases at the reservoir and diverts water around the ACDD to manage the reservoir level; with CDRP now under construction, the SFPUC is required to have the ACDD closed during construction per the Streambed Alteration Agreement with CDFW. Under with-CDRP conditions, the reservoir will operate at full capacity. In the dry season, the SFPUC will release water from Calaveras Reservoir to meet the instream flow schedules and also abstract water from the reservoir for treatment and distribution to municipal customers. As a result, the water level in Calaveras Reservoir will fall, increasing the volume of unused storage capacity in the reservoir. Under with-project conditions, releases from Calaveras Reservoir would be made to meet the instream flow schedules but some of the water needed to meet municipal demand would be supplied by the ACRP. The water level in Calaveras Reservoir under with-project conditions would be higher and the volume of unused storage capacity in the reservoir would be less than under with-CDRP conditions. Consequently, the reservoir would spill more frequently under with-project conditions than it will under with-CDRP conditions. The difference in spill frequency affects flow in Alameda Creek downstream of its confluence with Calaveras Creek.

The project would also affect flow in Alameda Creek by inducing changes in NPDES discharges of excess water from the quarry pits. The changed NPDES discharges would affect flow in the creek downstream of the quarry NPDES discharge location point near the San Antonio Creek confluence. Both the changes in operation of the SFPUC's Alameda System facilities and the altered NPDES discharges from the quarries would affect flow in Alameda Creek at the Niles gage (Node 9) just upstream of ACWD's diversion point. These factors are accounted for in the flow estimates for Node 9 made using the ASDHM as adjusted to include the NPDES discharges and the losses to the subsurface (as described in Appendix HYD1).

**Figure 5.16-23** shows flow duration curves for pre-2001, existing, with-CDRP, and with-project conditions calculated from daily flow estimates made using the ASDHM; the figure is based on ASDHM data for the period October 1 to May 31, the permitted period during which ACWD can divert flows from Alameda Creek. Flow at Niles, under pre-2001 conditions, is estimated to exceed 25 cfs on about 63 percent of the days. Under existing conditions, it is estimated to exceed 25 cfs on about 65 percent of the days. Under with-CDRP conditions it is estimated to exceed 25 cfs on about 75 percent of the days. Under with-project conditions, it would exceed 25 cfs on about 65 percent of the days. Flow would exceed 700 cfs on about 6 percent of the days and would exceed 1,200 cfs on about 4 percent of the days under all four conditions.

Average flow volumes in Alameda Creek at Niles for the period when ACWD can divert water from Alameda Creek, October 1 through May 31, for pre-2001, existing, and with-CDRP and with-project conditions were calculated from the daily flow estimates made using the ASDHM and adjusting output with accretions and depletion (see Appendix HYD1). Under with-CDRP conditions average flow volume for the period October 1 through May 31 is estimated to be 94,575 acre-feet. Under with-project conditions, it is estimated to be 97,797 acre-feet, about 3.4 percent greater than under with-CDRP conditions. By way of comparison, under pre-2001 and existing conditions average flow volume for the same period is estimated to be 96,264 acre-feet and 100,005 acre-feet, respectively.



SOURCE: SFPUC, 2016. Simulated stream flows for different scenarios at 5 nodes and pond elevation for ACRP. Excel spreadsheet file provided by Amod Dhakal on July 7, 2016.

NOTE: Data presented are derived from the Alameda System Daily Hydrologic Model (ASDHM) using from Water Years (1996 – 2013)

SFPUC Alameda Creek Recapture Project

**Figure 5.16-23**

Flow Duration Curves for Node 9 (Alameda Creek at Niles) for ACWD Diversion Period (October 1 – May 31) for Existing, Pre-2001, with-CDRP, and with-Project Conditions

Average monthly flow volumes in Alameda Creek at Niles for with-CDRP and with-project conditions were calculated from the daily flow estimates made using the ASDHM (see Appendix HYD1). Average monthly flows would be lower under with-project conditions than under with-CDRP conditions for eight months of the year (i.e., October, November, December, May, June. July, August, and September,). However, four of these months are June, July, August, and September when ACWD is not permitted to divert water from Alameda Creek. Average monthly flows under with-project conditions would be higher than under with-CDRP conditions in January, February, March and April. Average monthly flows would be lower under with-project conditions than under pre-2001 conditions in March, July, August and September; three of these months are months when ACWD is not permitted to divert water from Alameda Creek. Average monthly flows would be higher under with-project conditions than under pre-2001 conditions in all other months. Average flows would be lower under with-project conditions than under existing conditions in nine months of the year (i.e., October, December, January, April, May, June. July, August, and September). However, four of these months are June, July, August, and September when ACWD is not permitted to divert water from Alameda Creek. Average monthly flows under with-project conditions would be higher than under existing conditions in November, February and March.

In the future, when both the CDRP and the proposed ACRP (if approved) are in operation, the SFPUC will utilize Calaveras Reservoir's full capacity. It will release water at Calaveras Reservoir, bypass water at the ACDD to meet instream flow schedules, and pump water collected in Pit F2 to the regional water system. Under these with-project conditions, the average flow volume in Alameda Creek at ACWD's diversion point for the eight-month period between October and May when ACWD can divert water would be 97,797 acre-feet.

As indicated above, operation of the proposed ACRP is not expected to have an adverse effect on the overall amount of water available to ACWD from Alameda Creek. It is expected that an average of about 3,000 acre-feet more water would arrive at ACWD's diversion point between October and May under with-project conditions than it will under with-CDRP conditions. About an average of 2,200 acre-feet less water would arrive at the ACWD's diversion point between October and May under with-project conditions than under existing conditions.

The analysis above indicates that the number of days when flows at Niles would exceed 25 cfs under with-project conditions would be about the same as under existing conditions. Under with-project conditions, there would be a reduction in the number of days when flows at Niles exceeded 25 cfs at ACWD's diversion point compared to with-CDRP conditions. The reduced number of days is attributable to ACRP-caused changes in operations at Calaveras Reservoir and reductions in the amount of water that the quarry operators would need to manage and therefore would reduce the amount of water discharged by the quarries under their NPDES permit. It is not possible to reliably determine on which days the reduction might occur because of the unknown and unpredictable future pattern of quarry NPDES discharges.

It is expected that any effects of the proposed ACRP on ACWD operations in Alameda Creek would be too minor to cause ACWD to make substantial changes in the way it operates and uses its various sources of water. Therefore, it is expected that the environmental impacts that could stem from ACRP-caused changes in ACWD operating practices, if any, would be minor, and this impact would be considered *less than significant.*

**Mitigation:** None required.

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## *Cumulative Impacts*

**Impact C-HY: The project, in combination with past, present, and probable future projects, would not substantially affect hydrology and water quality. (Less than Significant)**

The geographic scope of cumulative construction impacts on water quality and hydrology is Alameda Creek within the Sunol Valley. The geographic scope of cumulative operational impacts in Alameda Creek from Calaveras Creek to the confluence of Arroyo de la Laguna, which, as described in Appendices HYD1 and HYD2, is the extent of discernible operational impacts of the ACRP on streamflow and subsurface waters. Therefore, only those projects listed in Table 5.1-6 within this geographic area could potentially result in cumulative hydrology or water quality impacts in combination with the ACRP.

As described below, neither construction nor operation of the ACRP would cause or make a considerable contribution to cumulative adverse impacts on water quality or hydrology in the Sunol Valley.

### Construction Impacts

Construction activities associated with the proposed project in combination with past, present, and reasonably foreseeable future projects in the Sunol Valley could result in cumulative impacts on water quality in Alameda Creek. The projects potentially contributing to this impact include all projects listed in Table 5.1-6. Construction and ground disturbance activities associated with any of the projects could result in temporary increases in sediments and turbidity, and temporary release and exposure of contaminants that could adversely affect water quality and beneficial uses without proper precautions. However, similar to the ACRP, all projects recently constructed, currently under construction, or proposed to be constructed in the near future would be subject to the same regulatory requirements for implementation of water quality protection measures—including a site-specific SWPPP—to prevent construction stormwater from adversely affecting Alameda Creek. These regulatory requirements promulgated by the Regional Water Quality Control Board are designed to protect water quality on a regional basis. Therefore, no adverse cumulative construction water quality impact would be expected, and the cumulative construction impacts on water quality would be *less than significant*.

### Groundwater

As described in Impact HY-2, there are no known active wells that draw water from the shallow alluvial aquifer along the Alameda Creek alignment between the project area and Arroyo de la

Laguna confluence downstream of the project site. Local supply wells in the Sunol Valley Groundwater Basin are completed in deep bedrock formations that are recharged from other sources, and therefore the project has no potential to affect movement and recharge in any area. The cumulative projects in the Sunol Valley (e.g., the SMP-30 Cutoff Wall and Creek Restoration, SMP-30 Quarry Expansion, PG&E Pipeline Removal, PG&E Pipeline Retirement Project), like the ACRP, would have the potential to only affect the shallow alluvial aquifer and associated subsurface water due to the limited extent of excavation. Therefore, no cumulative adverse impact on groundwater recharge or existing production wells is anticipated, and the cumulative impact on groundwater resources would be *less than significant*.

### Water Quality

Cumulative operational impacts on water quality in Alameda Creek could occur if operation of any of the projects listed in Table 5.1-6 located along Alameda Creek between Calaveras Creek and Arroyo de la Laguna would result in operational discharges to the creek. However, as described in the regulatory framework above, Alameda Creek has identified beneficial uses under the Basin Plan, and any discharges to Alameda Creek—whether operational or construction-related—are subject to permit requirements by the RWQCB in order to protect the identified beneficial uses. Therefore, any of the cumulative projects that might require operational discharges to Alameda Creek would be subject to the same waste discharge permitting requirements of the RWQCB, and that compliance with those permit requirements would reduce any potential cumulative impact on water quality to less than significant. Therefore, no cumulative adverse impact on water quality is anticipated, and the cumulative impact on water quality would be *less than significant*. Further, as described above in Impact HY-3, because ACRP would not result in either direct or indirect changes in Alameda Creek water quality, ACRP operations would not contribute to any cumulative water quality effects on Alameda Creek.

### Flooding

As described in Impact HY-4, the ACRP would have a less than significant effect on flood hazards. Similarly, other projects located in the Sunol Valley listed in Table 5.1-6 would not be expected to affect flood hazard because they would have no effect on the size of floods produced by storms over the watershed, the size of floods caused by dam failure, or on water levels in the area subject to flooding. Like the proposed project, any cumulative project located within flood hazard areas would be required to comply with the San Francisco Floodplain Management Ordinance. Therefore, no adverse cumulative flooding impact would be expected, and this impact would be *less than significant*.

### Downstream Users

As described in Impact HY-5, ACWD is the only downstream user of Alameda Creek water that could potentially be affected by the ACRP. The only cumulative projects that could potentially affect the ACWD's water diversion operations on Alameda Creek is the Rubber Dam No. 1, BART Weir, and Related Fish Passage Improvements project, proposed by the ACWD together with the Alameda County Flood Control and Water Conservation District. However, it is assumed that ACWD as the project sponsor would not design or propose a project that would adversely affect its own water diversion operation. Therefore, there would be no significant cumulative impact on downstream users, and this impact would be *less than significant*.

**Mitigation:** None required.

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# 5.17 Hazards and Hazardous Materials

This section provides an assessment of potential impacts related to hazards and hazardous materials that could be present in the vicinity of the proposed Alameda Creek Recapture Project (ACRP or proposed project). Potential hazards addressed in this section include exposure to hazardous materials in soil and groundwater during construction, releases of hazardous materials during construction and operation, and risk of wildfires.

## 5.17.1 Setting

### 5.17.1.1 Hazardous Materials in Soil and Groundwater

This section assesses the potential for hazardous materials to be present in site soils or groundwater as a result of past and present land uses and land use activities in the project area, or as a result of documented releases of hazardous materials in the project vicinity. Historical land uses were determined based on a review of historical topographical maps from 1906 through 1996 and aerial photographs from 1940 through 2005. Documented hazardous materials releases in the project vicinity were identified by searching environmental databases for hazardous materials sites within a 1-mile radius of the project area. Existing land uses were determined based on observations during site visits conducted by ESA staff.

#### *Past and Present Land Uses and Hazardous Materials Usage in the Project Vicinity*

- ***Agricultural Uses.*** Between the 1940s and sometime after 1960, portions of the project area and adjacent properties were used to cultivate hay and row crops. Although specific information regarding historical agricultural practices in the areas within the vicinity of the project area is not available, the use of chemical fertilizers and pesticides was common practice at that time. The application of these hazardous chemicals could have affected soils in the project area; however, most of the surface soils in the area were subsequently excavated when aggregate mining began in Pits F3-East, F3-West, and F2. Thus, even if site soils were contaminated by past agricultural practices, it is unlikely that the soils remain affected by these historical uses.

- ***Commercial Nurseries.*** Between 1982 and 1993, three commercial nurseries were developed in the project area: (1) between Pit F3-East and Calaveras Road; (2) in the northern portion of the project area, just south of the Pacific Gas and Electric Company (PG&E) Sunol Substation and the Interstate 680 (I-680) / State Route 84 (SR 84) interchange; and (3) along the northern project area boundary, on the south side of I-680. Potting containers for the former nursery site between Pit F3-East and Calaveras Road were stored at the Permanent Spoils Site A, which is located adjacent to the project area and Pit F2.[1] The two commercial nurseries between Pit F3-East and Calaveras Road, and along the south side of I-680, were both vacated in 2010. Calaveras Nursery, located just south of the PG&E Sunol Substation, is still under operation. Fungicides, herbicides, and insecticides are commonly used at nursery sites. Thus, although no specific information regarding pesticide and herbicide use

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[1] Baseline Environmental Consulting (Baseline), 2009. *Phase I Environmental Site Assessment for the San Francisco Public Utility Commission New Irvington Tunnel Project, Alameda County, California*. May 2009.

is available[2], land use activities at the former and existing nursery sites may have affected soil and groundwater in the project area.

- ***Hanson Aggregates and Oliver De Silva Quarries.*** Two gravel quarries exist within and immediately adjacent to the project area. Pits F2, F3-East, and F3-West are within the project area and are operated by Hanson Aggregates under Surface Mining Permit 24 (SMP-24). To the south of the project area is Surface Mining Permit 30 (SMP-30), which is operated by Oliver De Silva. The SMP-24 aggregate processing facility is on the west side of Alameda Creek; the SMP-30 aggregate processing facility is approximately 0.25 mile south of the project area on the west side of Calaveras Road. Mining operations typically involve the use of fuels, lubricants, and other hazardous chemicals to maintain vehicles and heavy equipment. According to the environmental data base search via Geotracker, Envirostor, and the Alameda County Department of Environmental Health Local Oversight Program, there are no open hazardous material release cases at these facilities.[3]

- ***Hetch Hetchy Water & Power (HHWP) Calaveras Substation and PG&E Sunol Substation.*** There are two electrical power substations in the project area: the HHWP Calaveras Substation, located just south of San Antonio Creek and west of Calaveras Road, and the PG&E Sunol Substation, located just south of the I-680 / SR 84 interchange. Prior to 1979, insulating oils in transformers and other electrical equipment frequently contained polychlorinated biphenyls (PCBs), which are toxic pollutants. Today, a nontoxic mineral oil is used in these applications.

### *Environmental Database Search and Regulatory File Review*

A search of the relevant environmental data bases—including Geotracker, Envirostor, and the Alameda County Department of Environmental Health Local Oversight Program—was conducted to identify sites that could potentially affect soil and groundwater in the project area. The data base search identified four sites within approximately one mile of the project area. These sites are summarized in **Table 5.17-1** below.

As summarized above in Table 5.17-1, the results of the regulatory file review indicate that no sites have the potential to affect groundwater or subsurface water within the project area.

### *Previous Soil Sampling Results at the Permanent Spoils Site A*

Permanent Spoils Site A (also known as the North Spoils Site) is located within the project area between Calaveras Road and Pit F2. In 2010, the SFPUC conducted surface soil sampling within Permanent Spoils Site A to evaluate residual concentrations of pesticides and metals in the soils from historical agricultural activities.[4] The maximum concentrations of constituents detected in the

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[2] California Department of Pesticide Regulation, 2015. California Pesticide Information Portal (CALPIP). Available online at. http://calpip.cdpr.ca.gov/main.cfm. Accessed on: November 3, 2015.

[3] Geotracker, 2015. Available at: http://geotracker.waterboards.ca.gov/. Accessed on: October 12, 2015; Envirostor, 2015. Available at: http://www.envirostor.dtsc.ca.gov/public/ Accessed November 3, 2015; Alameda County Department of Environmental Health Local Oversight Program Available at: http://www.co.alameda.ca.us/aceh/lop/index.htm. Accessed on: November 3, 2015.

[4] Baseline Environmental Consulting (Baseline), 2010. *Soil Quality Investigation Report for the San Francisco Public Utility Commission New Irvington Tunnel Project, Alameda County, California*. August 2010.

### TABLE 5.17-1
### HAZARDOUS MATERIALS RELEASES IN PROJECT VICINITY

| Site Name and Location | Distance / Direction Relative to Project Area | Summary | Potential to Impact Groundwater or Subsurface Water in the Project Area | Map ID (see Figure 5.17-1) |
|---|---|---|---|---|
| Mission Valley Rock & Asphalt (Hanson Aggregates' SMP-24 aggregate processing facility) – 7999 Athenour Way | 1,200 feet southwest | A former leaking underground storage tank containing gasoline resulted in groundwater contamination. Remedial action has been completed, and the case has been closed. Groundwater flows north-northeast towards the project area. | Unlikely | A |
| Sunol Tree Service – 3004 Andrade Road | 0.75 mile southwest | A former leaking underground storage tank containing gasoline resulted in groundwater contamination. Remediation has been completed and the case has been closed, but monitoring is ongoing. Groundwater flows north-northeast towards the project area. | Unlikely | B |
| Sunol Tree Gas – 3004 Andrade Road | 0.75 mile southwest | A fuel release at this site has affected a water supply well on an adjacent property. The fuel release was discovered during removal of five underground storage tanks on April 12, 2002. Site investigation activities have been conducted at the site since 2002. The case is open and verification monitoring has occurred since June 2014. Groundwater flows north-northeast towards the project area. | Unlikely | C |
| Y's Equipment Rental – 7999 Athenour Way | 0.5 mile west | A subsurface petroleum products spill occurred at this site, but the chemicals of concern were not detected during groundwater sampling. Remedial action has been completed, and the case has been closed. Groundwater flows north-northeast towards the project area. | Unlikely | D |

SOURCE: State Water Resources Control Board, 2015. Geotracker. Available at: http://geotracker.waterboards.ca.gov/ Accessed on: October 12, 2015.

soil samples were compared to following relevant federal, state, and regional hazardous waste criteria: the federal toxicity characteristic leaching procedure regulatory level; the state total threshold limit concentration and soluble threshold limit concentration; and the RWQCB ESLs for construction workers.[5] These waste classification criteria are discussed below in Section 5.17.2.1.

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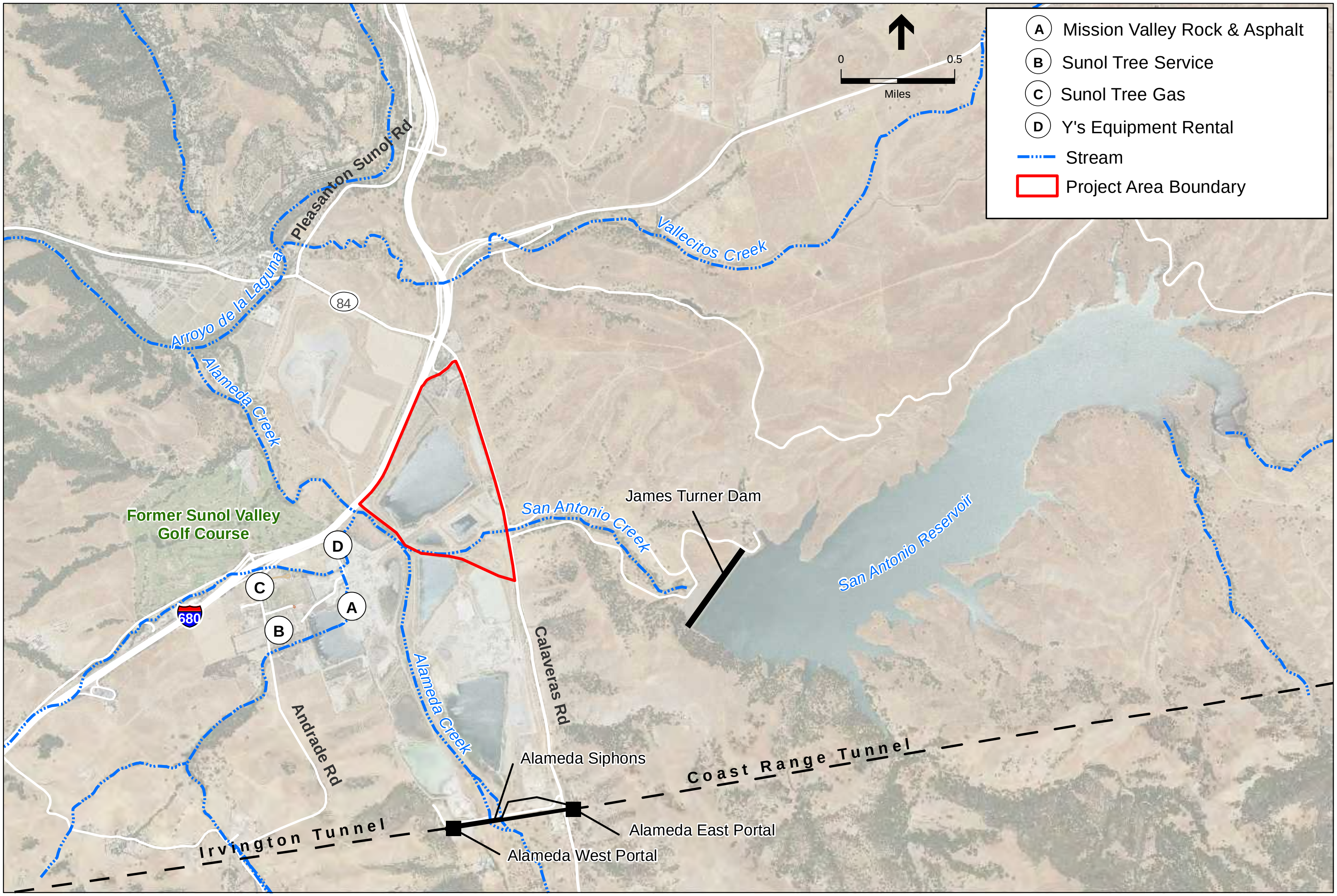
[5] San Francisco Bay Regional Water Quality Control Board (RWQCB), 2013. *Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater*. Interim Final – December 2013. Available at: http://www.waterboards.ca.gov/rwqcb2/water_issues/programs/esl.shtml. Accessed on: January 7, 2016.



SOURCE: ESA, 2011

SFPUC Alameda Creek Recapture Project

**Figure 5.17-1**

Hazardous Materials Release Sites in the Project Vicinity

During the 2010 sampling event at Permanent Spoils Site A, 11 pesticides and 13 metals were detected in discrete soil samples. Based on a comparison of analytical results to federal and state waste classification criteria, the soil at Permanent Spoils Site A would not be classified as a hazardous waste. Based on a comparison of analytical results to the RWQCB ESLs for construction workers, earthwork at Permanent Spoils Site A would not present an unacceptable risk to construction workers. If any excavated soil were removed from the Permanent Spoils Site A during project construction, in accordance with applicable federal, state, and local laws and regulations, further analysis would be required to identify the appropriate disposal options.

### 5.17.1.2 Wildfire Hazards

The project vicinity has a Mediterranean climate, which is characterized by long, dry, hot summers and cool, rainy winters. The majority of measurable rainfall occurs from mid-October to mid-April, and in most years this precipitation results in abundant grass growth. May to October is the main fire season, and July is the time of the highest fire danger. During this period the grasses dry and provide a fuel source for fires, with fire conditions exacerbated by warm air temperatures and the lack of precipitation.

The proposed project is not located in a high fire hazard severity area, as mapped by the California Department of Forestry and Fire Prevention.[6] In addition to CAL FIRE's designations, the *Alameda Watershed Management Plan* (WMP) characterizes fire hazards in the watershed. The Alameda WMP indicates that the ACRP lies within a low fire hazard severity area, although areas to the east of Calaveras Road are mapped as moderate and high hazard fire severity areas.

## 5.17.2 Regulatory Framework

### 5.17.2.1 Federal and State Regulations

#### *Definition of Hazardous Materials*

Hazardous materials and wastes can result in public health hazards if released to soil, groundwater, or air. Hazardous materials as defined in Section 25501(o) of the California Health and Safety Code are materials that, because of their "quantity, concentration, or physical or chemical characteristics, pose a significant present or potential hazard to human health and safety or to the environment if released to the workplace or environment." Hazardous materials have been and are commonly used in commercial, agricultural, and industrial applications and, to a limited extent, in residential areas.

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[6] California Department of Forestry and Fire Protection (CAL FIRE), 2007. *Alameda County, Fire Hazard Severity Zones in SRA,* adopted by CAL FIRE on November 7, 2007. Available at http://www.fire.ca.gov/fire_prevention/fhsz_maps_alameda. Accessed on: November 3, 2015

### *Aboveground Storage of Petroleum Products*

The Aboveground Petroleum Storage Act (APSA) regulates facilities with aggregate aboveground petroleum storage capacities of 1,320 gallons or more, which include aboveground storage containers or tanks with petroleum storage capacities of 55 gallons or greater. As of January 2008, the Alameda County Department of Environmental Health (ACEH), the local Certified Unified Program Agency, is responsible for implementation, enforcement, and administration of the APSA, and as of January 2013, the CAL FIRE-Office of the State Fire Marshal has oversight responsibility of the APSA. ACEH inspects facilities with total petroleum storage quantities at or above 10,000 gallons at least once every three years and imposes reporting and fee requirements on these facilities. Facilities with petroleum storage quantities equal to or greater than 1,320 gallons but less than 10,000 gallons have reporting and fee requirements only.

### *Transportation of Hazardous Materials*

Within California, the state agencies with primary responsibility for enforcing federal and state regulations related to the transport of hazardous materials are the California Highway Patrol, the Department of Toxic Substances Control, and the California Department of Transportation. Together, federal and state agencies determine load labeling procedures, container specifications, and driver-training requirements for truckers who transport hazardous materials. Although certain requirements apply to the transport of hazardous materials, requirements for transporting hazardous waste are more stringent, and hazardous waste haulers must be licensed to transport hazardous waste on public roads.

### *Environmental Screening Levels*

The RWQCB's ESLs are the guidelines used to evaluate the potential risk associated with chemicals found in soil or groundwater in areas where a release of hazardous materials has occurred. ESLs have been established for both residential and commercial/industrial land uses and also for construction workers. Residential screening levels are the most restrictive; soil with detected chemical concentrations below these levels does not typically require remediation and is suitable for unrestricted uses if disposed of offsite. Commercial/industrial screening levels are generally higher than residential screening levels because they are based on potential worker exposure to hazardous materials in the soil, and workers are typically exposed to lower contaminant levels than residents. Screening levels for construction workers are also higher than for commercial/industrial workers, because construction workers are exposed to chemicals of concern only during the duration of construction, while industrial workers are assumed to be exposed over a working lifetime.

### *Waste Classification Criteria*

In accordance with Title 22 of the California Code of Regulations (CCR), Section 66261.20 et seq., excavated soil is classified as a hazardous waste if it exhibits the characteristics of ignitability, corrosivity, reactivity, and/or toxicity. A waste is considered toxic in accordance with 22 CCR 66261.24 if it contains:

- Total concentrations of certain substances at concentrations greater than the total threshold limit concentration;
- Soluble concentrations greater than the soluble threshold limit concentration;
- Soluble concentrations of certain substances greater than federal toxicity regulatory levels using the toxicity characteristic leaching procedure; or
- Specified carcinogenic substances at a single or combined concentration of 0.001 percent.

Soil that is not classified as a hazardous waste can be accepted at a Class II or Class III designated landfill, depending on the waste acceptance criteria for the specific landfill.

### *Naturally Occurring Asbestos*

In 2001, the California Air Resources Board adopted the Asbestos Airborne Toxic Control Measure (Asbestos ATCM) for Construction, Grading, Quarrying, and Surface Mining Operations in areas of serpentine[7] and other ultramafic rocks[8] (17 CCR 93105), which became effective in July 2002. The ATCM protects public health and the environment by requiring the use of best available dust mitigation measures to prevent the offsite migration of asbestos-containing dust from road construction and maintenance activities, construction and grading operations, and quarrying and surface mining operations in areas of ultramafic rock, serpentine, or asbestos.[9] The Bay Area Air Quality Management District implements the regulation. As discussed in Section 5.16, Geology and Soils, geologic bedrock units present in the project area include the Briones Formation, Livermore Gravels, and Cretaceous-age unnamed sandstone. Alluvial material fills the Sunol Valley floor, including older alluvium, alluvial fan deposits, stream terrace deposits, gravel deposits, and modern stream channel deposits. None of these are comprised of ultramafic rock and thus are not expected to contain naturally occurring asbestos. Therefore, the Asbestos ATCM would not apply to the proposed project.

### *Wildfires*

The State Office of the Fire Marshall and CAL FIRE administer state policies regarding wildland fire safety. CAL FIRE also provides firefighting personnel and equipment in response to wildland fires. California Public Resources Code, Section 4427 et seq., and in Title 24 of the CCR, Division 1.5, Chapter 7, Subchapter 2, Article 5 set forth minimum requirements for construction activities within "high fire hazard severity zones." However, since the project area is not characterized as a high fire hazard severity zone, there are no specific wildfire requirements that apply to the proposed project.

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[7] Serpentine is a naturally occurring group of minerals that can be formed when ultramafic rocks are metamorphosed during uplift to the earth's surface. Serpentinite is a rock consisting of one or more serpentine minerals. This rock type is commonly associated with ultramatic rock along earthquake faults. Small amounts of chrysotile asbestos, a fibrous form of serpentine minerals, are common in serpentinite.

[8] Ultramafic rocks are formed in high-temperature environments well below the surface of the earth.

[9] Asbestos includes several types of naturally occurring fibrous materials found in many parts of California.

### 5.17.2.2 Local Policies

#### *Certified Unified Program Agency*

The ACEH Certified Unified Program Agency is the administrative agency that coordinates and enforces numerous local, state, and federal hazardous materials management and environmental protection programs in Alameda County. The Certified Unified Program Agency administers the following programs:

- Hazardous Materials Business Program
- Hazardous Waste Generator Program
- Underground Storage Tank Program
- California Accidental Release Program
- Tiered Permitting Program
- Aboveground Storage Tank Program

#### *Hazardous Materials Business Program*

In accordance with the State requirements under the Hazardous Materials Business Program, businesses that use, handle, or store hazardous materials in excess of threshold quantities are required to submit a HMBP in accordance with community right-to-know laws. Threshold quantities are 500 pounds for solids, 55 gallons for liquids, and 200 cubic feet for compressed gases. The HMBP allows local agencies to plan appropriately for a chemical release, fire, or other incident. In Alameda County, the HMBP must include the following:

- An inventory of hazardous materials and wastes with specific quantity data, storage or containment descriptions, ingredients of mixtures, and physical and health hazard information;
- Site and facility layouts that must be coded for chemical storage areas and other facility safety information;
- Emergency response/contingency plan for a release or threatened release of hazardous materials; and
- An employee training plan.

In Alameda County, the HMBP is filed with and administered by the ACEH, which ensures review by and distribution to other potentially affected agencies. The plan must be reviewed every three years to determine if any revision is needed, and must be updated within 30 days when there is a 100 percent or more increase in the quantity of previously disclosed hazardous materials, or when a facility begins storing a new hazardous material at or above threshold quantities. The SFPUC has prepared and implemented HMBPs for its facilities located south of the project area (e.g., the San Antonio Pump Station, the Sunol Valley Chloramination Facility, the fluoride facility, and the existing chemical facility) that use hazardous materials above threshold limits.[10]

### *Alameda Watershed Management Plan*

The Alameda WMP, which the SFPUC has adopted, provides a policy framework for the SFPUC to make management decisions about the activities, practices, and procedures that are appropriate on SFPUC-owned Alameda watershed lands. Several WMP actions are intended to reduce risks from wildfires and releases of hazardous materials and would apply to the ACRP, including:

- ***Action haz1:*** Develop hazardous chemical management procedures addressing the type, use, storage, transport, and disposal of hazardous chemicals and pesticides used in watershed activities (e.g., SFPUC operations, nurseries, quarries, pest management, easements and leases, etc.). Guidelines include:
    - A. Ensure proper material transport procedures (e.g., tie-down/attach material to vehicle).
    - B. Carry appropriate spill response chemicals when transporting hazardous chemicals and pesticides.
- ***Action haz4*:** Conduct regular servicing for the SFPUC vehicle fleet and equipment so that leaks/drips/spills of contaminants are minimized. Guidelines include the following:
    - A. Immediately report accidental spills of hazardous materials into surface waters to the Water Quality Bureau and the appropriate state agencies.
    - B. Require that buckets and absorbent materials be carried in all SFPUC vehicles in case of an accident or breakdown in which vehicle-related fluids are released.
    - C. Follow appropriate best management practices (BMPs) in Appendix C-6 of the WMP to minimize leaching of vehicle-related contaminants into the soil or groundwater from facilities.
    - D. For fire protection purposes, ensure that all vehicles and equipment are equipped with spark arrestors and that each vehicle carries fire suppression equipment.
- ***Action haz6*:** Identify high-risk spill potential areas and implement measures (e.g., fines, barricades, etc.) to reduce the risk of hazardous spills.
- ***Action haz7*:** Develop spill response and containment measures for SFPUC vehicles on the watershed. These measures should be coordinated with the overall Emergency Response Plan developed in Action saf7.
- ***Action haz8:*** Train staff members, as appropriate, in spill response and containment measures for SFPUC vehicles as well as for other types of spills on the watershed.

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[10] San Francisco Public Utilities Commission (SFPUC), 2007. *Final Hazardous Materials Business Plan, San Antonio Pump Station, Sunol, California.* Prepared by AEW Engineering, Inc. October 2004. Revised August 2007.

- ***Action fir1***: Prior to authorizing the use of any vehicle or equipment on the watershed, require that SFPUC vehicle/equipment comply with the fire prevention regulations established by CAL FIRE for use in the watershed. Non-SFPUC equipment must be certified by CAL FIRE. All vehicles/equipment shall include spark arrestors and carry fire suppression equipment during fire season.

As described in Chapter 4, Plans and Policies, as part of implementation of the Alameda WMP, the SFPUC reviews all plans, projects, and activities that occur within the Alameda watershed for conformity with the management plan and for compliance with environmental codes and regulations. To accomplish this, the SFPUC has established a project review team with members from various SFPUC departments as well as the City Attorney's office. Appropriate SFPUC personnel review proposals for new facilities, structures, roads, trails, projects, and leases or for improvements to existing facilities. Projects subject to this review include those that involve construction, digging or earthmoving, clearing, installation, use of hazardous materials, or other disturbance to watershed resources.

## 5.17.3 Impacts and Mitigation Measures

### 5.17.3.1 Significance Criteria

The proposed project would have a significant impact related to hazards and hazardous materials if the project were to:

- Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials;

- Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment;

- Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within 0.25 mile of an existing or proposed school;

- Be located on a site that is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, create a significant hazard to the public or the environment;

- For a project located within an area covered by an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport, result in a safety hazard for people residing or working in the project area;

- For a project within the vicinity of a private airstrip, result in a safety hazard for people residing or working in the project area;

- Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan; or

- Expose people or structures to a significant risk of loss, injury, or death involving wildland fires.

### 5.17.3.2 Approach to Analysis

Based on the findings of the *California Building Industry Association (CBIA) v. Bay Area Air Quality Management District (BAAQMD)* 62 Cal.4th 369 (2015), this approach to analyzing impacts determines if the proposed project would substantially exacerbate any existing environmental hazards or conditions, and then evaluates the potential for such exacerbated hazards to affect future residents or users associated with the proposed project. The analysis does not consider the effects of existing environmental conditions on the project's future users or residents. In these specific instances, it is the project's impact on the environment, and not the environment's impact on the project, that compels an evaluation of how future residents or users could be affected by exacerbated conditions.[11]

Due to the nature of the proposed project, there would be no impacts related to the following criteria; therefore, no impact discussion is provided for these topics for the reasons described below:

- ***Emit or Handle Hazardous Materials within 0.25 Mile of a School.*** Sunol Glen Elementary School, the closest school to the project area, is the located approximately 1 mile to the northwest. Therefore, the criterion related to the use or emission of hazardous materials within 0.25 mile of a school is not applicable to the proposed project and is not discussed further.

- ***Safety Hazards Within an Airport Land Use Plan Area or in the Vicinity of a Private Airstrip***. The nearest public airport to the proposed project is San Jose International Airport, which is approximately 14 miles to the southwest. The nearest private airstrips are the First Interstate Bank Operations Center Heliport and Washington Hospital Heliport in Fremont, both of which are approximately 6 miles to the west. Because the project is more than 2 miles from a public airport or private airstrip and would not involve the construction of aboveground structures that could interfere with air traffic, the criterion related to safety hazards in the vicinity of an airport is not applicable to the proposed project and is not discussed further.

- ***Risk of Loss, Injury, or Death Involving Wildland Fires during Project Operations.*** As indicated in Section 5.17.1.3, above, the ACRP area is not within a designated fire hazard severity zone. Project operations would not involve the routine use of equipment that may produce a spark, flame, or fire. The project would not include any long-term hazardous chemical storage. Thus, the criterion related to fire hazards is not applicable to project operations and is only discussed below as it relates to project construction.

This analysis focuses on the potential for workers to encounter hazardous substances in soil and groundwater during construction. The analysis is based on: (1) review of historical maps and aerial photographs of the project area performed to identify historical land uses within and adjacent to the project area; (2) the results of the environmental database search and regulatory

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[11] Special CEQA exceptions, such as those in Pub. Res. Code Sections 21096, 21151.8, 21155.1 and 21159.22-21159.24 that apply to certain airport, school, and housing construction projects may requires agencies to evaluate a project site's environmental conditions regardless of whether the project risks exacerbate existing conditions. That these exceptions exist, however, does not alter the Supreme Court’s findings that CEQA’s general rule requires consideration only of a project's impact on the environment, not the environment's impact on project users or residents.

file review performed to identify documented hazardous materials releases in the project vicinity with the potential to adversely affect soil and groundwater in the project area; (3) the results of ongoing water quality monitoring by the SFPUC in the project area; and (4) the results of previous soil sampling at Permanent Spoils Site A. The analysis also addresses the potential for the ACRP to result in the inadvertent release of hazardous chemicals during construction; interfere with an adopted emergency response plan or emergency evacuation plan during construction; increase fire hazards during construction; or result in a release of hazardous materials during operation. Each potential impact is assessed in terms of the applicable regulatory requirements, and mitigation measures are identified as appropriate.

As described in Section 5.1.2 regarding baseline conditions for evaluation of project impacts, construction-related impacts in this section are evaluated against the existing conditions. The current construction schedule for the proposed project is from fall 2017 to spring 2019 (18 months), and construction of the Calaveras Dam Replacement Project (CDRP) is also anticipated to be completed in spring 2019. It is possible that operation of the CDRP will commence prior to completion of ACRP construction, and that with-CDRP conditions could occur while ACRP is still under construction. However, operation of the CDRP is not expected to change any of the baseline hazards or hazardous materials conditions analyzed in this section. Therefore, no change in the approach to the impact analysis is necessary to account for the with-CDRP conditions. More specifically, the construction-related impacts of the ACRP presented in this section would be the same regardless of the implementation of bypass flows at the Alameda Creek Diversion Dam and instream flow releases from Calaveras Reservoir and all other aspects of CDRP operations that characterize the with-CDRP conditions.

### 5.17.3.3 Construction Impacts and Mitigation Measures

**Impact HZ-1: Project construction would not result in a substantial adverse effect related to reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment. (Less than Significant)**

#### *Contaminated Soil or Groundwater*

Excavation and grading activities during project construction could encounter contaminated soil or groundwater, and without proper precautions, this could result in a release of hazardous materials to the environment, potentially exposing construction workers and the public to hazardous materials and chemical vapors. Depending on the nature and extent of any contamination encountered, adverse health effects and nuisance vapors could result if proper precautions are not taken. There are no documented releases of hazardous materials within the project area. However, documented past releases resulting in contamination of soil and groundwater have occurred in close proximity to the project area, as further described below. In addition, historical agricultural production and commercial nursery uses at the project site may have involved the application of hazardous chemicals to site soils, which may have resulted in soil contamination. Depending on the concentration of any contaminants in soil or groundwater, contaminated soil and groundwater encountered during construction could require disposal as a restricted or hazardous waste.

As described in Section 3.4.9.1, Construction Dewatering, in Chapter 3, Project Description, construction dewatering could be required to create a dry work area if surface water or groundwater is encountered in open excavations. As described above in Section 5.17.1.1, one environmental case with identified groundwater contamination has occurred within 0.25 mile of the project area: a release of diesel gasoline and leaded gasoline from underground storage tanks at Hanson Aggregates' SMP-24 aggregate processing facility (previously operated by Mission Valley Rock & Asphalt), which is located on the west side of Alameda Creek. Remediation at this site has been completed and the case is closed. This site is located upgradient of the ACRP project area and groundwater flows north-northeast towards the project area, thus, even though remediation of this site has been completed, there remains a potential that any residual petroleum hydrocarbons in groundwater could affect groundwater in the project area. If dewatering is required during ACRP construction, contaminated groundwater could be encountered, and without proper precautions, result in a release of hazardous materials to the environment, potentially exposing construction workers and the public to hazardous materials and chemical vapors.

Agricultural chemicals may have been used in the project area and vicinity during historical nursery operations. Under the proposed project, the SFPUC would use the former nursery site located east of Pit F3-East for construction staging (Staging Area 1) and in addition, this site could be used for the permanent placement of excess spoils generated during construction (Permanent Spoils Site B). Prior to construction mobilization, Staging Area 1 would be cleared of vegetation and debris and then graded to provide a relatively level surface for the movement of construction vehicles. Throughout construction, the movement of vehicles and equipment across the site would continue to disturb site soils. Soil sampling has not been conducted at this former nursery site. The potential exists for soil contaminated with pesticides and metals from past nursery operations at this site to be encountered and disturbed during project construction. If chemicals in soil were accidentally released at Staging Area 1 or Permanent Spoils Site B, construction workers or the public could be exposed to an unacceptable health risk.

However, as described in Chapter 3, Project Description, the construction contractors would be required to implement the SFPUC standard construction measures for hazardous materials. The SFPUC requires that where there is reason to believe that site soil or groundwater to be disturbed may contain hazardous materials, the construction contractors shall undertake an assessment of the site in accordance with any applicable local requirements ) or using reasonable commercial standards (e.g., Phase I and Phase II assessments, as needed). If hazardous materials would be disturbed, the SFPUC would prepare and implement a plan for treating, containing, and/or removing the hazardous materials in accordance with any applicable local, State and federal regulations so as to avoid any adverse exposure to the material during and after construction. In addition, any previously unidentified hazardous materials encountered during construction likewise would be characterized and appropriately treated, contained, and/or removed to avoid any adverse exposure.

As part of the SFPUC standard construction requirements, protection measures would also be implemented to prevent the release of hazardous materials used during construction, such as storing them pursuant to manufacturer recommendation, maintaining spill kits onsite, and containing any spills that occur to the extent safe and feasible followed by collection and disposal in accordance with applicable laws. SFPUC will report spills of reportable quantity to applicable agencies (e.g., the Governor's Office of Emergency Services). Implementation of the SFPUC Standard Construction Measures for Hazardous Materials for the excavation activities in the former nursery areas would address impacts related to encountering existing hazardous materials in soil and groundwater during construction in the Staging Area 1 and Permanent Spoils Site B. Therefore, with implementation of the SFPUC Standard Construction Measures for Hazardous materials, the impact related to encountering hazardous, contaminated soil at Staging Area 1 and Permanent Spoils Site B would be less than significant

The SFPUC may also use the Permanent Spoils Site A for the permanent placement of excess spoils generated during construction. However, as discussed in Section 5.17.1.1, above, the SFPUC conducted soil sampling in 2010 at Permanent Spoils Site A, which was historically used as part of nursery operations, and the results indicated that soil excavated from this site would not be classified as a hazardous waste; therefore, project construction activities at this location would not release hazardous materials to the environment. Therefore, the impact related to upset conditions and/or the accidental release of hazardous materials in soil during earthwork activities at Permanent Spoils Site A would be less than significant.

**Mitigation**: None required.

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**Impact HZ-2: Project construction would not result in a substantial adverse effect related to accident conditions involving the release of hazardous construction chemicals into the environment. (Less than Significant)**

It is expected that fuels, lubricants, paints, and solvents would be used during construction activities. Temporary storage and use of hazardous materials at the construction sites and staging areas could result in the accidental release of small quantities of such materials, which could degrade soil, groundwater, and surface water in Alameda or San Antonio Creeks.

As part of standard procedures, the construction contractor would be required to implement SFPUC standard construction measures, including those for hazardous materials. (see Section 3.5.9.2 in Chapter 3, Project Description). The SFPUC would also implement Alameda WMP actions that pertain to spills of hazardous materials. Specific Alameda WMP requirements would be included in the Environmental Procedures specification section and other sections of the project construction documents. These include Action haz4, requiring regular servicing of fleet vehicles to minimize spills; Action haz6, requiring identification of high-risk spill areas; Action haz7, requiring development of spill response and containment measures for SFPUC vehicles; and Action haz8, requiring training of SFPUC staff members in spill response and containment measures. In addition, consistent with the requirements of the National Pollutant Discharge Elimination System (NPDES) stormwater construction permit, the SFPUC or its contractor(s) shall submit a notice of intent (NOI) and a Storm Water Pollution Prevention Plan (SWPPP) to the State Water Resources Control Board (SWRCB’s) Division of Water Quality, which would include and require implementation of site-specific BMPs to prevent the accidental release of hazardous construction chemicals to the environment. With mandatory adherence to the construction general permit and the relevant actions of the SFPUC standard construction measures and the Alameda WMP, this impact would be less than significant.

**Mitigation:** None required.

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**Impact HZ-3: Project construction would not impair implementation of, or physically interfere with, an adopted emergency response plan or emergency evacuation plan. (Less than Significant)**

Alameda County does not have an adopted emergency response plan or emergency evacuation plan that encompasses the project area. However, the proposed project could interfere with emergency response services or an emergency evacuation if construction activities involved the complete or partial closure of roadways, otherwise restricted access for emergency response vehicles, or restricted access to critical facilities such as hospitals or fire stations. As discussed under Impact TR-2 in Section 5.6, Transportation and Circulation, project construction would not be conducted within the travel lanes of Calaveras Road. Temporary closure of a single lane for up to approximately 10 minutes could be required periodically to accommodate large construction vehicles accessing the project area; however, traffic flow along Calaveras Road would be maintained at all times. Therefore, emergency response vehicles would have continuous access to all public roadways. There are no critical emergency facilities (i.e., hospitals, fire departments, or police stations) in the immediate vicinity of the project area that could be adversely affected by these temporary delays, and access to private property (e.g., private driveways and access roads to the SMP-24 area) would be maintained at all times. In addition, project construction would not change traffic patterns such that emergency response activities would be substantially impeded. Therefore, the impact related to interference with an adopted emergency response plan or emergency evacuation plan during construction would be less than significant.

**Mitigation:** None required.

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**Impact HZ-4: Project construction would not expose people or structures to a significant risk of property loss, injury, or death involving fires. (Less than Significant)**

Although the ACRP area is not located within a high fire hazard severity zone, construction activities and equipment could increase fire hazards. The time of the greatest fire danger would be during vegetation removal, when people and machines are working in vegetated areas that can be highly flammable. If piled on the worksite, the cleared dry vegetation could also become a fire fuel.

Potential sources of ignition include equipment with internal combustion engines, gasoline-powered tools, and equipment or tools that produce a spark, fire, or flame. Such sources include sparks from blades or other metal parts scraping against rock, overheated brakes on wheeled equipment, heated emissions-control devices or vehicles, friction from worn or unaligned belts and drive chains, and burned-out bearings or bushings. Sparking as a result of scraping against rock is difficult to prevent; the other hazards result primarily from poor equipment maintenance. Smoking by construction personnel is also a potential source of ignition during construction.

Project construction activities would be conducted in accordance with Action fir1 of the Alameda WMP (see Section 5.17.2, Regulatory Framework, above), which requires that construction contractor vehicles and equipment be certified by CAL FIRE and comply with the fire prevention regulations. Specific Alameda WMP requirements would be included in the Environmental Procedures specification section and other sections of the project construction documents. This action also requires all vehicles and equipment to have spark arrestors and for construction contractors to carry fire suppression equipment during the fire season. Because the SFPUC's construction contractor(s) would be required to adhere to the fire safety provisions contained in the Alameda WMP, impacts related to the risk of fire during construction would be less than significant.

**Mitigation:** None required.

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### 5.17.3.4 Operational Impacts and Mitigation Measures

**Impact HZ-5: Project operations would not result in a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials. (Less than Significant)**

The proposed electrical transformer would operate with a biodegradable vegetable oil that meets OSHA and NEC requirements. The electrical transformer pad would include a secondary containment space to contain any oil leak or rupture from the transformer. A sump pump and an oil / water detector would be provided in the secondary containment space to detect either oil leak or rain water in the containment. If water is detected, the sump pump would automatically pump water out of the oil spill containment. If oil is detected, the system would send an alarm to the supervisory control and data acquisition (SCADA), in which case the SFPUC's Operation Department has a Spill Prevention Control and Countermeasure (SPCC) plan to clean the oil manually. Prior to project operations, the SFPUC would prepare an Emergency Response Plan addressing SPCC measures for this project.

As indicated in Chapter 3, Project Description, Section 3.6.3, Maintenance Activities, SFPUC facility operators and maintenance staff would periodically visit the site to inspect the project facilities. Maintenance activities could include lubricating turbine pump bearings with lubricants that are considered hazardous materials. In addition to lubricants, other hazardous chemicals may also be used during project operations and maintenance activities, and the accidental release of these chemicals could create a hazard to the public and the environment.

The proposed project would include preparation of an emergency response plan, and would be subject to Action haz1 of the Alameda WMP, which requires the development of hazardous chemical management procedures addressing the type, use, storage, transport, and disposal of hazardous chemicals and pesticides used in watershed activities. Mandatory compliance with legal requirements for the transport of hazardous materials, including an emergency response plan, and implementation of Alameda WMP Action haz1 would ensure the impact related to the transport, storage, and use of hazardous materials during project operations would be less than significant.

**Mitigation:** None required.

## 5.17.3.5 Cumulative Impacts and Mitigation Measures

**Impact C-HZ: The project, in combination with past, present, and probable future projects, would not substantially affect hazards and hazardous materials. (Less than Significant)**

The geographic scope for cumulative impacts associated with hazards and hazardous materials encompasses the project area and immediate vicinity. With respect to hazardous materials in the environment, effects are generally limited to site-specific conditions.

### *Hazardous Materials in Soil*

Cumulative impacts related to the reasonably foreseeable upset or accidental release of contaminated soil could occur if the ACRP and other projects were implemented in the same area at the same time. Of the projects shown in Figure 5.1-1 and listed in Table 5.1-6 (in Section 5.1, Overview), the PG&E Line 303 Alameda Creek Relocation project, the PG&E Gas Line 107 Retirement Project, and the ongoing Calaveras Dam Replacement project (CDRP) are located in the Sunol Valley, and there is a potential for their construction periods to overlap with that of the ACRP.

As discussed in Impact HZ-1, the ACRP would be constructed within or in the vicinity of former agricultural areas where pesticides were applied in the past. Therefore, residual hazardous materials could be present in site soils. Construction of the other projects listed above would also require excavation in areas that were previously used for agricultural purposes. Therefore, cumulative impacts related to the accidental release of hazardous chemicals, such as fuels, lubricants, paints, and solvents, into the environment or to exposure of workers and the public to hazardous materials in soil during construction of the ACRP in combination with these cumulative projects could occur. However, like the ACRP, all of the SFPUC projects would be required to implements the SFPUC standard construction measures for hazardous materials, and all of the cumulative project would be required to comply with applicable hazardous materials regulations. Therefore, the potential cumulative impacts related to the release of hazardous materials would be less than significant.

### *Risk of Wildland Fires during Construction*

Cumulative impacts related to the risk of fire could occur if projects with overlapping construction schedules and footprints would be constructed in close proximity to moderate or high fire hazard areas. As discussed in Impact HZ-4, the ACRP project area is not located within a high fire hazard severity zone. However, nearby cumulative projects located in moderate or high fire hazard severity zones whose construction could overlap geographically or in timing with the ACRP include the PG&E Line 303 Alameda Creek Relocation project and the ongoing CDRP. Although the ACRP is not located within a high fire hazard severity zone, construction activities and equipment could increase fire hazards and the overlap of project construction in moderate to high fire hazard areas could result in an increased wildland fire risk, which would be a significant cumulative impact.

However, construction activities associated with the ACRP would be subject to compliance with Action fir1 of the SFPUC's Alameda WMP, which requires the construction contractor's vehicles and equipment to be certified by CAL FIRE's to ensure they comply with fire prevention regulations. Compliance with the Alameda WMP and CAL FIRE fire prevention requirements during construction would ensure that the ACRP's contribution to cumulative impacts related to increased wildland fire hazards during construction would not be cumulatively considerable (less than significant).

### *Increased Use of Hazardous Materials during Project Operations*

Cumulative impacts related to the use of hazardous materials could occur where projects would increase the use of hazardous materials in the same general area. Operation of possibly other SFPUC projects in the vicinity could also increase the use of hazardous materials (such as fuels and maintenance chemicals) in the same general area and result in accidental releases of hazardous materials into the environment, which would be a potentially significant cumulative impact. However, ACRP would include preparation of an emergency response plan, and the project operations would comply with Action haz1 of the Alameda WMP, which requires the development of hazardous chemical management procedures addressing the type, use, storage, transport, and disposal of hazardous chemicals and pesticides used in watershed activities. Compliance with these requirements during operation would ensure that the ACRP's contribution to cumulative impacts related to releases of hazardous materials during project operations would not be cumulatively considerable (less than significant).

**Mitigation:** None required.

# 5.18 Mineral and Energy Resources

This section describes the existing mineral resources and energy usage in the Sunol Valley, and analyzes the potential for construction and operation of the Alameda Creek Recapture Project (ACRP or proposed project) to result in adverse effects on mineral and energy resources.

## 5.18.1 Setting

### 5.18.1.1 Mineral Resources

#### *Mineral Resource Zones*

Pursuant to the Surface Mining and Reclamation Act of 1975 (discussed below in Section 5.19.2.2), the California Geological Survey (CGS) classifies land into Mineral Resource Zones (MRZs). The MRZs indicate whether economically significant mineral deposits are present or likely to be present based on the best available data. The MRZ classifications are as follows:

- ***MRZ-1.*** Areas where adequate information indicates that no significant mineral deposits are present, or where it is judged that little likelihood exists for their presence.
- ***MRZ-2.*** Areas where adequate information indicates that significant mineral deposits are present, or where it is judged that a high likelihood exists for their presence.
- ***MRZ-3.*** Areas containing mineral deposits, the significance of which cannot be evaluated.
- ***MRZ-4.*** Areas where available information is inadequate for assignment to any other zone.

The entire ACRP area is mapped as MRZ-2 and is located within aggregate resource Sector E of the Alameda Creek–Sunol Valley Resource Area. Sector E encompasses an extensive sand and gravel deposit along Alameda Creek that extends northward from approximately 1.5 miles south of the Alameda Siphons to the Surface Mining Permit-32 (SMP-32) area, just north of Interstate 680 (I-680). The CGS has estimated that Sector E contains 153 million tons of aggregate resources.[1]

#### *Mining Operations in the Sunol Valley*

Alluvial deposits in the Sunol Valley, including older stream terrace and active stream channel deposits, are an important source of aggregate mineral resources. Aggregate materials—primarily sand, gravel, and crushed rock—have been mined and processed in the Sunol Valley since the 1960s. Currently, aggregate mining in the Sunol Valley occurs in accordance with four Surface Mining Permits (SMPs): the SMP-24, SMP-32 and SMP-33 areas are operated by Hanson Aggregates, and the SMP-30 area is operated by Oliver de Silva. All of the SMP-30 and SMP-32

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[1] California Geological Survey (CGS), 1987. *Mineral Land Classification: Aggregate Materials in the San Francisco – Monterey Bay Area.* DMG Special Report 146 part II. 1987; California Geological Survey (CGS), 1996. *Update of Mineral Land Classification: Aggregate Materials in the South San Francisco Bay Production-Consumption Region.* DMG Open-File Report 96-03. 1996.

areas and a portion of the SMP-24 area are located on SFPUC Alameda watershed[2] lands that the quarry operators lease from the City and County of San Francisco (CCSF) (see **Figure 3-2** in Chapter 3, Project Description). The Surface Mining Reclamation Plans for the SMP-30, SMP-32, and CCSF-owned lands of SMP-24 indicate that, upon completion of aggregate mining activities in these areas, the quarry pits will provide approximately 63,000 acre-feet of water storage for the SFPUC Alameda watershed.

Hanson Aggregates operates the Sunol surface mining facility located on the west side of Alameda Creek in the SMP-24 area. The portion of the SMP-24 area located on the east side of Alameda Creek, which comprises most of the ACRP project area, was mined for aggregate up until 2006. Since 2006, the quarry operator has used the SMP-24 quarry pits on the east side of Alameda Creek, including Pit F2, for water management and to support mining activities in active mining areas. Hanson Aggregates currently extracts aggregate from the SMP-32 area, which is located downstream (north) of the SMP-24 area, on the east side of Alameda Creek between I-680 and Arroyo de La Laguna. Hanson Aggregates has completed aggregate mining in the SMP-33 area, which is located south of the ACRP project area, on the west side of Alameda Creek and just north of the Irvington Tunnels.

SMP-30, operated by Oliver de Silva and commonly known as the Sunol Valley Aggregate Quarry, is located immediately south of the project area, south of San Antonio Creek and west of Alameda Creek. The SMP-30 Quarry Expansion Project, approved by Alameda County in 2012, allows for active mining in the 367-acre SMP-30 area through the year 2039.[3]

### 5.18.1.2 California's Electricity Supply

California's electricity is derived from natural gas (44.5 percent), coal (6.4 percent), large hydroelectric plants (5.5 percent), and nuclear (8.5 percent); the remaining 20.1 percent is from renewable resources such as wind, solar, geothermal, biomass, and small hydroelectric facilities.[4] Despite California's policies aimed at diversifying the state's electrical supply, dependence on natural gas is continuing to grow, from 43.4 percent in 2012 and 44.3 percent in 2013[5] to 44.5 percent in 2014. In 2002, California imposed a requirement that electricity providers increase their procurement of eligible renewable energy resources by at least 1 percent per year so that 20 percent of their energy sales to retail end-users would be obtained from renewable resources by 2010 (Public Utilities Code, Section 399.15). The California Public Utilities Commission (CPUC) encourages publicly-owned utilities to consider establishing similar targets.

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[2] The SFPUC Alameda watershed refers to lands that are owned by the CCSF and managed by the SFPUC as part of the Hetch Hetchy regional water system.

[3] Alameda County, 2014. *Draft Environmental Impact Report for the SMP-30 Revised Use Permit Sunol Valley Aggregate Quarry Project*. State Clearinghouse No. 2011102051. April 2012.

[4] California Energy Commission (CEC), 2015. Energy Almanac, 2014 Total Electricity System Power in Gigawatt Hours. Available at: http://energyalmanac.ca.gov/electricity/total_system_power.html. Accessed on April 3, 2016.

[5] California Energy Commission (CEC), 2014. Energy Almanac, 2013 Total Electricity System Power. September 25, 2014.

## 5.18.1.3 Current Energy Providers

### *SFPUC Power Enterprise*

The SFPUC Power Enterprise provides a long-term annual average of 1.7 billion kilowatt-hours (kWh) of electrical power, which is generated by the SFPUC's hydroelectric facilities in the Hetch Hetchy system. The system includes 150 miles of high-voltage transmission lines that carry this power from the SFPUC power generation facilities on the Tuolumne River to Newark, where the Hetch Hetchy power system is linked to California's electricity grid. The SFPUC Power Enterprise provides electricity to its facilities in the Sunol Valley as well as to all CCSF-owned facilities, San Francisco International Airport, Norris Industries (a federal facility), and the Modesto and Turlock Irrigation Districts (for municipal and agricultural water supply pumping). Although the quantity of power produced exceeds San Francisco's municipal power needs on an annual basis, the CCSF must supplement its power sources to meet municipal demand and its contractual obligations during the summer and fall months, when power generation is reduced so that water can be stored. The Hetch Hetchy Water & Power (HHWP) Calaveras Substation provides electricity to several SFPUC facilities in the Sunol Valley via several overhead electrical transmission and distribution lines in the project vicinity.

### *Pacific Gas and Electric Company*

Pacific Gas and Electric Company (PG&E) provides natural gas and electricity to most of Northern California. In 2014, PG&E's retail customers used 74,547 gigawatts per hour (GWh) of electricity. Of that amount, 28,929 GWh[6] were generated by PG&E-owned natural gas (24 percent), hydroelectric (8 percent), and nuclear facilities (21 percent), as well as smaller amounts of wind, geothermal, solar (27 percent), and 21 percent from unspecified power.[7] The SFPUC Power Enterprise Interconnection Agreement (IA) with PG&E is regulated by the Federal Energy Regulatory Commission and governs the transmission and distribution of Hetch Hetchy energy to San Francisco.[8]

## 5.18.1.4 Current Energy Use

The SFPUC's energy demand for operation of water facilities between Oakdale in the San Joaquin Valley and San Francisco is nearly 44 million kWh per year, which is less than 4 percent of the historical low production rate of the Hetch Hetchy system and less than 3 percent of the

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[6] Pacific Gas and Electric Company (PG&E), 2016. PG&E Overview. Available at: http://www.pgecorp.com/corp_responsibility/reports/2015/bu01_pge_overview.jsp. Accessed on April 3, 2016.

[7] Pacific Gas and Electric Company (PG&E), 2015. 2014 Power Content. Mailer dated November 2015. Available at: http://pge.com/includes/docs/pdfs/myhome/myaccount/explanationofbill/billinserts/11.15_PowerContent.pdf, Accessed on April 3, 2016.

[8] San Francisco Public Utilities Commission (SFPUC), San Francisco's Updated 2011 Electricity Resource Plan, Achieving San Francisco's Vision for Greenhouse Gas Free Electricity. March 2011.

long-term annual average production rate of 1.7 billion kWh per year.[9,10] The SFPUC Power Enterprise provides power to SFPUC water supply facilities in the Sunol Valley from its hydroelectric facilities in the Hetch Hetchy system. The SFPUC's power usage in the Sunol Valley region is approximately 5 million kWh per year, or less than 0.3 percent of the long-term annual average production rate of the Hetch Hetchy system. In 2014, the annual energy demand by PG&E customers in Alameda County was 10,299 million kWh.[11]

## 5.18.2 Regulatory Framework

### 5.18.2.1 Federal Regulations

*National Energy Policy Act of 2005*

The National Energy Policy Act of 2005 sets energy efficiency standards for equipment, seeks to reduce reliance on nonrenewable energy resources, and provides incentives to reduce current demand on these resources. For example, under the act, consumers and businesses can attain federal tax credits for: purchasing fuel-efficient appliances and products, including hybrid vehicles; constructing energy-efficient buildings; and improving the energy efficiency of commercial buildings. Additionally, tax credits are available for the installation of qualified fuel cells, stationary microturbine power plants, and solar power equipment.

### 5.18.2.2 State Regulations

*Surface Mining and Reclamation Act of 1975*

The Surface Mining and Reclamation Act (SMARA) of 1975 (found in Chapter 9, Division 2, Section 2710 et seq. of the Public Resources Code) requires the State Mining and Geology Board to adopt state policies for the reclamation of mined lands and the conservation of mineral resources. These policies are found in Title 24 of the California Code of Regulations, Division 2, Chapter 8, Subchapter 1.

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[9] Energy supplies for the SFPUC come from the three hydroelectric power plants that the SFPUC owns and operates associated with San Francisco's Hetch Hetchy system. Under the City's "water first" policy, the primary purpose of the Hetch Hetchy system is to provide water to over 2.5 million customers, including all San Francisco residents. The availability of hydroelectric power in a given year varies depending upon the operation of the water system. During the spring run-off, the power generation facilities of the Hetch Hetchy system have a maximum capacity of approximately 400 MW. However, the average annual output is closer to 200 MW for a total yearly generation of 1.7 million MWh of electricity. (San Francisco Public Utilities Commission (SFPUC), San Francisco's Updated 2011 Electricity Resource Plan, Achieving San Francisco's Vision for Greenhouse Gas Free Electricity. May 2011.)

[10] San Francisco Planning Department, 2008. *Program Environmental Impact Report on the San Francisco Public Utilities Commission's Water System Improvement Program*, San Francisco Planning Department File No. 2005.0159E. October 2008.

[11] California Energy Commission (CEC), 2014 Electricity Consumption by County – Alameda. Available at: http://ecdms.energy.ca.gov/elecbycounty.aspx, Accessed on April 3, 2016.

In accordance with SMARA, the State of California established the Mineral Land Classification System to help identify and protect mineral resources in areas that are subject to urban expansion or other irreversible land uses that would preclude mineral extraction. Protected mineral resources include construction materials, industrial and chemical mineral materials, metallic and rare minerals, and non-fluid mineral fuels.

### *2008 California Energy Action Plan Update*

The 2008 Energy Action Plan Update provides a status update to the 2005 Energy Action Plan II, the State of California's principal energy planning and policy document. The plan continues the goals of the original Energy Action Plan, describes a coordinated implementation plan for state energy policies, and identifies specific action areas to ensure that California's energy is adequate, affordable, technologically advanced, and environmentally sound. First-priority actions to address California's increasing energy demands are energy efficiency, demand response (i.e., reducing customer energy usage during peak periods in order to address system reliability and support the best use of energy infrastructure), and the use of renewable sources of power. To the extent that these actions are unable to satisfy the increasing energy and capacity needs, the plan supports clean and efficient fossil-fired generation.[12]

### *Building Energy Efficiency Standards*

The Energy Efficiency Standards for Residential and Nonresidential Buildings, as specified in Title 24, Part 6, of the California Code of Regulations, were established in 1978 in response to a legislative mandate to reduce California's energy consumption. The standards are updated periodically to allow consideration and possible incorporation of new energy efficiency technologies and methods. The California Energy Commission adopted an update in 2013, and the new standards became effective on July 1, 2014. The 2013 Building Energy Efficiency Standards focus on several key areas to improve the energy efficiency of newly constructed buildings and additions and alterations to existing buildings, and include requirements that will enable both demand reductions during critical peak periods and alternative energy system installations. Energy Commission staff estimates that the implementation of the 2013 Building Energy Efficiency Standards may reduce statewide annual electricity consumption by approximately 613 gigawatt-hours per year, electrical peak demand by 195 megawatts (MW), and natural gas consumption by 10 million therms per year.[13]

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[12] California Public Utilities Commission and California Energy Commission (CPUC and CEC), 2008 Energy Action Plan Update. February 2008.

[13] California Energy Commission (CEC), 2013 Building Energy Efficiency Standards, Title 24, Part 6, of the California Code of Regulations. May 2012.

### 5.18.2.3 Local Regulations

#### *Alameda County General Code*

The Alameda County General Code (Title 6, Health and Safety, Chapter 6.80, Surface Mining and Reclamation, Section 6.80.031, Mineral Resources Protection) encourages mining operators to extract minerals from compatible areas before encroaching into conflicting land uses. This section of the general code also protects mineral resource areas (classified by CGS or designated by the State Mining and Geology Board), as well as existing surface mining operations that remain in compliance with the provisions of this chapter, from intrusion by incompatible land uses that may impede or preclude mineral extraction or processing.

Section 6.80.031 of the Alameda County General Code also specifies that land use decisions within the county should be guided by information on the location of regionally significant mineral resources (as identified in the Alameda County General Plan and in accordance with the SMARA resource classification system). Section 6.80.031 requires decision-makers to consider and encourage conservation and potential development of the mineral resources within identified mineral resource areas. For development projects within an important mineral resource area, the County may require recordation of the presence of mineral resources on the property title. Prior to approving a land use that would otherwise be incompatible with mineral resource protection, conditions of approval may be applied to encroaching development projects to minimize potential conflicts.

Section 6.80.060 of the Alameda County General Code specifies land use permitted other than mining, and allows other uses provided such uses do not interfere with the ability of the County to ensure the continued availability of important mineral resources and provided any such uses are not prohibited by conditions of the surface mining permit or approved reclamation plan.

**Reclamation Plan for CA Mine ID #91-01-0013 (Surface Mining Permit 24)**

Within the ACRP project area, Hanson Aggregates operates quarry Pits F2, F3-East and F3-West as part of the gravel mining operation authorized under Surface Mining Permit 24 (SMP-24); this permit was issued by Alameda County pursuant to the Alameda County Surface Mining Ordinance and the California Surface Mining and Reclamation Act. The Hansen Reclamation Plan for CA Mine ID #91-01-0013, Exhibit B-SMP-24 was approved by Board of Supervisors Resolution R-86-62 on January 28, 1986 [14] for an aggregate mining operation. The mine has been reporting "active" with no production since 2007.[15] The Reclamation Plan identifies the long term use of the project area for water storage, and therefore the proposed project would not be inconsistent with this plan.

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[14] Bissel and Karn, Inc., 1986 *Hansen Reclamation Plan, Exhibit B-SMP-24, Mission Valley Rock Quarry, Sunol California.* Approved by Board of Supervisors Resolution R-86-62. January 28, 1986.

[15] Hendrickson, Beth Office of Mine Reclamation *Personal Communication, email to Steve Smith Planning Department CCSF.* July 20, 2015.

### *San Francisco Plans*

**Electricity Resource Plan**

The updated 2011 *Electricity Resource Plan* for San Francisco establishes an action plan to achieve greenhouse gas (GHG)-free electricity by 2030.[16] Since the 2002 Plan, GHG emissions associated with San Francisco's electric system were reduced from 1.7 million tons carbon dioxide in 2004 to 1.3 million tons by 2011 through support from statewide legislation and local implementation actions, including the decommissioning of the Hunter's Point and Potrero Power Plants, installation of 15 MW of in-city solar facilities in San Francisco (split between SFPUC facilities [7 MW] and over 2,000 privately-owned sites [8 MW]), and the SFPUC meeting 17 percent of San Francisco's electric needs by providing zero-GHG energy from its Hetch Hetchy system to municipal facilities. The main components of the 2011 Plan include empowering residents and business to implement demand reduction through energy efficiency and load management; increasing use of renewable and GHG-free electricity supplies, potentially through "green pricing" under community choice aggregation (CCA); and continuing and expanding SFPUC's electricity service through new City-owned transmission projects to increase the delivery of Hetch Hetchy and renewable power to San Francisco. The *Electricity Resource Plan* identifies specific energy savings and production goals for each component of the plan.

## 5.18.3 Impacts and Mitigation Measures

### 5.18.3.1 Significance Criteria

The project would have a significant impact related to minerals and energy resources if the project were to:

- 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;
- Result in the loss of availability of a locally important mineral resource recovery site delineated in a local general plan, specific plan, or other land use plan; or
- Encourage activities that resulted in the use of large amounts of fuel, water, or energy, or used these resources in a wasteful manner.

### 5.18.3.2 Approach to Analysis

Due to the nature of the proposed project, there would be no impacts related to the second significance criterion, and a portion of the third criterion, for the reasons described below:

- ***Result in the Loss of Availability of a Locally Important Mineral Resource Recovery Site Delineated in a Local General Plan, Specific Plan, or Other Land Use Plan.*** Locally important mineral resources are not delineated in any local land use plans for the project

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[16] San Francisco Public Utilities Commission (SFPUC), 2011. *San Francisco's Updated 2011 Electricity Resource Plan, Achieving San Francisco's Vision for Greenhouse Gas Free Electricity*. March 2011.

area, including the East County Area Plan of the Alameda County General Plan and the SFPUC's *Alameda Watershed Management Plan*. Therefore, this significance criterion is not applicable to the proposed project and is not discussed further. However, project-related impacts on mineral resources mapped by CGS pursuant to SMARA are analyzed in Impacts ME-1 and ME-3, below.

- ***Encourage Activities that Result in the Use of Large Amount of Water, or Use Water in a Wasteful Manner.*** With respect to water usage, construction of the proposed facilities would require the use of some water for dust control and other purposes, but would not involve the wasteful use of water or encourage activities that use large amounts of water. Likewise, operation of the ACRP would require minimal water use. As discussed in Chapter 3, the ACRP project objectives include recapture of water to maximize local watershed supplies and to minimize impact on water supply during drought, system maintenance, and in the event of water supply problems or transmission disruptions in the Hetch Hetchy system. Therefore, because neither construction nor operation of the ACRP would result in the wasteful use of water or encourage activities that use large amounts of water, water usage is not discussed further in this section.

This impact analysis evaluates the potential project-related loss of availability of locally or regionally important mineral resources based on CGS mapping conducted under the California Mineral Land Classification System. Impacts related to the loss of mineral resources would be considered significant if construction activities would make known mineral resources temporarily unavailable, or if the construction of new facilities would make these resources permanently unavailable.

This analysis also considers the project's temporary construction-related use of energy resources (such as fuel, water, and electricity) and the permanent operations-related use of energy resources. The evaluation discusses how construction activities would be conducted to minimize the use of fuels, and estimates the amount of energy needed for operational purposes. Natural gas would not be required for project construction or operation and is not discussed further in this section.

As described in Section 5.1.2 regarding baseline conditions for evaluation of project impacts, construction-related impacts in this section are evaluated against the existing conditions. The current construction schedule for the proposed project is from fall 2017 to spring 2019 (18 months), and construction of the Calaveras Dam Replacement Project (CDRP) is also anticipated to be completed in spring 2019. It is possible that operation of the CDRP will commence prior to completion of ACRP construction, and that with-CDRP conditions could occur while ACRP is still under construction. However, operation of the CDRP is not expected to change any of the baseline mineral and energy resource conditions analyzed in this section. Therefore, no change in the approach to impact analysis is necessary to account for the with-CDRP conditions. More specifically, the construction-related impacts of the ACRP presented in this section would be the same regardless of the implementation of bypass flows at the Alameda Creek Diversion Dam and instream flow releases from Calaveras Reservoir and all other aspects of CDRP operations that characterize the with-CRDP conditions.

### 5.18.3.3 Construction Impacts and Mitigation Measures

**Impact ME-1: Project construction would not result in the temporary loss of availability of known mineral resources that would be of value to the region or residents of the state, or the temporary loss of availability of a locally important mineral resource recovery site. (Less than Significant)**

Project construction activities would be conducted in an area mapped by the California Mineral Land Classification System as MRZ-2. This mineral resource classification delineates areas where significant mineral deposits are believed to be present, as evidenced by the active quarries within and adjacent to the ACRP area. Impacts associated with the temporary loss of known mineral resources could occur if the ACRP impeded active mining operations in a manner that rendered mineral resources temporarily unavailable.

Project construction activities would not impede active mining operations. Construction of the pumps mounted on floating barges, pipelines, electrical control building, electrical transformer, and overhead powerline would occur in a portion of the SMP-24 area located east of Alameda Creek where Hanson Aggregates has completed aggregate extraction, and at the adjacent SFPUC HHWP Calaveras Substation site. Construction activities in this area would not interfere with Hanson Aggregates’ active mining operations or result in the temporary or permanent loss of availability of mineral resources. As a result, impacts related to the temporary loss of availability of known mineral resources or a locally important mineral resource recovery site during project construction would be *less than significant*.

**Mitigation:** None required.

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**Impact ME-2: Project construction would not result in substantial adverse effects related to the use of large amounts of fuel or energy, or the use of these resources in a wasteful manner. (Less than Significant)**

Construction of the ACRP would require the use of fuels (primarily gas, diesel, and motor oil) for a variety of construction activities, including excavation, grading, demolition, and vehicle travel. Fuel for construction worker commute trips would be minor in comparison to the fuel used by construction equipment. Although the amount of construction-related energy consumption has not been quantified, the construction contractor has a direct economic incentive to avoid using fuel in an inefficient manner. Further, project construction involves a limited amount of new facilities and earthmoving activity. Thus, it is reasonable to conclude that construction activities would not use a large amount of fuel or energy in a wasteful manner. Therefore, the impact related to the use of large amounts of fuel or energy, or the use of these resources in a wasteful manner during construction, is *less than significant*.

Although mitigation is not required for this impact, implementation of the mitigation measure prescribed in Section 5.8, Air Quality, would increase the fuel efficiency of construction vehicles and equipment.

Mitigation Measure M-AQ-1 restricts idling of diesel-fueled commercial vehicles and requires that tune-ups be performed for all construction equipment, which in turn has the potential to reduce overall fuel consumption. Implementation of this measure would increase fuel efficiency and further reduce the less-than-significant impact related to the use of fuels in a wasteful manner.

**Mitigation:** None required.

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### 5.18.3.4 Operational Impacts and Mitigation Measures

**Impact ME-3: Project operations would not result in the permanent loss of availability of known mineral resources that would be of value to the region or residents of the state, or the permanent loss of availability of a locally important mineral resource recovery site. (Less than Significant)**

All of the proposed facilities would be constructed in an area mapped as MRZ-2 (i.e., areas where significant mineral resources are present). However, the proposed facilities would be located in an area where mineral extraction has been completed. Thus, implementation of the ACRP would not affect the availability of or ability to mine aggregate resources in this area, and impacts related to a permanent loss of availability of mineral resources or a locally important mineral resource recovery site would be *less than significant*.

**Mitigation:** None required.

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**Impact ME-4: Project operations could encourage activities that use large amounts of fuel or energy, or use these resources in a wasteful manner. (Less than Significant with Mitigation)**

In addition to meeting its own project objectives, the ACRP would contribute to the SFPUC regional water supply in support of the SFPUC's Water System Improvement Program's (WSIP) water supply goals to meet customers water supply needs during non-drought and drought periods. The ACRP in itself would not encourage activities that would use large amounts of energy or fuel, since it is part of the much larger WSIP which is intended to serve the existing and anticipated water supply needs of the entire SFPUC regional water system through 2018. The ACRP, as part of the WSIP, would support planned growth in the SFPUC service area through 2018, serving 2.6 million people in five counties, and would be designed and operated consistent with the WSIP goal for cost-effectiveness to achieve a cost-effective, fully operational regional system. It would not encourage activities that use energy beyond those activities that are part of already planned growth.

The power demand for ACRP operations is primarily associated with use of the pumps. The four 400 HP pumps would require 1,404 kilovolt-amps (KVA). In addition, the electrical control building would require general power to supply metering equipment, lighting, valve actuators, etc. The ACRP's electricity requirements were estimated to be approximately 16 KVA; therefore a total of 1,704 KVA, or 3,785,740 kWh per year (estimated power demand plus 20 percent) power supply is assumed necessary for project operation. Either the HHWP Calaveras Substation or the PG&E Sunol Substation would provide electrical power for the proposed project.

As described in Section 5.18.1.4, above, SFPUC energy usage for the regional system is about 44 million kWh per year, with about 5 million kWh per year usage in the Sunol Valley. The long-term average production of the Hetch Hetchy system is 1.7 billion kWh per year.[17] The increased energy consumption under the proposed project would increase the SFPUC's energy usage within the Sunol Valley from 5 million kWh per year to about 8.8 kWh per year and the regional system energy usage from 44 million kWh per year to about 47.8 kWh per year. This increase, while a substantial increase in energy usage in the Sunol Valley and about a 10 percent increase in energy usage for the regional system, would constitute a small portion of the total energy production for the Hetch Hetchy system (i.e., 3,785,740 kWh per year is about 0.2 percent of 1.7 billion kWh per year) and a negligible portion of the total energy production for PG&E. Although operation of ACRP facilities, including use of the pumps to convey water, would increase the SFPUC's energy usage, depending on the electrical power source ultimately selected by the SFPUC, the total amount of energy used by the project would be about 0.2 percent of the total energy produced by the Hetch Hetchy system (if the preferred power supply option is implemented) and a negligible portion of the total energy produced by PG&E (if the backup power supply option is implemented). In addition, the SFPUC would incorporate energy efficient project design elements into the project. The SFPUC would use the most energy efficient pumps available at the time of project implementation and the proposed facilities would be designed in accordance with California's Efficiency Standards, as specified in the California Code of Regulations, Title 24, Part 6, as appropriate. The SFPUC would also consult with the Energy Efficiency Services division to incorporate all feasible energy efficiency best practice measures for pumping energy optimization as well as for unoccupied facilities into the project design. Furthermore, as described in Section 5.9, Greenhouse Gas Emissions, in 2009, the SFPUC completed a departmental climate action plan focused on energy efficiency and renewable energy programs, and the ACRP would comply with this plan to the extent applicable.

Under the preferred power option, the ACRP would use hydroelectric power from the Hetch Hetchy system, and under the backup option, electricity needs would be met by PG&E. As described in Section 5.9, Greenhouse Gas Emissions, should the ACRP project be powered by electricity from PG&E, it is expected that the project's indirect GHG emissions would be progressively reduced in future years because PG&E is subject to the renewable portfolio requirements, which would require PG&E to procure 50 percent of its electricity from renewable

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[17] San Francisco Planning Department, Program Environmental Impact Report on the San Francisco Public Utilities Commission's Water System Improvement Program, San Francisco Planning Department File No. 2005.0159E. October 2008.

sources by year 2030, with interim targets established for years 2024 and 2027. Therefore, under either power option, a substantial portion of the electrical energy demand is anticipated to be supplied by renewable energy sources.

Even though the ACRP would be designed and operated to optimize energy usage and minimize energy demands, consistent with the overall WSIP goals for cost-effectiveness, and is for the purpose of serving existing customers and planned growth in the service area through 2018, the ACRP could encourage activities that result in the use of large amounts of energy or use energy in a wasteful manner. Operation of ACRP facilities, including use of the pumps to convey water, would increase the SFPUC's energy usage. Therefore, this impact would be *potentially significant*. Mitigation Measure M-ME-4, Incorporation of Energy Efficient Measures, is the same as Mitigation Measure 4.15-2 that was identified in the Program EIR (PEIR) on the Water System Improvement Program (WSIP),[18] and would reduce this impact to a less than significant level.

> **Mitigation Measure M-ME-4: Incorporation of Energy Efficiency Measures**
>
> Consistent with the Energy Action Plan II priorities for reducing energy usage, the SFPUC will ensure that energy efficient equipment is used in all WSIP projects. A repair and maintenance plan will also be prepared for each facility to minimize power use. The potential for use of renewable energy resources (such as solar power) at facility sites will be evaluated during project-specific design.

### 5.18.3.5 Cumulative Impacts and Mitigation Measures

**Impact C-ME: The project, in combination with past, present, and probable future projects, could substantially affect energy resources. (Less than Significant with Mitigation)**

The geographic scope for potential cumulative impacts related to mineral and energy resources consists of the Sunol Valley region (for mineral resources) and Alameda County (for energy resources).

#### *Loss of Availability of Known Mineral Resources*

A cumulative impact to mineral resources could occur if the proposed project and other cumulative projects were to be sited in active mining areas or in areas that would otherwise be available for mining. As described above under Impacts ME-1 and ME-3, all of the proposed facilities and improvements for the ACRP would be constructed in an area mapped as MRZ-2. Several of the cumulative projects listed in Table 5.1-6 are also located in areas designated as MRZ-2, including the SFPUC's Alameda Siphons Seismic Reliability Upgrade project, New Irvington Tunnel (NIT) project, San Antonio Pump Station Upgrade project, Sunol Valley Water

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[18] San Francisco Planning Department, *Final Program Environmental Impact Report for the San Francisco Public Utilities Commission's Water System Improvement Program*, San Francisco Planning Department File No. 2005.0159E, State Clearinghouse No. 2005092026. Certified October 30, 2008.

Treatment Plant (SVWTP) Expansion and Treated Water Reservoir project, and San Antonio Backup Pipeline (SABPL) project. Although all of these projects involve construction and/or the placement of spoils within areas mapped as containing significant mineral resources, none of the projects, including ACRP, would result in the construction of new facilities or high-value improvements in active mining areas or in areas that would otherwise be available for mining. Thus, no cumulative impact to mineral resources would result.

### *Fuel and Energy Use During Construction*

A cumulative impact related to fuel and energy use could occur if the ACRP together with other cumulative projects in the region were to encourage activities that use large amounts of fuel or energy, or use them in a wasteful manner. The ACRP (see Impact ME-2) and all of the cumulative projects listed in Table 5.1-6 would use energy during construction and, when combined, may use a large amount of energy. Although other projects in the region would also use these resources, the cumulative construction impact would be less than significant because all of the projects, including the proposed project, would have a direct economic incentive to avoid using fuel or energy in an inefficient manner and, where applicable, would be required to comply with building codes that encourage sustainable construction practices related to planning and design. These projects would also be required to comply with BAAQMD Basic Construction Measures, which include practices that have the potential to reduce overall fuel consumption. Implementation of this measure would increase fuel efficiency and further reduce the impact related to the use of fuels in a wasteful manner during construction. Furthermore, the ACRP's relatively limited scale and intensity of ACRP construction (e.g., 2,236 cubic yards of excavated materials)would not be cumulatively considerable (*less than significant*).

### *Long-Term Energy Use during Operation*

Operation of the ACRP would require an estimated total of 1,704 KVA of energy per year (see Impact ME-4). The projects listed in Table 5.1-6, such as the SFPUC's Alameda Siphons Seismic Reliability Upgrade project, NIT project, San Antonio Pump Station Upgrade project, SVWTP Expansion and Treated Water Reservoir project, and SABPL project, and the planned/ongoing operation of the SFPUC Calaveras Dam Replacement Project (CDRP) and Hanson SMP-30 Expansion, will also use energy for operations and could result in a significant cumulative impact related to the use of large amounts of energy or the wasteful use of energy. However, the operational energy requirements for the ACRP project represent a negligible percentage of the total energy produced by the Hetch Hetchy system (if the preferred power supply option is implemented) and an negligible portion of the total energy production for PG&E (if the backup power supply option is implemented). Further the ACRP would be designed and operated to optimize energy usage and minimize energy demands, consistent with the overall WSIP goals for cost-effectiveness. As discussed in Impact ME-4, the proposed project's potential to result in significant impacts to energy resources would be reduced to a less-than-significant level with implementation of Mitigation Measures M-ME-4 (Incorporation of Energy Efficiency Measures) (see Impact ME-4, above, for description). This measure is the same as Mitigation Measure 4.15-2 that was identified in the Program EIR on the Water System Improvement Program and adopted by the SFPUC, requiring the SFPUC to ensure that energy efficient equipment is used in all WSIP projects in the region, including the Sunol Valley Expansion and Treated Water Reservoir project. Therefore, with implementation of this mitigation measure by the ACRP, the ACRP's residual contribution to cumulative impacts related to energy usage during operation would not be cumulatively considerable (*less than significant*).

> **Mitigation Measure M-ME-4: Incorporation of Energy Efficiency Measures** (See Impact ME-4)

# 5.19 Agriculture and Forest Resources

This section describes existing agricultural and forest resources in the vicinity of the Alameda Creek Recapture Project (ACRP or proposed project) and analyzes the potential for project implementation to adversely affect such resources through displacement or conversion of these uses, or through conflicts with the associated zoning categories.

## 5.19.1 Setting

The ACRP is located entirely within SFPUC Alameda watershed lands in the Sunol Valley of unincorporated Alameda County. The East County Area Plan of the Alameda County General Plan zones SFPUC Alameda watershed lands as Resource Management, Water Management, and Parklands. The project area[1] is designated as Water Management.[2]

As described in Section 5.2, Land Use, existing land uses in the vicinity of the proposed project include commercial gravel mining operations, commercial nurseries, grazing, regional open space, and SFPUC water supply facilities. Calaveras Nursery, located just south of the Pacific Gas and Electric (PG&E) Sunol Substation near the Interstate 680 (I-680) and State Route 84 (SR 84) interchange, is the only active nursery in the project area. Two former nursery sites are located in the project area between Staging Area 1 and Pit F3-East, and between Pit F2 and I-680 (see **Figure 3-2** in Chapter 3, Project Description). These two nurseries were decommissioned in 2010. As described in Section 3.5.2 of Chapter 3, Project Description, the former nursery site between Staging Area 1 and Pit F3-East has also been used for the permanent placement of spoils generated during recent construction of the SFPUC's San Antonio Backup Pipeline project (SABPL) and Alameda Siphons Seismic Reliability Upgrade project.

### 5.19.1.1 Agricultural Resources

#### *Farmland Classifications*

##### Farmland Mapping and Monitoring Program

Important farmlands throughout California are designated through the California Department of Conservation (CDC) Farmland Mapping and Monitoring Program (FMMP). Farmland is classified into the following categories based on soil conditions (i.e., their suitability for agriculture) and current land use.

- ***Prime Farmland*** is land that has the best combination of physical and chemical characteristics for long-term crop production. It has the soil quality, growing season, and moisture supply needed to sustain high crop yields when appropriately treated and managed. However, in order to qualify under this category, the land must have been used for irrigated agricultural production within four years of the map date.

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[1] Project area refers to the area within which all construction-related disturbance would occur.

[2] Alameda County, 2002. *East County Area Plan, A Portion of the Alameda County General Plan, Volume I: Goals, Policies, and Programs*. May 2002.

- ***Farmland of Statewide Importance*** is similar to Prime Farmland in that it has a good combination of physical and chemical characteristics for crop production, but with minor shortcomings such as greater slopes and less ability to store moisture.
- ***Unique Farmland*** is land that does not meet the criteria for Prime Farmland or Farmland of Statewide Importance but has been used for the production of the state's leading agricultural crops. This land is usually irrigated, but may include the types of non-irrigated orchards or vineyards that are found in some climatic zones of California. Unique Farmland must have been in agricultural production at some time during the four years prior to the mapping date.
- ***Farmland of Local Importance*** applies to land of importance to the local agricultural economy as determined by the county. This land is either currently producing crops or has the capability of production, but does not meet the criteria of the preceding categories.
- ***Grazing Land*** is land on which the existing vegetation is suited to the grazing of livestock.

### Farmland Designations in the Project Area

As shown in **Figure 5.19-1**, farmland mapping designations in the vicinity of the ACRP consist of Grazing Land, Other Land, and Unique Farmland. This figure is based on 2012 FMMP data published in 2014. The Grazing Land designation is based on the underlying soil types; the Other Land and Unique Farmland designations are based in part on historical and current land uses. The farmland mapping system designates the two former nursery sites located within the project area (the former nursery located at Permanent Spoils Site B between Staging Area 1 and Pit F3-East, and the former nursery located between Pit F2 and I-680) as Unique Farmland. Sites that supported nursery operations in the recent past are commonly mapped as Unique Farmland in the FMMP, even if the nursery was comprised entirely of potted plants or trees. Calaveras Nursery, located in the north end of the project area, is also designated as Unique Farmland. Permanent Spoils Site A and a portion of the project area on the west side of Calaveras Road, just south of the San Antonio Creek crossing and encompassing the Hetch Hetchy Water & Power (HHWP) Calaveras Substation, are mapped as Grazing Land. The remainder of the project area is mapped as Other Land. The Other Land mapping designation coincides with the boundaries of the gravel quarries.[3]

### Williamson Act Program

The California Land Conservation Act of 1965 (commonly referred to as the Williamson Act) is the state's primary program for the conservation of private land for agricultural and open space uses. Property owners voluntarily enroll property in the program in return for receiving reduced property taxes. This act is described in more detail in Section 5.19.2.2, below. No property under a Williamson Act contract is located in or near the project area.

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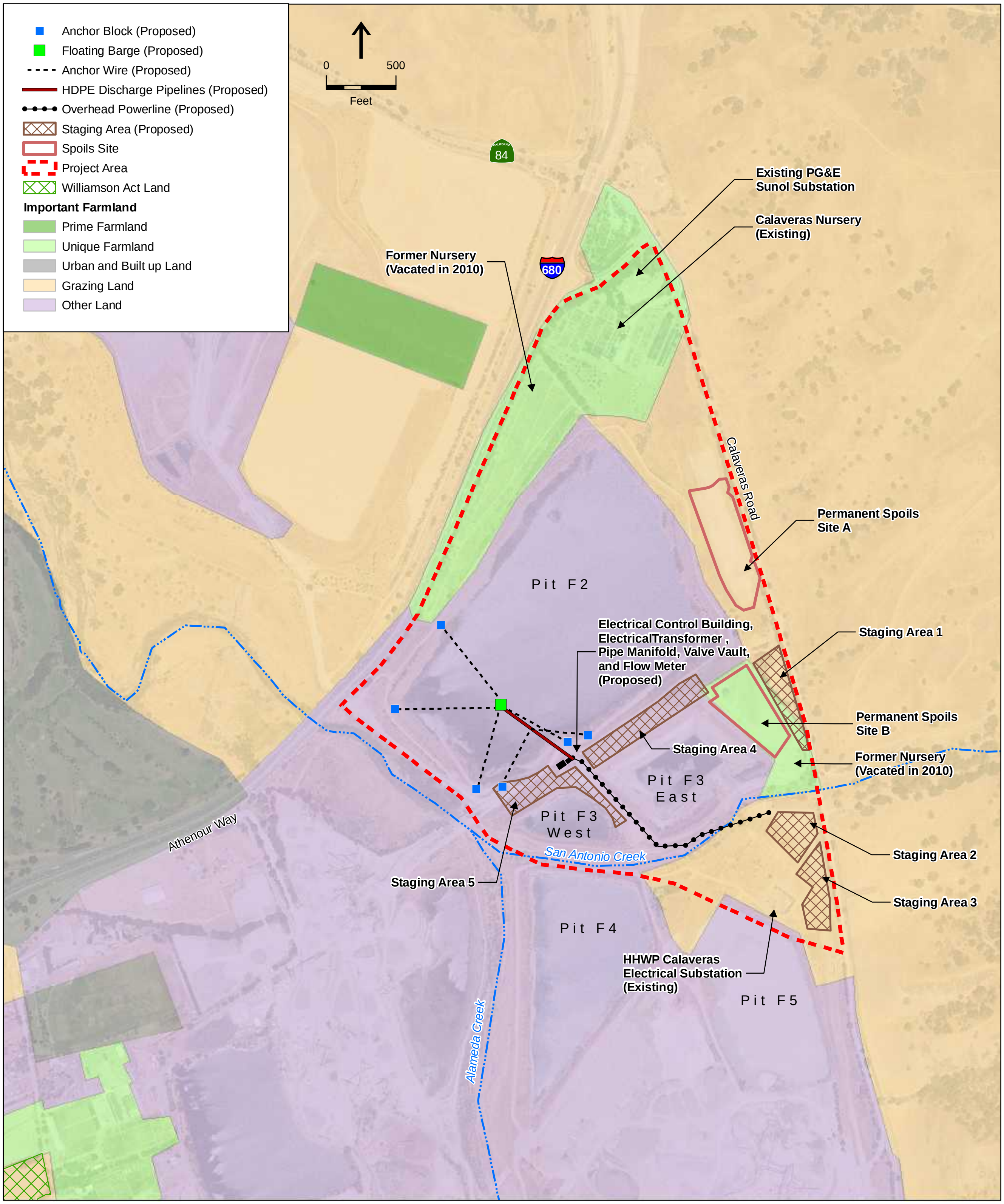
[3] California Department of Conservation (CDC), Division of Land Resource Protection, Farmland Mapping and Monitoring Program. Alameda County Important Farmland 2012, April 2014.



SOURCE: CDC, 2012/2014

SFPUC Alameda Creek Recapture Project

**Figure 5.19-1**

Farmland Mapping Designations

### 5.19.1.2 Forest Resources

The California Public Resources Code, Section 12220(g) defines forest land as "land that can support 10 percent native tree cover of any species, including hardwoods, under natural conditions, and that allows for management of one or more forest resources, including timber, aesthetics, fish and wildlife, biodiversity, water quality, recreation, and other public benefits." Section 4526 of the California Public Resources Code defines timberland as "land (other than land owned by the federal government and land designated by the California Board of Forestry and Fire Protection as experimental forest land) that is available for, and capable of, growing a crop of trees of a commercial species used to produce lumber and other forest products, including Christmas trees." There are no timber harvesting activities or land specifically designated as forest land within the project area. There are no timber harvesting activities on SFPUC Alameda watershed lands. The former nursery sites located within and adjacent to the project area were not used to grow trees that produce lumber or forest products. Although portions of the Alameda watershed meet the definition of forest land as provided above, the ACRP is located in an active quarry areas; no forest land exists within the project area.

## 5.19.2 Regulatory Framework

### 5.19.2.1 Federal Regulations

The Farmland Protection and Policy Act requires an evaluation of the relative value of farmland that could be affected by decisions sponsored in whole or part by the federal government. The Farmland Protection and Policy Act does not apply to the proposed project because the project is not a federal government action or program.

### 5.19.2.2 State Regulations

As described above, the California Land Conservation Act, or Williamson Act, is the state's primary program aimed at conserving private land for agricultural and open space use. It is a voluntary, locally administered program that offers reduced property taxes on lands whose owners place enforceable restrictions on land use through contracts between the individual landowners and local governments. The Williamson Act provides a mechanism through which private landowners can contract with counties and cities to voluntarily restrict their land to agricultural and compatible open space uses. In return, Williamson Act contracts offer tax incentives by ensuring that land is assessed for its agricultural productivity rather than its highest and best use. Contracts typically restrict land use for a period of 10 years; however, some jurisdictions exercise the option to extend the term for up to 20 years. Contracts are automatically renewed unless the landowner files for non-renewal or petitions for cancellation.

The CDC prepares countywide maps of lands enrolled in Williamson Act contracts and classifies them into the categories described below.

- ***Prime Agricultural Land.*** This category represents the state's highest quality agricultural land. Land in this category is typically used for the production of irrigated crops or to support livestock.

- ***Non-prime Agricultural Land.*** This category represents Open Space Land of Statewide Significance as defined under the California Open Space Subvention Act. Most land in this category is being used for agricultural purposes, such as livestock grazing or non-irrigated crops, but may also include other open space uses that are compatible with agriculture and consistent with local general plans.

- ***Land in Non-renewal.*** This category represents land under a Williamson Act contract that is being terminated at the option of the landowner or local government.

None of the parcels within or immediately adjacent to the project area are enrolled in the Williamson Act program.[4]

### 5.19.2.3 Local Policies

#### *Alameda County General Plan – East County Area Plan*

The East County Area Plan of the Alameda County General Plan governs land use planning for eastern Alameda County. As discussed in Section 5.19.1, above, land use in the project area is designated as Water Management. Although the Water Management category allows for land uses that are compatible with this designation, the project area is not zoned for agricultural or forestry uses.[5]

## 5.19.3 Impacts and Mitigation Measures

### 5.19.3.1 Significance Criteria

The project would have a significant impact related to agriculture and forestry resources if the project were to:

- Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance, as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use;

- Conflict with existing zoning for agricultural use or a Williamson Act contract;

- Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code Section 12220[g]), timberland (as defined by Public Resources Code Section 4526), or timberland zoned Timberland Production (as defined by Government Code Section 51104[g]);

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[4] California Department of Conservation (CDC), Division of Land Resource Protection, Alameda County Williamson Act Lands FY 2013/2014, 2013.

[5] Alameda County, 2002. *East County Area Plan, A Portion of the Alameda County General Plan, Volume I: Goals, Policies, and Programs.* May 2002.

- Result in the loss of forest land or the conversion of forest land to non-forest use; or
- Involve other changes in the existing environment, which, due to their location or nature, could result in the conversion of farmland to non-agricultural use or forest land to non-forest use.

Due to the nature of the proposed project, there would be no impacts related to the following criteria for the reasons described below:

- ***Conflict with Zoning for Agricultural Use or with a Williamson Act Contract.*** The ACRP is not located on or immediately adjacent to land zoned for agricultural uses, and the project area is not subject to a Williamson Act contract. The closest lands to the project area that are under a Williamson Act contract are a private residence located approximately 1.3 mile south of the ACRP project area near the Alameda West Portal, and existing nurseries located on the west side of Alameda Creek near the SMP-24 aggregate processing facility). Since none of the project area is under a Williamson Act contract, land use restrictions imposed by the Williamson Act are not applicable to the ACRP. Therefore, the second significance criterion listed above is not applicable to the ACRP and is not discussed further in this EIR.
- ***Conflict with Existing Zoning for Forest Land, or Result in the Loss of Forest Land or the Conversion of Forest Land to Non-forest Use.*** There is no forest land in the project area; thus, implementation and operation of the ACRP would not conflict with zoning regulations for forest land, result in the loss of forest land, or result in the conversion of forest land to non-forest use. Therefore, the third and fourth significance criteria listed above are not applicable to the proposed project and are not discussed further in this EIR.
- ***Involve Other Changes in the Existing Environment, which, due to their Location or Nature, Could Result in the Conversion of Farmland to Non-agricultural Use or Forest Land to Non-forest Use.*** The proposed project would not result in changes to the existing environment (for instance, by creating conflicting land uses or operational activities) that could cause the conversion of farmland to non-agricultural use or forest land to non-forest use. Thus, the fifth criterion listed above is not applicable to the proposed project and is not discussed further in this EIR.

### 5.19.3.2 Approach to Analysis

To determine the potential for temporary and permanent impacts on agricultural resources, this evaluation considers the effects of project implementation on the designated farmland areas that are mapped within the project area boundary. The potential for disturbance to, conflicts with, or conversion of lands designated as Unique Farmland would be limited to project construction. Project operations would have no effect on agricultural land use or designations. Areas mapped as Grazing Land (i.e., the Permanent Spoils Site A) or Other Land (i.e., Pits F2, F3-East, F3-West, F4, and F5) are not addressed in this analysis because these designations do not relate to the significance criteria described above.

As described in Section 5.1.2 regarding baseline conditions for evaluation of project impacts, construction-related impacts in this section were evaluated against the existing conditions. The current construction schedule for the proposed project is from fall 2017 to spring 2019

(18 months), and construction of the Calaveras Dam Replacement Project (CDRP) is also anticipated to be completed in spring 2019. It is possible that operation of the CDRP will commence prior to completion of ACRP construction, and that with-CDRP conditions could occur while ACRP is still under construction. However, operation of the CDRP is not expected to change any of the baseline agriculture and forest resource conditions analyzed in this section. Therefore, no change in the approach to impact analysis is necessary to account for the with-CDRP conditions. More specifically, the construction-related impacts of the ACRP presented in this section would be the same regardless of the implementation of bypass flows at the Alameda Creek Diversion Dam and instream flow releases from Calaveras Reservoir and all other aspects of CDRP operations that characterize the with-CDRP conditions.

### 5.19.3.3 Project-level Impacts and Mitigation Measures

**Impact AG-1: Implementation of the proposed project would not result in the conversion of Unique Farmland, as shown on the maps pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use. (Less than Significant)**

The two former nursery sites within the project area (between Staging Area 1 and Pit F3-East, and between Pit F2 and I-680) are designated as Unique Farmland. The existing nursery (Calaveras Nursery) located at the north end of the project area (just south of the PG&E Sunol Substation) is also designated as Unique Farmland. The FMMP maps, as shown on Figure 5.19-1, designate the remainder of the project area as Other Land and Grazing Land.

Nursery operations at both former nursery sites ceased in 2010. Calaveras Nursery, located just south of the PG&E Sunol Substation, is still in operation. Although Calaveras Nursery and the former nursery site in the northern portion of the project area (between Pit F2 and I-680) are located entirely within the project area, no proposed project facilities (and therefore, no construction activities) are anticipated at these sites (see Figure 3-3 in Chapter 3, Project Description). If the former nursery site in the northern portion of the project area were disturbed during construction, the site would be restored to its preconstruction condition, and future nursery operations (or other activities suitable to the Unique Farmland designation) would still be possible. Calaveras Nursery would remain fully operational throughout the construction period. Thus, there would be no significant impact at these sites.

Excess spoils generated during project construction could be permanently placed in an earthen berm at the former nursery site, Permanent Spoils Site B, located between Staging Area 1 and Pit F3-East. As noted in Section 5.19.1, above, this former nursery site has been previously utilized for the permanent placement of spoils generated by other SFPUC WSIP facility improvement projects (namely the SABPL and Alameda Siphons Seismic Reliability Upgrade project). The environmental review document that was prepared for the SABPL project[6] assumed that the permanent placement of excess spoils in an earthen berm at this site would preclude

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[6] San Francisco Planning Department, 2012. *Final Environmental Impact Report for the San Francisco Public Utilities Commission San Antonio Backup Pipeline Project*. San Francisco Planning Department Case No. 2007.0039E, State Clearinghouse No. 2007102030, Certified September 20, 2012.

future use of this site for nursery operations and concluded that the SABPL project would result in the permanent conversion of Unique Farmland to non-agricultural uses.[7] To address this impact of the SABPL project, the SFPUC established a permanent agricultural conservation easement equal in area to the Unique Farmland lost on CCSF-owned lands in the SFPUC Alameda watershed. The Unique Farmland at Permanent Spoils Site B was subsequently converted to nonagricultural uses and mitigated for. No additional farmland would be converted to nonagricultural uses from implementation of the ACRP. Although the site is remains designated as Unique Farmland on the 2012/2014 FMMP maps, given that Permanent Spoils Site B has not been in agricultural production since 2012, it is anticipated that the Unique Farmland designation will be removed in future FMMP map updates. No impact related to the permanent conversion of Unique Farmland to nonagricultural uses would result.

**Mitigation:** None required.

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## 5.19.3.4 Cumulative Impacts and Mitigation Measures

**Impact C-AG: The project, in combination with past, present, and probable future projects, would not substantially affect agricultural and forestry resources. (Less than Significant)**

The geographic scope for cumulative impacts on agricultural resources consists of areas designated as Unique Farmland within the Sunol Valley.

Cumulative impacts on agricultural resources could result if the ACRP and other cumulative projects in the Sunol Valley result in the permanent conversion of Unique Farmland to non-agricultural use, either through direct changes in land use or through permanent changes from existing conditions.

As discussed in Impact AG-1, implementation of the ACRP would not result in the permanent conversion of Unique Farmland to non-agricultural use at either Calaveras Nursery or at the former nursery sites located within the project area. Although Calaveras Nursery and this former nursery site lie within the project area, there would be no overlap between the ACRP construction zones and these nursery sites. Therefore, project activities associated with the ACRP would not affect current operations at Calaveras Nursery. In addition, if the former nursery site in the northern portion of the project area were disturbed during construction, the site would be restored to its preconstruction condition, and future nursery operations (or other activities suitable to the Unique Farmland designation) would still be possible.

Many of the cumulative projects listed in **Table 5.1-6** and shown in **Figure 5.1-1** in Section 5.1, Overview, are located in the Sunol Valley. Although most of these projects are completed, this cumulative analysis considers the incremental contribution of the ACRP to agricultural impacts

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[7] Ibid.

associated with other projects. The Calaveras Dam Replacement Project (CDRP), San Antonio Pump Station Upgrade, San Antonio Reservoir Hypolimnetic Oxygenation System, Sunol Valley Water Treatment Plant Expansion and Treated Water Reservoir (SVWTP Expansion), PG&E Line 303 Alameda Creek Relocation project, Geary Road Bridge Replacement project, and SMP-30 Cutoff Wall and Creek Restoration project are not located on lands designated as Prime Farmland or on land protected under Williamson Act contracts. Therefore, these projects are not considered in the analysis of cumulative impacts to agricultural lands.

Although the New Irvington Tunnel (NIT) Project, SVWTP Expansion and Treated Water Reservoir, Alameda Siphons Seismic Reliability Upgrade, SABPL, and SMP-30 Expansion projects have all been completed, the ACRP contribution to cumulative agricultural impacts is considered along with the combined impacts associated with those projects.

Most of the NIT project area is mapped as Grazing Land of Other Land; however a portion of the Alameda West Portal work area is within Williamson Act contracted land. The NIT project, which was completed in 2015, used the former nursery site between Pit F6 and Calaveras Road, which is designated as Unique Farmland, for staging. This former nursery site is now included in the SMP-30 area (it was added as part of the SMP-30 Expansion project). Although this nursery was decommissioned, the NIT project included mitigation requiring that topsoil be segregated to address grading impacts, displaced nursery operations, and topsoil compaction. The NIT project also included permanent stockpiling of soils in a portion of this area. To mitigate permanent agricultural land conversion, the NIT project included dedication of a permanent agricultural conservation easement equal in area to the Unique Farmland lost, or by contributing funds to a local agricultural land conservancy to establish a conservation easement to protect an equivalent acreage.[8] The SMP-30 Expansion project was approved after the NIT project had utilized the former nursery site located between Pit F6 and Calaveras Road. This site was later added to the SMP-30 area as part of the SMP-30 Expansion project. The SVWTP Expansion project resulted in permanent conversion of approximately 19 acres of former nursery land designated as Unique Farmland. The SVWTP Expansion project mitigation included compensatory mitigation to address agricultural resource impacts.

As noted above in Impact AG-1, excess spoils generated during ACRP-related construction activities could be placed in a permanent berm at Permanent Spoils Site B located between Staging Area 1 and Pit F3-East. This former nursery site was used for permanent disposal of spoils generated during construction of the SABPL project as well as the Alameda Siphons Seismic Reliability Upgrade project. The SABPL EIR found the cumulative impacts related to the SABPL's permanent conversion of Unique Farmland to non-agricultural use during construction would be significant. The impact related to the permanent conversion of Unique Farmland to non-agricultural use was addressed by the SABPL project and reduced to a less-than-significant level with implementation of compensatory mitigation. Thus, implementation of the ACRP and other

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[8] San Francisco Planning Department, 2009. *Final Environmental Impact Report for the San Francisco Public Utilities Commission (SFPUC) New Irvington Tunnel Project*, San Francisco Planning Department Case No. 2005.0162E, State Clearinghouse No. 2006072085. December 2009.

cumulative SFPUC projects that use Permanent Spoils Site B for the placement of spoils generated during construction would not result in the conversion of additional agricultural land to nonagricultural uses, and the cumulative impact would be less than significant.

Implementation of the proposed project would not contribute to any significant cumulative impact on forest resources because the project would not result in project-specific impacts on forest resources, and the cumulative impact would be less than significant.

**Mitigation:** None required.

# CHAPTER 6
# Other CEQA Issues

## 6.1 Growth Inducement

### 6.1.1 Introduction and Overview

This chapter analyzes the growth inducement potential and associated secondary effects of growth impacts of the proposed project, as required by the California Environmental Quality Act (CEQA). CEQA requires that an Environmental Impact Report (EIR) evaluate the growth-inducing impacts of a proposed project.[1] A growth-inducing impact is defined as follows:

> [T]he ways in which the proposed project could foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment. Included in this are projects which would remove obstacles to population growth…. It must not be assumed that growth in any area is necessarily beneficial, detrimental, or of little significance to the environment.

As described in Chapter 2, Section 2.2, the San Francisco Planning Department prepared a Program Environmental Impact Report (PEIR) on the SFPUC's Water System Improvement Program (WSIP), which was certified in October 2008.[2] The PEIR includes a detailed analysis of the growth inducement potential of the overall WSIP water supply strategy and concluded that "The WSIP would support planned growth in the existing SFPUC service area (WSIP PEIR, Vol. 4, Chapter 7, Impact 7-1)."

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[1] CEQA Guidelines Section 15126.2(d).

[2] San Francisco Planning Department, *San Francisco Public Utilities Commission's Water System Improvement Program, Final Program Environmental Impact Report*, San Francisco Planning Department File No. 2005.0159E, State Clearinghouse No. 2005092026, Certified October 30, 2008.

The proposed Alameda Creek Recapture Project (ACRP or proposed project), as a facility improvement project of the WSIP, would be a contributing factor to growth inducement potential and associated indirect effects of growth. By removing the lack of a reliable water supply and supply system as one potential obstacle to growth within the SFPUC service area, the WSIP, and thus the proposed project, would have an indirect growth-inducing effect according to the CEQA definition above.[3]

This EIR tiers from the WSIP PEIR, and the growth inducement analysis contained in PEIR Chapter 7 and associated Appendix E are incorporated by reference into this EIR. All impacts related to the WSIP water supply strategy to which the ACRP would contribute have been examined at a sufficient level of detail in the PEIR and no additional analysis is necessary in this EIR. The significant environmental effects have been adequately addressed in the PEIR, and the SFPUC has adopted the CEQA Findings on the PEIR related to the growth inducing impacts of the WSIP. A summary of the growth inducement analysis in the PEIR is provided below.

### 6.1.2 Summary of PEIR Growth Inducement Analysis

Implementation of the WSIP would achieve the WSIP goals and objectives, including the water supply goal through the year 2018. It would allow the SFPUC to: (1) meet its customer water needs in nondrought periods through the year 2018 and (2) limit rationing to a maximum of 20 percent systemwide reduction in water service during extended droughts. Achieving the WSIP water supply goal would increase the reliability of water service to existing customers as well as would provide water to serve planned growth of additional residential and business customers in the existing SFPUC service area.

A variety of factors influence new development or population growth in the area served by the SFPUC regional water system, including economic conditions of the region, adopted growth management policies in the affected communities, and the availability of adequate infrastructure (e.g., water service, sewer service, public schools, and roadways, etc.), with economic factors generally the lead driver. While water service is only one of many factors affecting the growth potential of a community, it is one of the chief public services needed to support urban development, and lack of a reliable water supply as well as a service capacity deficiency could constrain future development.

Pursuant to CEQA, growth *per se* is not assumed to be necessarily beneficial, detrimental, or of little significance to the environment; it is the secondary, or indirect, effects of growth that can cause adverse changes to the physical environment. The indirect effects of population and/or economic growth and accompanying development can include: increased demand on community services and public service infrastructure; increased traffic and noise; degradation of air and

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[3] The WSIP would not *directly* induce growth as it does not involve the development of new housing to attract additional population, nor would it indirectly induce growth by establishing substantial permanent or even short-term construction employment opportunities that could stimulate population growth. Construction of the WSIP projects is not expected to involve employment opportunities substantially beyond what would normally be available to construction workers in the area, and workers are expected to be drawn from the local labor pool.

water quality; and conversion of agricultural land and open space to urban uses. Local land use plans (e.g., general plans and specific plans) of the jurisdictions served by the SFPUC regional water system establish land use development patterns and growth policies that are intended to allow for the orderly expansion of urban development supported by adequate public services, including water supply, roadway infrastructure, sewer service, and solid waste service. Local jurisdictions conduct CEQA environmental review on their general and specific plans to assess the secondary effects of their planned growth and to identify feasible mitigation for significant, adverse effects. A project that would induce growth and is inconsistent with local land use plans and policies could indirectly cause adverse environmental impacts, as well as impacts on public services; this could occur if the local land use jurisdictions have not previously addressed these issues in the CEQA review of their land use plans and development proposals.

By removing the lack of a reliable water supply and water system (as one potential obstacle to growth within the SFPUC service area) and providing and assisting in the development of additional water supply sources (such as recycled water and groundwater projects) as well as promoting more efficient use of water through conservation measures, the WSIP would have an indirect growth-inducing effect according to the CEQA definition. The WSIP would support growth in the SFPUC service area through 2018,[4] although it appears that some growth would occur irrespective of the WSIP due to increased water delivery efficiencies (e.g., plumbing code changes), conservation, and other water supply sources. Growth would in turn result in indirect effects. In most cases, the effects of population and employment growth have been identified and addressed in the EIRs for the general plans and associated area plans and specific plans adopted by the jurisdictions in the service area. Some of the identified indirect effects of growth are significant and unavoidable; others are significant but can be mitigated.

Potentially significant and unavoidable impacts as a result of growth in the SFPUC service area have been identified by the local jurisdictions in the following areas: traffic congestion, air pollution, traffic noise, construction noise, increased demand for public schools and other public services, loss of recreational opportunities and impacts on visual quality resulting from the loss of open space, cumulative effects on over-utilized parks, loss of wildlife habitat and wetlands and impacts on other biological resources, cumulative impacts on cultural resources, increased flooding potential, increased urban runoff pollutants, seismic hazards, induced population growth, failure to meet housing demand for projected population growth, exposure of new development to contaminated soil or groundwater, insufficient water supply, insufficient wastewater disposal capacity, loss of agricultural resources, land use conflicts, conflicts with existing land use plans or policies, and changes in density, scale, and character of an area.

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[4] As described in Chapter 2 of this EIR, the SFPUC adopted the WSIP in 2008. The WSIP will improve the regional water system with respect to water supply to meet water delivery needs in the service area for projected demands through the year 2018. The ACRP (referred to in the WSIP PEIR as the Alameda Creek Fishery Enhancement project) is identified as part of the WSIP, and was included in the growth-inducement analysis in the WSIP PEIR. Even though the ACRP is not scheduled for implementation until 2019, its contribution to growth inducement effects were still included in the PEIR analysis. The PEIR also indicated that prior to 2018, the SFPUC would further examine the needs of the regional water system and those studies are currently in progress.

The adopted WSIP would have growth-inducement potential through 2018 because the SFPUC (with the cooperation of the SFPUC's wholesale customers) would provide the additional water supply to meet purchase requests through 2018. The WSIP would support much of the growth through 2018 in the jurisdictions served by the SFPUC regional water system. In general, development that was planned and approved through the general plan process in the SFPUC service area would have environmental impacts. The environmental consequences of this planned growth have been largely addressed in local plans and the associated CEQA review as well as in other, project-specific documentation. In a number of jurisdictions, negative declarations or mitigated negative declarations were prepared for general plans and related planning documents that were found not to have significant environmental effects.

The PEIR does not identify any mitigation measures for implementation by the SFPUC that could substantially decrease or eliminate growth-inducing impacts. This is because the SFPUC does not have control over the decisions that each local agency will make with respect to growth in their jurisdictions. Individual agencies' general plans and environmental documents contain actions, limitations, and mitigation measures that will be implemented in the individual jurisdictions with local development project or program approvals. These types of mitigation measures were identified in the PEIR (see PEIR Chapter 7 and PEIR Appendix E, which are incorporated by reference into this EIR).

To assess the growth inducement potential of the WSIP and characterize the secondary effects of growth, the PEIR investigates the following questions:

- *What assumptions did the SFPUC and its wholesale customers make regarding growth (population and employment) in projecting future (2030) total water demand and customer purchases from the SFPUC?*
- *Are these assumptions consistent with forecasts prepared and used by local and regional planning agencies (e.g., Association of Bay Area Governments [ABAG], counties and cities) within the service area? What are the growth trends in the Bay Area region?*
- *Are there any notable inconsistencies between the population and employment forecasts used by the SFPUC and the wholesale customers and those of the local and regional planning agencies that suggest that the water supply planning efforts are inconsistent with land use planning efforts?*
- *Is the level of growth projected for 2030 consistent with that identified and planned for in existing adopted general plans?*
- *What are the potential environmental impacts (secondary effects) associated with growth projected to occur in the service area? Have these impacts been evaluated in previous CEQA review documents on existing general and specific plans?*
- *What mitigation measures and findings have the local jurisdictions adopted as part of approving their future growth plans?*

The issues raised in these questions are summarized below and addressed in detail in PEIR Chapter 7 (Vol. 4) and supplemented by PEIR Appendix E (Vol. 5).

- ***SFPUC Projections (PEIR Section 7.2).*** Accurate demand projections are important in ensuring that future water supplies will be adequate while not surpassing the needs of planned growth. SFPUC and its customers used computer models to forecast future water demand. Section 7.2 presents an overview of the SFPUC water service area, and describes key factors (assumptions, inputs, and methodologies) used in estimating future demand that relate to growth and inform comparisons between water demand and land use planning projections. These factors include baseline population, methodology used to determine existing water usage by land use/account type, the current water supply agreement between the SFPUC and its wholesale customers, and assumptions regarding future land use patterns, water conservation and recycling, and water from other (non-SFPUC) sources through 2030. The demand estimates, in conjunction with estimates of savings from conservation and use of other water sources, provide the basis for the 2030 purchase estimates.

- ***Growth Inducement Potential (PEIR Section 7.3).*** This section analyzes the WSIP's growth inducement potential: whether the demand to be met by the WSIP would be consistent with local plans and policies or could contribute to growth in the service area beyond that called for in the existing general plan. To gauge the consistency of the WSIP with growth planned in the jurisdictions served by the SFPUC, the analysis compares the growth assumed in the SFPUC projections with growth forecasts (a) developed by ABAG and (b) reflected in adopted land use plans in the service area. With respect to ABAG, this section also describes ABAG's changing expectations about growth as reflected in its updated projections issued in 2002, 2003, and 2005.

- ***Indirect Effects of Growth (PEIR Section 7.4).*** Growth (whether planned or unplanned) can cause environmental impacts. Section 7.4 describes the potential impacts of growth that could be supported, in part, by implementation of the WSIP. This section also identifies measures adopted to reduce, eliminate or otherwise mitigate the impacts of planned growth.

The complete growth inducement analysis is included in PEIR Chapter 7 and PEIR Appendix E, which are incorporated into this EIR by reference.

### 6.1.3 Indirect Effects of Growth

The indirect effects of growth expected in the general plans of jurisdictions in the service area have been identified in the EIRs prepared for those plans. Impacts commonly identified as significant and unavoidable and those commonly identified as significant but mitigable are presented in PEIR Section 7.4 and summarized briefly below.

- The most commonly identified significant and unavoidable impacts of growth are:
  - Increased traffic congestion
  - Deterioration of air quality
  - Cumulative effects of increased air pollutant emissions and noise

- Mitigation measures have been adopted by local jurisdictions as part of their general plan approval processes to address the secondary effects of planned growth. These measures are summarized in PEIR Appendix E.

- Two cities identified increased demand for potable water supply as a significant and unavoidable effect of growth; the WSIP would address this issue in those two cities.
- Overriding considerations commonly adopted by the decision-making bodies in adopting their general plans include the following:
  - Accommodation of growth in an orderly, fiscally sound manner
  - Economic diversification and job generation
  - Creation of housing, furtherance of regional housing share objectives, and provision of affordable housing
  - Improvements of the local jobs/housing balance
  - Increased sales revenue and positive fiscal impact
  - Promotion of alternative modes of travel to reduce reliance on private vehicles
  - Establishment of policies to preserve natural areas and open space lands
- For many cities that receive water from the SFPUC regional system, the supply to be provided under the WSIP supports and is consistent with the planned growth reflected in their existing adopted general plans. For other communities, it appears that the WSIP supply (in combination with other supply sources available to those communities) could serve a level of growth beyond that identified in the existing general plans. In those cases, secondary effects of such growth could include impacts related to increased density and impacts related to development of new land areas.
  - Density related impacts could include, e.g., increased traffic congestion, air pollution, traffic noise, construction noise, and demand on public services.
  - Land area related impacts could include, e.g., loss of open space and agricultural land, loss of and degradation of water quality due to increases in impervious surface area.

The proposed ACRP would not directly induce population or economic growth, nor would it tax existing community service facilities or encourage other activities that could significantly affect the environment. However, as described above, the ACRP is one of the facility improvement projects that comprise the WSIP and therefore, its implementation would contribute to the growth inducement potential of the WSIP and the associated indirect effects of growth. Implementation of the ACRP would thus contribute to an incremental portion of the growth inducement impacts and associated indirect impacts of growth of the WSIP. See Chapter 7 of the PEIR for a detailed analysis of the WSIP's growth inducement effects.[5]

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[5] San Francisco Planning Department, 2008. *Final Program Environmental Impact Report for the San Francisco Public Utility Commission's Water System Improvement Program, File No. 2005.0159E, State Clearinghouse No. 2005092026.* Certified October 30, 2008.

## 6.2 Summary of Cumulative Impacts

As described in Chapter 5, Section 5.1.5, Cumulative Impacts, cumulative impacts result from two or more individual effects that, when considered together, are considerable or that compound or increase other environmental impacts (CEQA Guidelines, Section 15355). The cumulative impacts from several projects are the change in the environment that results from the incremental impact of the project when added to other closely related past, present, or reasonably foreseeable future projects. The cumulative analysis in this EIR identifies project impacts that would be individually limited, but when viewed in connection with the effects of other past, present, and probable future projects, could be "cumulatively considerable" (i.e., significant) with regard to the project's contribution to a cumulative impact.

In Chapter 5, Environmental Setting, Impacts, and Mitigation Measures, cumulative impacts are discussed and analyzed under each resource area immediately following the description of the project impacts of the proposed project and the identified mitigation measures for that resource area. The analyses of cumulative impacts are based on the same setting, regulatory framework, and significance criteria as the direct impacts, and it applies the results of the project-level impact analysis within the context of the identified geographic scope of area affected by the cumulative effect. Table 5.1-6 lists the relevant past, present, or reasonably foreseeable future projects proposed by the SFPUC and other jurisdictions that are considered in the cumulative impact analysis. Figure 5.1-1 shows the cumulative project locations.

**Table 6-1**, below, provides a summary of all of the cumulative impacts associated with the ACRP that were identified in Chapter 5 of this EIR. All significant cumulative impacts could be reduced to a less-than-significant level with implementation of mitigation measures identified in Chapter 5, Environmental Setting, Impacts, and Mitigation Measures. See Chapter 5 for the detailed discussion of cumulative impacts by resource topic, and where appropriate, a description of the mitigation measures that would avoid or lessen the cumulative impacts.

## 6.3 Significant Environmental Effects That Cannot Be Avoided if the Proposed Project Is Implemented

In accordance with Section 21100(b)(2)(A) of CEQA and with Sections 15126(b) and 15126.2(b) of the CEQA Guidelines, the purpose of this section is to identify project-related environmental impacts that could not be eliminated or reduced to a less-than-significant level with implementation of all mitigation measures identified in Chapter 5, Environmental Setting, Impacts, and Mitigation Measures. The findings in this chapter are subject to final determination by the San Francisco Planning Commission as part of its certification of the EIR.

## TABLE 6-1
## SUMMARY OF CUMULATIVE IMPACTS

| Impact | Significance Determination |
|---|---|
| **Impact C-LU:** The project, in combination with past, present, and probable future projects, would not substantially affect land use. | LS |
| **Impact C-AE:** The project, in combination with past, present, and probable future projects, would not substantially affect aesthetics. | LS |
| **Impact C-PH:** No cumulative impacts related to population and housing. | NI |
| **Impact C-CUL:** The project, in combination with past, present, and probable future projects, could substantially affect cultural resources. | LSM |
| **Impact C-TR:** The project, in combination with past, present, and probable future projects, would not substantially affect transportation and circulation. | LS |
| **Impact C-NO:** The project, in combination with past, present, and probable future projects, would not substantially affect noise and vibration. | LS |
| **Impact C-AQ:** The project, in combination with past, present, and probable future projects, could substantially affect air quality. | LSM |
| **Impact C-GG:** Project construction and operation would not generate GHG emissions that could have a significant impact on the environment, or conflict with any applicable plan, policy, or regulation adopted for the purpose of reducing GHG emissions. | LS |
| **Impact C-WS:** No cumulative impacts related to wind and shadow. | NI |
| **Impact C-RE:** The project, in combination with past, present, and probable future projects, would not substantially affect recreational resources. | LS |
| **Impact C-UT:** The project, in combination with past, present, and probable future projects, would not substantially affect utilities and service systems. | LS |
| **Impact C-PS:** No cumulative impacts related to public services. | NI |
| **Impact C-BI-1:** The project, in combination with past, present, and probable future projects, could substantially affect terrestrial biological resources. | LSM |
| **Impact C-BI-2:** The project, in combination with past, present, and probable future projects, would not substantially affect fisheries resources. | LS |
| **Impact C-GE:** The project, in combination with past, present, and probable future projects, could substantially affect paleontological resources. | LSM |
| **Impact C-HY:** The project, in combination with past, present, and probable future projects, would not substantially affect hydrology and water quality. | LS |
| **Impact C-HZ:** The project, in combination with past, present, and probable future projects, would not substantially affect hazards and hazardous materials. | LS |
| **Impact C-ME:** The project, in combination with past, present, and probable future projects, could substantially affect energy resources. | LSM |
| **Impact C-AG:** The project, in combination with past, present, and probable future projects, would not substantially affect agricultural and forestry resources. | LS |

NI = No Impact
LS = Less than Significant
LSM = Less than Significant with Mitigation

## 6.3.1 Significant and Unavoidable, and Potentially Significant and Unavoidable Effects of the Proposed Project

This section identifies facility-related project impacts associated with the construction and operation of the ACRP that, even with the implementation of all identified mitigation measures, would remain significant, and are therefore considered unavoidable. As documented in Chapter 5, Environmental Setting, Impacts, and Mitigation Measures, of this EIR all ACRP project-level impacts would either be less than significant, or reduced to less-than-significant levels with implementation of the identified mitigation measures. No significant and unavoidable impacts were identified in the project-level environmental review of the ACRP. The facility-related project impacts of the ACRP do not address the water supply and system operations impacts of the WSIP, of which the ACRP is a component part. The ACRP's contribution to water supply and system operations of the WSIP are discussed below in Section 6.3.2.

## 6.3.2 Significant and Unavoidable Effects of the WSIP

The ACRP is one of the facility improvement projects that comprise the SFPUC's WSIP. Insofar as the proposed project is a component of the WSIP, it would contribute to the WSIP's significant and unavoidable, and potentially significant and unavoidable water supply and growth-inducement impacts, as identified in the WSIP PEIR and summarized below:[6]

- By providing water to support planned growth in the SFPUC service area, the WSIP will result in significant and unavoidable growth inducement effects that are primarily related to secondary effects such as air quality, traffic congestion, and water quality. These impacts were adequately addressed in the PEIR at a sufficient level of detail such that no further analysis is required in this EIR. The analysis contained in the PEIR is incorporated into this EIR by this reference (see PEIR Chapter 7).

- Based on the best available information at that time, the PEIR made the conservative determination that the WSIP could result in a significant and unavoidable impact on fishery resources in Crystal Springs Reservoir related to inundation of spawning habitat upstream of the reservoir (see PEIR Chapter 5, Section 5.5.5, Impact 5.5.5-1). The project-level fisheries analysis in the Lower Crystal Springs Dam Improvements Project EIR modifies certain PEIR impact determinations based upon more detailed site-specific data and analysis. These project-level conclusions supersede any contrary impact conclusions in the PEIR. Project-level review of updated, site-specific information that was developed following certification of the PEIR was incorporated into the project-level EIR for the Lower Crystal Springs Dam Improvements Project, and the project-level analysis determined that impacts on fishery resources due to inundation effects would be less than significant.[7]

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[6] San Francisco Planning Department, 2008. *Final Program Environmental Impact Report for the San Francisco Public Utility Commission's Water System Improvement Program, File No. 2005.0159E, State Clearinghouse No. 2005092026.* Certified October 30, 2008.

[7] San Francisco Planning Department, 2010. *Final Environmental Impact Report for the San Francisco Public Utilities Commission Lower Crystal Springs Dam Improvement Project, San Francisco Planning Department File No. 2005.0536E, State Clearinghouse No. 2007012002.* Certified October 7, 2010.

- Based on the best available information at that time, the PEIR made the conservative determination that the WSIP would result in a significant and unavoidable impact related to flow along Alameda Creek below the Alameda Creek Diversion Dam ("Alameda Creek Hydrologic Impact") (see PEIR Chapter 4, Section 5.4.1, Impact 5.4.1-2). The project-level analysis in the Calaveras Dam Replacement Project EIR modifies this PEIR impact determination to be less than significant based upon more detailed site-specific data and analysis.[8] These project-level conclusions supersede the contrary impact conclusions in the PEIR.

## 6.4 Significant Irreversible Environmental Changes

In accordance with CEQA Section 21100(b)(2)(B) and CEQA Guidelines Sections 15126(c) and 15126.2(c), the purpose of this section is to identify significant irreversible environmental changes that would be caused by the proposed project. Construction activities associated with the ACRP would result in an irretrievable and irreversible commitment of natural resources through the use of power supply and construction materials. In addition, the construction of new facilities (e.g., electrical control building, pipelines) would result in an irretrievable or irreversible commitment of land to water supply uses to the extent that the SFUC has integrated the ACRP facilities into the regional water system. Until such indeterminate time in the future if or when the SFPUC determines that these facilities are no longer required as part of the regional water system, this commitment of land would be considered an irreversible change. However, during this indeterminate timeframe, these uses would take up limited land area and are compatible with the adjacent land uses.

The proposed ACRP would require the commitment of energy resources to fuel and maintain construction equipment (such as gasoline, diesel, and oil) during the construction period. Project construction would commit resources, such as concrete and steel, to be used for the proposed facilities and related improvements. Implementation of the ACRP would also result in irreversible changes associated with increased energy demand and energy use for operation of the new pumps and electrical control building. Until such indeterminate time in the future if or when the SFPUC determines that these facilities are no longer required as part of the regional water system, this commitment of energy resources associated with ACRP operations would be considered an irreversible change. However, as noted in Section 5.18, Mineral and Energy Resources, a substantial portion of the operational energy usage under either power option would be from renewable energy sources.

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[8] San Francisco Planning Department, 2011. *Final Environmental Impact Report for the San Francisco Public Utilities Commission Calaveras Dam Replacement Project, San Francisco Planning Department File No. 2005.0161E, State Clearinghouse No. 2005102102.* Certified January 27, 2011.

## 6.5 Areas of Controversy and Issues to Be Resolved

On June 24, 2015, the San Francisco Planning Department issued a Notice of Preparation (NOP) to interested members of the public, organizations, and agencies to inform them of the intent to prepare an Environmental Impact Report (EIR) on the ACRP and to provide them an opportunity to comment on the issues and provide input on the scope of the EIR. Consistent with CEQA, the Planning Department conducted a public scoping process, including a 33-day scoping period from June 24 to July 27, 2015 and scoping meeting held on July 9, 2015. Comments received during the scoping period from community members and agencies, include the following:

- SFPUC water rights to the water that infiltrates into Pit F2
- Ability to meet WSIP level of service goals and objectives related to water supply during both non-drought and drought periods
- Effects to Alameda Creek, Alameda Creek watershed, and downstream agencies
- Origin of water that would be recaptured or pumped out of Pit F2 at various times of operation and hydrologic connections
- Effects on anadromous fish passage in Alameda Creek
- Effects on groundwater levels and groundwater supplies
- Effects on Alameda Creek surface flow through the Sunol Valley and downstream into Niles Canyon
- Effects on amphibians and aquatic reptiles and cumulative effects with CDRP
- Effects of changes in surface water and subsurface water levels on biological resources, including sycamore alluvial woodlands
- Cost of the project

Section 2.5, Notice of Preparation and Public Scoping Process, further details public comments received and provides a cross-reference to where each comment is addressed in this document.

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# CHAPTER 7
# Alternatives

## 7.1 Introduction

This chapter presents the CEQA alternatives analysis for the San Francisco Public Utilities Commission's (SFPUC) Alameda Creek Recapture Project (ACRP or proposed project). This Introduction, Section 7.1, presents an overview of the CEQA requirements for alternatives analysis, followed by a review of the alternatives analyzed in the Water System Improvement Program (WSIP) Program Environmental Impact Report (PEIR), from which this Environmental Impact Report (EIR) is tiered, to provide the overall context for the ACRP alternatives analysis. Section 7.2 describes the methodology used to identify and select a reasonable range of alternatives to the proposed project for detailed CEQA analysis. Section 7.3 describes and evaluates the selected alternative that could avoid or substantially lessen the significant impacts identified for the proposed project while still meeting most of the project objectives. This alternative is evaluated for its comparative merits with respect to minimizing adverse environmental effects that were identified for the proposed project and analyzes the potential impacts of the alternative relative to those of the proposed project. Based on this analysis, Section 7.4 compares the impacts of the action alternative and no project alternative against those of the proposed project and identifies the environmentally superior alternative. Finally, Section 7.5 describes other alternative concepts that were considered as part of the environmental review process but were eliminated from detailed consideration and identifies the reasons for their elimination.

## 7.1.1 CEQA Requirements for Alternatives Analysis

The CEQA Guidelines, Section 15126.6(a), state that an environmental impact report (EIR) must describe and evaluate a reasonable range of alternatives to the proposed project that would feasibly attain most of the project's basic objectives but would avoid or substantially lessen any identified significant adverse environmental effects of the project. Specifically, the CEQA Guidelines (Section 15126.6) set forth the following criteria for selecting and evaluating alternatives:

- ***Identifying Alternatives.*** The selection of alternatives is limited to those that would avoid or substantially lessen any of the significant effects of the project, are feasible, and would attain most of the basic objectives of the project. Factors that may be considered when addressing the feasibility of an alternative include site suitability, availability of infrastructure, general plan consistency, other plans or regulatory limitations, jurisdictional boundaries, economic viability, and whether the proponent can reasonably acquire, control, or otherwise have access to an alternative site. An EIR need not consider an alternative for which impacts cannot be reasonably ascertained and for which implementation is remote and speculative. The specific alternative of "no project" must also be evaluated.

- ***Range of Alternatives.*** An EIR need not consider every conceivable alternative, but must consider and discuss a reasonable range of feasible alternatives in a manner that will foster informed decision-making and public participation. The "rule of reason" governs the selection and consideration of EIR alternatives, requiring that an EIR set forth only those alternatives necessary to permit a reasoned choice. The lead agency is responsible for selecting a range of project alternatives to be examined and for disclosing its reasons for the selection of the alternatives. An EIR is not required to consider alternatives which are infeasible.

- ***Evaluation of Alternatives.*** EIRs are required to include sufficient information about each alternative to allow meaningful evaluation, analysis, and comparison with the proposed project. Matrices may be used to display the major characteristics and the environmental effects of each alternative. If an alternative would cause one or more significant effects that would not result from the project as proposed, the significant effects of the alternative must be discussed, but in less detail than the significant effects of the project.

## 7.1.2 WSIP PEIR Alternatives

As discussed in Chapter 2, Introduction and Background, of this EIR, the ACRP is one of the key regional facility improvement projects under the WSIP, for which the San Francisco Planning Department prepared the WSIP PEIR to comply with CEQA. On October 30, 2008, the San Francisco Planning Commission certified the WSIP PEIR and the SFPUC adopted the WSIP.[1]

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[1] San Francisco Planning Department, 2008. *Final Program Environmental Impact Report on the San Francisco Public Utilities Commission's Water System Improvement Program*. San Francisco Planning Department File No. 2005.0159E, State Clearinghouse No. 2005092026. Certified October 30, 2008.

The WSIP is a comprehensive program to improve the reliability of the SFPUC regional water system with respect to water quality, seismic response, water delivery, and water supply. The adopted program, referred to as the Phased WSIP is based on a planning horizon through the year 2030 with full implementation of the facility improvement projects and phased implementation of water supply delivery with an interim, mid-term planning horizon of 2018. As described above, the ACRP project,[2] is one of the many WSIP facility improvement projects, most of which have been approved and are under construction or near completion of construction. To the extent that the ACRP project would contribute to achieving the goals and objectives of the WSIP, the program-level analysis of the WSIP alternatives applies to the project-level analysis of the ACRP alternatives.

The WSIP PEIR considered a range of systemwide alternatives to the WSIP, as required by CEQA. The PEIR evaluated seven alternatives to the WSIP because of their apparent ability to meet most of the WSIP's goals, their ability to reduce one or more of the significant impacts associated with program implementation, their potential feasibility, and their collective ability to provide a reasonable range of alternatives to foster informed decision-making and public participation. Analysis of the No Program Alternative was included in the PEIR as required by CEQA.

Prior to approving the Phased WSIP, the SFPUC approved the PEIR and adopted the CEQA Findings on the WSIP (SFPUC Resolution 08-0200). The Phased WSIP incorporates elements of three alternatives analyzed in the PEIR: the No Purchase Request Alternative, the Aggressive Conservation/Water Recycling and Groundwater Alternative, and the Modified WSIP Alternative. Chapters 9 and 14 of the PEIR include more detailed descriptions of these WSIP alternatives, and also present the associated program-level environmental analysis of these alternatives. Chapter 13 of the PEIR includes additional information about the adopted Phased WSIP. All three of these chapters are incorporated into this EIR by reference. For informational purposes, the WSIP alternatives examined in the PEIR and the Phased WSIP that was ultimately approved are summarized below. The Phased WSIP and all program alternatives analyzed in the PEIR assume that the full amount of water that will be released from and bypassed around Calaveras Reservoir in accordance with the instream flow schedules and regulatory permit requirements for the Calaveras Dam Replacement Project (CDRP) would be recaptured.

- ***Phased WSIP.*** The Phased WSIP is the program that was ultimately adopted by the SFPUC. The Phased WSIP includes implementation of all of the key regional facility improvement projects, including the ACRP, but limits SFPUC's annual average deliveries from its watersheds to 265 million gallons per day (mgd) (about 297,000 acre-feet per year). This 265 mgd average annual water delivery was assumed to be comprised of approximately 85 percent from the Tuolumne River watershed and 15 percent from the local watersheds (the Alameda Creek and Peninsula watersheds). Limiting the annual average deliveries supplied from its watershed to 265 mgd generally represents the base-year level of supply delivered from the SFPUC watershed through the regional water

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[2] The ACRP is listed in the WSIP Program Environmental Impact Report (PEIR) under its former title, the Alameda Creek Fishery Enhancement project.

system to the SFPUC customers that was analyzed in the PEIR. Since the Phased WSIP included implementation of the ACRP, it assumed the SFPUC would recapture the water that will be released/bypassed as part of the future instream flow schedules for Calaveras Reservoir).

- ***No Program Alternative.*** Under the No Program Alternative, the SFPUC would implement only those facility improvement projects driven by regulatory requirements or existing agreements with regulatory agencies, which included the ACRP. It would meet only the water quality goals of the WSIP and would fail to meet the other goals and objectives related to seismic reliability, delivery reliability, and water supply. It would endeavor to meet increasing customer purchase requests through the year 2030 by diverting additional Tuolumne River water only when available under City and County of San Francisco's (CCSF) existing water rights.

- ***No Purchase Request Increase Alternative.*** The No Purchase Request Increase Alternative was designed to serve the wholesale customers the amount of water required under the Master Water Sales Agreement between the CCSF and each of the wholesale customers in effect at the time of the PEIR. It would thereby limit the ability of the system to meet customer purchase requests through 2030, but would include implementation of all regional facility improvement projects, including the ACRP.

- ***Aggressive Conservation/Water Recycling and Local Groundwater Alternative.*** Under the Aggressive Conservation/Water Recycling and Local Groundwater Alternative, the SFPUC would implement all of the key regional facility improvement projects, including the ACRP, but would endeavor to serve the projected increase in customer purchase requests through 2030 only through additional conservation, water recycling, and local groundwater projects.

- ***Lower Tuolumne River Diversion Alternative.*** Under the Lower Tuolumne River Diversion Alternative, the SFPUC would implement all of the key regional facility improvement projects, including the ACRP, and would serve the projected increase in customer purchase requests through 2030 through diversions from the lower Tuolumne River near its confluence with the San Joaquin River. This alternative would include construction and operation of additional conveyance and treatment facilities to divert, transport, treat, and blend the new supply into the regional water system.

- ***Year-round Desalination at Oceanside Alternative.*** Under the Year-round Desalination at Oceanside Alternative, the SFPUC would implement all of the key regional facility improvement projects, including the ACRP, and would construct a 25-million-gallon-per-day (mgd) desalination plant in San Francisco to serve the projected increase in customer purchase requests through 2030.

- ***Regional Desalination for Drought Alternative.*** Under the Regional Desalination for Drought Alternative, the SFPUC would implement all of the key regional facility improvement projects, including the ACRP, and would partner with other Bay Area water agencies to construct and operate a regional desalination plant in eastern Contra Costa County that would provide the SFPUC with supplemental supply during drought years. This alternative is also considered a project-level alternative to the ACRP, although without implementation of the ACRP, and is described and analyzed below in Section 7.3.2, Alternative B: Regional Desalination.

- ***Modified WSIP Alternative.*** Under the Modified WSIP Alternative, the SFPUC would implement all of the key regional facility improvement projects, including the ACRP, but would modify proposed system operations to minimize environmental effects. This alternative would include the implementation of key mitigation measures identified in the PEIR.

The program-level alternatives analyzed in the PEIR were determined to have varying abilities to meet the goals and objectives of the WSIP, and would have a wide range of additional environmental effects, while reducing to a varying extent the identified significant impacts of the WSIP. The Modified WSIP Alternative was identified as the environmentally superior alternative.

As a program-level EIR, the PEIR analyzed program-level alternatives that addressed the overall objectives of the WSIP for the entire regional water system, and thus, did not examine specific alternatives for individual facility improvement projects. This EIR, as discussed below, addresses specific alternatives for the ACRP, based on the ACRP objectives and project-level impacts identified in this EIR.

## 7.2 Alternatives Selection

Consistent with CEQA, the approach to alternatives selection for the ACRP project focused on identifying alternatives that: (1) could meet most of the basic objectives of the project while reducing one or more of its significant impacts, (2) could foster informed decision-making and public participation, and (3) could be feasible. The planning effort for the ACRP project entailed consideration of multiple strategies for recapturing the water that will be released at Calaveras Reservoir and bypassed at the Alameda Creek Diversion Dam (ACDD) when the Calaveras Dam Replacement Project (CDRP) is completed and the instream flow schedules are implemented. Many strategies were eliminated from consideration in this CEQA alternatives analysis based on their inability to meet most of the project's basic objectives, their lack of feasibility, their inability to recapture a sufficient volume of released/bypassed water, or their inability to reduce the project's environmental impacts and/or because they could result in greater environmental impacts than the proposed project. One action alternative was retained for consideration. The action alternative and the no project alternative are presented and analyzed in Section 7.3. Other alternatives considered but eliminated from further analysis are discussed in Section 7.5, including the reasons for their elimination.

### 7.2.1 Project Objectives

As discussed in Chapter 3, Project Description, Section 3.3, Project Goals and Objectives, the objectives of the ACRP are to:

- Recapture the water that would have otherwise been stored in Calaveras Reservoir due to the release and bypass of flows from Calaveras Dam and the ACDD, respectively, to meet instream flow requirements, thereby maintaining the historical annual transfers from the Alameda Watershed system to the SFPUC regional water system.

- Minimize impacts on water supply during drought, system maintenance, and in the event of water supply problems or transmission disruptions in the Hetch Hetchy system.
- Maximize local watershed supplies.
- Maximize the use of existing SFPUC facilities and infrastructure.
- Provide a sufficient flow rate to the SVWTP to meet its minimum operating requirements.

These objectives also support the water supply reliability goals and objectives of the WSIP.

## 7.2.2 Summary of Significant Environmental Impacts

The primary goal of the alternatives selection process is to identify alternatives that could reduce the severity and magnitude of impacts attributable to the proposed project, in accordance with CEQA Guidelines Section 15126.6(b). The following summarizes the conclusions for potentially significant and significant impacts of the ACRP that were identified in Chapter 5.

### 7.2.2.1 Significant and Unavoidable Impacts

The proposed project was determined to have no project-level significant and unavoidable impacts. See Chapter 5 of this EIR for details regarding the impacts of the project.[3]

### 7.2.2.2 Significant Impacts that can be Mitigated to Less than Significant

Project implementation would result in the following significant impacts; all of which could be mitigated to a less-than-significant level with the implementation of mitigation measures identified in Chapter 5 under each of the respective impacts:

***Cultural Resources***

- Project construction, both directly and cumulatively, could cause a substantial adverse change in the significance of archaeological resources, but implementation of accidental discovery measures would reduce this impact to less than significant. (Impact CUL-1)
- Project construction, both directly and cumulatively, could cause a substantial adverse effect related to the disturbance of human remains, but implementation of accidental discovery measures would reduce this impact to less than significant. (Impact CUL-2)
- Project construction in combination with other recent and reasonably foreseeable future projects in the project area could result in cumulative adverse impacts on archaeological resources or human remains, but implementation of mitigation measures identified for construction impacts would reduce this impact to a less-than-significant level. (Impact C-CUL)

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[3] As discussed in Chapter 6, Other CEQA Issues, the ACRP, as a facility improvement project of the WSIP, would be contributing factor to the WSIP's growth inducement potential and associated significant and unavoidable indirect effects of growth, as presented in detail in the WSIP PEIR. Alternatives that would reduce or avoid indirect effects of growth were evaluated in the WSIP PEIR, as described in Section 7.2, above.

### *Air Quality*

- Project construction could result in impacts from fugitive dust emissions, but implementation of the BAAQMD's basic control measures would reduce this impact to less than significant. (Impact AQ-1)
- Construction of the proposed project could conflict with or obstruct implementation of the 2010 Clean Air Plan, however incorporation of the BAAQMD's basic control measures during project construction activities would be consistent with the control measures and strategies identified in the CAP, and reduce this impact to less than significant. (Impact AQ-3)
- Project construction-related fugitive dust emissions could result in a considerable contribution to cumulative impacts, but implementation of BAAQMD Basic Construction Measures would reduce this impact to less than significant. (Impact C-AQ)

### *Terrestrial Biological Resources*

- Project construction could result in impacts on special-status wildlife species, but implementation of general protection measures, worker training, preconstruction surveys, avoidance/minimization measures, and a vegetation restoration plan would reduce this impact to a less-than-significant level. (Impact BI-1)
- Project construction could have a substantial adverse effect on riparian habitat due to the proximity of riparian features to the construction site, but implementation of avoidance and protection measures for riparian habitats and wetlands would reduce this impact to a less-than-significant level. (Impact BI-2)
- Project construction could result in impacts on jurisdictional wetlands, but implementation of avoidance and protection measures would reduce this impact to a less-than-significant level. (Impact BI-3)
- Project operations could result in a reduction in quarry NPDES discharges to Alameda Creek, which in turn could result in a reduction in tree-supporting riparian vegetation alliances downstream of the project area, but implementation of monitoring and enhancement activities that encourage riparian tree recruitment would reduce this impact to a less-than significant level. (Impact BI-6)
- Project construction and operations could conflict with local policies or ordinances protecting biological resources, but implementation of mitigation measures identified for construction and operational impacts would reduce this impact to a less-than-significant level. (Impact BI-8)
- Construction and operational impacts on terrestrial biological resources in combination with recent and reasonably foreseeable future projects in the project area could result in cumulative adverse impacts, but implementation of mitigation measures identified for project construction and operational impacts would reduce this impact to a less-than-significant level. (Impact C-BI-1)

### *Geology, Soils, and Paleontological Resources*

- Project construction, both directly and cumulatively, could cause a substantial adverse effect by directly or indirectly destroying a unique paleontological resource or site, but implementation of accidental discovery measures would reduce these impacts to a less-than-significant level. (Impact GE-3 and Impact C-GE)

*Energy Resources*

- Project operations, both directly and cumulatively, could use large amounts of energy or use these resources in a wasteful manner, but implementation of energy efficiency measures would reduce these impacts to a less-than-significant level. (Impact ME-4 and Impact C-ME)

## 7.2.3 Alternatives Screening and Selection

In order to qualify as a project alternative under CEQA, an alternative would need to meet the criteria of: (1) avoiding or substantially lessening the significant adverse impacts of the project, (2) being reasonably feasible, and (3) meeting most of the basic objectives of the ACRP. The alternatives selection process for the proposed project was based on first identifying strategies that would avoid or lessen the significant and potentially significant impacts identified above, with particular focus on strategies that address significant impacts of the proposed project. In addition, potential alternatives, options, and strategies were identified from review of scoping comments received following issuance of the Notice of Preparation (see Chapter 2, Section 2.5, Notice of Preparation and Public Scoping, and Table 2-3, Summary of Scoping Comments). Mitigation measures identified for the proposed project were also considered in the context of the alternatives screening process as possible strategies to avoid or substantially lessen significant impacts. The alternative strategies were then screened for their feasibility and their ability to meet most of the project objectives. This process resulted in the selection of one final action alternative. Due to the substantial efforts made by SFPUC in considering a myriad of alternative strategies and options during development of the proposed project (see Section 7.5, below for further description), the action alternative that was carried forward for detailed evaluation, when coupled with the no project alternative, was determined to represent a reasonable range of alternatives that are described and analyzed in this EIR.

### 7.2.3.1 Strategies Identified during the Scoping Process

Only one alternative strategy was identified during the ACRP scoping process. Alameda County Water District (ACWD) submitted a letter during the public scoping period suggesting that the EIR consider an operational alternative to the proposed project that would involve coordination between the ACWD and SFPUC. ACWD stated that such an alternative could "achieve the goals of enhancing environmental conditions within the Alameda Creek watershed while minimizing impacts to water supply reliability for both of our agencies." As described below in Section 7.5, Alternatives Considered but Eliminated from Further Analysis, this alternative strategy was determined to be infeasible and would not meet any of the project objectives.

### 7.2.3.2 Identification of Strategies to Avoid or Lessen Significant Impacts

With two exceptions, all of the significant and potentially significant impacts identified for the proposed project are related to project construction activities, as summarized in Section 7.2.2. All of these construction impacts could be mitigated to less than significant with standard mitigation measures that have been or are being effectively implemented elsewhere in the Sunol Valley on other SFPUC projects.

Potential strategies to substantially lessen any of the identified construction impacts or to reduce/avoid the need for any of the identified mitigation measures would include: (1) alternative construction approach; and (2) alternative project location that would avoid the sensitive resources in the project area.

The two potentially significant operational impacts identified for the proposed project relate to downstream tree-supporting riparian vegetation alliances and operational energy use. Both of these impacts could be mitigated to less than significant with identified mitigation measures that the SFPUC has or will be implementing as part of other projects in the Sunol Valley, regardless of the ACRP. The mitigation measure for downstream riparian vegetation impacts is based on the SFPUC's Sunol Valley Restoration Report, currently in preparation, while the mitigation measure for energy use is the same as the WSIP PEIR mitigation measure that was required for the completed Sunol Valley Water Treatment Plant Expansion and Treated Water Reservoir project. Nevertheless, an off-site project location is discussed below as a possible approach alternative approach to avoiding or mitigating these impacts.

**Alternative Construction Approach.** The identified significant construction impacts are related to ground disturbance and general use of construction equipment, rather than to any specific construction method or technique. However, given the limited area of total ground disturbance during construction—approximately 13 acres, most of which is required for temporary construction staging—there are limited options, if any, for modifying the construction scenario that would substantially reduce the area of ground disturbance or construction equipment usage. Also, the identified mitigation measures have been demonstrated to be effective in reducing the severity of the impacts to a less-than-significant level. Therefore, no alternative construction approaches in the project area have been identified that warrant further analysis in this EIR.

**Off-site Alternatives within the Alameda Creek Watershed.** Relocating the project to another site could potentially avoid construction impacts on the nearby uses and the sensitive cultural, biological, and paleontological resources at the project site, depending on the location of the alternative site. Similarly, an off-site alternative could also potentially avoid the operational impact on terrestrial biological resources or on energy resources. However, the primary goal of the ACRP is to recapture water that the SFPUC will release from Calaveras Reservoir and bypass around the ACDD when the SFPUC implements the instream flow schedules during future operation of Calaveras Reservoir. Therefore, the only options for an alternative project location must be located on or near Alameda Creek downstream of the confluence of Alameda and Calaveras Creeks. The SFPUC has extensively examined numerous options for recapture facilities along Alameda Creek, and as further described below in Section 7.5, Alternatives Considered but Eliminated from Further Analysis, all of these options were determined to be either infeasible or to result in greater environmental impacts than the proposed project. Therefore, no off-site alternative within the Alameda Creek watershed have been identified that warrant further analysis in this EIR.

**Off-site Alternative that Meets Other Project Objectives.** In order to fulfill the CEQA requirements for alternatives analysis, this EIR examines potential alternatives at other off-site locations that would meet the ACRP's second objective, which is to "minimize impacts on water supply during drought, system maintenance, and in the event of water supply problems or transmission disruptions in the Hetch Hetchy system." To achieve this objective, such an alternative would be required to offset the loss of water supply to the regional water system that would occur if the ACRP were not implemented. As described above in Section 7.1.2, the WSIP PEIR examined three water supply alternatives that were intended to achieve this objective: Aggressive Conservation/Water Recycling and Local Groundwater Alternative, Year-round Desalination at Oceanside Alternative, and Regional Desalination for Drought Alternative. The SFPUC is currently implementing conservation, water recycling, and local groundwater projects to the extent feasible as part of the WSIP, so that any additional water supply projects under the Aggressive Conservation/Water Recycling and Local Groundwater Alternative would have limited, if any, feasibility. The Year-round Desalination at Oceanside Alternative was determined to be marginally feasible, at best, due to the limited space available at this location (see WSIP PEIR, Chapter 9, for further discussion). The only remaining alternative is the Regional Desalination for Drought Alternative. Implementing this alternative instead of the ACRP would avoid all significant impacts identified in Chapter 5, including both construction and operational impacts. The San Francisco Planning Department has modified the Regional Desalination for Drought Alternative and selected it to carry forward for further analysis in this EIR as a potential alternative to the ACRP, and is described and analyzed below.

## 7.2.4 Alternatives Selected for Detailed Analysis

The following alternatives are analyzed in this chapter:

- Alternative A: No Project Alternative
- Alternative B: Regional Desalination Alternative

These two alternatives were determined to adequately represent the range of feasible alternatives required under CEQA for the proposed project. Alternative A is included, as required by CEQA Guidelines Section 15126.6(e), even though it would not meet the basic project objectives. Alternative B is a potentially feasible option that could meet the ACRP's second objective. **Table 7-1** summarizes and compares the characteristics of the proposed project with those of Alternatives A and B. Detailed descriptions of each alternative are presented in Section 7.3, below, along with an evaluation of their environmental impacts. **Table 7-2** summarizes the ability of the two alternatives to meet the project objectives.

## TABLE 7-1
## COMPARISON OF PROPOSED PROJECT AND ALTERNATIVES

| Characteristic | Proposed Project | Alternative A: No Project | Alternative B: Regional Desalination |
|---|---|---|---|
| **General** | | | |
| Source of Water / Yield | Historical transfers of Alameda Creek watershed waters to be recaptured from releases from Calaveras Reservoir and bypasses at ACDD per CDRP instream flow permit requirements | Loss of approximately 6.4 mgd of yield from the Alameda Creek watershed | Brackish water from Suisun Bay, at the western end of the San Francisco Bay Delta, assumed yield of 9 mgd in all year types; diversions may be limited in April, subject to Biological Opinions[4] |
| Location | Sunol Valley, Alameda County within the CCSF-owned Alameda Watershed | N/A | Eastern Contra Costa County, at Contra Costa Water District's Mallard Slough Pump Station or adjacent to the Bollman Treatment Plant in Concord, CA |
| **New Facilities** | | | |
| Facilities | Turbine pumps, barge floatation system; mooring system; electrical control building and transformer; various pipelines and associated appurtenances | No new facilities | 10–20 mgd desalination treatment facility and connections to the existing network of interconnections to participating agencies |
| Area of project footprint, acres | Approximately 13 acres | No new facilities | Approximately 5 acres |
| **Construction** | | | |
| Duration | 18 months, 2017 to 2019 | No construction required | Approximately 2–3 years |
| Schedule | Monday through Saturday, 7 a.m. to 7 p.m. | No construction required | To be determined |
| **Operations** | | | |
| Active Operation of Facilities | Recapture (pump water from Pit F2) from April to December | No new operations | Full operation in all year types, and banking excess production for dry year needs |
| Staff Requirements | Same as existing | Same as existing | To be determined, but would be greater staffing requirements than the proposed project |
| Maintenance | Periodic servicing and maintenance of facilities | No new maintenance | Periodic servicing and maintenance; cleaning of reverse osmosis membranes |

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[4] This would be the new source of supply, however, the water that would come to the SFPUC system would be a transfer from the East Bay Municipal Utility District (EBMUD).

## TABLE 7-1 (Continued)
## COMPARISON OF PROPOSED PROJECT AND ALTERNATIVES

| Characteristic | Proposed Project | Alternative A: No Project | Alternative B: Regional Desalination |
|---|---|---|---|
| **Permits and Approvals** | | | |
| | • USFWS Federal Endangered Species Act consultation<br>• CA Dept of Water Resources, written approval for construction access within the South Bay Aqueduct right-of-way<br>• State Water Resources Control Board, amendment to domestic water supply permit and possible new NPDES permit for discharge of water from Pit F2 to San Antonio Reservoir<br>• RWQCB Construction General Permit<br>• CDFW, Incidental Take Permit<br>• Bay Area Air Quality Management District, authority to construct | None | To be determined, but extensive permitting and approvals anticipated to be required from federal, state, and local agencies, but likely to include but not be limited to:<br>• U.S. Army Corps of Engineers, CWA 404 permit<br>• Regional Water Quality Control Board, CWA 401 permit<br>• CDFW Incidental Take Permit<br>• NMFS Biological Opinion<br>• USFWS Biological Opinion<br>• SWRCB Waste Discharge Requirements<br>• RWQCB approval of SWPPP<br>• Bay Area Air Quality Management District, authority to construct<br>• Water Rights – Point of Use Change/ Extension<br>• Agreement between participating agencies |

## TABLE 7-2
## SUMMARY OF ABILITY OF ALTERNATIVES TO MEET PROJECT OBJECTIVES

| | **Alternative A: No Project** | **Alternative B: Regional Desalination** |
|---|---|---|
| **Project Objective** | **Would the alternative meet this objective?** | |
| 1. Recapture the water that would have otherwise been stored in Calaveras Reservoir due to the release and bypass of flows from Calaveras Dam and the ACDD, respectively, to meet instream flow requirements, thereby maintaining the historical annual transfers from the Alameda Watershed system to the SFPUC regional water system. | No | No |
| 2. Minimize impacts on water supply during drought, system maintenance, and in the event of water supply problems or transmission disruptions in the Hetch Hetchy system. | No | Yes |
| 3. Maximize local watershed supplies. | No | No |
| 4. Maximize the use of existing SFPUC facilities and infrastructure. | Yes | Partial |
| 5. Provide sufficient flow to the SVWTP to meet its minimum operating requirements. | No | No |

# 7.3 Alternatives Analysis

Since the alternatives are conceptual, this evaluation is based on the best available information and reasonable assumptions about how each alternative would be implemented. For each alternative, this section presents the following:

- A description of the alternative, including the rationale for its selection and associated facility improvements and auxiliary components. Each description discusses feasibility issues as well as assumptions regarding the construction methods likely to be used.
- An evaluation of the alternative's ability to meet project goals and objectives.
- Analysis of the potential environmental impacts of each alternative compared to those of the proposed project.

## 7.3.1 Alternative A: No Project

### 7.3.1.1 Description

As required by CEQA Guidelines Section 15126.6(e), the No Project Alternative is evaluated to allow decision-makers to compare the environmental effects of approving the proposed project with the effects of not approving the project. The No Project Alternative represents what would reasonably be expected to occur in the foreseeable future if the project is not approved.

Thus, under the No Project Alternative, the ACRP would not be constructed. However, the Calaveras Dam Replacement Project (CDRP) is scheduled to be completed in 2019 and it includes the new replacement dam and modifications to the Alameda Creek Diversion Dam (ACDD). The new dam will include low-flow valves that will provide releases to Calaveras Creek below the dam, and the improved ACDD will include installation of fish screens and construction of a bypass tunnel and fish ladder.

Upon completion of the CDRP, the SFPUC will operate the new Calaveras Reservoir with its full historical operating capacity of 96,850 acre-feet (AF). After the reservoir is refilled, Calaveras Reservoir will be operated in accordance with established objectives by keeping the water elevation near the spillway crest at a nominal elevation of 756 feet. Furthermore, the SFPUC will provide releases from Calaveras Dam and minimum bypasses at the ACDD consistent with the instream flow and ramping schedules as agreed upon with the National Marine Fisheries Service and the California Department of Fish and Wildlife to address habitat needs for steelhead and other native aquatic species in Alameda Creek (see Chapter 5, Section 5.16, Hydrology and Water Quality, for a detailed description of the instream flow requirements).

Under the No Project Alternative, without the ACRP, the SFPUC would not recapture the flows released from Calaveras Reservoir and bypassed at the ACDD. Instead, the instream flow releases and bypasses would continue down Alameda Creek as surface or subsurface flows, with a portion of the flow entering the existing quarry pits as explained in Chapter 5, Section 5.16, Hydrology and Water Quality, the same as described under the "with-CDRP" conditions.

Commercial quarry operations would continue in the Sunol Valley, similar to existing conditions, including periodic discharges of excess water into Alameda Creek in accordance with the terms of their general discharge permit (SF Bay RWQCB Order No. R2-2008-0011, NPDES General Permit No. CAG982001) and lease terms. Pit F2 would continue to be used for water management as part of Hanson Aggregates operations under Surface Mining Permit 24 (SMP-24), with the land still under lease from the SFPUC. It is assumed that under the No Project Alternative, Hanson Aggregates would use Pit F2 as needed for their mining operations (such as water storage), although active gravel mining from this pit was completed in 2006.

In addition to full operation of the CDRP, this alternative assumes efforts to restore steelhead trout to the Alameda Creek watershed would continue through the ongoing work of the Alameda Creek Fisheries Workgroup. These include actions to remove impediments to fish migration and to construct facilities to facilitate fish migration, such as the Rubber Dam No. 1, BART Weir, and Related Fish Passage Improvements project, the PG&E Line 303 Alameda Creek Relocation project (this project would remove the concrete apron in Alameda Creek near Alameda Siphons), and SMP-30 Cutoff Wall and Creek Restoration project.

Under the No Project Alternative, without the implementation of the ACRP, the SFPUC would nevertheless continue to operate its regional system to maximize use of local watershed supplies for domestic and other municipal purposes. To make up the loss of yield from the Alameda watershed from the No Project Alternative, the SFPUC could be reasonably expected to pursue similar actions as those stated in the SFPUC's *2015 Water Supply Development Report*[5], which addressed loss of yield in the Peninsula watershed resulting from instream flow releases. Likely actions are participation in the Bay Area Regional Desalination Project and additional water transfers, although at this time, the SFPUC has not identified any particular water transfers that it might pursue.

### 7.3.1.2 Ability to Meet Project Objectives

The No Project Alternative would fail to meet all but one of the fundamental ACRP objectives. More importantly, the No Project Alternative would not meet the water supply objectives of the ACRP or the WSIP. Under the No Project Alternative, the SFPUC would continue to maintain and operate the regional water system in the Alameda watershed. Although the system would be operated differently than it would be under the proposed project, the SFPUC would presumably maximize the use of its existing facilities and infrastructure, thereby meeting the fourth project objective, even though there could be unused capacity in some of the facilities due to the reduced yield from the Alameda watershed.

As specified in the SFPUC's adopted Phased WSIP, the SFPUC decided to limit annual average deliveries from its watersheds to 265 million gallons per day (mgd) (about 297,000 acre-feet per year). Under the No Project Alternative, the SFPUC would have a reduced yield from the Alameda

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[5] Ritchie, Steven R., Assistant General Manager, Water, San Francisco Public Utilities Commission. *2015 Water Supply Development Report*. December 2, 2015.

Creek watershed of approximately 6.4 mgd compared to the estimated available deliveries from the Alameda Creek watershed assumed in the Phased WSIP analysis in the WSIP PEIR.

After approving the Phased WSIP, the SFPUC entered into a 2009 Water Supply Agreement with its wholesale customers under which the SFPUC reaffirmed its commitment (established in the previous 1984 Master Water Sales and Settlement Agreement) to make a "Supply Assurance" available to its wholesale customers (exclusive of San Jose and Santa Clara) of 184 mgd in perpetuity.[6] While the Supply Assurance creates an obligation to deliver 184 mgd to the wholesale customers, the obligation is not firm if water is not available due to drought, emergencies or scheduled maintenance activities. The SFPUC also imposed a delivery limit of an average annual of 265 mgd from the watersheds. The 265-mgd "Interim Supply Limitation" was anticipated to carry out the Phased WSIP through 2018, leaving an annual average of 81 mgd available from the SFPUC's regional water supply system for retail customers. The SFPUC also agreed to annually assess whether it needed to provide notice of interruption or reduction in supply of water to San Jose and Santa Clara, both of which have interruptible supply agreements with the SFPUC, in light of the Interim Supply Limitation of 265 mgd and projected demand of other wholesale customers.

As part of the 2009 Water Supply Agreement, the SFPUC annually prepares a Water Supply Development Report. The most recent report, dated December 2, 2015, estimated that total wholesale and retail demand on the SFPUC regional water system will be approximately 239.4 mgd through 2035, with approximately 163.8 mgd from wholesale demand (including San Jose and Santa Clara). The report explains that the SFPUC would be able to meet wholesale customer purchase requests for the foreseeable future. However, due to a projected loss of yield from the Peninsula watershed resulting from required instream flow releases from Lower Crystal Springs Dam into San Mateo Creek, the SFPUC would have a shortfall of 3.5 mgd in meeting the 184 mgd supply assurance for wholesale customers in the future. The SFPUC identified two options it might pursue to make up this shortfall: participation in the Bay Area Regional Desalination Project and additional water transfers (beyond a 2 mgd dry-year water transfer identified in the Phased WSIP Variant).

The No Project Alternative would result in an additional loss of yield of 6.4 mgd, which when combined with 3.5 mgd shortfall from the Peninsula watershed would result in a total loss of yield of 9.9 mgd for the SFPUC regional system when compared to the assumed available supply under the adopted Phased WSIP. The No Project Alternative would undermine the SFPUC's ability to exercise its water rights in the Alameda Creek watershed, and the associated loss of yield to the regional system would hinder the SFPUC's ability to reliably meet the water supply needs of its 2.6 million customers in San Francisco, San Mateo, Santa Clara, Alameda, and Tuolumne Counties. The No Project Alternative would fail all but one of the ACRP objectives and would: (1) <u>not</u> recapture the water that will be released from Calaveras Dam and bypassed at the ACDD, <u>nor</u> maintain the historical annual transfers from the Alameda Watershed system to the SFPUC regional water system; (2) <u>not</u> minimize impacts on water supply during drought, system

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[6] Water supply volumes expressed in million gallons daily (mgd) is an annual average daily volume.

maintenance, and in the event of water supply problems; (3) not maximize local watershed supplies; and (4) not provide a sufficient flow rate to the SVWTP to meet its minimum operating requirements.

Moreover, the No Project Alternative would jeopardize the SFPUC's ability to meet the following adopted WSIP program goal and system performance objectives:

- Water Supply — *Meet customer water needs in non-drought and drought periods*.
    - Meet dry-year delivery needs through 2018 while limiting rationing to a maximum 20 percent system-wide reduction in water service during extended droughts.

  (Although demand is currently less than anticipated when the SFPUC approved the WSIP water supply goals through 2018, SFPUC reservoirs in the Alameda Watershed are an important source of water supply in dry years because of their storage capacity. Loss of 6.4 mgd yield from the Alameda Watershed would affect the SFPUC's ability to guarantee it can meet customer demand with no more than 20 percent rationing in drought periods.)

- Delivery Reliability — *Increase delivery reliability and improve ability to maintain the system*.
    - Provide operational flexibility and system capacity to replenish local reservoirs as needed.
    - Meet the estimated average annual demand of up to 300 mgd under the conditions of one planned shutdown of a major facility for maintenance concurrent with one unplanned facility outage due to a natural disaster, emergency, or facility failure/upset.

### 7.3.1.3 Environmental Impacts

The No Project Alternative would avoid all of the impacts identified in Chapter 5 for the proposed project. Continued operation and maintenance of existing regional water system facilities in the Sunol Valley would have no impact compared to the existing condition. And similarly, continued operation of gravel mining operations, including those associated with Pit F2, would have no impacts.

However, as stated above, under the No Project Alternative, the SFPUC would be expected to pursue actions to make up for the loss of yield from the Alameda watershed. These actions could include participation in the Bay Area Desalination Project, which is described below as Alternative B, along with its potential environmental impacts. Other actions that the SFPUC might pursue are additional water transfers. The SFPUC has not yet identified any particular water transfer, so it is currently unknown what, if any, environmental impacts would occur with a water transfer project. However, it should be noted that other actions that the SFPUC would take to secure alternative water supplies could result in environmental impacts different from the ACRP and would affect a different watershed from the Alameda Creek watershed.

## 7.3.2 Alternative B: Regional Desalination

### 7.3.2.1 Description

This alternative consists of implementation of the Bay Area Regional Desalination Project (BARDP), a collaboration of five Bay Area water agencies to investigate a year-round regional water supply project using desalination and water transfers to serve the needs of over 5.6 million residents and businesses in the region.[7] The SFPUC, along with the Contra Costa Water District (CCWD), East Bay Municipal Utility District (EBMUD), Santa Clara Valley Water District, and Zone 7 Water Agency, have been working together on the BARDP for over a decade. These agencies have completed a number of feasibility studies, pilot testing, site-specific analyses, and reliability studies. With the studies completed to date, the agencies have determined that the BARDP is technically feasible. However, the schedule for the next steps in implementing the BARDP, including preliminary design, environmental review, and construction is still to be determined.[8]

Currently, the BARDP is envisioned to consist of construction of a 10 to 20 mgd desalination treatment facility with an intake located at CCWD's Mallard Slough Pump Station in eastern Contra Costa County, as shown in **Figure 7-1**. The desalination facility, which would be located at either the intake site or adjacent to CCWD’s Bollman Water Treatment Plant in Concord, California, using an existing pipeline, would turn brackish water into a reliable, drought-proof drinking water supply. It would rely on the available capacity of an extensive network of existing pipelines and interties that already connect the agencies, as well as existing wastewater outfalls and pump stations in the region. The desalination facility would operate in all year types and, if there is storage available at Los Vaqueros Reservoir, would bank the excess production for the agencies’ dry year needs. Brine discharged from the plant would be blended with effluent from one or more nearby wastewater treatment plants prior to discharge to Suisun Bay to stay within ambient water quality, mimicking the current water conditions as closely as possible.

Under the BARDP, other participating agencies would receive the desalinated water, but the SFPUC would not directly receive desalinated water. Instead, the SFPUC would receive an exchange of EBMUD system water through the SFPUC's existing Hayward Intertie facility (shown in Figure 7-1 as location D) for its share of desalinated water. For planning and costing purposes, it was assumed that the SFPUC's share of the regional water supply would be 9 mgd in all year types. The final share would be subject to negotiation with the other partners.

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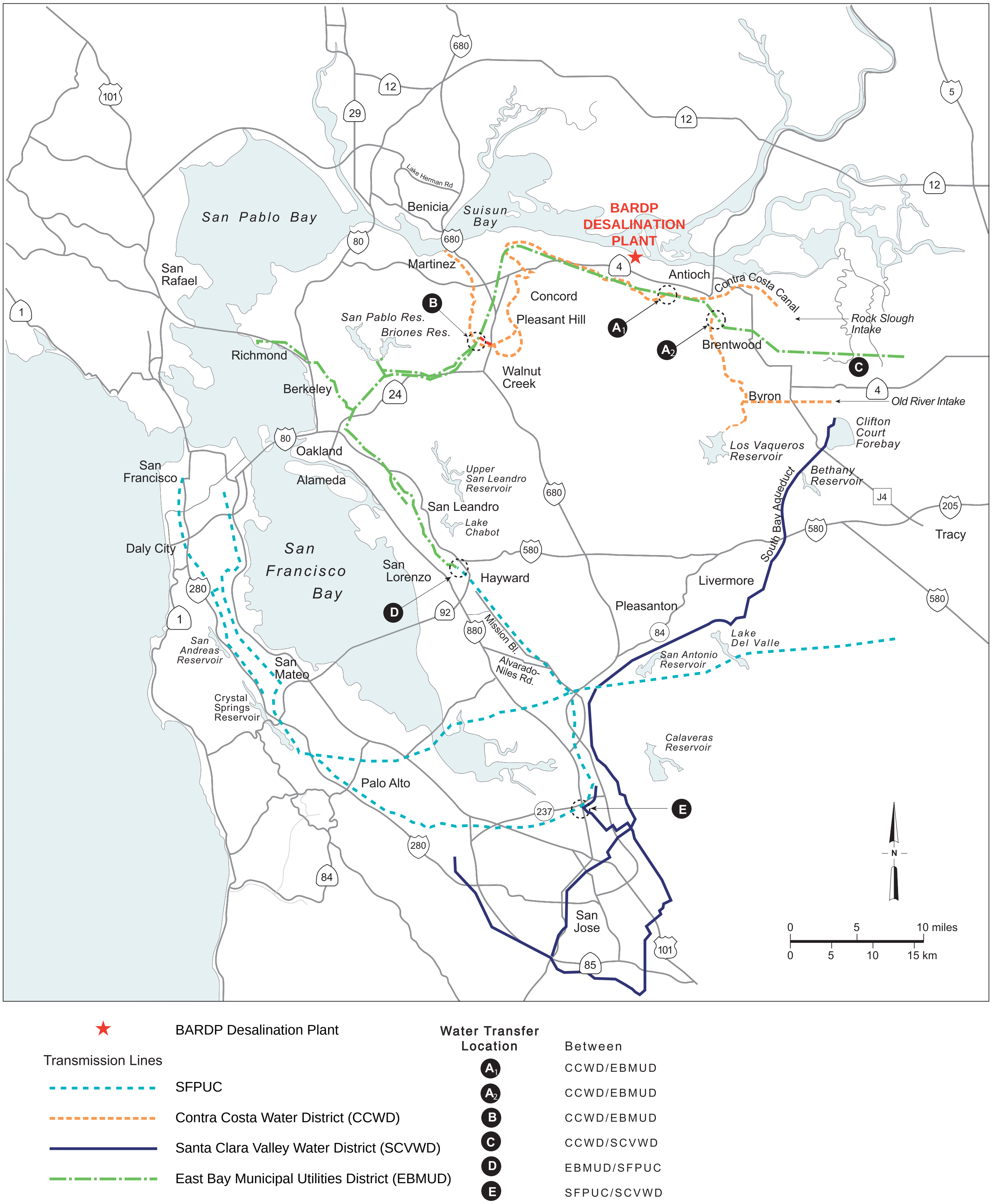
[7] The Regional Desalination for Drought Alternative analyzed in the WSIP PEIR was based on the BARDP as envisioned at that time, which was for a drought only supply. Currently, the BARDP is envisioned as a year-round supply for the SFPUC, which is the alternative analyzed here in the ACRP EIR.

[8] Bay Area Regional Desalination Project. Website accessed on April 8, 2016. http://www.regionaldesal.com/



SOURCE: URS, 2007. Bay Area Regional Desalination Project Feasibility Study, July 2007

SFPUC Alameda Creek Recapture Project

**Figure 7-1**

Alternative B – Bay Area Regional Desalination Project

### 7.3.2.2 Ability to Meet Project Objectives

The Regional Desalination Alternative would support the second ACRP objective of "minimiz[ing] impacts on water supply during system maintenance and in the event of drought, water supply problems, or transmission disruptions in the Hetch Hetchy system." The estimated yield of 9 mgd from the Regional Desalination Alternative would theoretically compensate for the loss of yield of 6.4 mgd from the Alameda watershed during both non-drought and drought periods if the ACRP were not to be implemented. Although the SFPUC's Alameda watershed facilities would be operated differently than it would be under the proposed project, the SFPUC would presumably maximize the use of its existing facilities and infrastructure in the Alameda watershed as well as use of the existing Hayward Intertie; however, there could be unused capacity in some of the facilities due to the reduced yield from the Alameda watershed. Thus, this alternative would partially meet the fourth project objective to maximize the use of existing SFPUC facilities and infrastructure.

This alternative would fail all the other ACRP objectives and would: (1) <u>not</u> recapture the water that will be released from Calaveras Dam and bypassed at the ACDD, nor maintain the historical annual transfers from the Alameda Watershed system to the SFPUC regional water system; (2) <u>not</u> maximize local watershed supplies; and (3) <u>not</u> provide a sufficient flow rate to the SVWTP to meet its minimum operating requirements.

### 7.3.2.3 Environmental Impacts

The WSIP PEIR analyzed the BARDP as an alternative to the WSIP that would reduce the overall increase in Tuolumne River diversions by roughly 7 mgd (from 27 mgd under the WSIP to 20 mgd with BARDP). Based on the conceptual planning studies available at that time, the WSIP PEIR provided a conceptual-level, generalized impact analysis of the BARDP in PEIR Volume 4, Chapter 8, which is incorporated into this EIR by reference. In summary, the PEIR identified potential impacts resulting from the construction of desalination facilities and appurtenances, including the following: temporary conflicts with established land uses during construction; temporary degradation of scenic resources; geologic and/or seismic hazards associated with facility siting; short-term impacts on water quality and the potential for short-term depletion of groundwater resources from construction dewatering; impacts on biological resources during construction and/or associated with facility siting; construction-related transportation impacts; increased air quality emissions and potential odors; construction-related noise; and potential impacts associated with encountering hazardous materials in soil and groundwater during construction.

In addition, the PEIR identified the following potential operational impacts: entrainment and/or impingement of special-status aquatic organisms in the intake pipeline; the discharge of potentially toxic substances from the outfall structure; potential impacts on wetlands, marshlands, and other sensitive habitats; substantial use of nonrenewable energy resources during operation; generation of greenhouse gases; permanent conflicts with existing land uses; permanent degradation of visual resources/scenic views; operational air quality emissions and odors; and permanent increases in noise and vibration.

Subsequent to the certification of the PEIR, the BARDP has under gone additional planning and development, and several site-specific studies[9] have been completed that addressed some key environmental concerns and concluded the following:

- Operation of a 20-mgd desalination plant at Mallard Slough would not have a significant impact on water quality or beneficial uses in the area under existing or forecast conditions (<0.25% change in salinity).
- Sensitive fish species are present in the vicinity of the Mallard Slough site in February through May, and mitigation for any potential impacts could be incorporated into the project design.
- Energy use and associated greenhouse gas emissions are less than other desalination projects because of brackish Bay (not ocean) source water. They would be even lower with BARDP except that pumping and treatment for delivery routes adds energy consumption. Use of existing facilities also lower the project's overall environmental footprint.

However, given that neither preliminary design nor CEQA environmental review of the BARDP has been completed, the above conclusions can only be considered preliminary indications of the potential impacts of the BARDP project. Detailed environmental review will be required prior to project approval to identify the project- and site-specific environmental impacts of this alternative. Nevertheless, based on the nature and magnitude of the BARDP relative to the ACRP, it is likely that both the construction and operations of the BARDP would result in more numerous and more severe environmental impacts than those of the ACRP, and the impacts would occur in the vicinity of the BARDP site in Contra Costa County rather than in the Alameda Creek watershed in Alameda County.

## 7.4 Alternatives Comparison and the Environmentally Superior Alternative

The CEQA Guidelines require the identification of an environmentally superior alternative to the proposed project (Section 15126.6[e]). If it is determined that the "no project" alternative would be the environmentally superior alternative, then the EIR shall also identify an environmentally superior alternative among the other project alternatives (Section 15126.6[3]).

**Table 7-3** compares the impacts associated with the CEQA alternatives to those of the proposed project. Alternative A, the No Project Alternative, would avoid all of the construction-and operational-related environmental impacts of the proposed project in the Sunol Valley, and because it would not involve any construction, it would result in no impacts in the Alameda Creek watershed under any resource area. However, this alternative would fail to meet the basic ACRP project objectives related to recapturing water that will be released or bypassed under the CDRP, maintaining historical annual yield from the Alameda Watershed system, and minimizing impacts

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[9] Bay Area Regional Desalination Project. Website accessed on April 8, 2016. http://www.regionaldesal.com/

## TABLE 7-3
## COMPARISON OF THE SIGNIFICANT ENVIRONMENTAL IMPACTS OF THE PROPOSED PROJECT VS. THE IMPACTS OF THE ALTERNATIVES

| Environmental Resource | Proposed Project | Alternative A: No Project | Alternative B: Regional Desalination[10] |
|---|---|---|---|
| ***Land Use*** | All impacts less than significant. | No impact. | Potentially significant impacts, if any, to be determined. |
| ***Population and Housing*** | Not applicable. | No impact. | Potentially significant impacts, if any, to be determined. |
| ***Cultural Resources*** | Impact CUL-1: The project could cause a substantial adverse change in the significance of an archaeological resource. Identified mitigation would reduce this impact to less than significant. (LSM) | No impact. | Potentially significant impacts, if any, to be determined. |
| | Impact CUL-2: The project could cause a substantial adverse change related to the disturbance of human remains. Identified mitigation would reduce this impact to less than significant. (LSM) | No impact. | Potentially significant impacts, if any, to be determined. |
| | Impact C-CUL: The project, in combination with past, present, and probable future projects, could substantially affect cultural(archaeological) resources, but identified mitigation would reduce this impact to less than significant. (LSM) | No impact. | Potentially significant impacts, if any, to be determined. |
| | No impact on historic resources. | No impact. | Potentially significant impacts, if any, to be determined. |
| ***Transportation and Circulation*** | All impacts less than significant. | No impact. | Potentially significant impacts, if any, to be determined. |
| ***Noise and Vibration*** | All impacts less than significant. | No impact. | Potentially significant impacts, if any, to be determined. |
| ***Air Quality*** | Impact AQ-1: Project construction could result in impacts from fugitive dust emissions, but implementation of the BAAQMD's basic control measures would reduce this impact to less than significant. (LSM) | No impact. | Potentially significant impacts, if any, to be determined. |
| | Impact AQ-3: Construction of the proposed project could conflict with or obstruct implementation of the 2010 Clean Air Plan, however implementation of the BAAQMD's basic control measures would reduce this impact to less than significant. (LSM) | No impact. | Potentially significant impacts, if any, to be determined. |

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[10] The Regional Desalination alternative could result in significant impacts that would not occur under the ACRP and are not listed in this table.

## TABLE 7-3 (Continued)
## COMPARISON OF THE ENVIRONMENTAL IMPACTS OF THE PROPOSED PROJECT VS. THE IMPACTS OF THE ALTERNATIVES

| Environmental Resource | Proposed Project | Alternative A: No Project | Alternative B: Regional Desalination |
|---|---|---|---|
| ***Air Quality (cont.)*** | Impact C-AQ: The project, in combination with past, present, and probable future projects, could substantially affect air quality (fugitive dust emissions), but implementation of identified measures would reduce this impact to less than significant. (LSM) | No impact. | Potentially significant impacts, if any, to be determined. |
| ***Greenhouse Gas Emissions*** | Impact is less than significant. | No impact. | Potentially significant impacts, if any, to be determined. |
| ***Recreation*** | All impacts less than significant. | No impact. | Potentially significant impacts, if any, to be determined. |
| ***Utilities and Service Systems*** | All impacts less than significant. | No impact. | Potentially significant impacts, if any, to be determined. |
| ***Public Services*** | All impacts less than significant. | No impact. | Potentially significant impacts, if any, to be determined. |
| ***Biological Resources*** | Impact BI-1: Project construction could result in impacts on special-status species, but implementation of identified measures would reduce this impact to less than significant. (LSM) | No impact. | Potentially significant impacts, if any, to be determined. |
| | Impact BI-2: Project construction could result in impacts on riparian habitats, but implementation of avoidance and protection measures would reduce this impact to less than significant. (LSM) | No impact. | Potentially significant impacts, if any, to be determined. |
| | Impact BI-3: Project construction could result in impacts on jurisdictional wetlands, but implementation of avoidance and protection measures would reduce this impact to less than significant. (LSM) | No impact. | Potentially significant impacts, if any, to be determined. |
| | Impact BI-6: Project operations could result in a reduction in quarry NPDES discharges to Alameda Creek, which in turn could result in a reduction in tree-supporting riparian vegetation alliances downstream of the project area, but implementation of identified mitigation measures would reduce this impact to a less-than significant level. (LSM) | | Potentially significant impacts, if any, to be determined. |
| | Impact BI-8: Project construction and operations could conflict with local policies or ordinances protecting biological resources, but implementation of mitigation measures identified for construction and operational impacts would reduce this impact to a less-than-significant level. (LSM) | No impact. | Potentially significant impacts, if any, to be determined. |

## TABLE 7-3 (Continued)
## COMPARISON OF THE ENVIRONMENTAL IMPACTS OF THE PROPOSED PROJECT VS. THE IMPACTS OF THE ALTERNATIVES

| Environmental Resource | Proposed Project | Alternative A: No Project | Alternative B: Regional Desalination |
|---|---|---|---|
| ***Biological Resources (cont.)*** | Impact C-BI-1: The project, in combination with past, present, and probable future projects, could substantially affect terrestrial biological resources, but implementation of mitigation measures identified for project construction and operational impacts would reduce this impact to a less-than-significant level. (LSM) | No impact | Potentially significant impacts, if any, to be determined. |
| ***Geology, Soils, and Paleontological Resources*** | Impact GE-3: Project construction could cause a substantial adverse effect by directly or indirectly destroying a unique paleontological resource or site, but implementation of identified measures would reduce this impact to less than significant. (LSM) | No impact. | Potentially significant impacts, if any, to be determined. |
| | Impact C-GE: The project, in combination with past, present, and probable future projects, could substantially affect paleontological resources, but implementation of the identified measure would reduce this impact to less than significant. (LSM) | No impact | Potentially significant impacts, if any, to be determined. |
| ***Hydrology and Water Quality*** | All impacts less than significant. | No impact. | Potentially significant impacts, if any, to be determined. |
| ***Hazards and Hazardous Materials*** | All impacts less than significant. | No impact. | Potentially significant impacts, if any, to be determined. |
| ***Mineral and Energy Resources*** | Impact ME-4: Project operations could encourage activities that use large amounts of energy or use these resources in a wasteful manner, but implementation of identified measures would reduce this impact to less than significant. (LSM). | No impact. | Potentially significant impacts, if any, to be determined. |
| | Impact C-ME: The project, in combination with past, present, and probable future projects, could substantially affect energy resources, but implementation of the identified measure would reduce this impact to less than significant. (LSM) | No impact. | Potentially significant impacts, if any, to be determined. |
| ***Agriculture and Forest Resources*** | All impacts less than significant. | No impact. | Potentially significant impacts, if any, to be determined. |

LSM = Less than Significant with Mitigation on customer water supply needs during drought or other periods. The No Project Alternative would jeopardize the SFPUC's ability to meet the adopted WSIP goals and objectives related to water supply and delivery reliability. The additional loss of yield under the No Project Alternative of 6.4 mgd would mean that the SFPUC regional system would have a combined loss of yield of 9.9 mgd (including the loss of yield from the Peninsula watershed) when compared to the assumed available supply with the adopted Phased WSIP. Even though the No Project Alternative in itself would have no direct environmental impacts and avoid all impact in the Alameda Creek watershed, other actions that the SFPUC might take under this scenario could result in environmental impacts at other locations, but it would be speculative to identify any such actions or any associated environmental impacts. Regardless, under CEQA, the No Project Alternative cannot be selected as the environmentally superior alternative.

Alternative B, the Regional Desalination Alternative, would also avoid all of the construction- and operational-related environmental impacts of the proposed project in the Sunol Valley. However, this alternative would involve a project of a much greater scale and magnitude than the ACRP with much broader objectives that would serve multiple Bay Area water agencies. The BARDP would have a longer construction duration and more extensive operational effort than that of the ACRP, with year-round operations compared to the April to December pumping operations of the ACRP. The BARDP would be at a different location and would likely result in numerous significant and potentially significant impacts at the BARDP project site and vicinity that are yet to be determined. While Table 7-3 compares the significant impacts of the ACRP with those of the Regional Desalination Alternative, the table does not list impacts that could be significant for the Regional Desalination Alternative but less than significant for the ACRP. Based on the magnitude of the year-round regional desalination project, at a conceptual level this alternative is likely to result in more numerous and more severe environmental impacts than the ACRP, including additional significant impacts that would not occur under the ACRP.

As described in Section 7.3.2.2 above, the Regional Desalination Alternative would meet the ACRP's objectives of minimizing impacts on water supply during drought, system maintenance, and in the event of water supply problems or transmission disruptions in the Hetch Hetchy system; and it would partially meet the objective of maximizing use of existing SFPUC facilities and infrastructure. However, this alternative would fail to meet the ACRP's basic objective of recapturing water released from Calaveras Reservoir and bypassed at the ACDD and maintaining the historical transfers from the Alameda watershed to the SFPUC regional system. Furthermore, the uncertainties associated with implementation of the BARDP and the unknown schedule, make this alternative less likely to satisfy the SFPUC's ability to meet the WSIP water supply and water reliability goals and objective.

The environmental analysis for the proposed project presented in this EIR determined that the ACRP would result in no project-level significant and unavoidable impacts, and that all identified impacts were either less than significant or could be mitigated to a less-than-significant level with implementation of identified mitigation measures. Therefore, compared to the No Project and Regional Desalination Alternatives, the proposed project is the environmentally superior alternative.

## 7.5 Alternatives Considered but Eliminated From Further Analysis

In developing the proposed ACRP, the SFPUC has identified and analyzed numerous alternative concepts, strategies, and locations over the past decade. One additional alternative concept was posed by ACWD during the scoping process. The San Francisco Planning Department reviewed the alternative concepts and locations as potential strategies for reducing or avoiding the significant adverse impacts identified for the proposed project. However, in all cases, alternative concepts or locations were determined to either be infeasible or to result in the same or more severe environmental impacts compared to those of the project. The process the SFPUC undertook to consider alternatives, the alternatives considered, and the reasons they have been rejected from further analysis are described below.

The SFPUC prepared several documents to scope and define potential alternatives to the ACRP project. The *Alameda Creek Fishery Enhancement Needs Assessment & Alternatives Analysis* (Alternatives Analysis Report)[11] ranked several impoundment alternatives based on a recapture goal of up to 20 cubic feet per second (cfs). After preparation of the 2004 Alternatives Analysis Report, the SFPUC published the WSIP PEIR and received numerous comments in response to the analysis presented in the WSIP PEIR about the potential for steelhead to be restored in the upper Alameda Creek watershed in the future. In response to comments received, in 2008 the SFPUC decided to reject any recapture options that would create barriers to steelhead migration. The SFPUC also directed staff to consider only those recapture options located downstream of the lowest critical riffle, which at that time was believed to be at the concrete apron at the PG&E Line 303 Alameda Creek Relocation project.[12,13]

### 7.5.1 Alameda Creek Fishery Enhancement Needs Assessment and Alternatives Analysis (2004)

The 2004 *Alameda Creek Fishery Enhancement Needs Assessment & Alternatives Analysis* evaluated three recapture technologies: (1) surface water impoundment (rubber dam or concrete weir) with diversion and transmission facilities; (2) subsurface recapture using groundwater extraction facilities (infiltration gallery or well field) and transmission facilities; and (3) a combination of surface water and subsurface water recapture using a surface water impoundment and groundwater extraction facilities. The recapture options were then screened based on constructability, hydrogeological feasibility, operational flexibility and maintainability issues, environmental impacts and issues, and estimated cost. The 2004 analysis recommended the construction of an inflatable dam in Alameda Creek downstream of SVWTP to create an impoundment from which the water could be recaptured. However, this alternative encountered

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[11] SFPUC, 2004. *Alameda Creek Fishery Enhancement Needs Assessment & Alternatives Analysis*

[12] SFPUC, 2008. Memorandum: Calaveras Dam Replacement Project and Alameda Creek Fishery Enhancement Descriptions. From Ed Harrington, SFPUC General Manager, to Diana Sokolove, SF Planning Department, Major Environmental Analysis. Dated July 16, 2008.

[13] Critical riffles can migrate along a stream channel due hydrologic and geomorphic changes (stream flow, instream water levels, and sediment transport and supply.

opposition from regulatory permitting agencies due to environmental concerns (specifically, the environmental impacts of construction on Alameda Creek) and was ultimately abandoned.[14]

### 7.5.2 Final Updated Alternatives Analysis Report (2009)

In 2009, the SFPUC issued the *Final Updated Alternatives Analysis Report for Alameda Creek Fishery Enhancement Project* (UAAR).[15] The UAAR was based on a 6,300 acre-feet per year target recapture goal with a maximum of recapture rate of 20 cfs. This target recapture goal was based on a 1997 Memorandum of Understanding (MOU) between the California Department of Fish and Game and SFPUC under which SFPUC agreed to release up to 6,300 acre-feet per year from Calaveras Reservoir for enhancement of fisheries and other natural resources of Calaveras and Alameda Creeks. The 2009 UAAR considered a wide range of recapture options at five different sites (see **Figure 7-2**):

- Site A is the area north of Interstate 680 (I-680) and south of the confluence of Alameda Creek and Arroyo de la Laguna.
- Site A/B, the Quarry Reach, is the area north of the Alameda Siphons and south of I-680.
- Site B is the area in the vicinity (south) of the Alameda Siphons.
- Site C is the area in the vicinity of the downstream end of the Sunol Valley Water Treatment Plant (SVWTP).
- Site B/C is the area between Sites B and C.

The July 2008 memorandum from the SFPUC General Manager issued a policy that eliminated Sites C, B/C, B, and portions of A/B from further consideration. The UAAR analysis was well underway when the July 2008 memo was issued; to address this policy in the 2008 memo, the UAAR recommended rejecting any alternative that was inconsistent with the policy in the 2008 memo. This resulted in the UAAR rejecting all options at sites C, B/C, and B, and certain options located a sites A/B, leaving only options at Sites A and some at site A/B for consideration based on other issues.

The UAAR identified eight groups of alternatives: infiltration galleries; shallow wells; horizontal drains; pumping from quarry pits; deep wells; extra-local sources (outside of the Sunol Valley); recirculation of surface water; and rehabilitation of the Sunol Filter Gallery. These groups were further developed into 34 specific alternatives that considered different methods of recapture, locations, facility configurations, and conveyance options for the recaptured water. The 34 specific alternative options were initially screened using a broad range of engineering, hydrogeologic, environmental, operational, financial, and construction criteria. The screening also considered the July 16, 2008 memorandum from the SFPUC General Manager that restricts the location of recapture to an area downstream of the lowest critical riffle location. The initial screening determined five groups of alternatives were not viable and should not be carried forward for additional evaluation in the UAAR. Four alternative options (Alternatives 1-1, 1-2, 4-1, and 4-2) were identified as superior to

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[14] SFPUC, 2004. *Alameda Creek Fishery Enhancement Needs Assessment and Alternatives Analysis*, Project Number CUW352. Dated April 8, 2004.

[15] URS. 2009. *Final Updated Alternatives Analysis Report, Alameda Creek Fishery Enhancement Project*. Prepared by URS Corporation. January 30, 2009.

the rest and carried forward for further evaluation. A summary of the alternative options and the UAAR initial screening results is presented in **Table 7-4**, below.

From the alternative options, the 2009 UAAR identified Alternative 4-1 (pumping from quarry pits) as the preferred engineering alternative based on the lower cost, reduced environmental impacts, and fewer permitting issues when compared to the other alternative options. However, based on the data that was available at that time, the hydrogeologic feasibility of Alternative 4-1 was uncertain, and therefore it was unknown how much water could be recaptured by this alternative. As a result, despite various environmental and permitting issues, Alternative 1-2 (in-stream filter gallery near San Antonio Creek confluence) was selected as the preferred alternative because there was greater confidence that it would be capable of achieving the target recapture volume. The 2009 preferred alternative—later named the Upper Alameda Creek Filter Gallery Project—is further described below.[16]

## 7.5.3 Upper Alameda Creek Filter Gallery Project

### 7.5.3.1 Description

Based on the findings in the Final UAAR, in 2009 the Upper Alameda Creek Filter Gallery project (Filter Gallery project) was the preferred project until 2013. The Filter Gallery project as designed would collect up to 7,500 acre-feet per year of water from beneath the Alameda Creek bed for transmission into the SFPUC regional water system. The total volume of water collected over any given 12-month period would not exceed the total volume of water that the SFPUC will release from Calaveras Reservoir or bypass around the Alameda Creek Diversion Dam, pursuant to the instream flow schedules required as part of future operations of Calaveras Reservoir. The Filter Gallery project would include the construction and operation of a new filter gallery and associated facilities, and enhancements to the Alameda Creek channel near the San Antonio Creek confluence. The six major components of the Filter Gallery project were:

- A filter gallery (including two well screens, which are similar to perforated pipes) buried approximately 15 to 20 feet beneath the streambed of Alameda Creek;
- A wet well (a water holding basin);
- A pump station (i.e., the Alameda Creek Pump Station);
- A (potential) water treatment facility;
- A 1,250-foot-long transfer pipeline between the Alameda Creek Pump Station and an existing pipeline; and
- Post-construction restoration and enhancement of Alameda Creek within the project area.

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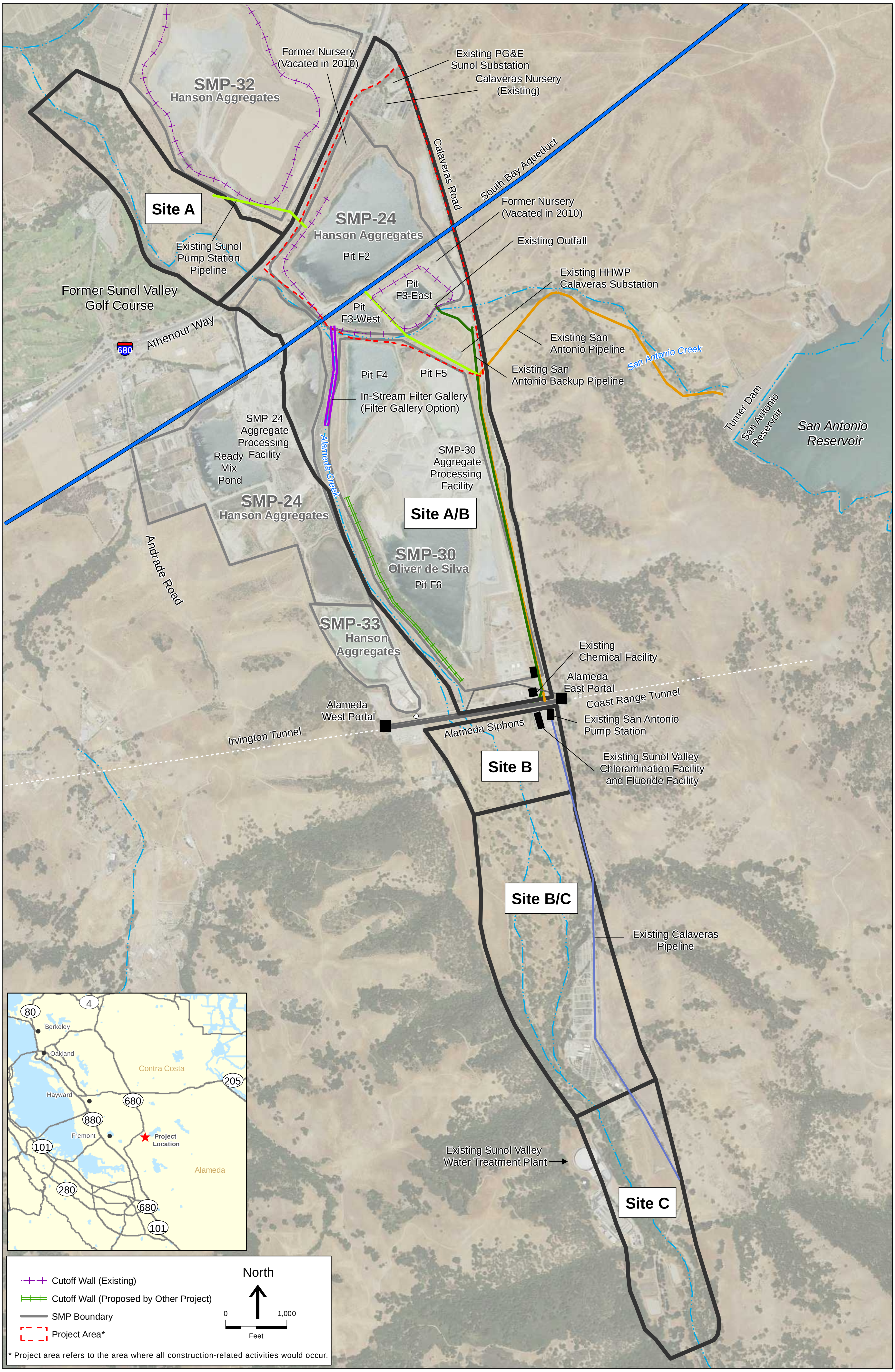
[16] URS. 2009. *Final Updated Alternatives Analysis Report, Alameda Creek Fishery Enhancement Project*. Prepared by URS Corporation. January 30, 2009.



SOURCE: ESA, 2016; Date of aerial photo is 2014.

SFPUC Alameda Creek Recapture Project

**Figure 7-2**
UAAR Alternatives Sites

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## TABLE 7-4
## ALTERNATIVE OPTIONS AND SCREENING RESULTS FROM 2009 FINAL UAAR

| ID | Name | Description | Screening Results |
|---|---|---|---|
| **Group 1: Infiltration Gallery** | | | |
| 1-1 | In-Stream Infiltration Gallery at Site A with Discharge to Sunol Pumps Station and Pumping to San Antonio Reservoir | Axial in-stream infiltration gallery on Alameda Creek north of Interstate 680 (I-680) and south of the confluence of Alameda Creek and Arroyo de la Laguna. This alternative includes two 1,800-foot-long, 24 inch-diameter, stainless steel pipes installed in a 1,800-foot-long, 5-foot-deep, 10-foot-wide trench within the Alameda Creek channel parallel to the creek centerline. This alternative would be capable of recapturing water at the same rate that it is released/bypassed, with a maximum recapture rate of 20 cubic feet per second (cfs). This alternative would also require the following capital improvements: a new 200-foot-long, 18-inch-diameter pipeline connection to the Sunol Pump Station; rehabilitation of the Sunol Pump Station; and a new 2,750-foot-long, 36-inch-diameter pipeline along the west side of Pit F2 to connect to the existing 36-inch-diameter Sunol Pipeline. | *Carried forward for further evaluation.* This alternative had the lowest-weighted ranking of the four alternatives when considering environmental issues and permitting.<br>This alternative was not identified as the preferred alternative due to greater environmental and permitting issues. |
| 1-2 | In-Stream Infiltration Gallery At Site A/B with Pumping to San Antonio Reservoir | Axial in-stream infiltration gallery on Alameda Creek north of the Hetch Hetchy Aqueduct and south of I-680. This alternative includes two 1,800-foot-long, 24 inch-diameter, stainless steel pipes installed in a 1,800-foot-long, 5-foot-deep, 10-foot-wide trench within the Alameda Creek channel parallel to the creek centerline. This alternative would be capable of recapturing water at the same rate that it is released/bypassed, with a maximum recapture rate of 20 cfs. This alternative would also require the following capital improvements: a new sump and pump station; and a new 2,750-foot-long, 36-inch-diameter pipeline along the west side of Pit F2 to connect to the existing 36-inch-diameter Sunol Pipeline. | *Carried forward for further evaluation.* This alternative had the second lowest-weighted ranking of the four alternatives when considering environmental issues and permitting. |
| 1-3 | In-Stream Infiltration Gallery At Site B/C with Discharge to San Antonio Pump Station and Pumping to San Antonio Reservoir | Axial in-stream infiltration gallery on Alameda Creek between the area in the vicinity (south) of the Hetch Hetchy Aqueduct Crossing and the area in the vicinity of the downstream end of the SVWTP. This alternative includes pipes installed within the Alameda Creek channel directly under the creek centerline with discharge to San Antonio Pump Station and pumping to San Antonio Reservoir. | *Eliminated from further evaluation.* Alternatives 1-3 and 1-4 involve construction of recapture facilities at Site B/C, which is south of the PG&E gas pipeline. These axial in-stream configurations would meet the target recapture volume of up to 7,500 acre-feet per year (afy). However, pursuant to the SFPUC's General Manager's memorandum of July 16, 2008, these alternatives were eliminated from consideration because they would inhibit steelhead passage at the critical riffles reach of Alameda Creek. |
| 1-4 | In-Stream Infiltration Gallery At Site B/C with Direct Pumping to San Antonio Reservoir | Axial in-stream infiltration gallery on Alameda Creek between the area in the vicinity (south) of the Hetch Hetchy Aqueduct crossing and the area in the vicinity of the downstream end of the SVWTP. This alternative includes pipes installed within the Alameda Creek channel directly under the creek centerline with pumping to San Antonio Reservoir. | |

## TABLE 7-4 (Continued)
## ALTERNATIVE OPTIONS AND SCREENING RESULTS FROM 2009 FINAL UAAR

| ID | Name | Description | Screening Results |
|---|---|---|---|
| **Group 1: Infiltration Gallery (cont.)** | | | |
| 1-5 | In-Stream Infiltration Gallery At Site A with Discharge to Sunol Pump Station and Pumping to San Antonio Reservoir | Perpendicular in-stream infiltration gallery on Alameda Creek north of I-680 and south of the confluence of Alameda Creek and Arroyo de la Laguna. This alternative includes pipes installed within the Alameda Creek channel perpendicular to the axis of the creek with discharge to Sunol Pump Station and pumping to San Antonio Reservoir. | <u>*Eliminated from further evaluation.*</u> All alternatives involving a perpendicular in-stream and parallel near-stream infiltration gallery configuration (Alternatives 1-5 through 1-12) were eliminated from consideration because they would not meet the target recapture volume. |
| 1-6 | In-Stream Infiltration Gallery At Site A/B with Discharge to Pit F2 West and Pumping to San Antonio Reservoir | Perpendicular in-stream infiltration gallery on Alameda Creek north of the Hetch Hetchy Aqueduct and south of I-680. This alternative includes pipes installed within the Alameda Creek channel perpendicular to the axis of the creek with discharge to Pit F2 and pumping to San Antonio Reservoir. | |
| 1-7 | In-Stream Infiltration Gallery At Site B/C with Discharge to San Antonio Pump Station and Pumping to San Antonio Reservoir | Perpendicular in-stream infiltration gallery on Alameda Creek between the area in the vicinity (south) of the Hetch Hetchy Aqueduct Crossing and the area in the vicinity of the downstream end of the SVWTP. This alternative includes pipes installed within the Alameda Creek channel perpendicular to the axis of the creek with discharge to San Antonio Pump Station and pumping to San Antonio Reservoir. | |
| 1-8 | In-Stream Infiltration Gallery At Site B/C with Direct Pumping to San Antonio Reservoir | Perpendicular in-stream infiltration gallery on Alameda Creek between the area in the vicinity (south) of the Hetch Hetchy Aqueduct Crossing and the area in the vicinity of the downstream end of the SVWTP. This alternative includes pipes installed within the Alameda Creek channel perpendicular to the axis of the creek with direct pumping to San Antonio Reservoir. | |
| 1-9 | Near-Stream Infiltration Gallery At Site A with Discharge to Sunol Pump Station and Pumping to San Antonio Reservoir | Parallel near-stream (approximately 50 feet from stream centerline) infiltration gallery on Alameda Creek north of I-680 and south of the confluence of Alameda Creek and Arroyo de la Laguna. This alternative includes pipes installed within 50 feet of the Alameda Creek channel parallel to the axis of the creek with discharge to Sunol Pump Station and pumping to San Antonio Reservoir. | |
| 1-10 | Near-Stream Infiltration Gallery At Site A/B with Pumping to San Antonio Reservoir | Parallel near-stream (approximately 50 feet from stream centerline) infiltration gallery on Alameda Creek north of the Hetch Hetchy Aqueduct and south of I-680. This alternative includes pipes installed within 50 feet of the Alameda Creek channel parallel to the axis of the creek with pumping to San Antonio Reservoir. | |

### TABLE 7-4 (Continued)
### ALTERNATIVE OPTIONS AND SCREENING RESULTS FROM 2009 FINAL UAAR

| ID | Name | Description | Screening Results |
|---|---|---|---|
| **Group 1: Infiltration Gallery (cont.)** | | | |
| 1-11 | Near-Stream Infiltration Gallery At Site B/C with Discharge to San Antonio Pump Station and Pumping to San Antonio Reservoir | Parallel near-stream (approximately 50 feet from stream centerline) infiltration gallery on Alameda Creek between the area in the vicinity (south) of the Hetch Hetchy Aqueduct Crossing and the area in the vicinity of the downstream end of the SVWTP. This alternative includes pipes installed within 50 feet of the Alameda Creek channel parallel to the axis of the creek with discharge to San Antonio Pump Station and pumping to San Antonio Reservoir. | |
| 1-12 | Near-Stream Infiltration Gallery At Site B/C with Direct Pumping to San Antonio Reservoir | Parallel near-stream (approximately 50 feet from stream centerline) infiltration gallery on Alameda Creek between the area in the vicinity (south) of the Hetch Hetchy Aqueduct Crossing and the area in the vicinity of the downstream end of the SVWTP. This alternative includes pipes installed within 50 feet of the Alameda Creek channel parallel to the axis of the creek with direct pumping to San Antonio Reservoir. | |
| **Group 2: Shallow Wells** | | | |
| 2-1 | Shallow Wells at Site A, with Discharge to Sunol Pump Station and Pumping to San Antonio Reservoir, without Cutoff Walls | Well field consisting of vertical wells pumping groundwater from the shallow alluvium along Alameda Creek north of I-680 and south of the confluence of Alameda Creek and Arroyo de la Laguna. This alternative would consist of installation of approximately 108 shallow wells and piping with discharge to Sunol Pump Station and pumping to San Antonio Reservoir. | *<u>Eliminated from further evaluation.</u>* A variety of well field alternatives at Sites A, B and C were evaluated. The large number of required wells needed to make a significant contribution to the water recapture goals of the project were not considered feasible from the perspectives of initial costs, operational costs, and maintenance costs.<br>Based on the above summarized results, Group 2 alternatives were eliminated from consideration. |
| 2-2 | Shallow Wells at Site A, with Discharge to Sunol Pump Station and Pumping to San Antonio Reservoir, with Cutoff Walls | Well field consisting of vertical wells pumping groundwater from the shallow alluvium along Alameda Creek north of I-680 and south of the confluence of Alameda Creek and Arroyo de la Laguna. This alternative would consist of installation of approximately 108 shallow wells, a perpendicular cutoff wall, and piping with discharge to Sunol Pump Station and pumping to San Antonio Reservoir. | |
| 2-3 | Shallow Wells at Site B, with Discharge to San Antonio Pump Station and Pumping to San Antonio Reservoir, without Cutoff Walls | Well field consisting of vertical wells pumping groundwater from the shallow alluvium along Alameda Creek in the vicinity (south) of the Hetch Hetchy Aqueduct Crossing. This alternative would consist of installation of 70 to 100 shallow wells and piping with discharge to Sunol Pump Station and pumping to San Antonio Reservoir. | |
| 2-4 | Shallow Wells at Site B, with Discharge to San Antonio Pump Station and Pumping to San Antonio Reservoir, with Cutoff Walls | Well field consisting of vertical wells pumping groundwater from the shallow alluvium along Alameda Creek in the vicinity (south) of the Hetch Hetchy Aqueduct Crossing. This alternative would consist of installation of 70 to 100 shallow wells, a perpendicular cutoff wall, and piping with discharge to San Antonio Pump Station and pumping to San Antonio Reservoir. | |

## TABLE 7-4 (Continued)
## ALTERNATIVE OPTIONS AND SCREENING RESULTS FROM 2009 FINAL UAAR

| ID | Name | Description | Screening Results |
|---|---|---|---|
| **Group 2: Shallow Wells (cont.)** | | | |
| 2-5 | Shallow Wells at Site C, with Discharge to San Antonio Pump Station and Pumping to San Antonio Reservoir, without Cutoff Walls | Well field consisting of vertical wells pumping groundwater from the shallow alluvium along Alameda Creek in the vicinity of the downstream end of the SVWTP. This alternative would consist of installation of 70 to 100 shallow wells and piping with discharge to San Antonio Pump Station and pumping to San Antonio Reservoir. | |
| 2-6 | Shallow Wells at Site C, with Discharge to San Antonio Pump Station and Pumping to San Antonio Reservoir, with Cutoff Walls | Well field consisting of vertical wells pumping groundwater from the shallow alluvium along Alameda Creek in the vicinity of the downstream end of the SVWTP. This alternative would consist of installation of 70 to 100 shallow wells, a perpendicular cutoff wall, and piping with discharge to San Antonio Pump Station and pumping to San Antonio Reservoir. | |
| **Group 3: Horizontal Drains** | | | |
| 3-1 | Horizontal Drains At Site A with Discharge to Sunol Pump Station and Pumping to San Antonio Reservoir without Cutoff Walls | Near stream parallel horizontal drains installed between the alluvium and the Livermore Gravels approximately 25 feet deep and 20 to 30 feet from the centerline of Alameda Creek north of I-680 and south of the confluence of Alameda Creek and Arroyo de la Laguna. This alternative would consist of the horizontal drains flowing to individual sumps connected by pipeline to a new single pump station with discharge to Sunol Pump Station and pumping to San Antonio Reservoir. | *Eliminated from further evaluation.* The capabilities of horizontal drains at Site A to meet the recapture goals of the project (7,500 afy at the time) were evaluated. It was determined that horizontal drains, which are deep, are not feasible for the recapture volumes and Alternatives 3-1 and 3-2 were eliminated from consideration. |
| 3-2 | Horizontal Drains At Site A with Discharge to Sunol Pump Station and Pumping to San Antonio Reservoir with Cutoff Walls | Near stream parallel horizontal drains installed between the alluvium and the Livermore Gravels approximately 25 feet deep and 20 to 30 feet from the centerline of Alameda Creek north of I-680 and south of the confluence of Alameda Creek and Arroyo de la Laguna. This alternative would consist of a cutoff wall and the horizontal drains flowing to individual sumps connected by pipeline to a new single pump station with discharge to Sunol Pump Station and pumping to San Antonio Reservoir. | |
| 3-3 | Horizontal Drains At Site B/C with Discharge to San Antonio Pump Station and Pumping to San Antonio Reservoir without Cutoff Walls | Near stream parallel horizontal drains approximately 12,000 lineal feet installed between the alluvium and the Livermore Gravels approximately 25 feet deep and 20 to 30 feet from the centerline of Alameda between the area in the vicinity (south) of the Hetch Hetchy Aqueduct Crossing and the area in the vicinity of the downstream end of the SVWTP. This alternative would consist of the horizontal drains flowing to individual sumps connected by pipeline to a new single pump station with discharge to San Antonio Pump Station and pumping to San Antonio Reservoir. | *Eliminated from further evaluation.* The capabilities of horizontal drains at Site B/C were evaluated. The target recapture volume of 7,500 afy would require a horizontal drain of approximately 3 miles. A reduced recapture goal of 6,300 afy was assumed for the horizontal drain category.<br>Horizontal drains at Site B/C were determined to be marginally feasible but would not meet recapture goals. This fact, combined with the anticipated |

## TABLE 7-4 (Continued)
## ALTERNATIVE OPTIONS AND SCREENING RESULTS FROM 2009 FINAL UAAR

| ID | Name | Description | Screening Results |
|---|---|---|---|
| **Group 3: Horizontal Drains (cont.)** | | | |
| 3-3 cont. | | | environmental impacts during construction and operations, make this alternative group significantly less feasible than other alternative groups.<br>The SFPUC General Manager's memorandum of July 16, 2008 also eliminated any alternatives located within Site B/C from further consideration.<br>Based on the above summarized results, Alternatives 3-3 and 3-4 were eliminated from further consideration. |
| 3-4 | Horizontal Drains At Site B/C with Discharge to San Antonio Pump Station and Pumping to San Antonio Reservoir with Cutoff Walls | Near stream parallel horizontal drains approximately 12,000 lineal feet installed between the alluvium and the Livermore Gravels approximately 25 feet deep and 20 to 30 feet from the centerline of Alameda Creek between the area in the vicinity (south) of the Hetch Hetchy Aqueduct Crossing and the area in the vicinity of the downstream end of the SVWTP. This alternative would consist of a cutoff wall and the horizontal drains flowing to individual sumps connected by pipeline to a new single pump station with discharge to San Antonio Pump Station and pumping to San Antonio Reservoir. | |
| 3-5 | Horizontal Drains At Site A with Discharge to Sunol Pump Station and Pumping to San Antonio Reservoir without Cutoff Walls | Instream perpendicular horizontal drains installed between the alluvium and the Livermore Gravels approximately 25 feet deep in the centerline of Alameda Creek north of I-680 and south of the confluence of Alameda Creek and Arroyo de la Laguna. This alternative would consist of the horizontal drains flowing to individual sumps connected by pipeline to a new single pump station with discharge to Sunol Pump Station and pumping to San Antonio Reservoir | *Eliminated from further evaluation.* The capabilities of horizontal drains at Site A were evaluated to meet the recapture goals of the project (7,500 afy at the time). It was determined that horizontal drains, which are deep, were not feasible for the recapture volumes, and Alternatives 3-5 and 3-6 were eliminated from further consideration. |
| 3-6 | Horizontal Drains At Site A with Discharge to Sunol Pump Station and Pumping to San Antonio Reservoir with Cutoff Walls | Instream perpendicular horizontal drains installed between the alluvium and the Livermore Gravels approximately 25 feet deep in the centerline of Alameda Creek north of I-680 and south of the confluence of Alameda Creek and Arroyo de la Laguna. This alternative would consist of a cutoff wall and the horizontal drains flowing to individual sumps connected by pipeline to a new single pump station with discharge to Sunol Pump Station and pumping to San Antonio Reservoir. | |

**TABLE 7-4 (Continued)**
**ALTERNATIVE OPTIONS AND SCREENING RESULTS FROM 2009 FINAL UAAR**

| ID | Name | Description | Screening Results |
|---|---|---|---|
| **Group 3: Horizontal Drains (cont.)** | | | |
| 3-7 | Horizontal Drains At Site B/C with Discharge to San Antonio Pump Station and Pumping to San Antonio Reservoir without Cutoff Walls | Instream perpendicular horizontal drains, approximately 12,000 lineal feet, installed between the alluvium and the Livermore Gravels approximately 25 feet deep in the centerline of Alameda Creek between the area in the vicinity (south) of the Hetch Hetchy Aqueduct Crossing and the area in the vicinity of the downstream end of the SVWTP. This alternative would consist of the horizontal drains flowing to individual sumps connected by pipeline to a new single pump station with discharge to San Antonio Pump Station and pumping to San Antonio Reservoir. | <u>*Eliminated from further evaluation.*</u> The recapture goal of 7,500 afy would require a horizontal drain of approximately 3 miles. A reduced recapture goal of 6,300 afy was assumed for the horizontal drain category.<br>Horizontal drains were determined to be marginally feasible but would not meet recapture goals.<br>The SFPUC General Manager's memorandum of July 16, 2008 eliminated any alternatives located within Site B/C from consideration.<br>Based on the above summarized results, Alternatives 3-7 through 3-10 were eliminated from further consideration. |
| 3-8 | Horizontal Drains At Site B/C with Discharge to San Antonio Pump Station and Pumping to San Antonio Reservoir with Cutoff Walls | Instream perpendicular horizontal drains, approximately 12,000 lineal feet, installed between the alluvium and the Livermore Gravels approximately 25 feet deep in the centerline of Alameda Creek between the area in the vicinity (south) of the Hetch Hetchy Aqueduct Crossing and the area in the vicinity of the downstream end of the SVWTP. This alternative would consist of a cutoff wall and the horizontal drains flowing to individual sumps connected by pipeline to a new single pump station with discharge to San Antonio Pump Station and pumping to San Antonio Reservoir. | |
| 3-9 | Horizontal Drains At Site B/C with Discharge to San Antonio Pump Station and Pumping to San Antonio Reservoir without Cutoff Walls | Instream axial horizontal drains, approximately 12,000 lineal feet, installed between the alluvium and the Livermore Gravels approximately 25 feet deep in the centerline of Alameda Creek between the area in the vicinity (south) of the Hetch Hetchy Aqueduct Crossing and the area in the vicinity of the downstream end of the SVWTP. This alternative would consist of the horizontal drains flowing to individual sumps connected by pipeline to a new single pump station with discharge to San Antonio Pump Station and pumping to San Antonio Reservoir. | |
| 3-10 | Horizontal Drains At Site B/C with Discharge to San Antonio Pump Station and Pumping to San Antonio Reservoir with Cutoff Walls | Instream axial horizontal drains, approximately 12,000 lineal feet, installed between the alluvium and the Livermore Gravels approximately 25 feet deep in the centerline of Alameda Creek between the area in the vicinity (south) of the Hetch Hetchy Aqueduct Crossing and the area in the vicinity of the downstream end of the SVWTP. This alternative would consist of a cutoff wall and the horizontal drains flowing to individual sumps connected by pipeline to a new single pump station with discharge to San Antonio Pump Station and pumping to San Antonio Reservoir. | |

### TABLE 7-4 (Continued)
### ALTERNATIVE OPTIONS AND SCREENING RESULTS FROM 2009 FINAL UAAR

| ID | Name | Description | Screening Results |
|---|---|---|---|
| **Group 4: Pumping from Quarry Pits** | | | |
| 4-1 | Pumping from Quarry Pits Located at Site A/B with Discharge to San Antonio Reservoir | New pump station adjacent to Pit F2 with suction lines to the pond near Alameda Creek north of the Hetch Hetchy Aqueduct and south of I-680. This alternative would consist of a new pump station, new suction lines, new 36-inch pipeline, and improvements at the quarry ponds to accommodate the new pump station. The recaptured water would be discharged to San Antonio Reservoir. | *Carried forward for further evaluation.* This alternative had the highest-weighted ranking, which is partially due to the few environmental and permitting issues associated with this alternative. |
| 4-2 | Pumping from Quarry Pits Located at Site A/B with Discharge through Sunol Filter Gallery to Sunol Pump Station and Pumping to San Antonio Reservoir | New pump station adjacent to Pit F2 with suction lines to the pond near Alameda Creek north of the Hetch Hetchy Aqueduct and south of I-680. This alternative would consist of a new pump station, new suction lines, new 36-inch pipeline, new 18-inch pipeline, rehabilitation of the Sunol Filter Gallery, renovation of Sunol Pump Station, and improvements at the quarry ponds to accommodate the new pump station. The recaptured water would be discharged through Sunol Filter Gallery and pumped to San Antonio Reservoir. | *Carried forward for further evaluation.* This alternative was not identified as the preferred alternative due to costs associated with rehabilitation of the Sunol Filter Gallery and the amount of new piping. This alternative would also have greater effects on the environment due to the rehabilitation of the Sunol Filter Gallery. |
| **Group 5: Deep Wells** | | | |
| 5 | Deep Wells | This alternative consists of deep wells in the Livermore Gravels with the upper 20 to 30 feet screened in the alluvium and the remaining length screened in the Livermore Gravels, in the area upstream of Site A (bounded by I-680) and downstream of the PG&E pipeline. | *Eliminated from further evaluation.* During the screening process it was determined that wells in the Livermore Gravel would most likely have low yields as the deeper Livermore Gravels are not capable of supporting pumping at the rates necessary for the project. Therefore, the deep wells at Site A were determined to be infeasible, and this alternative was eliminated from further consideration. |
| **Group 6: Extra Local Sources** | | | |
| 6 | Extra Local Sources | This alternative considered recovering water from local sources such as Welch Creek watershed, San Antonio Creek watershed, or the Arroyo de la Laguna watershed. All three creeks are tributaries to Alameda Creek. | *Eliminated from further evaluation.* Welch Creek and San Antonio Creek are ephemeral and the creek beds are usually dry or contain negligible flow during the dry season (June – December), and therefore would not provide a reliable source of water.<br>It was determined that Arroyo de la Laguna is not a viable source of water because much of the water in Arroyo de la Laguna is Delta water belonging to ACWD and not available due to exiting water rights. Arroyo de la Laguna was also eliminated as a source of water due to water quality issues.<br>Due to the reason summarized above, this alternative was eliminated from further consideration. |

## TABLE 7-4 (Continued)
## ALTERNATIVE OPTIONS AND SCREENING RESULTS FROM 2009 FINAL UAAR

| ID | Name | Description | Screening Results |
|---|---|---|---|
| **Group 7: Recirculation of Surface Water** | | | |
| 7 | Recirculation of Surface Water | This alternative considered recovering water from Alameda Creek below the critical riffles and diverting it to Calaveras Creek immediately downstream of Calaveras reservoir. This alternative includes construction of a diversion or retention facility, most likely a rubber dam in Alameda Creek, downstream of the SVWTP. | *Eliminated from further evaluation.* This alternative was determined to be infeasible because the recirculation may not be compatible with the bypass and release permit conditions for CDRP. While recirculation is not specifically precluded, it was clear at the time that the permit conditions anticipate water being released from Calaveras reservoir or bypassed around ACDD.<br>This alternative was eliminated from consideration because it would require construction of a diversion or impoundment within Alameda Creek channel.<br>The SFPUC General Manager's memorandum of July 16, 2008 also eliminated any alternatives located upstream of the critical riffles from consideration.<br>Due to the reason summarized above, this alternative was eliminated from further consideration. |
| **Group 8: Rehabilitation of Sunol Filter Gallery** | | | |
| 8 | Rehabilitation of the Sunol Filter Gallery | This alternative considered rehabilitation of the Sunol Filter Gallery to recover bypassed/released water. | *Eliminated from further evaluation.* During the screening analysis, it was concluded that the existing Sunol Filter Gallery does not intercept a significant cross section of the saturated aquifer even under peak flow conditions. The historical operation of Sunol Filter Gallery relied on surface water diversion from Alameda Creek into the downstream basins to capture peak seasonal flows using temporary earthen diversion dams constructed in the creek. Due to opposition from the public and regulatory agencies to surface water diversions, these diversions are not considered feasible now or in the future. Therefore, rehabilitation of the existing Sunol Filter Gallery was not considered a feasible alternative and was eliminated from further consideration. |

SOURCE: URS. 2009. Final Updated Alternatives Analysis Report, Alameda Creek Fishery Enhancement Project. Prepared by URS Corporation. January 30, 2009.

The filter gallery would be comprised of two approximately 1,400-foot-long, 36-inch-diameter stainless steel well-screen pipes (similar to perforated pipes) buried beneath the Alameda Creek bed, starting approximately 1,000 feet north of the concrete apron at the PG&E gas pipeline crossing and extending north to the confluence of Alameda and San Antonio Creeks. Approximately 100 feet of solid welded steel pipe would connect the filter gallery to the wet well. To take advantage of the permeable alluvium[17] underlying the streambed, the pipes would be located approximately 15 to 20 feet below the ground surface at the contact between the permeable upper alluvium and less-permeable Livermore Gravel deposits. The filter pipes would be installed in trenches backfilled with an engineered filter pack,[18] which would protect against the migration of fine-grained alluvial sediments into the pipes. The native alluvium would be placed on top of the filter pack to form the streambed above the filter gallery. Water that is collected by the filter gallery would flow by gravity into the proposed wet well. A slide gate at the end of each filter pipe would allow SFPUC facility operators to isolate (close-off) either filter pipe and prevent water from passively entering the wet well in the event the filter gallery is nonoperational due to a power failure or other unanticipated conditions.

The filter gallery would collect water from beneath the Alameda Creek bed. Surface water in the Alameda Creek channel above the streambed would percolate downward through the upper alluvium and the filter pack and into the filter pipes. Depending on precipitation, stream baseflow conditions, and the flow from the CDRP instream flow schedules, at times there would be no surface water present in Alameda Creek at the location of the filter gallery. In months when surface flow is not present in the creek channel, the filter gallery would collect subsurface flow occurring in the upper alluvium. Because the upper alluvium is highly responsive to stream flow and the underlying Livermore Gravel deposits are relatively impervious and considered non-water-bearing, subsurface flow in the upper alluvium is essentially surface water that flows beneath the streambed.

A new pump station—the Alameda Creek Pump Station—would be located northeast of the confluence of Alameda and San Antonio Creeks, above the wet well, adjacent to and north of an existing access road. The pump station would be used to pump water from the wet well to either San Antonio Reservoir or the SVWTP through the transfer pipeline and other existing pipelines.

Construction of the filter gallery components would involve a temporary but substantial excavation within and adjacent to the Alameda Creek channel. The creek restoration and enhancement component would involve restoring and enhancing habitat along Alameda Creek. This component would likely include the following elements: a low-flow channel to concentrate surface water flow and provide increased flow depth to facilitate fish passage; an enhanced riparian corridor; and topographic controls to support the migration of steelhead.

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[17] Alluvium refers to loose sediments (including sands, silts, clays, or gravels) deposited by flowing streams and rivers along a valley.

[18] Filter pack is graded granular material (usually coarse sand or fine gravel) that is placed between the filter pipes and the streambed to prevent fine-grained particles from entering and clogging the filter pipes.

### 7.5.3.2 Reasons for Rejection

In spring 2013, SFPUC abandoned the Filter Gallery project due to the extensive construction that would be required in the Alameda Creek channel, the anticipated impacts on surface flow in Alameda Creek and on fish passage and aquatic habitat in the Sunol Valley and Niles Canyon, and the associated regulatory permit requirements, which would have been challenging and could have ultimately deemed this option infeasible. The SFPUC re-scoped the project to recapture water that infiltrates into Pit F2 and eliminate all construction in the Alameda Creek channel. The revised project—referred to as the Alameda Creek Recapture Project, and the subject of this EIR— was determined to substantially reduce and, in some cases, avoid, the impacts of the Filter Gallery option. In addition to avoiding construction impacts in the Alameda Creek channel, by recapturing water that passively infiltrates into Pit F2, the ACRP would also avoid direct and immediate effects on surface flow in Alameda Creek during ACRP operations. Because the Filter Gallery project would result in substantially greater and more severe environmental impacts than the ACRP, particularly with respect to biological resources, this project was not considered for further evaluation in this EIR as an alternative to the ACRP.

## 7.5.4 ACWD Alternative

### 7.5.4.1 Description

The Alameda County Water District (ACWD) submitted a letter during the public scoping period for the ACRP EIR requesting that the ACRP EIR consider an operational alternative to the proposed project that would involve coordination between the ACWD and SFPUC. ACWD stated that such an alternative could "achieve the goals of enhancing environmental conditions within the Alameda Creek watershed while minimizing impacts to water supply reliability for both of our agencies." Both agencies have existing infrastructure in the area and rely on natural runoff from the Alameda Creek watershed as one of their water supply sources. In addition, the ACWD is a wholesale customer of the SFPUC and purchases drinking water from the SFPUC regional water supply system.

As described in Chapter 5, Section 5.16, ACWD diverts water from Alameda Creek at two inflatable rubber dams near the downstream end of Niles Canyon about four miles downstream of the proposed ACRP; water can be diverted from October 1 to May 31 of each year, with a maximum permissible diversion volume set by ACWD’s water rights. The ACWD alternative concept contemplates that instead of the SFPUC constructing the ACRP, the ACWD could increase its diversions from Alameda Creek at Niles with its existing infrastructure based on the assumption that there would be sufficient increased flows from the CDRP bypasses and releases. This increased diversion by ACWD would then be offset by a commensurate decrease in ACWD's wholesale water supply purchase from the SFPUC. This concept is based on the assumption that the decrease in ACWD's wholesale water supply purchases would be sufficient to meet the ACRP objective of minimizing impacts on the SFPUC's water supply during drought, system maintenance, and in the event of water supply problems or transmission disruptions in the Hetch Hetchy system. This alternative would also avoid all significant impacts associated with constructing and operating the ACRP as identified in Chapter 5. This concept assumes that resolution of the institutional, contractual, and water rights considerations is potentially feasible, which would include modifications to ACWD water rights permits as well as contractual changes to the SFPUC's wholesale agreement with ACWD.

### 7.5.4.2 Reasons for Rejection

As described in Section 5.16.2.8, ACWD obtains its water from three sources: local supplies, the State Water Project, and the San Francisco regional water system. The primary source of the local supplies, which represent 40 percent of the district's total supply, is Alameda Creek. ACWD diverts water from Alameda Creek at two inflatable rubber dams near the downstream end of Niles Canyon. Diverted water is routed to lakes and ponds, where it percolates into and recharges the Niles Cone Groundwater Basin.

ACWD has identified the following operational constraints that control operations of its Alameda Creek diversions throughout the year:[19]

- ***Water Rights Permit***. Under ACWD's water rights permit, the period of permitted diversions from Alameda Creek is restricted to October 1 through May 31 of each year; ACWD is not permitted to divert water from Alameda Creek during the four-month period from June through September. The permit also defines the total annual volume of Alameda Creek water that can be diverted off-stream.

- ***Environmental Permits***. Currently, ACWD operates the rubber dams based on requirements outlined by the California Department of Fish and Wildlife, which are expected to be more detailed upon completion of the currently ongoing Section 7 consultation with the National Marine Fisheries Service.

- ***Rubber Dam Design Criteria***. The design of the rubber dams only allows for an *instantaneous* flow rate of 1,200 cfs to flow over the crest of the dams while they are inflated. When flows in Alameda Creek at the Niles gage crest above 1,200 cfs, ACWD deflates the dams until the peak of the hydrograph has passed, and flows recede to below 1,200 cfs. During periods of high flow (about 700 cfs) or before a flood event, ACWD generally deflates dams. The rubber dams are raised as soon as possible following a flood event.

- ***Debris Management***. ACWD typically encounters a large amount of debris that is deposited in the flood control channel after large storm events. Removal of this debris is critical to protect the integrity of the rubber dams, and may cause a delay in the re-inflation of the dams after a storm event.

- ***Water Quality***. Alameda Creek typically has a very large suspended sediment load associated with runoff events, and during typical years, ACWD operates to pre-determined water quality thresholds to determine whether or not to divert from Alameda Creek. This is done in order to keep recharge ponds from excessively silting up over time. ACWD also manages dissolved oxygen concentration in the rubber dam forebays during the late summer into early fall months, and depending on the dissolved oxygen levels, ACWD may be forced to deflate a dam or partially drain the forebay to manage algae growth.

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[19] Evan Buckland, Water Supply Supervisor and Hydrologist, Alameda County Water District. Email to Kelly White, ESA, dated February 22, 2016 regarding the SFPUC ACRP project.

- ***Niles Cone Groundwater Levels***. This is the major item that controls ACWD's recharge operations. ACWD manages groundwater elevation in the Niles Cone by manipulation of off stream diversions and rubber dam position.
- ***Maintenance***. ACWD is required to take certain components of the recharge facilities out of service from time to time to perform routine maintenance. This can include deflating a dam or having off-stream diversions inoperable for extended periods of time.

The feasibility of this alternative concept is dependent upon the above operating constraints, which limit the ACWD's ability to divert water from Alameda Creek, as well as the Alameda Creek streamflow conditions that would occur at the ACWD point of diversion if the ACRP is not constructed. Currently, ACWD diverts as much water as it can from Alameda Creek within the constraints of its water rights and the operational limitations as described above. When construction of CDRP is completed, CDRP operations will include restoring the historical capacity of Calaveras Reservoir as well implementing instream flow releases and bypasses, all of which will affect the Alameda Creek streamflow conditions at the ACWD point of diversion.

Alameda streamflow conditions at Niles were examined for the feasibility analysis for this alternative. As described in Appendix HYD1, Section 8, the ASDHM was used to estimate flows in Alameda Creek at Niles (Node 9) for four scenarios: pre-2001 conditions, existing conditions, with-CDRP conditions, and with-ACRP conditions. On average, for the eight-month period from October 1 through May 31 (the period during which ACWD is permitted to divert water from Alameda Creek), the ASDHM predicts that the average flow volume at the ACWD’s diversion point under with-CDRP conditions (94,575 acre-feet) would be less than under either pre-2001 (96,264 acre-feet) or existing conditions (100,005 acre-feet), even with the CDRP releases and bypasses. These results indicate that, on average, there will be less water available for ACWD to divert from Alameda Creek once CDRP is completed than there is under existing conditions. This is due to the restoration of the historical capacity of Calaveras Reservoir and implementation of the instream flow releases and bypasses in combination with the complex upstream conditions (e.g., losses to the subsurface, quarry operations, and NPDES discharges). Implementation of the CDRP will not increase the amount of water in Alameda Creek at ACWD’s diversion point, and therefore, on average, the ACWD would not be able to increase its diversions compared to existing or pre-2001 conditions. Thus, ACWD increasing its diversions to recapture the CDRP instream releases and bypasses at the ACWD diversion point would not be a reliable water supply source for ACWD that could substitute for wholesale purchases from the SFPUC.

Therefore, while it may be potentially feasible to resolve the institutional, contractual, and water rights considerations that would be required under this alternative concept, the physical constraints on streamflow conditions at Niles preclude the necessary flows to provide ACWD with an adequate water supply source. This would mean that ACWD would still need to purchase wholesale water from the SFPUC. Thus, based on the ASDHM results for predicted Alameda Creek streamflow at Niles, this alternative concept does not appear to be feasible. Furthermore, this alternative concept would not meet any of the ACRP objectives. It would not recapture water needed to maintain historical annual transfers from the Alameda Watershed system to the SFPUC regional water system; would not minimize impacts on water supply during system maintenance; would not maximize local watershed supplies; would not maximize use of existing SFPUC facilities and infrastructure; and would not provide a sufficient flow to the SVWTP. Therefore, because this alternative concept was determined to be infeasible and would not meet any of the ACRP objectives, it was eliminated from further consideration in this EIR.

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# CHAPTER 8

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# DRAFT ENVIRONMENTAL IMPACT REPORT

# SFPUC Alameda Creek Recapture Project

## Volume 2

PLANNING DEPARTMENT
CASE NO. 2015-004827ENV
STATE CLEARINGHOUSE NO. 2015062072

| | | |
|---|---|---|
| Screencheck Administrative Draft | Draft EIR Publication Date: | November 30, 2016 |
| | Draft EIR Public Hearing Date: | January 5, 2017 |
| | Draft EIR Public Comment Period: | November 30, 2016 through January 17, 2017 |

SAN FRANCISCO
PLANNING
DEPARTMENT

*Written comments should be sent to:*
Lisa Gibson, Acting Environmental Review Officer | 1650 Mission Street, Suite 400 |
San Francisco, CA 94103 or Lisa.Gibson@sfgov.org

# DRAFT ENVIRONMENTAL IMPACT REPORT

# SFPUC Alameda Creek Recapture Project

## Volume 2

PLANNING DEPARTMENT
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# VOLUME 2 – APPENDICES

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# APPENDIX NOP

## Scoping Report and Notice of Preparation

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San Francisco Public Utilities Commission

# Alameda Creek Recapture Project Environmental Impact Report

# Final Scoping Report

September 2015

Prepared for the San Francisco Planning Department

Prepared by ESA

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# 1.0 Introduction and Background

## 1.1 Introduction

The San Francisco Planning Department is the lead agency for implementation of California Environmental Quality Act (CEQA) requirements for all projects sponsored by the City and County of San Francisco (CCSF) or conducted within San Francisco. The San Francisco Planning Department is preparing an Environmental Impact Report (EIR) for the San Francisco Public Utilities Commission's (SFPUC's) proposed Alameda Creek Recapture Project (ACRP or proposed project). The EIR, which will assess the potential impacts of the project on the physical environment, is being prepared in accordance with CEQA. CEQA requires the preparation of an EIR when a proposed project could significantly affect the physical environment.

As part of the EIR process, the San Francisco Planning Department conducted a public scoping effort in June and July 2015, soliciting comments from interested parties, State and resource agencies, and the public to help determine the scope of the Draft EIR. This report describes the scoping process and summarizes the comments received during the scoping period.

## 1.2 Notice of Preparation

The San Francisco Planning Department published a Notice of Preparation (NOP) on June 24, 2015, announcing the preparation of the EIR for the project under CEQA (see **Appendix A**). The NOP summarized the project objectives and provided a description of the proposed project. The NOP also described the scoping process and included information on the public scoping meeting. The scoping process, notification procedures, and outcome of the scoping meeting are described below, following a brief description of the proposed project.

## 1.3 Alameda Creek Recapture Project

The SFPUC is proposing the ACRP on SFPUC Alameda watershed[1] lands in unincorporated Alameda County. The proposed project would recapture an annual average of up to 9,820 acre-feet per year (ac-ft/yr) (or 3,200 million gallons per year [mgal/yr]) of water that will be released from Calaveras Reservoir and/or bypassed around the Alameda Creek Diversion Dam during future operation of Calaveras Reservoir. Water would be recaptured from a quarry pit, Pit F2, in the Sunol Valley located approximately 6 miles downstream of Calaveras Reservoir and 0.5-mile south of the Interstate 680/State Route 84 interchange. The ACRP would recapture an amount of water equivalent to that which is released and/or bypassed. Proposed project components for recapture of the water from Pit F2 include pumps mounted on barges, pipelines extending from the pumps to shore; a new pipeline connecting to the existing Sunol Pump Station Pipeline; and ancillary facilities such as throttle valves, a flow meter, and electrical facilities. No work would occur in the bed, bank, or channel of Alameda Creek.

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[1] The SFPUC Alameda watershed refers to CCSF-owned lands managed by the SFPUC as part of the SFPUC regional water system. The Alameda watershed lands are located within the much larger hydrologic boundary of the Alameda Creek watershed.

The City and County of San Francisco (CCSF), through the SFPUC, owns and operates a regional water supply conveyance, treatment, and distribution system that extends from the Sierra Nevada to San Francisco and serves drinking water to 2.6 million people in San Francisco, San Mateo, Santa Clara, Alameda, and Tuolumne Counties. The proposed ACRP is a component of the SFPUC's Water System Improvement Program (WSIP)[2]. The basic goals of the WSIP are to increase the reliability of the regional water system with respect to water quality, seismic response, delivery, and water supply to meet water delivery needs in the service area. A Program EIR (PEIR) for the WSIP was certified by the San Francisco Planning Commission and the WSIP was adopted by the SFPUC on October 30, 2008. The PEIR addresses the potential environmental impacts of the WSIP facility improvement projects at a programmatic level and evaluates the WSIP's water supply strategy at a project level of detail. Implementation of the proposed project would contribute to meeting the WSIP's overall goals and objectives. Specifically, the ACRP would assist the SFPUC in achieving the established WSIP level of service goals and objectives related to water supply during both nondrought and drought periods by increasing operational flexibility and avoiding the loss of yield to the regional system from the SFPUC Alameda watershed system that would otherwise result from future operations of Calaveras Reservoir.

# 2.0 Purpose of the Scoping Process

The purpose of the scoping process is to solicit input from the public, interested parties, and agencies with discretionary authority over the project on the appropriate scope, focus, and content of the Draft EIR. The San Francisco Planning Department will consider all of the input received during the scoping process in the preparation of the Draft EIR.

The Draft EIR will describe the existing environmental conditions of the area that could be affected by the proposed project and evaluate the potential effects of the project on the environment in accordance with CEQA. The comments provided by the public and agencies during scoping will help the San Francisco Planning Department identify pertinent issues, methods of analyses, and level of detail that should be addressed in the Draft EIR. The scoping comments will also provide input for development of a reasonable range of feasible alternatives to be evaluated in the Draft EIR.

The scoping comments will augment the information developed by the EIR project team, which includes specialists in each of the environmental subject areas covered in the EIR. This combined input will result in an EIR that is both comprehensive and responsive to issues raised by the public and regulatory agencies, and that meets CEQA requirements.

In addition to facilitating public and regulatory agency input on the scope and focus of the Draft EIR, scoping allows the San Francisco Planning Department to explain the EIR process to the public and to identify additional opportunities for public comment and public involvement during the EIR process.

# 3.0 Notification of Scoping

The scoping period began on June 24, 2015 with the issuance of the NOP. The San Francisco Planning Department held a scoping meeting on July 9, 2015 and accepted written comments through July 27,

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[2] The Alameda Creek Recapture Project is listed in the WSIP PEIR under its former title of Alameda Creek Fishery Enhancement project.

2015. The following methods were used to notify agencies and the public about the availability of the NOP, the scoping meeting dates and locations, and details on the comment process:

- **Mailing List.** A mailing list was compiled, including approximately 600 contacts for federal, state, regional, and local agencies; federal, state, regional, and local elected officials; regional and local interest groups; member agencies of the Bay Area Water Supply and Conservation Agency; Sunol water account holders; adjacent water districts; information repositories; media contacts; and property owners and residents within 300 feet of the proposed project limits.
- **Notice of Preparation of an EIR and Notice of Public Scoping Meeting.** Copies of the NOP were distributed via certified mail to responsible and trustee agencies and 15 copies were delivered to the State Clearinghouse (See Appendix A for a copy of the NOP and NOP Notice of Availability). In addition, a notice of availability of the NOP was distributed via first-class mail to the entire mailing list (approximately 600 addressees):

    - ***Locations to obtain a copy of the NOP***. The NOP was posted to the San Francisco Planning Department's website (http://www.sf-planning.org/index.aspx?page=1829). A printed copy of the NOP was also provided to anyone who requested it from the San Francisco Planning Department.
    - ***Notice to entire mailing list***. Notifications of the scoping meeting, including information on the project EIR and the scoping process, and instructions on how to obtain a copy of the NOP and provide public comment were mailed to the entire project mailing list approximately two weeks prior to the scoping meeting.
    - ***Legal notices.*** Notices of the scoping meeting and information on how to obtain a copy of the NOP and provide public comment were placed in the legal classified section of the Valley Times, Argus, and Oakland Tribune on June 24, 2015.

**Table 1** presents an itemized list of mailings.

**TABLE 1**
**NUMBER OF RECIPIENTS ON MAILING LIST FOR NOP AND NOTICE OF SCOPING MEETING**

| Category | Number of NOP Recipients | Number of NOP Notice of Availability Recipients |
|---|---|---|
| Owners and Occupants | 0 | 7 |
| Wholesale Customers | 3 | 45 |
| SF Standard List | 7 | 99 |
| Other Interested Parties | 7 | 245 |
| Responsible and Trustee Agencies | 7 | 9 |
| Local and Bordering Jurisdictions | 1 | 32 |
| Media and Libraries | 14 | 11 |
| SFPUC Sunol Accounts | 0 | 150 |
| **TOTAL** | **39** | **598** |

# 4.0 Scoping Meeting

The San Francisco Planning Department held a public scoping meeting on July 9, 2015 at the Sunol Glen School (11601 Main Street, Sunol), approximately two weeks after publication of the NOP. An informational open house was held prior to the formal scoping meeting. The objective of the scoping meeting was to solicit input from the public on potential environmental impacts of the proposed project, the appropriate scope of the EIR, potential mitigation measures, and potential alternatives to the proposed project.

The scoping meeting included presentations on the environmental review process and the proposed project, followed by a formal public comment period. Attendees interested in presenting verbal comments submitted speaker cards and were allowed to speak. The meeting concluded with closing remarks. **Appendix B** includes copies of the scoping meeting presentation, handouts, comment/speaker cards, and sign-in sheets.

The total attendance for the scoping meeting was 11 (based on the meeting sign-in sheets and excluding CCSF and EIR consultant staff). Meeting attendees primarily consisted of private citizens residing near the proposed project area. A total of 4 participants provided verbal comments at the meeting. The scoping meeting was recorded by a certified court reporter who provided a verbatim written transcript of the proceedings. The transcript can be found in **Appendix C** of this report.

# 5.0 Overview of Comments Received

Agencies and members of the public utilized several different methods of providing input: verbal comments during the scoping meeting, or written comments sent via U.S. mail, email and fax. **Table 2** lists the agencies, groups, and other individuals that provided written comments in response to the NOP. Table 3 lists individuals that commented at the scoping meeting, listed in alphabetical order by last name. The scoping meeting transcript is located in Appendix C. Copies of written comment letters and emails are located in **Appendix D**.

**TABLE 2**
**INDEX OF WRITTEN COMMENTS**

| Comment Agency | Commenter |
|---|---|
| **State Agencies** | |
| S1 | California Department of Conservation, Office of Mine Reclamation |
| S2 | California Department of Transportation, District 4 (Caltrans) |
| S3 | California Department of Water Resources, Division of Safety of Dams (DWR DSOD) |
| S4 | San Francisco Bay Regional Water Quality Control Board (SF Bay RWQCB) |
| **Local/Regional Agencies** | |
| L1 | Bay Area Water Supply and Conservation Agency (BAWSCA) |
| L2 | Alameda County Water District (ACWD) |
| L3 | Alameda County Flood Control and Water Conservation District, Zone 7 (Zone 7 Water Agency) |
| L4 | North Coast County Water District |
| **Groups** | |
| G1 | Alameda Creek Alliance (ACA) |
| G2 | Save the Frogs |
| **Individuals** | |
| I1 | Jim O'Laughlin |

**TABLE 3**
**INDEX OF VERBAL COMMENTS**

| Verbal Comment | Commenter | Affiliation (if applicable) |
|---|---|---|
| V1 | Connie DeGrange | Sunol Resident |
| V2 | Bob Foster | Sunol Resident |
| V3 | Jeff Miller | Alameda Creek Alliance |
| V | Jim O'Laughlin | Sunol Resident |

# 6.0 Summary of Comments by Subject Area

**Table 4** provides a summary of scoping comments by commenter. For the full comments, please refer to Appendices C and D.

## TABLE 4
## SUMMARY OF COMMENTS BY COMMENTER

| **Commenter** | | **Page, Paragraph** | **Summary of Comment** | **CEQA Subject Area(s)** |
|---|---|---|---|---|
| ***Federal Agencies*** | | | | |
| | No scoping comments received from Federal Agencies | | | |
| ***State Agencies*** | | | | |
| **S1** | California Department of Conservation, Office of Mine Reclamation (Beth Hendrickson) | Page 1, paragraph 1 (email dated 7/20/15) | In accordance with the Surface Mining and Reclamation Act of 1975 the reclamation plan for SMP-24 will need to be amended to account for the proposed new end use. | • Project Description<br>• Plans & Policies<br>• Permits and Approvals |
| **S2** | Caltrans (Sherie George) | Page 1, paragraph 3. | Recommends coordinating with Caltrans if ACRP construction overlaps with construction of State Route 84–Niles Canyon Road Safety Improvements. | • Cumulative Projects<br>• Transportation and Circulation |
| **S2** | Caltrans (Sherie George) | Page 2, paragraphs 1 and 2. | Describes criteria for determining whether preparation of a Transportation Impact Study (TIS) is required. | • Transportation and Circulation |
| **S2** | Caltrans (Sherie George) | Page 2, paragraphs 3. | Preparation of a TIS or Traffic Management Plan (TMP) may be required if project-related traffic restrictions or detours affect State highways. | • Transportation and Circulation |
| **S2** | Caltrans (Sherie George) | Page 2, paragraph 4. | Project work that requires movement of oversized or excessive load vehicles on State facilities requires a transportation permit. | • Transportation and Circulation |
| **S2** | Caltrans (Sherie George) | Pages 2 (last paragraph) to 3 (first partial paragraph) | An encroachment permit is required for any work or traffic control that encroaches the State ROW. | • Transportation and Circulation |
| **S2** | Caltrans (Sherie George) | Page 3, full paragraph. | The EIR should fully discuss the project's fair share contribution, financing, scheduling, and implementation responsibilities associated with planned improvements on the State ROW. | • Transportation and Circulation |
| **S3** | DWR DSOD (Roberto Cervantes) | Page 1, paragraphs 2 thru 4. | Describes criteria for dams under the DWR DSOD's jurisdiction and states that, as the project would not involve an aboveground barrier, the project would not be subject to DSOD jurisdiction. | • Permits and Approvals |
| **S4** | SF Bay RWQCB (Brian Wines) | Page 1, paragraph 2 | The EIR should discuss/describe SFPUC's water rights to the water that infiltrates into Pit F2. | Water Rights |
| **S4** | SF Bay RWQCB | Page 2, paragraph 1 | The EIR should evaluate the potential for the project to increase the | • Hydrology and Water Quality |

| | Commenter | Page, Paragraph | Summary of Comment | CEQA Subject Area(s) |
|---|---|---|---|---|
| | (Brian Wines) | | regional rate of infiltration into the subsurface and quarry pits (i.e., losses) in the Sunol Valley, and associated effects on surface flows in and fish passage along Alameda Creek. | • Hydrology Appendix<br>• Fishery Resources |
| ***Local/Regional Agencies*** | | | | |
| **L1** | BAWSCA<br>(Michael Hurley) | Page 1, paragraph 2 | The EIR should confirm and/or update any information derived from the WSIP PEIR, as appropriate. | • Introduction and Background<br>• Project Objectives (Project Description)<br>• WSIP PEIR Consistency and Analysis and Mitigation Measures, Applicability to the Proposed Project |
| **L1** | BAWSCA<br>(Michael Hurley) | Page 1, paragraph 3 | The EIR should clarify the basis for the target recapture amount (9,820 afy) and demonstrate how the target amount satisfies WSIP level of service goals and objectives related to water supply during both non-drought and drought periods. | • Introduction and Background<br>• Project Objectives (Project Description) |
| **L1** | BAWSCA<br>(Michael Hurley) | Page 1, paragraph 4 | The EIR should provide information to support the assumption that water quality in Pit F2 would be adequate and pretreatment would not be needed prior to conveying the water to the SVWTP or San Antonio Reservoir. | • Need for Pretreatment (Project Description) |
| **L1** | BAWSCA<br>(Michael Hurley) | Page 2, paragraph 1 | The EIR should provide information regarding the mechanism for infiltration of water into Pit F2 and any other means by which water enters/exits Pit F2 (evaporation/precipitation). | • Hydrology and Water Quality<br>• Hydrology Appendix |
| **L2** | ACWD<br>(Steven Inn) | Page 1, paragraph 3 thru page 2, end of 2nd full paragraph | Due to the timing and rate of releases/bypasses and recapture, during certain periods the ACRP may capture flows that are neither releases nor bypasses. Additional water originating from sources other than Calaveras Reservoir and the ACDD, such as Welch Creek, may be captured. Due to this mechanism of operations, it is difficult to define the ACRP as strictly a “recapture” facility. | • Operations (Project Description)<br>• Hydrology and Water Quality<br>• Hydrology Appendix |

| Commenter | | Page, Paragraph | Summary of Comment | CEQA Subject Area(s) |
|---|---|---|---|---|
| **L2** | ACWD<br>(Steven Inn) | Page 2, 3rd full paragraph | The EIR should evaluate potential impacts to Alameda Creek, the Alameda Creek Watershed, and downstream agencies. | • Hydrology and Water Quality<br>• Hydrology Appendix<br>• Fishery Resources<br>• Terrestrial Biological Resources |
| **L2** | ACWD<br>(Steven Inn) | Page 2, 4th full paragraph thru 1st set of bullets on page 3 (Comment 1) | Surface water and groundwater interactions are complex and dynamic physical processes. Alameda System Daily Hydrologic Model (ASDHM) will need to be substantially modified to fully analyze the project's impacts on stream flow, subsurface flow, and groundwater. The EIR should describe the origin of the water that will be recaptured or pumped out of Pit F2 at various times of operation. | • Hydrology and Water Quality<br>• Hydrology Appendix |
| **L2** | ACWD<br>(Steven Inn) | Page 3, 2nd set of bullets (Comment 2) | The EIR should provide sufficient detail to analyze impacts associated with differing rates of release and recapture on: anadromous fish passage in Alameda Creek Flood Control Channel, Niles Canyon, and Sunol Valley; aquatic and riparian habitat in Niles Canyon and Sunol Valley; and ACWD groundwater recharge operations and water supply. The EIR should evaluate impacts separately for dry, average, and wet year conditions. | • Operations (Project Description)<br>• Hydrology and Water Quality<br>• Hydrology Appendix<br>• Fishery Resources<br>• Terrestrial Biological Resources |
| **L2** | ACWD<br>(Steven Inn) | Page 3 (Comment 3) | The EIR should clarify the basis for the target recapture amount (9,820 afy) vs. the 6,300 afy identified for the Alameda Creek Fishery Enhancement project in the WSIP. | • Introduction and Background<br>• Project Objectives (Project Description) |
| **L2** | ACWD<br>(Steven Inn) | Page 3 (Comment 4) | The EIR should discuss/describe SFPUC's water rights to the water that infiltrates into Pit F2. | Water Rights |
| **L2** | ACWD<br>(Steven Inn) | Page 4 (Comment 5) | The cumulative impact analysis should consider other projects being pursued by the Alameda Creek Fisheries Restoration Workgroup. | • Cumulative Projects |
| **L2** | ACWD<br>(Steven Inn) | Page 4 (Comment 6) | The EIR should evaluate potential impacts to waters of the U.S. and permit requirements under the Clean Water Rule published on 6/29/15 in the Federal Register (80 FR 37054), and take into account the recent holding in the case Siskiyou County Farm Bureau v. Department of Fish and Wildlife C.D.O.S. 5632, No. C073735 (6/1/15). | • Permits and Approvals<br>• Fishery Resources<br>• Terrestrial Biological Resources |

| Commenter | | Page, Paragraph | Summary of Comment | CEQA Subject Area(s) |
|---|---|---|---|---|
| **L2** | ACWD<br>(Steven Inn) | Page 4 (Comment 7) | The EIR should evaluate potential impacts to DWR South Bay Aqueduct. | • Utilities and Service Systems |
| **L2** | ACWD<br>(Steven Inn) | Page 4 (Comment 8) | The commenter encourages the SFPUC to coordinate w/ACWD on the scoping and assessment of project alternatives, including operational alternatives of the proposed project. | • Alternatives Analysis |
| **L3** | Zone 7 Water Agency<br>(Elke Rank) | Page 1, 1st bullet | The EIR should evaluate potential impacts on groundwater supplies as there will be water losses associated with the instream flow schedules (evapo-transpiration, surface water outflow, soil moisture and bank storage increases, and infiltration of stream flow to parts of the groundwater basin where it may become unrecoverable or non-beneficial). | • Hydrology and Water Quality<br>• Hydrology Appendix |
| **L3** | Zone 7 Water Agency<br>(Elke Rank) | Page 1, 2nd bullet | The EIR should require groundwater monitoring at key locations around the groundwater basin to ensure ACRP operations are not having an unacceptable impact on groundwater supplies. | • Project Description |
| **L4** | North Coast County Water District (Janice Zavala-Clark) | | Mailing list correction RE General Manager at North Coast County Water District | N/A |
| ***Groups*** | | | | |
| **G1** | ACA<br>(Jeff Miller) | Page 1, paragraph 1 | The SFPUC's current concept for the ACRP is an improvement over previous concepts that involved construction of infrastructure in the Alameda Creek channel. | • Opinion (Alternatives Analysis) |
| **G1** | ACA<br>(Jeff Miller) | Page 1, paragraph 2 | The EIR should describe the origin of the water that infiltrates into Pit F2, the hydrologic connections between the groundwater that infiltrates into Pit F2 and the Sunol Valley Groundwater Basin, and the hydrologic connections between this water and surface water in Alameda Creek above, adjacent to, and below the project reach. The project should evaluate impacts on surface flow in Alameda Creek through the Sunol Valley and downstream into Niles Canyon, and the associated impacts on fisheries and other aquatic resources through Niles Canyon. | • Hydrology and Water Quality<br>• Hydrology Appendix<br>• Fishery Resources<br>• Terrestrial Biological Resources |
| **G1** | ACA<br>(Jeff Miller) | Page 1, paragraph 3 through page 2 | Recapture of summer flows released from Calaveras Reservoir that are intended to enhance rearing habitat in upper Alameda Creek would have no impact on trout rearing conditions or trout migration. However, recapturing the water that will be bypassed at the ACDD that is specifically intended to benefit upstream and downstream migration of adult and juvenile trout along the length of Alameda Creek from ACDD downstream | • Hydrology Appendix<br>• Fishery Resources |

| Commenter | | Page, Paragraph | Summary of Comment | CEQA Subject Area(s) |
|---|---|---|---|---|
| | | | to the SF Bay is an issue.<br>*"Yet the March 5, 2011 Biological Opinion ("BO") by the National Marine Fisheries Service for the Calaveras Dam Replacement Project explicitly anticipated (pp 49-52) that bypass flows at the Alameda Creek Diversion Dam would provide suitable migration conditions for steelhead trout from Alameda Creek below the ACDD all the way downstream through Niles Canyon and Lower Alameda Creek to San Francisco Bay. The BO stated (p 52) that "CDRP minimum flows from the southern watershed when combined with flows from the northern watershed (at the confluence with the Arroyo de la Laguna) through Niles Canyon are expected to provide suitable conditions for adult upstream migration and smolt downstream migration. These flows will arrive at the upstream end of the Alameda Creek Flood Control Channel and ACWD will provide bypass flows at their water diversion facilities for fish passage through the Flood Channel."* | |
| **G2** | Save the Frogs (Kerry Kriger) | Page 1, 2nd paragraph to top of page 2 | The EIR should consider the project's contribution to cumulative impacts on stream-dwelling amphibians and aquatic reptiles together with the CDRP impacts to the same species. | • Hydrology Appendix<br>• Terrestrial Biological Resources |
| **G2** | Save the Frogs (Kerry Kriger) | Page 2, 1st full paragraph | The commenter urges the SFPUC to uphold its Environmental Stewardship Policy. The EIR should evaluate impacts on the federally endangered foothill yellow-legged frog and western pond turtle (neither of which was identified in the NOP), as well as common amphibians. | • Hydrology Appendix<br>• Terrestrial Biological Resources |
| **G2** | Save the Frogs (Kerry Kriger) | Page 3 | The EIR should assess the potential for ACRP operations to lower groundwater levels and result in stream baseflow depletion in Alameda Creek at times of the year that are critical for amphibians, snakes, and turtles. The commenter is concerned that the ACRP's recapture rate may be out of sync with the timing of the bypasses and releases and result in the capture of water from other origins. The EIR should evaluate how the magnitude, timing, and duration of surface flows in lower San Antonio Creek and Alameda Creek may be changed by the proposed recapture of water. | • Hydrology Appendix<br>• Terrestrial Biological Resources |
| **G2** | Save the Frogs (Kerry Kriger) | Page 4, 1st paragraph | The EIR should assess the potential for ACRP operations to lower groundwater levels and adversely affect Sycamore alluvial woodlands. | • Hydrology Appendix<br>• Terrestrial Biological Resources |
| **G2** | Save the Frogs (Kerry Kriger) | Page 4, 2nd paragraph | The EIR should clarify the basis for the target recapture amount (9,820 afy) vs. the 6,300 afy identified for the Alameda Creek Fishery Enhancement project in the WSIP and provide additional information regarding how the water bypassed/released will coincide with the the water recaptured. Commenter expresses the opinion that evaluation of the proposed recapture separately from the evaluation of CDRP is piecemealing. | • Introduction and Background<br>• Operations (Project Description) |

| Commenter | | Page, Paragraph | Summary of Comment | CEQA Subject Area(s) |
|---|---|---|---|---|
| **G2** | Save the Frogs (Kerry Kriger) | Page 5, Conclusion | The EIR should:<br>*"(1) describe in detail the flow paths of water that recharge the groundwater basin and provide summer baseflows to San Antonio Creek and Alameda Creek;*<br>*(2) quantify what percent of bypass and release flows will actually enter the groundwater and clearly illustrate whether this project is truly recapturing flows or simply mining groundwater in excess of amounts released and bypassed;*<br>*(3) evaluate the impacts of groundwater extraction on riparian flora and fauna under various climate change scenarios which may exacerbate fluctuations between series of extremely wet and extremely dry years; and*<br>*(4) detail the likely impacts on amphibians and reptiles, as described above. Because the dynamic interactions among surface water, ground water, and rock moisture are extremely complex, we would like to see direct observations and controlled physical tests made to trace water sources and address our questions about impacts on in-stream flow conditions."* | • Hydrology and Water Quality<br>• Hydrology Appendix<br>• Fishery Resources<br>• Terrestrial Biological Resources |
| ***Individuals*** | | | | |
| **I1** | Jim O'Laughlin | Page 1, paragraph 3 | Commenter expresses opinion that the project is not needed; SFPUC has other more substantive water supply sources. | • Project purpose and need (Project Description) |
| **I1** | Jim O'Laughlin | Page 1, paragraph 4 | Commenter suggests that SFPUC should shift their focus to improving watershed management to better utilize water resources. | N/A - opinion |
| **I1** | Jim O'Laughlin | Page 1, paragraph 5 | Commenter suggests that SFPUC operate the ACRP to recapture water during wet periods (as opposed to dry periods). | • Operations (Project Description) |
| **I1** | Jim O'Laughlin | Page 2, paragraph 1 | Commenter asks if the CDRP instream flow schedules will support restoration of steelhead in the watershed. | • Relationship to CDRP (Introduction and Background) |
| **I1** | Jim O'Laughlin | Page 2, paragraph 2 | The EIR should evaluate the potential for the ACRP to adversely affect groundwater levels in the Sunol Valley. | • Hydrology and Water Quality<br>• Hydrology Appendix |
| **I1** | Jim O'Laughlin | Page 2, paragraph 3 | The EIR should consider options for improving the visual quality of Pit F2. | • Aesthetics |
| **I1** | Jim O'Laughlin | Page 2, bullets | *"- What is the cost of the project?*<br>*- How much electricity be used and what would it cost?*<br>*- Does the existing Pump Station Pipeline take water out of the South Bay Aquaduct ? How* | • Project Description<br>• Utilities and Service Systems<br>• Permits and Approvals |

| Commenter | | Page, Paragraph | Summary of Comment | CEQA Subject Area(s) |
|---|---|---|---|---|
| | | | *much?*<br>*- What approvals will Alameda County have to provide for this project?*<br>*- Exactly what is required of the SFPUC in regards to increased flow into Alameda Creek for steelhead habitat ?"* | • Relationship to CDRP (Introduction and Background) |
| ***Verbal Comments*** | | | | |
| **V1** | Connie DeGrange | Page 18, paragraph 1 | The EIR should include an evaluation of the impacts of the draw-down that would result from pumping Pit F2. | • Hydrology and Water Quality<br>• Hydrology Appendix<br>• Biology |
| **V2** | Bob Foster | Page 16, paragraph 2 | The EIR should describe other alternatives to the project that have been rejected by the SFPUC. | • Alternatives |
| **V3** | Jeff Miller<br>(Alameda Creek Alliance) | Page 12 to Page 13 | The EIR should describe the source for the recaptured flow and where it originates from<br>The EIR should describe if there is a hydraulic connection between the recaptured flow and surface flows in Alameda Creek.<br>The EIR should include an evaluation of the change in groundwater infiltration rates when pumping is happening.<br>The EIR should include an evaluation of the pumping effects on surface flow in Niles Canyon or in downstream reaches of the creek.<br>Comment suggests that the EIR describe the cold water flows coming in the summer and the flows that infiltrate into the subsurface. | • Hydrology and Water Quality<br>• Hydrology Appendix<br>• Fisheries |
| **V4** | Jim O'Laughlin | Page 14<br>Page 18, paragraph 3 | The EIR should evaluate what impacts there is going to be on the groundwater levels, especially below Pit F2.<br>The EIR should describe is there is a way to for the project to provide acceleration of the reclamation plan for Pit F2.<br>The EIR should include an alternative that evaluates only the legally responsible operations based on current historical agreements, and does not include the project. | • Hydrology and Water Quality<br>• Hydrology Appendix<br>• Hazards |

# APPENDICES

A. Notice of Preparation (NOP) and NOP Notice of Availability
B. Scoping Meeting Materials
C. Scoping Meeting Transcripts
D. Comments Received During EIR Scoping Process

# APPENDIX A

## Notice of Preparation and NOP Notice of Availability

SAN FRANCISCO
**PLANNING DEPARTMENT**

1650 Mission St.
Suite 400
San Francisco,
CA 94103-2479

Reception:
**415.558.6378**

Fax:
**415.558.6409**

Planning
Information:
**415.558.6377**

# Notice of Preparation of an Environmental Impact Report and Notice of Public Scoping Meeting

| | |
|---|---|
| *Date:* | June 24, 2015 |
| *Case No.:* | **2015-004827ENV** |
| *Project Title:* | **Alameda Creek Recapture Project** |
| *Location:* | The Sunol Valley in unincorporated Alameda County, west of Calaveras Road and south of Interstate 680. The proposed facilities would be constructed within and adjacent to a quarry pit in the Surface Mining Permit 24 (SMP-24) area and at the existing Hetch Hetchy Water and Power Calaveras Substation site. |
| *BPA Nos.:* | N/A |
| *Zoning:* | Water Management |
| *Block/Lot:* | N/A |
| *Project Sponsor* | San Francisco Public Utilities Commission<br>Kelley Capone<br>KCapone@sfwater.org<br>(415) 934-5715 |
| *Lead Agency:* | San Francisco Planning Department |
| *Staff Contact:* | Steven Smith<br>Steve.Smith@sfgov.org<br>(415) 558-6373 |

This Notice of Preparation (NOP) of an Environmental Impact Report (EIR) has been prepared by the San Francisco Planning Department in connection with the project listed above. The purpose of the EIR is to provide information about the potential significant physical environmental effects of the proposed project, to identify possible ways to minimize the project's significant adverse effects, and to describe and analyze possible alternatives to the proposed project. The San Francisco Planning Department is issuing this NOP to inform the public and responsible and interested agencies about the proposed project and the intent to prepare an EIR. This NOP is also available online at: http://www.sf-planning.org/puccases.

## PROJECT SUMMARY

The San Francisco Public Utilities Commission (SFPUC) is proposing the Alameda Creek Recapture Project (ACRP or proposed project) on SFPUC Alameda watershed[1] lands in unincorporated Alameda County. The proposed project would recapture an annual average of up to 9,820 acre-feet per year (ac-ft/yr) (or 3,200 million gallons per year [mgal/yr]) of water that will be released from Calaveras Reservoir and/or bypassed around the Alameda Creek Diversion Dam during future operation of Calaveras Reservoir. Water would be recaptured from a quarry pit, Pit F2, in the Sunol Valley located approximately 6 miles downstream of Calaveras Reservoir and 0.5-mile south of the Interstate 680/State

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[1] The SFPUC Alameda watershed refers to CCSF-owned lands managed by the SFPUC as part of the SFPUC regional water system. The Alameda watershed lands are located within the much larger hydrologic boundary of the Alameda Creek watershed.

Route 84 interchange. The ACRP would recapture an amount of water equivalent to that which is released and/or bypassed. Proposed project components for recapture of the water from Pit F2 include pumps mounted on barges, pipelines extending from the pumps to shore; a new pipeline connecting to the existing Sunol Pump Station Pipeline; and ancillary facilities such as throttle valves, a flow meter, and electrical facilities. No work would occur in the bed, bank, or channel of Alameda Creek. The project location and components are described in more detail further below.

## OVERVIEW AND BACKGROUND

The ACRP would recapture water that the SFPUC will release from Calaveras Reservoir and/or bypass around the Alameda Creek Diversion Dam as part of the future operations plan for the Calaveras Dam Replacement project. As further described below, the releases and bypasses are required by regulatory permits for the Calaveras Dam Replacement project.

### The SFPUC Water System Improvement Program and the Alameda Creek Recapture Project

The City and County of San Francisco (CCSF), through the SFPUC, owns and operates a regional water supply conveyance, treatment, and distribution system that extends from the Sierra Nevada to San Francisco and serves drinking water to 2.6 million people in San Francisco, San Mateo, Santa Clara, Alameda, and Tuolumne Counties. The proposed ACRP is a component of the SFPUC's Water System Improvement Program (WSIP)[2] (see www.sfwater.org). The basic goals of the WSIP are to increase the reliability of the regional water system with respect to water quality, seismic response, delivery, and water supply to meet water delivery needs in the service area. A Program EIR (PEIR) for the WSIP was certified by the San Francisco Planning Commission and the WSIP was adopted by the SFPUC on October 30, 2008.[3] The PEIR addresses the potential environmental impacts of the WSIP facility improvement projects at a programmatic level and evaluates the WSIP's water supply strategy at a project level of detail. Implementation of the proposed project would contribute to meeting the WSIP's overall goals and objectives, which are to:

- Maintain high-quality water
- Reduce vulnerability to earthquakes
- Increase delivery reliability
- Meet customer water supply needs
- Enhance sustainability in all system activities
- Achieve a cost-effective, fully operational system

Specifically, the ACRP would assist the SFPUC in achieving the established WSIP level of service goals and objectives related to water supply during both nondrought and drought periods by increasing operational flexibility and avoiding the loss of yield to the regional system from the SFPUC Alameda watershed system that would otherwise result from future operations of Calaveras Reservoir.

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[2] The Alameda Creek Recapture project is listed in the WSIP PEIR under its former title of Alameda Creek Fishery Enhancement project.

[3] San Francisco Planning Department, 2008. *Final Program Environmental Impact Report on the San Francisco Public Utilities Commission's Water System Improvement Program.* San Francisco Planning Department File No. 2005.0159E, State Clearinghouse No. 2005092026. Certified October 30, 2008.

## Project Relationship to the Calaveras Dam Replacement Project

Calaveras Reservoir, located at the southern end of the SFPUC Alameda watershed and approximately 6 miles upstream of the ACRP project area, collects and stores local runoff, including flows from Alameda, Calaveras, and Arroyo Hondo Creeks. The Alameda Creek Diversion Dam and Tunnel divert flows from Alameda Creek into Calaveras Reservoir.[4] Water stored in Calaveras Reservoir is conveyed to the Sunol Valley Water Treatment Plant (SVWTP) for treatment prior to delivery to customers, or to San Antonio Reservoir for storage prior to being treated at the SVWTP. Local runoff that is collected in Calaveras and San Antonio Reservoirs accounts for approximately 13 percent of the SFPUC's total water yield. **Figure 1** shows SFPUC facilities in the Alameda watershed.

In 2001, due to safety deficiencies regarding the seismic stability of Calaveras Dam, the California Department of Water Resources, Division of Safety of Dams, placed interim operational restrictions on Calaveras Reservoir that limit the reservoir's water storage volume to approximately 40 percent of its historical storage capacity. The Calaveras Dam Replacement project, another key regional facility improvement project of the WSIP, will restore the storage capacity of Calaveras Reservoir and is designed to help the SFPUC meet the WSIP level of service goals related to seismic reliability and water delivery reliability.[5] The Calaveras Dam Replacement project is currently under construction, with completion anticipated in 2018.

Through the permitting process for the Calaveras Dam Replacement project, the SFPUC, in coordination with the California Department of Fish and Wildlife (CDFW) and National Marine Fisheries Service (NMFS), agreed to two in-stream flow schedules that satisfy the requirements of the Federal Endangered Species Act and the provisions of the California Fish and Game Code. These in-stream flow schedules will be implemented as part of the future operations plan for Calaveras Reservoir to be protective of Central California Coast (CCC) steelhead (*Oncorhynchus mykiss*) distinct population segment (DPS), a species listed as threatened under the federal Endangered Species Act, in Alameda and Calaveras Creeks below the Alameda Creek Diversion Dam and Calaveras Dam, respectively. The in-stream flow schedule at the Alameda Creek Diversion Dam will increase flows in Alameda Creek below the dam, with a corresponding reduction in the amount of water that the SFPUC historically diverted from Alameda Creek into Calaveras Reservoir; the in-stream flow schedule for Calaveras Creek below Calaveras Dam will provide year-round releases from Calaveras Reservoir (see Figure 1).

The SFPUC used the Alameda System Daily Hydrologic Model (ASDHM)[6] to estimate the water supply loss from the SFPUC Alameda watershed if the water that is bypassed and/or released during future operations of Calaveras Reservoir is not recaptured. Using historic hydrology data for the period of October 1995 through September 2009, the model was used to compare the water loss to the regional system under

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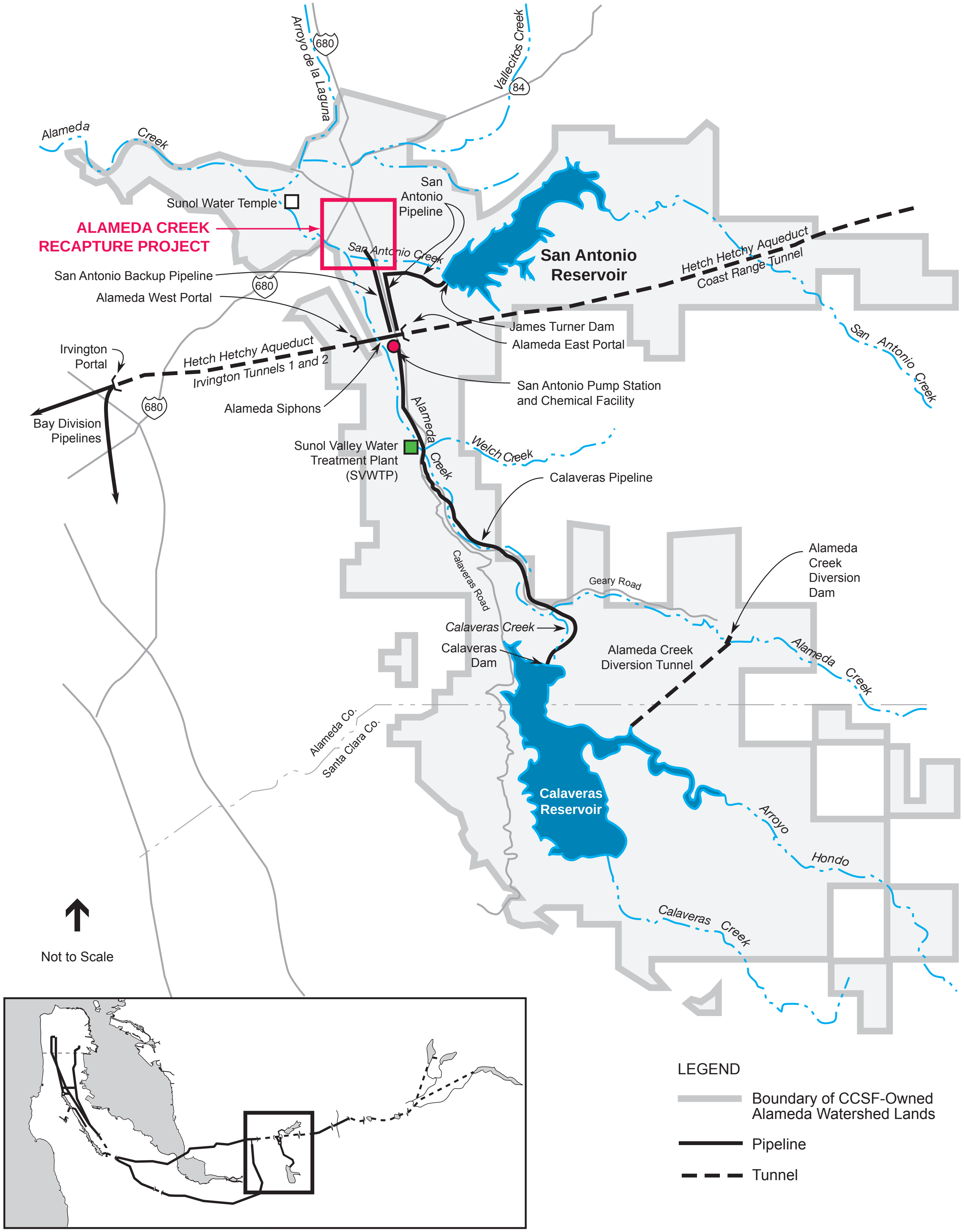
[4] The SFPUC operates the Alameda Creek Diversion Dam and Calaveras Reservoir under pre-1914 appropriative water rights that were originally established by the Spring Valley Water Company.

[5] San Francisco Planning Department, 2011. *Final Environmental Impact Report for the San Francisco Public Utilities Commission Calaveras Dam Replacement Project*. San Francisco Planning Department File No. 2005.0161E, State Clearinghouse No. 2005102102. Certified January 27, 2011.

[6] ASDHM was first developed during the Calaveras Dam Replacement Project permitting process and has been continuously modified and improved. For more information on the model and the assumptions incorporated into the model, please refer to "Dhakal, A. S., E. Buckland, S. McBain, 2012. Overview of Methods, Models, and Results to Develop Unimpaired, Impaired, and Future Flow and Temperature Estimates along Lower Alameda Creek for Hydrologic Years 1996-2009. 81 pp".



SOURCE: San Francisco Planning Department, 2008

SFPUC Alameda Creek Recapture Project

**Figure 1**

Overview of Alameda Watershed Facilities two scenarios: (a) Calaveras Reservoir is restored to its historical storage capacity and the in-stream flow schedules are implemented, against (b) Calaveras Reservoir is restored to its historical storage capacity and the in-stream flow schedules are not implemented. The difference in the volume of water diverted to Calaveras Reservoir at the Alameda Creek Diversion Dam and released from Calaveras Dam under these two scenarios represents the total water supply loss associated with the in-stream flow schedules. The model estimated an average annual loss of 9,820 ac-ft/yr[7] (or 3,200 mgal/yr), which is equal to the average annual volume of water that SFPUC proposes to recapture with the ACRP.[8]

## PROJECT DESCRIPTION

### Project Location

The project area[9] is in unincorporated Alameda County, south of the Interstate 680/State Route 84 interchange and west of Calaveras Road. Figure 1 shows the regional location of the project. The proposed facilities would be in the Sunol Valley on the east side of Alameda Creek, approximately 6 miles north of Calaveras Reservoir and 1 mile west of San Antonio Reservoir. The ACRP would be located within the SFPUC Alameda watershed.

### Project Objectives

As stated previously, implementation of the proposed project would assist the SFPUC in achieving established WSIP level of service goals and objectives related to ensuring the SFPUC has an adequate supply of water to deliver to customers during both non-drought and drought periods. The primary purpose of the ACRP is the downstream recapture of an annual average of up to 9,820 ac ft/yr (or 3,200 mgal/yr) of water that is released from Calaveras Reservoir and/or bypassed around the Alameda Creek Diversion Dam, pursuant to the Calaveras Dam Replacement project's in-stream flow schedules to be implemented during future operations of Calaveras Reservoir. The ACRP would recapture an amount of water equivalent to that which is released and/or bypassed. By recapturing the water, the SFPUC would be able to maintain historic water diversions from the SFPUC Alameda watershed system and avoid the loss of yield to the regional water system.

### Project Components

The ACRP would recapture the water by collecting Alameda Creek water that naturally infiltrates into quarry Pit F2, operated under Surface Mining Permit-24 (SMP-24) by Hanson Aggregates, and pumping the water directly to SVWTP or San Antonio Reservoir. The quarry pit is located adjacent to Alameda Creek in the Sunol Valley, approximately six miles downstream of Calaveras Reservoir. The project area and vicinity are shown on **Figure 2** and the preliminary project site plan is shown on **Figure 3**. The proposed project components include:

- Four pumps mounted on barges that would be floated in quarry Pit F2 (including a mooring system)
- Four flexible discharge pipelines extending from each pump to a new pipe manifold located on shore

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[7] The total volume of water released from Calaveras Reservoir and/or bypassed at the Alameda Creek Diversion Dam will vary year to year depending on precipitation over the watershed and the future operations plan for Calaveras Reservoir.

[8] San Francisco Public Utilities Commission (SFPUC), 2014. *Final Conceptual Engineering Report for Alameda Creek Recapture Project*. Prepared by SFPUC Engineering Management Bureau. November 21, 2014.

[9] "Project area" refers to the area within which all construction-related disturbance would occur.

- 100-foot-long, 36-inch-diameter pipeline connection between the new pipe manifold and the existing Sunol Pump Station Pipeline
- Throttling valves and a flow meter
- Electrical control building
- Electrical transformer, ten new power poles, and approximately 1,600 feet of overhead power lines extending from the HHWP Calaveras Electrical Substation to the new electrical control building.[10]

SFPUC assumes that the water quality in Pit F2 would be adequate and that pretreatment would not be required prior to conveying the water to the SVWTP or San Antonio Reservoir. This assumption will be confirmed through water quality monitoring and testing at Pit F2.[11]

## Construction

Construction is expected to begin in 2017 and to be completed within 1.5 years (by 2018), resulting in an overall construction period of approximately 18 months. Construction activities would include staging/laydown, site clearing, demolition, drilling, earth work, structural placement and backfilling, concrete and paving work, dewatering, excavation, and trenching in the project area. Calaveras Road would be the primary construction access route to the project area. Two existing quarry access roads that run east-to-west along either side of San Antonio Creek would provide secondary access to the ACRP site. No construction work would be required within the Alameda Creek bed, bank or channel.

## Proposed Operations

Operation of the ACRP is dependent on the in-stream flow schedules that will be implemented as part of future operations of Calaveras Reservoir; that is, ACRP operations would not commence until the in-stream flow schedules are implemented. The maintenance of the in-stream flows will be measured at two compliance points: (1) the compliance point for the releases from Calaveras Dam is the existing United States Geological Service (USGS) gage located on Calaveras Creek immediately below Calaveras Dam, and (2) the compliance point for the water that is bypassed around the Alameda Creek Diversion Dam is a new stream flow gage that will be installed as part of the Calaveras Dam Replacement project below the Alameda Creek Diversion Dam.

SFPUC modeling and monitoring of current conditions at Pit F2 in Sunol Valley, approximately six miles downstream of the compliance points, shows that natural infiltration occurs from Alameda Creek into Pit F2. SFPUC facility operators would use the proposed pumps in Pit F2 and existing facilities and infrastructure in the Sunol Valley and surrounding areas of the Alameda watershed system to recapture an amount of water equivalent to that which is released and/or bypassed by collecting water that naturally infiltrates into Pit F2. SFPUC would convey the recaptured water from the quarry pit directly to either the SVWTP or San Antonio Reservoir.[12] The SFPUC would document the amounts of water recaptured from pumping at Pit F2, and operate the project in a manner that would assure the amounts recaptured correlate with amounts released and/or bypassed.

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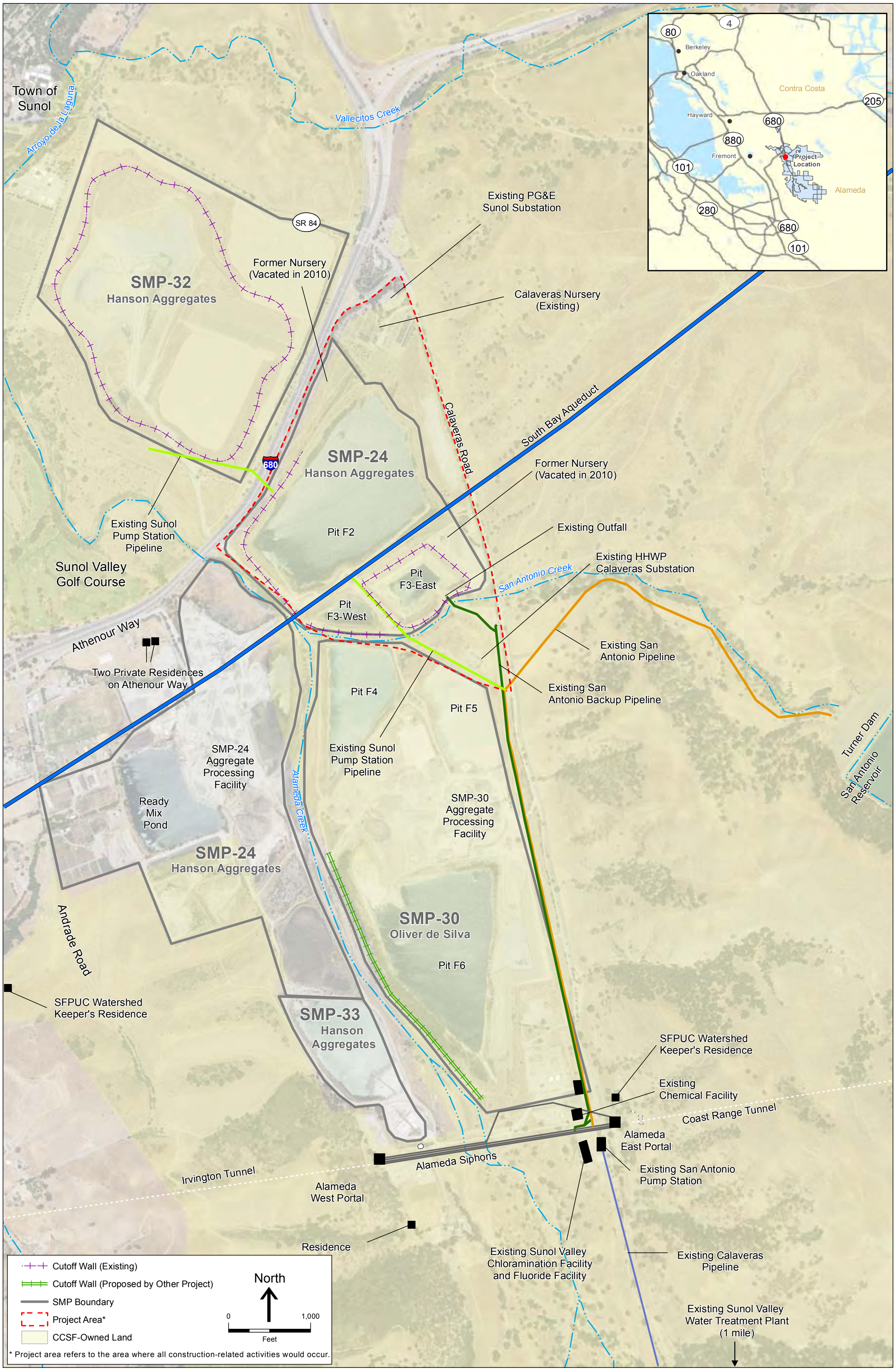
[10] Alternatively, if the HHWP Calaveras Electrical Substation cannot meet the power needs of the ACRP, power would come from the PG&E Sunol Electrical Substation.

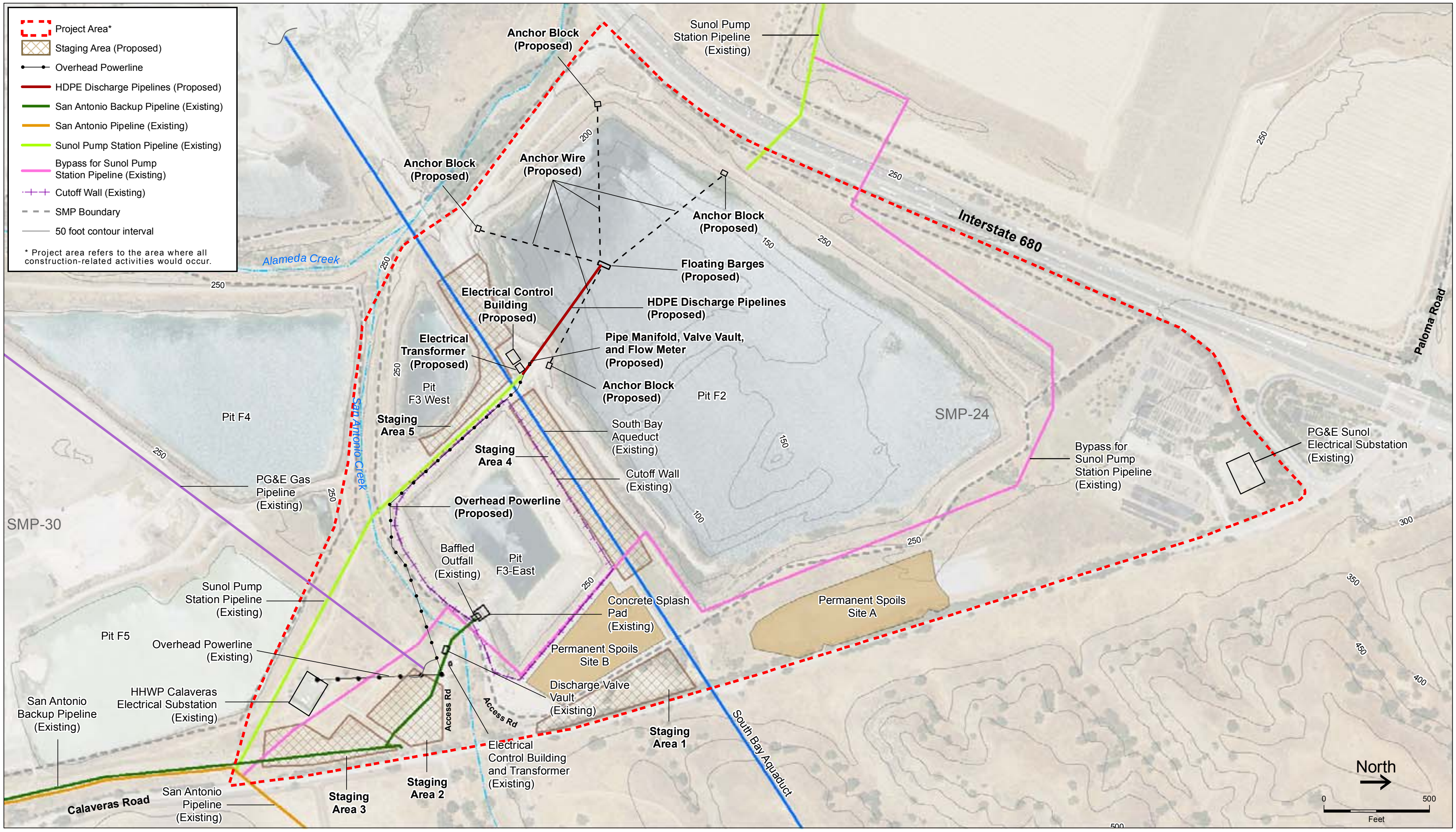
[11] San Francisco Public Utilities Commission (SFPUC), 2014. *Final Conceptual Engineering Report for Alameda Creek Recapture Project*. Prepared by SFPUC Engineering Management Bureau. November 21, 2014.

[12] San Francisco Public Utilities Commission (SFPUC), 2014. Final Conceptual Engineering Report for Alameda Creek Recapture Project. Prepared by SFPUC Engineering Management Bureau. November 21, 2014.



SOURCE: ESA, 2015; Date of aerial photo is 2014.

**Figure 2**
Project Vicinity Map



SOURCE: SFPUC, 2014a

SFPUC Alameda Creek Recapture Project

**Figure 3**

Preliminary Site Plan

## PERMITS AND APPROVALS

The SFPUC could be required to obtain the following permits and approvals for project construction and operations.

### Federal

No federal permits are anticipated at this time.

### State/Regional

- California Department of Water Resources – Temporary encroachment permit for construction access within the South Bay Aqueduct right-of-way and permanent encroachment permit for overhead power line crossing.
- State Water Resources Control Board (SWRCB) Division of Drinking Water – Amendment to SF Regional Water System domestic water supply permit to utilize Pit F2 as a new source of water supply.
- Regional Water Quality Control Board, San Francisco Bay Region – Construction General Permit coverage and preparation of a Stormwater Pollution Prevention Plan.
- California Department of Fish and Wildlife – California Endangered Species Act Section 2081 incidental take permit.
- Bay Area Air Quality Management District – Authority to construct permit.
- State Water Resources Control Board – Issuance of a new National Pollutant Discharge Elimination System (NPDES) permit for discharges of water pumped from quarry Pit F2 to San Antonio Reservoir.

### Local

- San Francisco Planning Commission – Certification of the Final EIR.
- SFPUC – Project approval and adoption of CEQA findings and a Mitigation Monitoring and Reporting Program.
- San Francisco Board of Supervisors – Consideration of any appeals of the Planning Commission's certification of the Final EIR and appropriation of project funding.

## ENVIRONMENTAL REVIEW PROCESS

The San Francisco Planning Department is preparing an Environmental Impact Report (EIR) to evaluate the environmental effects of the proposed project on the environment. The EIR will be prepared in compliance with CEQA (California Public Resources Code, Sections 21000 *et seq.*), the *CEQA Guidelines*, and Chapter 31 of the San Francisco Administrative Code, and will address project-specific construction and operational impacts. The EIR is an informational document for use by governmental agencies and the public to aid in the planning and decision-making process. The EIR will disclose any physical environmental effects of the project and identify possible ways of reducing or avoiding its potentially significant impacts.

The EIR will address all environmental issue topics required under CEQA. The EIR will evaluate the environmental impacts of the ACRP resulting from construction and operation activities, and will propose mitigation measures for impacts determined to be significant. The EIR will address all environmental topics in the San Francisco Planning Department's CEQA environmental checklist. Key environmental issues that will be addressed in the EIR are described below.

### Hydrology and Water Quality

The EIR will address the potential for the ACRP to adversely affect surface water and groundwater resources, and the designated beneficial uses of these resources. Construction activities could result in soil erosion and sedimentation that impairs water quality. Water recapture could affect surface water quality or flow, and groundwater resources. Potential secondary impacts on fisheries and other aquatic resources resulting from project-related effects on hydrology and water quality will also be evaluated, as described below.

### Aquatic and Terrestrial Biological Resources

The EIR will address the potential for construction and operation of the proposed project to adversely affect aquatic and terrestrial habitats, as well as special-status plants and wildlife including California red-legged frog, California tiger salamander, Alameda whipsnake, and Central California Coast steelhead. These biological resources could be directly affected during construction (e.g., species mortality) or indirectly affected by construction-related noise, vibration, dust, soil erosion, or water quality effects. Potential operational impacts include entrainment or impingement of aquatic species at the intake locations within Pit F2. In addition, operation of the ACRP could result in adverse impacts on fisheries and other aquatic resources if surface water flow or surface water quality were altered in a way that adversely affected habitat conditions or impaired migration corridors.

### Other Environmental Issues

Other topics to be addressed in the EIR include, but are not limited to, the potential for impacts related to:

- Other land use activities in the Alameda watershed, including nearby residences, nursery and quarry operations, and recreational activities;
- Temporary visual effects resulting from construction activities;
- Handling, storage, and use of common hazardous materials (such as fuels) during construction and operations; and
- Increases in criteria air quality pollutants and noise levels during construction and operational activities.

The EIR will also evaluate the potential for cumulative impacts resulting from implementation of the ACRP in combination with other projects in the vicinity.

### Alternatives

CEQA requires that an EIR evaluate a reasonable range of feasible alternatives to the project or the project location that would attain most of the project objectives, but avoid or substantially lessen any of the project's significant effects. The significant impacts identified by the EIR preparers will guide the development of an appropriate range of alternatives to be evaluated in the EIR that would avoid or substantially lessen significant impacts, while still meeting the project objectives. Alternatives suggested during the public scoping period will be considered. The EIR will also discuss impacts associated with the No Project Alternative.

## FINDING

**This project may have a significant effect on the environment and an Environmental Impact Report is required.** This determination is based upon the criteria of the State CEQA Guidelines, Sections 15063 (Initial Study), 15064 (Determining Significant Effect), and 15065 (Mandatory Findings of Significance), and for the reasons documented in the attached project description and description of potential environmental effects. (Documents are also available online at: http://www.sf-planning.org/puccases).

## PUBLIC SCOPING PROCESS

Pursuant to the State of California Public Resources Code Section 21083.9 and California Environmental Quality Act Guidelines Section 15206, a public scoping meeting will be held to receive oral comments concerning the scope of the EIR. The meeting will be held on **Thursday, July 9, 2015 at 6:30 p.m. at Sunol Glen School located at 11601 Main Street, Sunol**. The SFPUC will provide an informational open house from **5:30 to 6:30 p.m.** prior to the formal scoping meeting. To request a language interpreter or to accommodate persons with disabilities at the scoping meeting, please contact the staff contact listed above at least 72 hours in advance of the meeting. Written comments will also be accepted at this meeting and until 5:00 p.m. on **July 27, 2015.** Written comments should be sent to Sarah B. Jones, San Francisco Planning Department, 1650 Mission Street, Suite 400, San Francisco, CA 94103; by fax to 415-558-6409 (Attn: Sarah Jones); or by email to Sarah.B.Jones@sfgov.org.

If you work for a responsible State agency, we need to know the views of your agency regarding the scope and content of the environmental information that is germane to your agency's statutory responsibilities in connection with the proposed project. Your agency may need to use the EIR when considering a permit or other approval for this project. Please include the name of a contact person in your agency.

Members of the public are not required to provide personal identifying information when they communicate with the Commission or the Department. All written or oral communications, including submitted personal contact information, may be made available to the public for inspection and copying upon request and may appear on the Department's website or in other public documents.

6/24/15
Date

FOR
Sarah B. Jones
Environmental Review Officer

SAN FRANCISCO
**PLANNING DEPARTMENT**

1650 Mission St.
Suite 400
San Francisco,
CA 94103-2479

Reception:
**415.558.6378**

Fax:
**415.558.6409**

Planning
Information:
**415.558.6377**

# PUBLIC NOTICE
# Availability of Notice of Preparation of Environmental Impact Report and Notice of Public Scoping Meeting

| | |
|---|---|
| *Date:* | June 24, 2015 |
| *Case No.:* | 2015-004827ENV |
| *Project Title:* | **Alameda Creek Recapture Project** |
| *Location:* | The Sunol Valley in unincorporated Alameda County, west of Calaveras Road and south of Interstate 680. Proposed facilities would be constructed within and adjacent to a quarry pit in the Surface Mining Permit 24 (SMP-24) area and at the existing Hetch Hetchy Water and Power Calaveras Substation site. |
| *Zoning:* | Water Management |
| *Block/Lot:* | N/A |
| *Project Sponsor:* | San Francisco Public Utilities Commission<br>Kelley Capone<br>KCapone@sfwater.org<br>(415) 934-5715 |
| *Staff Contact:* | Steven H. Smith<br>Steve.Smith@sfgov.org<br>(415) 558-6373 |

A notice of preparation (NOP) of an environmental impact report (EIR) has been prepared by the San Francisco Planning Department in connection with this project. The NOP is available for public review and comment on the Planning Department's SFPUC Negative Declarations and EIRs web page (http://www.sf-planning.org/puccases). CDs and paper copies are also available at the Planning Information Center (PIC) counter on the first floor of 1660 Mission Street, San Francisco. Referenced materials are available for review by appointment at the Planning Department's office on the fourth floor of 1650 Mission Street. (Call (415) 558-6378).

## PROJECT DESCRIPTION:

The San Francisco Public Utilities Commission (SFPUC) is proposing the Alameda Creek Recapture Project (ACRP or proposed project) on SFPUC Alameda watershed lands in unincorporated Alameda County approximately 0.5-mile south of the Interstate 680 (I-680)/State Route 84 (SR 84) interchange and west of Calaveras Road. The primary goal of the proposed project is the downstream recapture of an annual average of up to 9,820 acre-feet per year (ac ft/yr) (or 3,200 million gallons per year [mgal/yr]) of water that the SFPUC will release from Calaveras Reservoir or bypass around the Alameda Creek Diversion Dam, pursuant to the Calaveras Dam Replacement project's in-stream flow schedules that will be implemented as part of the future operations plan for Calaveras Reservoir.[1] The SFPUC would operate the ACRP to recapture an amount of water equivalent to that which is released and/or bypassed by collecting Alameda Creek water that naturally infiltrates into a quarry pit, Pit F2, in the Sunol Valley approximately 6 miles downstream of Calaveras Reservoir. In doing so, the ACRP would allow the SFPUC to maintain its historic water diversions from the Alameda watershed system and avoid the loss of yield to the regional water system that will occur if the water is not recaptured.

Proposed project components for recapture of the water from Pit F2 include pumps mounted on barges, pipelines extending from the pumps to shore; a new pipeline connecting to the existing Sunol Pump Station Pipeline; throttling valves; flow meter; electrical control building; electrical transformer, and approximately 1,600 feet of overhead power lines extending from HHWP Calaveras Electrical Substation to the new electrical control building. The proposed pumps in Pit F2 would be used to pump the recaptured water from the quarry pit directly to either the SVWTP or San Antonio Reservoir. SFPUC facility operators would utilize existing facilities and infrastructure in the Alameda watershed to support ACRP operations. No work would occur in the bed, bank, or channel of Alameda Creek.

The proposed project is a component of the SFPUC's Water System Improvement Program (WSIP), which includes facility improvement projects designed to: (1) maintain high-quality water; (2) reduce vulnerability to earthquakes; (3) increase delivery reliability and improve the ability to maintain the system; (4) meet customer purchase requests in nondrought and drought periods; (5) enhance sustainability in all system activities; and (6) achieve a cost-effective, fully operational system. Implementation of this project would contribute to meeting the overall WSIP goals and objectives.[2,3]

The Planning Department has determined that an EIR must be prepared for the proposed project prior to any final decision regarding whether to approve the project. The purpose of the EIR is to provide information about potential significant physical environmental effects of the proposed project, to identify possible ways to minimize the significant effects, and to describe and analyze possible alternatives to the proposed project. Preparation of an NOP or EIR does not indicate a decision by the City to approve or to disapprove the project. However, prior to making any such decision, the decision makers must review and consider the information contained in the EIR.

The Planning Department will hold a **PUBLIC SCOPING MEETING** on **Thursday, July 9, 2015 at 6:30 p.m.** at **Sunol Glen School located at 11601 Main Street, Sunol**. The SFPUC will provide an informational open house from **5:30 to 6:30 p.m.** prior to the formal scoping meeting. Meeting location access and restrooms are compliant with the Americans with Disabilities Act. To request a language interpreter or to accommodate persons with disabilities at the scoping meeting, please contact the staff contact listed

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[1] The in-stream flow schedules are required by the Calaveras Dam Replacement project's California Department of Fish and Game (CDFG) Streambed Alteration Agreement (CDFG, 2011) and National Marine Fisheries Service (NMFS) Biological Opinion (NMFS, 2011).

[2] San Francisco Planning Department, 2008. *Final Program Environmental Impact Report on the San Francisco Public Utilities Commission's Water System Improvement Program*. San Francisco Planning Department File No. 2005.0159E, State Clearinghouse No. 2005092026. Certified October 30, 2008.

[3] The Alameda Creek Recapture project is listed in the WSIP Program Environmental Impact Report under its former title, the Alameda Creek Fishery Enhancement project.

above at least 72 hours in advance of the meeting. The purpose of this meeting is to receive oral comments to assist the Planning Department in reviewing the scope and content of the environmental impact analysis and information to be contained in the EIR for the project. Written comments will also be accepted until 5:00 p.m. on July 27, 2015. Written comments should be sent to Sarah B. Jones, San Francisco Planning Department, 1650 Mission Street, Suite 400, San Francisco, CA 94103 or sent by email to Sarah.B.Jones@sfgov.org.

If you work for an agency that is a Responsible or a Trustee Agency, we need to know the views of your agency as to the scope and content of the environmental information that is relevant to your agency's statutory responsibilities in connection with the proposed project. Your agency may need to use the EIR when considering a permit or other approval for this project. We will also need the name of the contact person for your agency. If you have questions concerning environmental review of the proposed project, please contact **Steven Smith** at **(415) 558-6373**.

Members of the public are not required to provide personal identifying information when they communicate with the Commission or the Department. All written or oral communications, including submitted personal contact information, may be made available to the public for inspection and copying upon request and may appear on the Department's website or in other public documents.

# APPENDIX B

## Scoping Meeting Materials

# Public Scoping Meeting

## San Francisco Planning Department
### Environmental Planning Division

## SCOPING MEETING

## Alameda Creek Recapture Project
### Environmental Impact Report

*July 9, 2015*

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SAN FRANCISCO
**PLANNING DEPARTMENT**

## Agenda
## SFPUC Alameda Creek Recapture Project Environmental Impact Report
## Public Scoping Meeting

Sunol Glen School, 11601 Main Street, Sunol
July 9, 2015

Informational Open House 5:30pm to 6:30pm

**Brief Overview of Proposed Project**

Formal Scoping Meeting starts at 6:30pm.

I. **Introduction**
- Introductions to EIR Preparers and Project Sponsor
  - Steven Smith – SF Planning Department (Environmental Review Coordinator)
  - Kelley Capone – SFPUC (Environmental Project Manager)
  - Jesus Almaguer – SFPUC (Project Engineer)
  - Ravi Krishnaiah SFPUC (Project Manager)
  - Ellen Levin – SFPUC Water Enterprise
  - Betsy Lauppe Rhodes – SFPUC (Communications)
  - Kelly White – Environmental Science Associates (EIR Consultant)
  - Meryka Dirks – Environmental Science Associates (EIR Consultant)
- Purpose of meeting
- Meeting format

II. **Project Overview**

II. **Summary of California Environmental Quality Act (CEQA) Process**
- Notice of Preparation/IS (30-day public review period)
- Scoping Meeting
- Draft EIR (45-day public review period, Planning Commission hearing)
- Comments and Responses Document (approx. 14-day review)
- Final EIR Certification (Planning Commission hearing)

IV. **Public Comment**
- Comments on environmental review issues from speakers who fill out a speaker card
- Three minutes per speaker

V. **Final Reminders**
- Submit written comments to **Sarah B. Jones, Environmental Review Officer, San Francisco Planning Department, 1650 Mission Street, Suite 400, San Francisco, CA 94103**, by 5:00 p.m., **July 27, 2015.** Please include **"Alameda Creek Recapture Project"** in the subject line.
- If you have questions or comments regarding the proposed project and the environmental process, please contact Steven Smith at **(415) 558-6373**.

www.sfplanning.org

## Meeting Agenda

- Introductions
- Environmental Review Process Overview (Planning)
- Proposed Project Overview (SFPUC)
- Public Comments
- Closing Remarks

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## Alameda Creek Recapture Project – EIR Scoping Meeting

- Sign in at the table near the entrance.
- Pick up copies of meeting materials.
- If you would like to speak tonight, fill out a speaker card.
- To make written comments, pick up a comment card.
  - ***Drop in Comment Box at the end of the meeting***
  - ***Mail, email, or fax later***
- Please hold all comments until the end of the overview/presentation.

# ENVIRONMENTAL REVIEW PROCESS

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## Project Team Introductions

San Francisco Planning Department

- ***Steven Smith, Environmental Review Coordinator***
- ***Kelly White, Environmental Consultant Lead, ESA***

San Francisco Public Utilities Commission (SFPUC)

- ***Ravi Krishnaiah, Project Manager***
- ***Jesus Almaguer, Project Engineer***
- ***Kelley Capone, Environmental Project Manager***
- ***Betsy Lauppe Rhodes, Communications***

## CEQA Objectives

- Disclose environmental impacts of proposed projects
- Identify ways to avoid or reduce environmental impacts
- Inform the agency decision-making process
- Encourage public participation
- Promote interagency coordination

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## California Environmental Quality Act

Projects require environmental review under the California Environmental Quality Act (CEQA) before they can be considered for approval.

For SFPUC projects, CEQA is implemented by the San Francisco Planning Department, the CEQA Lead Agency

## Environmental Impact Report

- Primary focus of EIR analysis:
    - *Hydrology and Water Quality*
    - *Aquatic and Terrestrial Biology*
    - *Aesthetics*
    - *Land Use*
    - *Air Quality*
    - *Hazards*
- *All environmental topics* provided in the CEQA Guidelines will be addressed in the EIR

## What will the EIR do?

- Provide a description of the project and surrounding environment
- Identify potential environmental effects of the project
- Identify ways to avoid or reduce significant environmental effects through mitigation
- Evaluate a reasonable range of alternatives to the proposed project

## Meeting Purpose

- Hear your comments on the proposed scope aof the environmental review for the Alameda Creek Recapture Project
- Help identify the following to be identified in depth:
  - *Environmental effects (e.g., biology, hydrology, noise, transportation, etc.)*
  - *Range of alternatives*
  - *Methods of assessment*
  - *Mitigation measures*

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## Proposed Environmental Review Schedule

- Notice of Preparation – June 24, 2015
- Public Scoping Meeting – July 9, 2015
- Scoping Period Ends – July 27, 2015

Tentative EIR schedule

- Public Review of Draft EIR – Spring 2016
- Certification of Final EIR – Fall 2016

Hetch Hetchy Regional Water System

## ACRP Project Needs & Objectives

- Recapture future in-stream flow releases from Calaveras Reservoir and Alameda Creek Diversion Dam required under the Calaveras Dam Replacement Project permits.
- Annual average recapture: 9800 AF.

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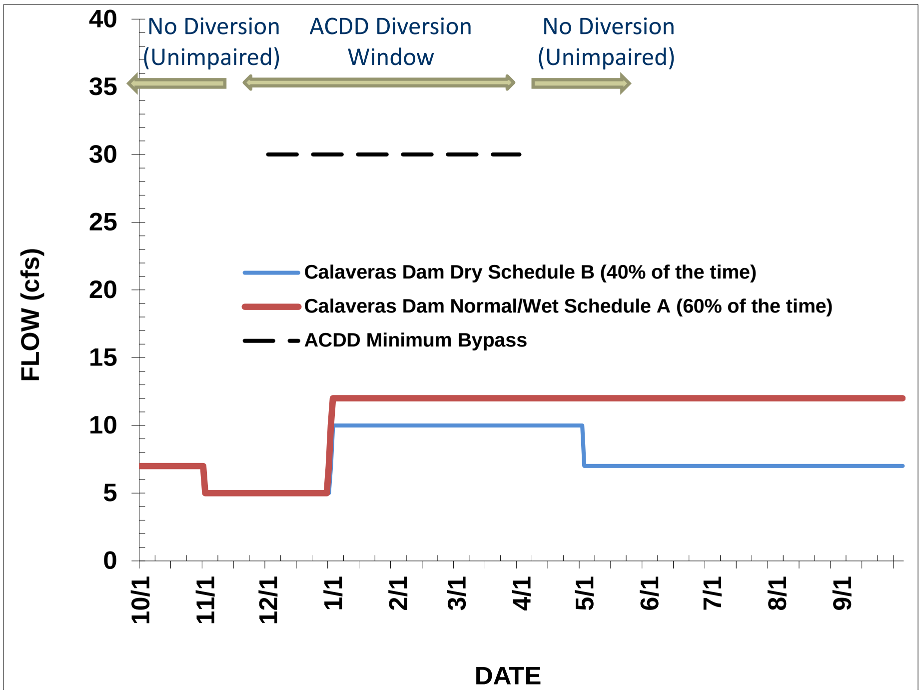
## SFPUC PRESENTATION OF THE PROJECT

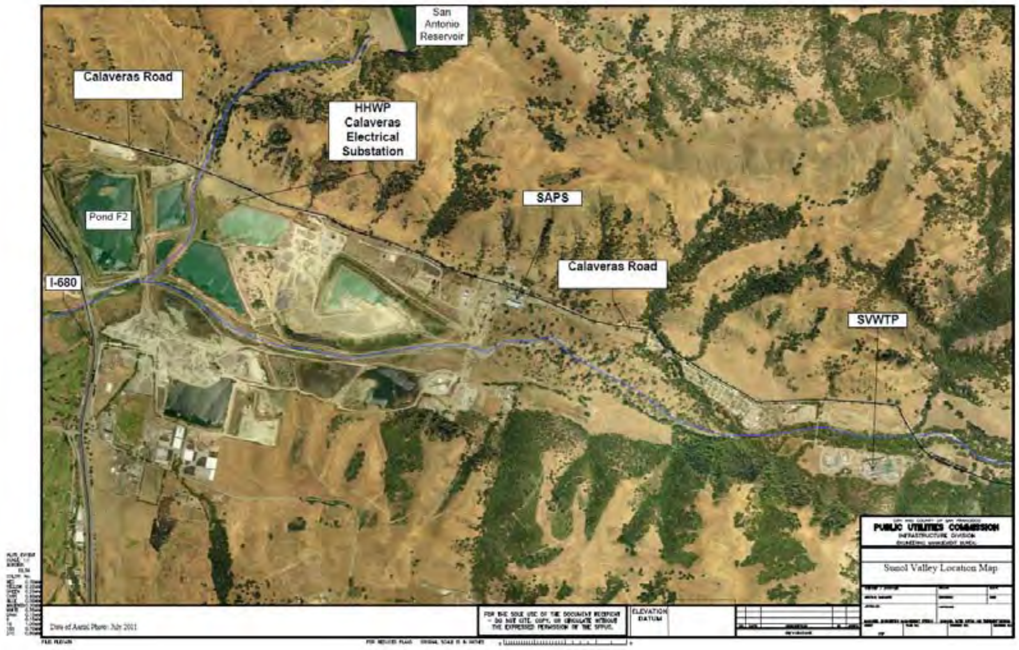
## ACRP Operation

- Operate the Pond as a reservoir:
  - Let the Pond fill in the winter
  - Bring the Pond down in late-Spring to early-Fall
- Pumping to occur generally May - October
- Pumps will be on barges in the Pond
  - Pumping rate: 19.4 MGD (30 cfs)
- Distribution to the RWS through the existing Sunol Pump Pipeline

## Future Instream Flow Releases in Alameda Creek from Calaveras Reservoir and ACDD



# Sunol Valley



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# Project components

- Four vertical turbine pumps on barges
  - including a mooring system
- Four 16-inch flexible discharge pipelines
- New pipe manifold and connection to existing Sunol Pump Station Pipeline
- Throttling valves and a flow meter
- Electrical control building
- Electrical transformer and utility poles

# PUBLIC COMMENTS

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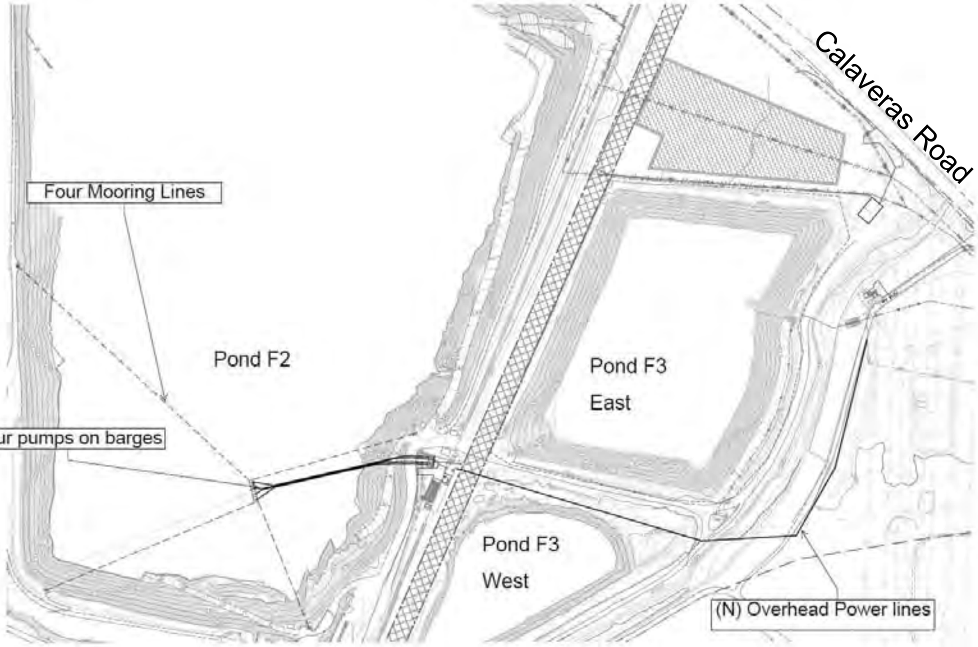
# ACRP Site Plan



## Where to send comments

Scoping comments accepted through Monday, July 27, 2015 (by 5 p.m.).

Send Comment Letter :

- By U.S. mail to:

  **San Francisco Planning Department**
  **Attn: Sarah Jones, Environmental Review Officer**
  **Alameda Creek Recapture Project**
  **1650 Mission Street, Suite 400**
  **San Francisco, CA 94103**
- By fax to (415) 558-*6409*
- By email to: *Sarah.B.Jones@sfgov.org*

## Comment Session Ground Rules

- Submit speaker cards to speak
- Wait until your name is called
- State your name & speak clearly
- Limit comments to 3 minutes
- Use comment forms for more extensive input

## San Francisco Planning Department
## EIR Public Scoping Meeting Written Comment Form

SFPUC Alameda Creek Recapture Project
Case # 2015-004827ENV

If you wish to submit written comments on the above project, you may do so on this sheet (although use of this form is not required). Please drop written comments in the Comment Box at today's public scoping meeting, or submit by mail to Sarah B. Jones, San Francisco Planning Department, 1650 Mission Street, Suite 400, San Francisco, CA 94103; by fax to 415-558-6409 (Attn: Sarah Jones); or by email to Sarah.B.Jones@sfgov.org. **All comments must be submitted no later than 5 P.M., July 27, 2015.**

*Write your comments regarding the environmental review for the project here. Use the back of the sheet or additional pages if necessary.*

Name: ____________________

Organization (if any): ____________________

Address: ____________________

---

## For More Information

About the Environmental Review Process:

*Steven Smith, SF Planning Dept.*
*Environmental Planning Division*
*(415) 558-6373, Steve.Smith@sfgov.org*

The Notice of Preparation (NOP) is available online at the Planning Department website:

*http://tinyurl.com/sfpucceqadocs*

About the Proposed Project:

*Kelley Capone, SFPUC*
*Bureau of Environmental Management*
*(415) 934-5715, KCapone@sfwater.org*

SAN FRANCISCO
**PLANNING DEPARTMENT**

## EIR Public Scoping Meeting Sign-In Sheet
### SFPUC Alameda Creek Recapture Project
### July 9, 2015

| PRINT NAME | ORGANIZATION/AFFILIATION | ADDRESS | TELEPHONE | EMAIL |
|---|---|---|---|---|
| 1. Jeff Miller | ACA | | 510-499-9185 | jeff@alameda creek.org |
| 2. BoB FOSTER | SUNOL RESIDENT | Po Box 6 SUNOL CA 94586 | 9258620223 | |
| 3. THOMAS NIESAR | ACWD | | 510-668-6549 | Thomas.Niesar @ACWD.com |
| 4. DOUG WITMORE | TVFF | | 925-980-8760 | DOUGWIT@ SBCGLOBAL.NET |
| 5. Connie DeGrange | Sunol Resident | 10833 Foothill Rd Sunol 94586 | 925-862-2084 | cdegrange@ comcast.net |
| 6. ROSEMARY CHANG | Sunol Resident | 11044 Foothill Rd Sunol CA 94586 | 925-862-2019 | RECHANG@COMCAST.NET |
| 7. Ted Buttner | " | " | " | EMBUTTNER@COMCAST.NET |
| 8. DAN ZACHARISEN | HANSON AGGREGATES | 7999 ATHENOUR WAY SUNOL, 94586 | 925-835-1203 | DAN.ZACHARISEN@ LEHIGHHANSON.COM |
| 9. Jim Summers | SUNOL AGGREGATES | | 925 828-7999 | JSummers@ desilvagroup.com |
| 10. | | | | |

**Privacy Notice: All information provided on this form will become part of the public record.*

www.sfplanning.org

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**San Francisco Planning Department**
**Speaker Card**

To aid in the preparation of minutes or a transcript, you are requested, but not required, to provide this information:

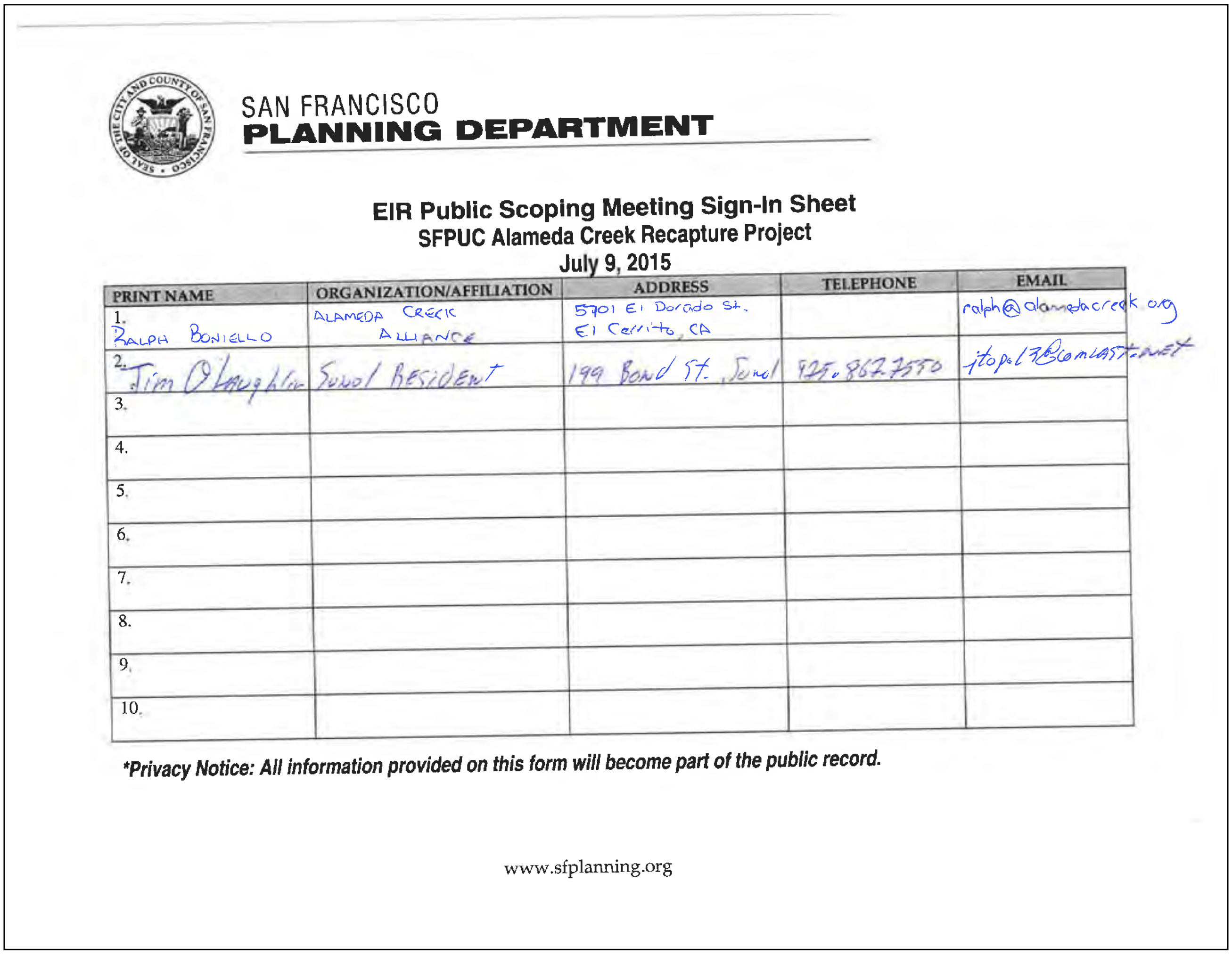
Please **PRINT** then give to meeting moderator

Name: ____________________

Organization (if any): ____________________

Address: ____________________

www.sfplanning.org



SAN FRANCISCO
**PLANNING DEPARTMENT**

## EIR Public Scoping Meeting Sign-In Sheet
### SFPUC Alameda Creek Recapture Project
### July 9, 2015

| PRINT NAME | ORGANIZATION/AFFILIATION | ADDRESS | TELEPHONE | EMAIL |
|---|---|---|---|---|
| 1. RALPH BONIELLO | ALAMEDA CREEK ALLIANCE | 5701 El Dorado St.<br>El Cerrito, CA | | ralph@alamedacreek.org |
| 2. Jim OLaughlin | Sunol RESIDENT | 199 Bond St. Sunol | 925.8627550 | jtopol7@comcast.net |
| 3. | | | | |
| 4. | | | | |
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# APPENDIX C

## Scoping Meeting Transcripts

# SAN FRANCISCO PLANNING DEPARTMENT
# PUBLIC SCOPING MEETING
# ENVIRONMENTAL IMPACT REPORT

# ALAMEDA CREEK RECAPTURE PROJECT

---o0o---

Thursday, July 9, 2015
Sunol Glen School
11601 Main Street
Sunol, California

REPORTED BY: DEBORAH FUQUA, CSR #12948

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## A P P E A R A N C E S

SAN FRANCISCO PLANNING COMMISSION:
Steven Smith, EIR Coordinator

SAN FRANCISCO PUBLIC UTILITIES COMMISSION
Ravi Krishnaiah, Project Manager
Kelley Capone, Environmental Project Manager
Jesus Almaguer, Project Engineer
Betsy Lauppe Rhodes, Communications

ESA
Kelly White, Consultant

## PUBLIC COMMENTS

---o0o---

Thursday, July 9, 2015 6:39 o'clock p.m.

---o0o---

P R O C E E D I N G S

STEVEN SMITH: Okay. I think we're going to get started with the scoping portion, if folks are all set.

Well, welcome everybody. Thanks for coming. This is the scoping meeting for Alameda Creek Recapture Project.

My name is Steven Smith. I'm with the San Francisco Planning Department. The Planning Department is the CEQA lead agency.

Just a couple reminders, if you haven't already, we'd appreciate if you would sign in. If you would like to speak tonight, filling out a speaker card is also very helpful. There also are ways to make written comments, so tonight is one opportunity. We've got a court reporter here tonight I want people to be aware of.

Everything said goes into a transcript which becomes part of the administrative record for the project. But you're also welcomed to provide brief comments tonight. We've got a box for that. Or you could follow up with an e-mail or a written letter if you'd like.

And if you would, this is something of a

one-way communication. I'm going to do a presentation, and I'd just ask for your comments after that. I heard a lot of good comments during the open house, so hopefully of you will repeat those either tonight or in writing. But it's not a question-and-answer kind of forum; I just want you to be aware of that.

So we'll do some introductions. I'll talk about the environmental review process related to CEQA, the California Environmental Quality Act. We'll do a recap of the proposed project, a short version of what Jesus did earlier, and then we'll open up for public comments after that.

So again, I'm Steven Smith. I wanted to introduce Kelly White, our consultant for the project. She's from ESA. And then from PUC, Ravi Krishnaiah's here; he's the project manager. Jesus Almaguer is the project engineer. You'll hear from him again in a bit. He's going to do the project description.

Kelley Capone is my counterpart at PUC; she's the environmental project manager. And Betsy Rhodes is also here from PUC, communications.

So just a couple slides about the environmental review process, which will hopefully help inform your comments tonight.

Why we're here is the California Environmental

Quality Act, or CEQA. It's a state law, basically requires the consideration of environmental consequences before any public agency approves a project. It does a lot more than that, but that's basically the gist of it.

In the City of San Francisco, the Planning Department, whom I work for is, is always the CEQA lead agency. So the PUC is the project sponsor, but the San Francisco Planning Department is responsible for compliance with the California Environmental Quality Act.

Some of the objectives of CEQA, again, really primarily about disclosing environmental impacts. In so doing, that also helps us identify ways to avoid or reduce the environmental impacts. Public participation is also a big part of it. Tonight is a good example.

As well, there's a lot of agencies that will rely on our analysis that also will issue permits. So it's also a means by which to inform other public agencies that are involved and help us all communicate together on a common analysis.

So we will be preparing an environmental impact report for this project, also known as an EIR. Basically, the EIR provides a very detailed project description for this project, specifically during this

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case. We'll do a thorough analysis of the environmental impacts, look for ways to mitigate those impacts, and also formulate and then analyze a range of alternatives that could meet some, maybe most, of the project's objectives but that could also help reduce or avoid the environmental consequences of the proposed project.

So this is more or less what we expect the focus of the EIR to be: Hydrology and water quality, biology -- you know, those are some of the obvious topics. We're still getting started with the analysis.

I do want to emphasize that we're going to look at all of the topics that are required under CEQA, so to the extent anybody has a comment or concern about any environment issue area, please just let us know because it will be addressed in some fashion in the EIR.

Just real briefly, the schedule: the Notice of Preparation went out. If anybody wanted a copy of that, we have some at the back table. It's a good overview of the proposed project. That was published on the 24th. Tonight, we're here obviously having the scoping meeting. And the scoping period ends on July 27th. Please keep that in mind. If you want to submit written comments, that's the deadline.

And then, tentatively we expect the Draft EIR to be published in spring of 2016. And that's, again, an opportunity for the public to comment. Once that's distributed, we solicit comments from the public and other agencies about our draft analysis before we certify it as a final EIR, which we expect to occur around fall of 2016.

So, again, the purpose of this meeting is really to hear from you. There's not going to be any back and forth tonight. We're really here to hear your concerns. A lot of you have local perspective that can be valuable to help shape the content and scope of the EIR.

So in that regard, your comments are most pertinent in terms of the environmental impacts. It's not so much whether you like the project or not. You're helping us write the EIR by commenting on concerns related to environmental effects, alternatives, perhaps the way we go about analyzing the impacts, mitigation measures. Those are the types of relevant topics that are really most pertinent to the scoping meeting.

So I'll turn it back, I think, to Jesus. We'll get into a brief overview, kind of a mini version of what some of you heard earlier.

JESUS ALMAGUER: Hi, I'm Jesus Almaguer. I'm the project engineer for the Alameda Creek Recapture Project.

So the recapture -- sorry.

The project, the proposed needs and objectives: recapture the future instream flow releases from Calaveras Reservoir and Alameda Creek Diversion Dam required under the Calaveras Dam Replacement Project permits. The annual recapture average is 9,800 acre feet. That's equivalent to 32 million gallons -- 3200 million gallons, sorry.

Shown up here is the future instream flow releases for the Alameda Creek from the Calaveras Reservoir and bypasses around the Alameda Creek Diversion Dam.

On the top is the Alameda Creek Diversion Dam flow releases. And then on the bottom is the Calaveras flow releases for the dry year and the normal wet years. Those are the three flow releases.

The Alameda Creek Recapture Project plans to operate the pond similar to -- as a reservoir. The water naturally infiltrates into the pond and fills in the winter, and then the pond is slowly drawn down late spring to early fall.

So pumping will occur generally from May to

October. The water will be captured by pumping it, using pumps on barges in the pond. And the pumping rate is 19.4 million gallons per day, or it's equivalent to 30 cubic feet per second.

Once the water's pumped, it's going to get sent to the Regional Water System through the existing pipes in the Sunol Valley, direct connected to our existing Sunol pipeline.

So the project components which will be designed and installed into the proposed project are:

Four vertical turbine pumps on barges. Each vertical turbine pump will have a dedicated barge, be clustered together, tethered into a cluster of four. A mooring system will help -- will keep it in its desired location.

Each pump has its 16-inch flexible discharge line. So this will connect the pumps to the valve vaults and the pipelines on the shore.

The new manifold and pipeline will connect it to the existing pipes and send it into the regional water system.

The throttling valves or control valves and flow meter will be used to operate the facility.

And an electrical control building is used to house all the major electrical components to operate

the facility.

The power will be provided by a nearby substation so the power and communication cables will be ran through overhead lines and utility poles to the project site.

So this is a location of the map of the Sunol area. This is where the Pond F2 is. This pond water will be sent to either San Antonio Reservoir or the Sunol Valley Water Treatment Plant using pipes that are not shown on this drawing.

The power will come primarily -- will come from the substation, which is located close to Pond F2 on the other side of -- south side of San Antonio Creek.

This is the site plan which shows the mooring lines and the four pumps on barges and the discharge -- flexible discharge lines which go to onshore valve vault. And the other note is the new overhead power lines, which also will have the communication wires. So it runs from the new project site, the proposed project site, to the existing power lines just south of San Antonio Creek.

At the electrical control building, which is shown, a small area here, that's a prefabricated building. And it will house all the electrical components, like I said earlier.

And that is it.

STEVEN SMITH: Great. So, again, you know, we're here to hear from you tonight. So hopefully, if you're interested in making a comment, you filled out a speaker card.

Meryka, I think, was collecting those.

KELLY WHITE: I can collect it.

STEVEN SMITH: Okay, Kelly's got it.

Briefly, a couple of ground rules.

If you wouldn't mind speaking your name when you come up. Three minutes, that's a rough guideline. I don't think it's going to take a long time to get through public comments tonight. But just a reminder too, there's ways to submit written comments, whether it's by e-mail or through a letter or fax even.

So -- and we have a court reporter here. Again, I just want you to be aware of that.

So let me ask, if folks get up and just speak, that will work for you? Okay.

Kelly do you have the first?

KELLY WHITE: I do.

STEVEN SMITH: Do you mind?

KELLY WHITE: Jeff Miller from the Alameda Creek Alliance.

JEFF MILLER: Yes. Hope you can hear me. Jeff Miller, J-E-F-F, M-I-L-L-E-R, Director of the Alameda Creek Alliance.

I've got to say, I mean, it's a pretty interesting project. It is kind of elegant to take water off stream. But, unfortunately, water doesn't just appear from nowhere. So I'm hoping the EIR would look at where this flow is coming from.

It's apparently already known that it's subsurface flow coming into F pit. If there's any hydraulic connection between that flow and surface flows in Alameda Creek so that, when pumping is happening, is that going to increase infiltration rates? Is it in any way going to affect surface flow in Alameda Creek adjacent to the quarry or upstream of the quarry?

And then also look at downstream; is there -- where is that water ultimately going? And will pumping at all impact surface flow in, say, Niles Canyon or in downstream reaches.

Obviously, the time of year, if it is impacting, the time of year will have some impact on migratory fish or fish habitat.

I'm also hoping the EIR will look at -- I see it as kind of two-flow. There's two kinds of flows being released. There are flows being released from Calaveras Reservoir, cold water flows coming in the summer. Those are flows that are being released at a time when they naturally are going to infiltrate into the alluvium there in Sunol Valley and were not going to continue downstream. So recapturing those flows is not going to harm any fish or fish habitat downstream.

The flows from the diversion dam that are being bypassed the diversion dam, though, are intended as migration flows. And that's a different type of mitigation flow. And that's flow that's intended to be moving downstream so the fish can move upstream on those flows and other flows that are in the creek.

And I'd be curious how the Calaveras Dam Environmental Impact Report and the Biological Opinion for the Calaveras Dam Replacement Project characterized those bypass flows. If those are mitigation flows, that it states clearly are going to be moving down stream and providing fish passage and habitat downstream, I think it is raises some interesting questions for recapturing those kind of mitigation flows.

That's pretty much it.

KELLY WHITE: Jim O'Laughlin?

JIM O'LAUGHLIN: Jim, J-I-M, O, apostrophe L-A-U-G-H-L-I-N, Sunol resident.

The one issue I mentioned previously would be what impact is there going to be on the groundwater levels, especially below the pit, to release them out in Niles Canyon in terms of the immediate Sunol area.

A second is related to the reclamation plan. It would be interesting to see if there's a way of providing an acceleration of the reclamation plan for that pit at the time that is -- that the use of the pit is being substantially changed and not have to wait another 26 years before they start talking about that. It would be a real plus for, I think, everyone who has to go by there and especially local people who have to live close by if there could be some reclamation accelerated in that area.

The whole question of what is -- what historically has been required in terms of release, what previous commitments were and how exactly -- exactly how those previous commitments, especially legal commitments, are going to be impacted by this project. And we talked about that a bit tonight, but it still, I think, would be in everyone's interest to have that sort of crystal clear, so that we really do know what was the commitment and what is going to be the new commitment.

I think everyone would agree that the goal would be to have all the water coming down the creek all the time. But the real question is what has to happen, not what we'd like to see.

The question in terms of the cost and specifically how much electricity would be used to, you know, pump this water.

And that's all my questions.

KELLY WHITE: Thanks.

I didn't see any other filled-out cards. Anyone? Going once?

BOB FOSTER: I have a question. I'll fill out the card. I was waiting.

KELLY WHITE: Do you need a minute or --

STEVEN SMITH: If you want to just state your name --

BOB FOSTER: I wanted to hear what other people were asking because a lot of these things are commonsense questions that would be evoked by this process.

Bob Foster, B-O-B, F-O-S-T-E-R.

My question has to do with the cost, what is this project costs; how is it going to be financed; what effect will it have on our rates, these kinds of things.

The other question I have is I suspect that this project is the result of a lot of conversations, something that -- influenced by what has gone before, which you tried to explain. But I don't really understand the historical agreement. But I can read about that in your materials.

I will be curious as to what alternatives did you turn down for whatever reason. It seems that there are -- if we're trying to take care of the ecology of that flow of water to permit ancestral fish to be able to move up, that the further on down, the closer to sea that you start process of reclaiming water that has come down, the less danger there is of simply having things happen that you can't -- we don't -- we simply don't know enough.

And I'm not a hydrologist, but that challenge of -- of figuring out, "Well, if we take this out, what is going to happen here, here and here and here?" The devil is in the details. And when we start to mess with systems, we try to do our best to figure out, "Well, what is going to happen?"

And it seems like when you start removing water from a system that has existed for millennia, can you really predict what's going to happen? In other words, can you write an EIR that is complete enough so that we can make a good decision about whether to support this or not to support it?

So it would be nice for whoever is going to do the research to prepare us to be able to have us be able to see there's some credibility here.

What has happened before? Are there other places that have done this kind of thing? What has happened there? Because right now, I'm overwhelmed with the amount of ignorance I have on -- I mean, I understand financially and in terms of the business sense why SFPUC's interested in doing this. You have a resource, and you're counting on being able to maintain the resource for your customers.

But I don't know. I'm -- I'm waiting to really see the EIR before I can be any better in asking the right questions.

CONNIE DeGRANGE: I don't have a card. Connie C-O-N-N-I-E, D-E, capital G-R-A-N-G-E. And I recall that, when the City of San Francisco bought the Spring Valley Water Company and then for several years after that, that there were -- I think there were about 32 wells in the area that were drawing down the water table.

And wasn't there an agreement reached that San Francisco would stop pumping out of the valley and

stop drawing down the water table? And when I look at this project, it appears to be just one giant well pumping the groundwater.

So I think I'd like to hear more about the same thing that Jeff was talking about and Jim was talking about, the impacts of the draw-down, of pumping from that giant well, which is, you know, a quarry.

STEVEN SMITH: Anyone else?

JIM O'LAUGHLIN: I assume that -- I saw in one of your documents that you will look at some alternatives. And I guess my question is will you carefully look at the alternative of doing nothing except what you are legally responsible to do based on current historical agreements?

And then what would -- and then part of that would be, well, what would be the impact? Supposedly what would be the negative impact which would rule that out?

STEVEN SMITH: Anybody else?

(No response)

STEVEN SMITH: This information here is how can you go about submitting your written comments -- we also have materials up there you're welcome to take with you -- by e-mail, fax.

KELLY WHITE: It's on the comment card. Even if you don't want to fill it out tonight, all of the information for submitting written comments is on the comment card as well as at the end of the NOP.

STEVEN SMITH: Right. You can drop off a comment tonight, if you like.

Well, thank you very much, everybody. We really appreciate you coming tonight. I'll formally close the hearing. And just want to say staff will be around for a little while, if there's any other follow-up questions you want to pose. And then as well, I think I've got some -- feel free to contact me particularly for anything related to the environmental review process. And Kelly Capone is a great contact if you have questions specific to the project. Thank you again, everybody.

(Whereupon, the proceedings concluded at 7:05 o'clock p.m.)

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STATE OF CALIFORNIA )
) ss.
COUNTY OF MARIN )

I, DEBORAH FUQUA, a Certified Shorthand Reporter of the State of California, do hereby certify that the foregoing proceedings were reported by me, a disinterested person, and thereafter transcribed under my direction into typewriting and is a true and correct transcription of said proceedings.

I further certify that I am not of counsel or attorney for either or any of the parties in the foregoing proceeding and caption named, nor in any way interested in the outcome of the cause named in said caption.

Dated the 30th day of July, 2015.

DEBORAH FUQUA
CSR NO. 12948

# APPENDIX D

## Comments Received During EIR Scoping Process

**From:** Hendrickson, Beth@DOC [mailto:Beth.Hendrickson@conservation.ca.gov]
**Sent:** Monday, July 20, 2015 3:00 PM
**To:** Smith, Steve (CWP)
**Cc:** Goodwin, Joshua@DOC; james.gilford@acgov.org
**Subject:** RE: Alameda Creek Recapture Project

Hi Steve,

Thanks for your help. I was able to determine that the mine in question has a CA Mine ID #91-01-0013. They have been reporting "active" with no production since 2007; which means that technically they are abandoned. In any case, the reclamation plan for the mine will need to be amended to account for this new end use. Alameda County would be the lead agency for the reclamation plan amendment. Since SF doesn't have any mines you may be unaware of the requirements under the Surface Mining and Reclamation Act of 1975 (SMARA), and I just wanted to make sure that SMARA requirements are also met during this project.

Thank you,

Beth Hendrickson
Manager, Environmental Services Unit
Office of Mine Reclamation
801 K St. MS 09-06
Sacramento, CA 95814
(916) 445-6175
fax 445-6066

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SaveOurWater.com · Drought.CA.gov

**From:** Smith, Steve (CWP) [mailto:steve.smith@sfgov.org]
**Sent:** Monday, July 20, 2015 2:25 PM
**To:** Hendrickson, Beth@DOC
**Subject:** RE: Alameda Creek Recapture Project

Hi Beth – the quarry pit in question, Pit F2, was previously the site of an aggregate mining operation under Surface Mining Permit 24. The current owner/operator is Hanson Aggregates in the vicinity, though it's possible a different owner operated the site when it was actively mined. I believe the mining work at Pit F2 ended around 2006.

Let me know if you have any additional questions.

Thanks,
Steve

---

**Steven H. Smith, AICP**
**Senior Environmental Planner**

Planning Department│City and County of San Francisco
1650 Mission Street, Suite 400, San Francisco, CA 94103
Direct: 415-558-6373│Fax: 415-558-6409
Email: steve.smith@sfgov.org
Web: www.sfplanning.org

**From:** Hendrickson, Beth@DOC [mailto:Beth.Hendrickson@conservation.ca.gov]
**Sent:** Monday, July 20, 2015 8:31 AM
**To:** Smith, Steve (CWP)
**Subject:** Alameda Creek Recapture Project

Hello,

I'm trying to determine whether the quarry to be used in this project was ever operated under the Surface Mining and Reclamation Act of 1975. Do you have any more information about it?

Thank you,

Beth Hendrickson
Manager, Environmental Services Unit
Office of Mine Reclamation
801 K St. MS 09-06
Sacramento, CA 95814
(916) 445-6175
fax 445-6066

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July 23, 2015

SFGEN025
ALA-680-R 11.04
SCH# 2015062072

Mr. Steve Smith
Planning Division
City and County of San Francisco
1650 Mission Street, Suite 400
San Francisco, CA 94103

**SFPUC Alameda Creek Recapture Project – Notice of Preparation**

Dear Mr. Smith:

Thank you for including the California Department of Transportation (Caltrans) in the environmental review process for the project referenced above. Our comments seek to promote the State's new mission, vision, and smart mobility goals for sustainability, livability, economy, safety and health. We have reviewed the Notice of Preparation and have the following comments to offer.

***Project Understanding***

The Alameda Creek Recapture Project (Project) is located on San Francisco Public Utilities Commissions (SFPUC's) Alameda watershed lands in unincorporated Alameda County. Recaptured water will be released from Calaveras Reservoir and/or bypassed around the Alameda Creek Diversion Dam during future operation of Calaveras Reservoir. The Project is a component of the SFPUC's Water System Improvement Program. It will allow the SFPUC to maintain its historic water diversions from the Alameda watershed system and avoid loss of regional water system yield. Water would be recaptured from a quarry pit in the Sunol Valley located an approximate one half mile south of the Interstate 680 (I-680) / State Route 84 interchange.

***State Route 84 – Niles Canyon Road Safety Improvements***

Please be advised that proposed safety improvements on State Route 84, including the signalization of the State Route 84/Paloma Way/Pleasanton-Sunol Road/Temple Road intersection, are part of the Niles Canyon Safety Improvement Project under Caltrans State Highway Operation and Protection Program for Alameda County. The environmental document should consider possible overlapping of construction operations and traffic impacts, and should coordinate with Caltrans, if necessary. Please see the following website for more information: http://www.dot.ca.gov/dist4/nilescanyon/.

***Transportation Impact Study***

During construction or starting "opening day," this project may generate traffic at volumes sufficient to impact the operations of nearby State highway facilities at I-680 and State Route 84. It may be necessary to prepare a Transportation Impact Study (TIS). If it is found that a TIS is not required, please provide a verifiable explanation for this finding. The following criteria are among those that may be used to determine whether a TIS is warranted:

1. The project will generate over 100 peak hour trips assigned to a State highway facility.

2. The project will generate between 50 and 100 peak hour trips assigned to a State highway facility, and the affected highway facilities are experiencing noticeable delay; approaching unstable traffic flow (level of service (LOS) "C" or "D") conditions.

3. The project will generate between one to 49 peak hour trips assigned to a State highway facility, and the affected highway facilities are experiencing significant delay; unstable or forced traffic flow (LOS "E" or "F") conditions.

We are in the process of updating our *Guide for the Preparation of Traffic Impact Studies* (TIS Guide*)* for consistency with SB 743, but meanwhile recommend using the Caltrans TIS Guide for determining which scenarios and methodologies to use in the analysis, available at: http://dot.ca.gov/hq/tpp/offices/ocp/igr_ceqa_files/tisguide.pdf.

***Transportation Management Plan***

A Transportation Management Plan (TMP) or construction TIS may be required of the City for approval by Caltrans prior to construction where traffic restrictions and detours affect State highways. TMPs must be prepared in accordance with California *Manual on Uniform Traffic Control Devices.* Please ensure that such plans are also prepared in accordance with the transportation management plan requirements of the corresponding jurisdictions. For further TMP assistance, please contact the Office of Traffic Management Plans/Operations Strategies at 510-286-4579. TMP information is also available at the following webpage: http://www.dot.ca.gov/hq/traffops/engineering/mutcd/pdf/camutcd2014/Part6.pdf.

***Transportation Permit***

Project work that requires movement of oversized or excessive load vehicles on State roadways requires a transportation permit that is issued by Caltrans. To apply, a completed transportation permit application with the determined specific route(s) for the shipper to follow from origin to destination must be submitted to: Caltrans Transportation Permits Office, 1823 14th Street, Sacramento, CA 95811-7119. See the following website for more information: http://www.dot.ca.gov/hq/traffops/permits.

***Encroachment Permit***

Please be advised that any work or traffic control that encroaches onto the State Right-of-way

(ROW) requires an encroachment permit that is issued by Caltrans. Traffic-related mitigation measures should be incorporated into the construction plans prior to the encroachment permit process. To apply, a completed encroachment permit application, environmental documentation, and five (5) sets of plans clearly indicating State ROW must be submitted to the following address: David Salladay, District Office Chief, Office of Permits, California Department of Transportation, District 4, P.O. Box 23660, Oakland, CA 94623-0660. See the following website for more information: http://www.dot.ca.gov/hq/traffops/developserv/permits.

***Mitigation Responsibility***
As the lead agency, the City and County of San Francisco is responsible for identifying and ensuring the coordinated implementation of all project mitigations. The project's fair share contribution, financing, scheduling, implementation responsibilities associated with planned improvements on Caltrans ROW should be listed, in addition to identifying viable funding sources per General Plan Guidelines.

Should you have any questions regarding this letter or require additional information, please contact Sherie George at (510) 286-5535 or by email at: sherie.george@dot.ca.gov.

Sincerely,

PATRICIA MAURICE
District Branch Chief
Local Development - Intergovernmental Review

c: State Clearinghouse

---

STATE OF CALIFORNIA – CALIFORNIA NATURAL RESOURCES AGENCY
**EDMUND G. BROWN JR.**, *Governor*

**DEPARTMENT OF WATER RESOURCES**
1416 NINTH STREET, P.O. BOX 942836
SACRAMENTO, CA 94236-0001
(916) 653-5791

JUL 13 2015

Mr. Steve Smith, Project Manager
San Francisco Planning Department
1650 Mission Street, Suite 400
San Francisco, California 94103-2479

Notice of Preparation of Environmental Impact Report for Alameda Creek Recapture Project
Alameda County

Dear Mr. Smith:

We have reviewed your submittal entitled Notice of Preparation of Environmental Impact Report (NOP) for the above referenced project which describes the construction of:

- Four anchored barge-mounted floating pumps
- Four flexible discharge pipelines and manifold
- Ancillary electrical instrumentation

No above ground barrier will be constructed according to our conversation with you on July 7, 2015. Therefore, this project as described is not subject to State jurisdiction for dam safety.

As defined in Sections 6002 and 6003, Division 3 of the California Water Code, dams 25 feet or higher with a storage capacity of more than 15 acre-feet, and dams higher than 6 feet with a storage capacity of 50 acre-feet or more are subject to State jurisdiction. Dam height is defined as the vertical distance measured from the maximum possible water storage level to the downstream toe of the barrier.

If the design of the proposed project changes such that it includes a jurisdictional dam, it will become subject to State jurisdiction for dam safety upon construction. In the event the proposed project is under State jurisdiction, a construction application, together with plans, specifications, and the appropriate fees must be filed with this Division. All dam safety related issues must be satisfactorily addressed prior to our approval of the application. Additionally, all design and construction work must be performed under the direction of a Civil Engineer registered in California.

If you have any questions or need additional information, you may contact Office Engineer Roberto Cervantes at (916) 227-4601 or me at (916) 227-4604.

Sincerely,

for YDE

Y-Nhi D. Enzler, Regional Engineer
Northern Region
Field Engineering Branch
Division of Safety of Dams

cc: Ms. Nadell Gayou, Resources Agency Project Coordinator
Environmental Review Section
Division of Statewide Integrated Water Management
901 P Street
Sacramento, California 95814

Governor's Office of Planning and Research
State Clearinghouse
Post Office Box 3044
Sacramento, California 95812-3044

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CALIFORNIA
Water Boards

EDMUND G. BROWN JR.
GOVERNOR

MATTHEW RODRIQUEZ
SECRETARY FOR
ENVIRONMENTAL PROTECTION

**San Francisco Bay Regional Water Quality Control Board**

*Sent via electronic mail: No hard copy to follow*

July 22, 2015
CIWQS Place ID No. 816770

City and County of San Francisco
San Francisco Planning Department
1650 Mission Street, Suite 400
San Francisco CA 94103-2479

Attn.: Steve Smith (steve.smith@sfgov.org)

**Subject: Notice of Preparation for the San Francisco Public Utilities Commission Alameda Creek Replacement Project, Draft Environmental Impact Report.**
**SCH No. 2015062072**

Dear Mr. Smith:

San Francisco Bay Regional Water Quality Control Board (Water Board) staff has reviewed the Notice of Preparation for the San Francisco Public Utilities Commission Alameda Creek Replacement Project, Draft Environmental Impact Report. The San Francisco Public Utilities Commission (SFPUC) is proposing to implement the Alameda Creek Recapture Project (Project) on SFPUC Alameda watershed lands in unincorporated Alameda County. The Project would recapture an annual average of up to 9,820 acre-feet per year (or 3,200 million gallons per year) of water that will be released from Calaveras Reservoir and/or bypassed around the Alameda Creek Diversion Dam during future operation of Calaveras Reservoir. Water would be recaptured from a quarry pit, Pit F2, in the Sunol Valley located approximately 6 miles downstream of Calaveras Reservoir and 0.5-mile south of the I-680/State Route 84 interchange. Water Board staff have the following comments on areas of potential impacts that should be assessed in the

**Comment 1. Establishing water rights to water taken from Pit F2.**

The SFPUC is planning to extract water from Pit F2 to compensate for water that will be released from Calaveras Reservoir or bypassed around the Alameda Creek Diversion Dam in order to enhance habitat in Alameda Creek for salmonids. Quarry Pit F2 receives water that infiltrates through the bed of Alameda and into Pit F2. Please include a discussion of water rights in the Draft Environmental Impact Report (DEIR) for the Project. The DEIR should describe how the SFPUC will establish water rights to water that infiltrates into Pit F2.

DR. TERRY F. YOUNG, CHAIR | BRUCE H. WOLFE, EXECUTIVE OFFICER

1515 Clay St., Suite 1400, Oakland, CA 94612 | www.waterboards.ca.gov/sanfranciscobay

♻ RECYCLED PAPER

**Comment 2. Assessing the impact of the Project on overall infiltration of water through the bed of Alameda Creek.**

The extraction of water from Pit F2 will lower the local groundwater elevation and increase the driving force for water infiltrating through the bed of Alameda Creek in the vicinity of the Project. It is possible that the Project will result in greater rates of infiltration to adjoining quarry pits, as well as into Pit F2. The DEIR should assess the impact of the extraction of water from Pit F2 on increasing the regional rate of infiltration through the bed of Alameda Creek, and reducing the quantity of flow that remains in Alameda Creek. This assessment should include potential impacts to fish passage in response to increased rates of infiltration.

Please contact me at (510) 622-5680 or brian.wines@waterboards.ca.gov if you have any questions.

Sincerely,

Brian Wines
Water Resource Control Engineer

Attachment

cc: State Clearinghouse (state.clearinghouse@opr.ca.gov)
San Francisco Public Utilities Commission, Kelley Capone (kcapone@sfwater.org)

---

BAWSCA
Bay Area Water Supply & Conservation Agency

July 27, 2015

Ms. Sarah B. Jones
Environmental Review Officer
Alameda Creek Recapture Project EIR Scoping Comments
San Francisco Planning Department
1650 Mission Street, Suite 400
San Francisco, CA 94103

**Subject:** **Case No. 2015-004827ENV – Response to Notice of Preparation (NOP) of an EIR for the SFPUC Alameda Creek Recapture Project**

Dear Ms. Jones,

Thank you for the opportunity to provide the following comments from the Bay Area Water Supply & Conservation Agency (BAWSCA). BAWSCA represents the interests of 25 cities and water districts, an investor-owned utility, and a university, that purchase water wholesale from the San Francisco Regional Water System. These agencies, in turn, provide water to 1.7 million people, businesses and community organizations in Alameda, Santa Clara and San Mateo Counties. These comments are in response to the Notice of Preparation (NOP) of an Environmental Impact Report (EIR) for the Alameda Creek Recapture Project (Project) dated June 24, 2015. They are intended as input to the scope and focus of the Project EIR.

1. **General Comment**

   Any information derived from the *Final Program Environmental Impact Report on the San Francisco Public Utilities Commission's Water System Improvement Program* (certified October 30, 2008) for this EIR should be confirmed and/or updated where necessary.

2. **Project Objectives (page 5)**

   The EIR should provide the basis for understanding the target recapture amount (an annual average of up to 9,820 ac ft/yr) in the context of the future, long-range operation of the Calaveras Reservoir. This will demonstrate the sufficiency of the target amount to completely satisfy the Water System Improvement Program level of service goals and objectives related to water supply during both non-drought and drought periods.

3. **Project Components (pages 5-6)**

   The EIR should provide information supporting the assumption that the water quality in Pit F2 would be adequate and that pretreatment would not be required prior to conveying the water to the Sunol Valley Water Treatment Plant or the San Antonio Reservoir.

4. **Proposed Operations (page 6)**
   The EIR should provide information about the mechanism of natural infiltration into Pit F2 and the associated volume as it relates to various hydrologic conditions. As water also enters/exits Pit F2 through other means (e.g., precipitation and evaporation) all factors contributing to the understanding of the recapture amount under various conditions should be discussed.

Thank you for the opportunity to provide these comments on the NOP dated June 24, 2015 regarding the Alameda Creek Recapture project. If you have any questions, please contact me at (650) 349-3000.

Sincerely,

Michael B. Hurley
Water Resources Manager

cc: Nicole M. Sandkulla, BAWSCA
Allison Schutte, Hanson Bridgett
File

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ACWD
ALAMEDA COUNTY WATER DISTRICT

43885 SOUTH GRIMMER BOULEVARD • FREMONT, CALIFORNIA 94538
(510) 668-4200 • FAX (510) 770-1793 • www.acwd.org

July 27, 2015

Sarah B. Jones
San Francisco Planning Department
1650 Mission Street, Suite 400
San Francisco, CA 94103

Dear Ms. Jones:

Subject: Comments on the Notice of Preparation of an Environmental Impact Report for the Alameda Creek Recapture Project

Thank you for the opportunity to provide comments on the proposed Alameda Creek Recapture Project (ACRP) during the project scoping phase. The Alameda County Water District (ACWD) acknowledges the significant accomplishments of the SFPUC to date in the implementation of the Water Supply Improvement Program (WSIP) since ACWD is a customer and, therefore, a beneficiary of the water supply reliability improvements that the SFPUC is achieving through its implementation.

That said, ACWD has a strong interest in protecting and preserving water quality and water supply in Alameda Creek and the Alameda Creek Watershed. ACWD is particularly concerned with potential impacts that the ACRP may have on ACWD's water supplies as well as ongoing projects related to fisheries restoration in Alameda Creek. With a service area located downstream of the proposed project location, ACWD uses water from the Alameda Creek watershed for drinking water supply to over 344,000 people in the cities of Fremont, Newark, and Union City. ACWD relies on adequate flow in Alameda Creek for groundwater recharge and its subsequent use as a potable drinking water supply. Additionally, ACWD, together with the SFPUC and other watershed stakeholders, is actively involved in the ongoing steelhead restoration efforts to restore the steelhead run in the Alameda Creek Watershed.

<u>ACWD's Understanding of the ACRP</u>

The ACRP is intended to recapture flows released from Calaveras Reservoir and/or bypassed around the Alameda Creek Diversion Dam as part of the future operations plan described in the Calaveras Dam Replacement Project Biological Opinion. The ACRP will rely on the slow and steady percolation of surface water from Alameda Creek, into the Sunol Groundwater Basin, and into Pit-F2 from where it will be captured and pumped to surface storage or treatment. Pit-F2 will effectively act as a sump for southern Sunol Valley and the dewatering of Pit-F2 could, in theory, facilitate recapture by increasing the potential head needed to increase percolation out of Alameda Creek.

As indicated in the Notice of Preparation (NOP), the volume of water that the ACRP intends to recapture is approximately equal to the average annual water to be released or bypassed. However, while annual totals may be the same, the actual daily rate of releases or bypass flows will be quantifiably different from the recapture rate provided by the ACRP. Real-time releases and bypasses will be on the order of tens to thousands of cubic feet per second (cfs), while the real time recapture rate will likely be on the order of ones to tens of cfs. Thus, when releases or bypasses are high, a substantial amount of the actual flows will exit Sunol Valley rather than percolate into the ground. Conversely, when releases or bypasses are low, the ACRP may continue to *capture* flows from Alameda Creek that are neither releases nor bypasses. The disparity in the release and recapture rates may have impacts in a variety of areas of concern and will need to be analyzed in sufficient detail for potential impacts to be understood and ultimately mitigated if necessary.

Since much of the releases and bypass flows will exit Sunol Valley, in order to make the annual average volume of yield from the ACRP equal the volume released or bypassed, the ACRP must "make-up" additional water. Some release or bypass water will be recaptured; however, additional water originating from sources other than Calaveras Reservoir and the Diversion Dam, such as Welch Creek, may be captured, pumped, and delivered to storage or treatment as a result of the ACRP. Due to this mechanism of operations, it is difficult to define the ACRP as strictly a 'recapture' facility. Rather, the ACRP will act as an alternative water supply or management system to compensate for lost yield from Calaveras Dam and Alameda Creek Diversion Dam.

It is with this understanding that the following comments are provided.

<u>ACWD Comments</u>

The Environmental Impact Report (EIR) must adequately address issues associated with protection of Alameda Creek, and the Alameda Creek Watershed as well as address potential impacts to downstream agencies. ACWD requests the EIR include sufficient detail to address the following areas of concern:

1. <u>Rigor of Analysis</u>

Surface water and groundwater interactions are complex and dynamic physical processes. The Alameda System Daily Hydrologic Model (ASDHM) cited in the NOP is an empirically derived surface water model developed to analyze surface water flow rates under existing and future conditions. By design, the proposed ACRP will influence the surface water and groundwater interaction in a manner different from existing conditions. Therefore this empirical model will need to be substantially modified and may prove to be insufficient to fully analyze the impacts of operation of the ACRP. The EIR should consider using a more robust, physically based hydrological model capable of estimating the impact on stream flows throughout the project area, in Niles Canyon, and out to the San Francisco Bay. Alternatively, as is often the case with surface water and groundwater interactions, controlled physical tests could be conducted and would likely be more conclusive.

The following information should be considered as part of the analysis:

a) Evaluation of the groundwater seepage and surface water recharge from Alameda Creek and San Antonio Creek into Pit F2.

b) Quantify the amount of release and bypass water that will actually percolate into the Sunol Valley Groundwater Basin (including water captured at the existing infiltration gallery) that can actually be defined as "recapture."

c) Description of the origin of water other than the "recapture" that will be pumped out of Pit F2 at the various times of operation (*i.e.*, surface water or groundwater).

2. <u>Hydrologic, Biological, and Water Supply Impacts</u>

a) The EIR should provide sufficient detail to analyze impacts associated with the differing rates of release and recapture on the following:
    - Anadromous fish passage in the Alameda Creek Flood Control Channel, Niles Canyon and Sunol Valley.
    - Aquatic and riparian habitat in Niles Canyon and Sunol Valley.
    - ACWD groundwater recharge operations and water supply.

b) The potential impacts of the ACRP will likely vary significantly between dry, average, and wet year conditions. The EIR analysis should address these separate hydrologic year types.

3. <u>Inconsistency with the WSIP Programmatic EIR</u>

Previous environmental reporting described a recapture facility with capacity of up to 6,300 AF/year. The proposed ACRP capacity has been increased to 9,820 AF/year. The EIR should address this discrepancy and any additional environmental impacts from the increased capacity.

4. <u>Water Rights</u>

The EIR should identify the alternative water supply that is being captured as a result of the ACRP and include an analysis of the impact to both surface water and groundwater rights in the affected area.

5. Past, Present, and Future Work on Fisheries Projects

   The NOP states that the EIR will evaluate potential cumulative impacts resulting from implementation of the ACRP in combination with other projects in the vicinity. This cumulative impacts analysis should include projects that are being pursued by the Alameda Creek Fisheries Workgroup including; ACWD/Alameda County Flood Control and Water Conservation District's Joint Fish Passage Projects, Alameda County Flood Control's projects in the lower Alameda Creek, SFPUC's projects in Niles Canyon, and PG&E's plans to address fish passage in Sunol Valley.

6. Permits and Approvals

   a) The NOP states that no federal permits are anticipated. ACWD encourages the SFPUC to evaluate the potential impacts to "waters of the United States" and permit requirements under the Clean Water Rule published on June 29, 2015, in the Federal Register (80 FR 37054). The final rule becomes effective on August 28, 2015, modifying the definition of waters of the United States under 40 C.F.R. 230.3.

   b) The NOP does not indicate that notification of California Department of Fish and Wildlife is required under Fish and Game Code section 1602. This determination in the environmental impact report should take into account the recent holding in the case *Siskiyou County Farm Bureau v. Department of Fish and Wildlife* C.D.O.S. 5632, No. C073735 (June 4, 2015) that notification is required even if there is no disturbance of a streambed or bank.

7. Infrastructure Concerns

   Pit-F2 lies adjacent to the South Bay Aqueduct (SBA), which supplies water to the Zone 7 Water Agency, ACWD, and the Santa Clara Valley Water District. Recent studies indicate the section of the SBA located adjacent to Pit F2 is at an increased risk of failure under seismic events.Given these findings, ACWD requests that the EIR evaluate whether cycling water levels in Pit F2 will have the potential to compromise the integrity and stability of soils in this area.

8. Considerations for the Alternatives Analysis

   As stated in the NOP, the California Environmental Quality Act (CEQA) requires an evaluation of alternatives to the project. ACWD, being both a downstream agency and wholesale customer of the SFPUC, believes that there is a potential to coordinate in the scoping and assessment of some project alternatives, including operational alternatives of the proposed project, and welcomes discussions with the SFPUC on ways in which our two agencies can achieve the goals of enhancing environmental conditions within the Alameda Creek watershed while minimizing impacts to water supply reliability for both of our agencies.

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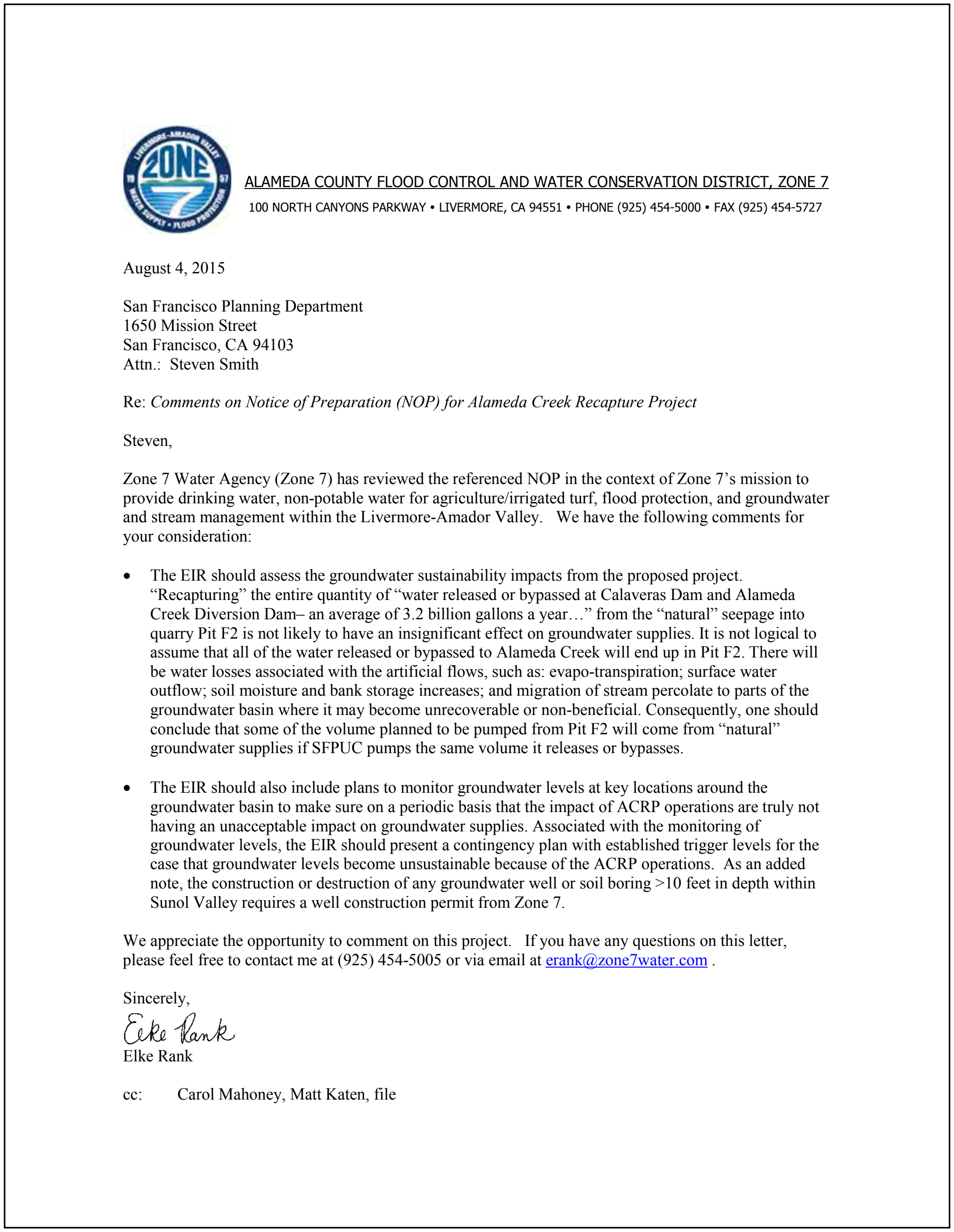
Thank you again for the opportunity to comment during the project scoping phase. Should you have any questions about these comments or about ACWD's Alameda Creek water supply and downstream operations, please feel free to contact Steven Inn, Manager of Water Resources, at (510) 668-4441. We look forward to coordinating further with you on this project.

Sincerely,

Robert Shaver
General Manager

tn/tf
cc: Steven Inn, ACWD
Michael Carlin, SFPUC
Steve Ritchie, SFPUC



ALAMEDA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT, ZONE 7
100 NORTH CANYONS PARKWAY • LIVERMORE, CA 94551 • PHONE (925) 454-5000 • FAX (925) 454-5727

August 4, 2015

San Francisco Planning Department
1650 Mission Street
San Francisco, CA 94103
Attn.: Steven Smith

Re: *Comments on Notice of Preparation (NOP) for Alameda Creek Recapture Project*

Steven,

Zone 7 Water Agency (Zone 7) has reviewed the referenced NOP in the context of Zone 7's mission to provide drinking water, non-potable water for agriculture/irrigated turf, flood protection, and groundwater and stream management within the Livermore-Amador Valley. We have the following comments for your consideration:

- The EIR should assess the groundwater sustainability impacts from the proposed project. "Recapturing" the entire quantity of "water released or bypassed at Calaveras Dam and Alameda Creek Diversion Dam– an average of 3.2 billion gallons a year…" from the "natural" seepage into quarry Pit F2 is not likely to have an insignificant effect on groundwater supplies. It is not logical to assume that all of the water released or bypassed to Alameda Creek will end up in Pit F2. There will be water losses associated with the artificial flows, such as: evapo-transpiration; surface water outflow; soil moisture and bank storage increases; and migration of stream percolate to parts of the groundwater basin where it may become unrecoverable or non-beneficial. Consequently, one should conclude that some of the volume planned to be pumped from Pit F2 will come from "natural" groundwater supplies if SFPUC pumps the same volume it releases or bypasses.

- The EIR should also include plans to monitor groundwater levels at key locations around the groundwater basin to make sure on a periodic basis that the impact of ACRP operations are truly not having an unacceptable impact on groundwater supplies. Associated with the monitoring of groundwater levels, the EIR should present a contingency plan with established trigger levels for the case that groundwater levels become unsustainable because of the ACRP operations. As an added note, the construction or destruction of any groundwater well or soil boring >10 feet in depth within Sunol Valley requires a well construction permit from Zone 7.

We appreciate the opportunity to comment on this project. If you have any questions on this letter, please feel free to contact me at (925) 454-5005 or via email at erank@zone7water.com .

Sincerely,

Elke Rank
Elke Rank

cc: Carol Mahoney, Matt Katen, file

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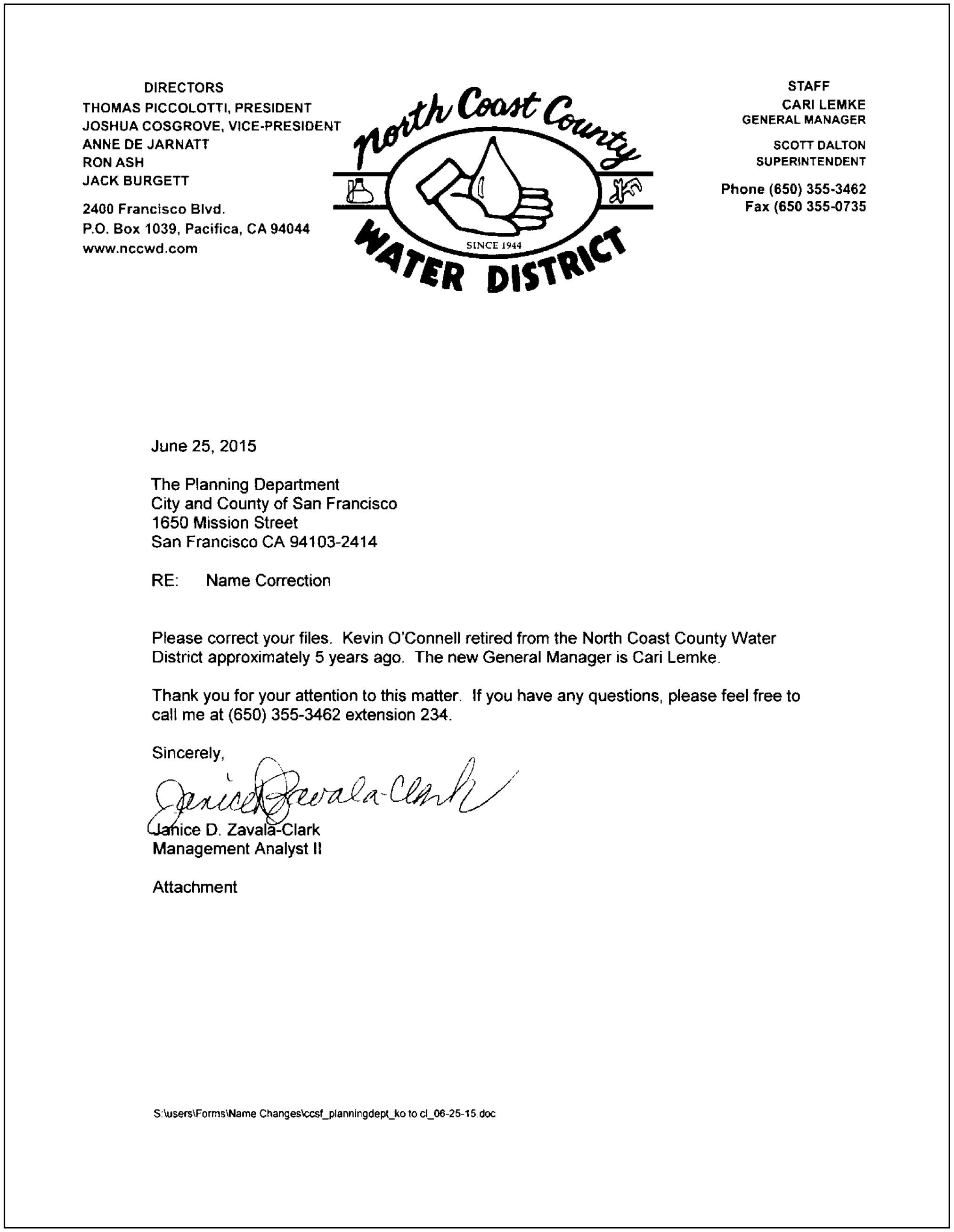

DIRECTORS
THOMAS PICCOLOTTI, PRESIDENT
JOSHUA COSGROVE, VICE-PRESIDENT
ANNE DE JARNATT
RON ASH
JACK BURGETT

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P.O. Box 1039, Pacifica, CA 94044
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North Coast County
WATER DISTRICT
SINCE 1944

STAFF
CARI LEMKE
GENERAL MANAGER

SCOTT DALTON
SUPERINTENDENT

Phone (650) 355-3462
Fax (650 355-0735

June 25, 2015

The Planning Department
City and County of San Francisco
1650 Mission Street
San Francisco CA 94103-2414

RE: Name Correction

Please correct your files. Kevin O'Connell retired from the North Coast County Water District approximately 5 years ago. The new General Manager is Cari Lemke.

Thank you for your attention to this matter. If you have any questions, please feel free to call me at (650) 355-3462 extension 234.

Sincerely,

Janice Zavala-Clark
Janice D. Zavala-Clark
Management Analyst II

Attachment

S:\users\Forms\Name Changes\ccsf_planningdept_ko to cl_06-25-15.doc

**Alameda Creek Alliance**

P.O. Box 2626 • Niles, CA • 94536
Phone: (510) 499-9185
E-mail: alamedacreek@hotmail.com
Web: www.alamedacreek.org

July 14, 2015

Sarah B. Jones
San Francisco Planning Department
1650 Mission Street, Suite 400
San Francisco, CA 94103

*Sent via e-mail to Sarah.B.Jones@sfgov.org, Steve.Smith@sfgov.org, KCapone@sfwater.org and TRamirez@sfwater.org*

**ACA Scoping Comments on Alameda Creek Recapture Project, 2015-004827ENV**

These are the scoping comments of the Alameda Creek Alliance on the proposed SFPUC Alameda Creek Recapture Project, Case No. 2015-004827ENV.

Improvements over Previous Project Designs

Previous design proposals for the Alameda Creek Recapture Project included construction of an inflatable rubber dam or installing an in-stream infiltration gallery under Alameda Creek in the Sunol Valley, to recapture water released from or bypassed at Alameda Creek Diversion Dam and Calaveras Dam. Both of these recapture approaches would have required construction of infrastructure in Alameda Creek which could have had impacts on fish migration, water quality, in-stream habitat, spread of invasive species, and riparian vegetation. The project as currently proposed, with the water recapture location moved to an off-stream quarry pit, removes those potential impacts from the project.

Potential Impacts of Groundwater Mining On Surface Flows in Alameda Creek

The proposed project will "recapture" Alameda Creek groundwater that flows subsurface and infiltrates into quarry Pit F2. The Environmental Impact Report should describe the origin of this water, the hydrologic connections between the groundwater that infiltrates into Pit F2 and the Sunol Valley groundwater basins, and the hydrologic connections between this water and surface water flows in Alameda Creek above, adjacent to and below the project reach. The EIR should analyze the impacts of mining up to 9,820 acre-feet of groundwater annually from Pit F2, on groundwater resources in the Sunol Valley and downstream in Niles Canyon, on surface water flows in Alameda Creek through the Sunol Valley and downstream through Niles Canyon, and any potential impacts on fisheries and other aquatic resources, including habitat alteration or impairment of fish migration corridors. If there are impacts to surface flow in Alameda Creek from the project, appropriate avoidance and mitigation measures should be incorporated.

Concern about "Recapture" of In-Stream Flows Intended for Fish Migration

The Alameda Creek Alliance has concerns about the precedent of "recapturing" bypass and release flows that are intended to benefit migration of anadromous steelhead trout throughout the length of Alameda Creek from below the Alameda Creek Diversion Dam downstream to San Francisco Bay.

The Water System Improvement Program adopted in 2008 by the SFPUC anticipated, discussed and evaluated recapturing only 6,300 acre-feet of flow releases from Calaveras Dam annually, as part of the "Alameda Creek Fishery Enhancement Project" – now the proposed Alameda Creek Recapture Project. This recapture was to be of summer flows released from Calaveras Reservoir intended to enhance rearing habitat in upper Alameda Creek from the confluence with Calaveras Creek downstream to the vicinity of the Sunol Water Treatment Plant. The lower end of this reach is characterized by permeable gravels that result in a lack of surface flow in Alameda Creek during summer and fall months. Thus the Calaveras flow releases would enhance about 5 miles of upper Alameda Creek from the confluence with Calaveras Creek downstream to the vicinity of the water treatment plant, providing cold water flows for improved rearing of juvenile trout. Recapturing these summer rearing flows on the downstream end of the release reach would have no impact on trout rearing conditions or trout migration, and the Alameda Creek Alliance has no objection to recapturing these flows or an equivalent amount of water.

However, the current project proposes to increase the water recapture to an average of 9,820 acre-feet annually, including water bypassed at the Alameda Creek Diversion Dam that is specifically intended to benefit upstream and downstream migration of adult and juvenile trout along the length of Alameda Creek from the Alameda Creek Diversion Dam downstream to San Francisco Bay.

The proposed project would essentially recapture equivalent surrogate flows, not recapture the actual flow releases and bypass flows from Calaveras Reservoir and the Alameda Creek Diversion Dam. Our objection is philosophical, since the fall, winter and spring flows bypassed at the ACDD will actually continue downstream to either infiltrate into the Sunol groundwater basin or flow down Alameda Creek through the Sunol Valley and Niles Canyon. The current SFPUC project proposes to mine an equivalent amount of groundwater from the Sunol Valley Pit F2, from May to October, mostly outside of the trout migration season and from an off-stream location.

Our concerns relate to the precedent of "recapturing" surrogate flows or offsetting flow releases and bypass flows which are intended to continue downstream to improve stream flows for trout migration. To benefit steelhead migration, these flows must reach San Francisco Bay or contribute significantly to natural flows in Alameda Creek and flows from other portions of the watershed that reach the bay, to allow adequate hydrologic connection for adult steelhead to migrate all the way upstream past the ACDD, or for juvenile steelhead to migrate from the ACDD reach downstream to the Bay.

The final EIR for the Calaveras Dam Replacement Project (Jan 5, 2011) characterized ACDD bypass flows as only intended to enhance trout spawning in Alameda Creek from the diversion dam downstream only to the confluence with Calaveras Creek, not to provide migration flows. The FEIR states: "Implementation of the proposed bypass flows at the ACDD is intended to improve spawning habitat for resident trout and future steelhead and would provide a more natural base-flow hydrology within approximately 16,000 linear feet of habitat in Alameda Creek above the confluence with Calaveras Creek." (p 9-36)

Yet the March 5, 2011 Biological Opinion ("BO") by the National Marine Fisheries Service for the Calaveras Dam Replacement Project explicitly anticipated (pp 49-52) that bypass flows at the Alameda Creek Diversion Dam would provide suitable migration conditions for steelhead trout from Alameda Creek below the ACDD *all the way downstream through Niles Canyon and Lower Alameda Creek to San Francisco Bay*. The BO stated (p 52) that "CDRP minimum flows from the southern watershed when combined with flows from the northern watershed (at the confluence with the Arroyo de la Laguna) through Niles Canyon are expected to provide suitable conditions for adult upstream migration and smolt downstream migration. These flows will arrive at the upstream end of the Alameda Creek Flood Control Channel and ACWD will provide bypass flows at their water diversion facilities for fish passage through the Flood Channel."

Sincerely,

Jeff Miller
Director, Alameda Creek Alliance

---

SAVE THE FROGS!

**Kerry Kriger, Ph.D.**
Executive Director
415-878-6525

PO Box 78758
Los Angeles, CA 90016 USA
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## The Impact of the Proposed Alameda Creek Recapture Project (ACRP: 2015-004827ENV) on California's Native Amphibians

7/29/2015

To: Sarah B. Jones
San Francisco Planning Department
1650 Mission Street, Suite 400
San Francisco, CA 94103

Dear Ms. Jones:

On behalf of the SAVE THE FROGS! community, I would like to thank you for allowing me this opportunity to comment on the San Francisco Public Utilities Commission's (SFPUC) proposed Alameda Creek Recapture Project (ACRP), Case No. 2015-004827ENV. As California's native amphibians face a multitude of threats in the 21st century, SAVE THE FROGS! wants to ensure that the SFPUC includes all relevant amphibian and aquatic reptile conservation issues in the environmental review of this project. Amphibians and reptiles arrived in California long before the first human settlers, and they have an inherent right to exist. Plus they are incredibly valuable to our ecosystems and kids love them – so it is up to all of us to protect them for future generations of Californians.

Below, we list issues and questions we would like to see fully analyzed in the Draft Environmental Impact Report.

**1. Cumulative Impacts.**

The SFPUC's environmental review process must consider any potential impacts of ACRP to stream-dwelling amphibians and aquatic reptiles in relation to the cumulative impacts of the Calaveras Dam Replacement Project (CDRP) and projects directly associated with CDRP. These adverse effects include: (a) the loss of stream habitat for amphibians in Arroyo Hondo once Calaveras Reservoir is fully inundated; (b) the loss of amphibian breeding habitat at the site of the Alameda Creek Diversion Dam (ACDD) fish ladder; (c) future disruption to amphibian breeding by a new sluicing schedule for ACDD; (d) the loss of habitat in Little Yosemite due to proposed construction of weirs; (e) the loss of shallow slow habitat due to higher summer base flows along the reach of Alameda Creek from the confluence with Calaveras Creek to the ACRP; (f) the potential to spread infectious diseases if any amphibians are transported from their current breeding sites; and (g) the effects of predicted colder water temperatures on survival, growth, and development of amphibians[1] and reptiles[2] when hypolimnetic releases from Calaveras Reservoir commence.

## 2. Comprehensive species review needed.

The SFPUC has paid much attention to balancing the needs of providing drinking water with restoring anadromous salmonids to Alameda Creek. We hope that the needs of the system's diverse herpetofauna will similarly be considered when evaluating the effects of this project. We urge the SFPUC to uphold its Environmental Stewardship Policy, which states that it will "protect and restore native fish *and wildlife* downstream of SFPUC dams and water diversions" (emphasis added). Unfortunately the scoping document (on page 10) excludes two special-status taxa which are extant in the ecosystem and currently undergoing review by the US Fish and Wildlife Service for listing under the federal Endangered Species Act. SAVE THE FROGS! expects that potential impacts on these stream dwellers, the foothill yellow legged frog (*Rana boylii*), and the Western pond turtle (*Emys marmorata*), will be fully addressed in the EIR. In addition to sensitive and special status taxa, the potential impacts of the ACRP on non-native taxa known to have detrimental effects on native species should also be included in the review. Because protecting ecosystem function also encompasses the goal of keeping common species common, we hope that all amphibians in the creeks will be assessed for potential impacts. These include the Western toad, the Pacific chorus frog, and the California newt.

*Foothill Yellow-legged Frog (Rana boylii) in Alameda Creek, 2014.*

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[1] Catenazzi, A. and S. J. Kupferberg. 2013. The importance of thermal conditions to recruitment success in stream-breeding frog populations distributed across a productivity gradient. Biological Conservation. 168: 40–48.

[2] Ashton, D. T., J. B. Bettaso, and H. H. Welsh, Jr. *In press*. Changes across a decade in growth, size, and body condition of western pond turtles (*Actinemys* [*Emys*] *marmorata*) on free-flowing and regulated forks of the Trinity River in northwest California. Copeia

## 3. Potential Impacts of Groundwater Extraction on Surface Flows and Aquatic Habitats

The proposed project is meant to "recapture" Alameda Creek groundwater that flows below the surface of the streambed and contributes to the water in quarry Pit F2. The ACRP will use water that percolates into the ground from surface water flows into the Sunol Groundwater Basin and Pit F2. A central question is: Will de-watering Pit F2 create a cone of depression that might adversely alter surface water flows in Alameda Creek and San Antonio Creek at times of year critical for amphibians, turtles, and snakes? Although the intent of the ACRP is to extract a volume of water that 'correlates with' the average *annual* amount to be released from Calaveras Reservoir or bypassed at the Alameda Creek Diversion Dam, we are concerned that the *daily* extraction rate may be out of synchrony with the seasonal timing of surface water flow events. In other words, during peak flood events and other periods when flows, releases, and bypasses are high, most water will flow downstream and not re-charge the groundwater. When instream flows are receding or low, on the other hand, the ACRP might extract water that did not originate as a dam release or a bypass flow, and further impair the flow regime.

We question the degree to which ACRP will extract water from the hyporheic flow under the alluvium in San Antonio Creek. According to documents received via Public Records Act request, California red-legged frog (*Rana draytonii*) adults, juveniles, and egg masses have been observed in San Antonio Creek less than 0.5 mile from the ACRP site. The EIR should assess how the magnitude, timing, and duration of surface flows in lower San Antonio Creek and Alameda Creek may be changed by ground water harvesting. Will the recession rate of flows in late spring be affected in the vicinity of ACRP? Will amphibian eggs be at increased risk of stranding? We are concerned that there are no releases from Turner Dam/San Antonio Reservoir to maintain adequate surface flow for native amphibians and compensate for groundwater harvested by ACRP operations.

*California newt (Taricha torosa) embryos stranded (left) and successfully hatching California red-legged frog (Rana draytonii) tadpoles (right) in Alameda Creek, Spring 2015.*

## 4. Impacts on Riparian Trees.

Our understanding is that the proposed ACRP project will harvest groundwater year round, including from May to October when there is usually no precipitation. In addition to this being the breeding and rearing season for amphibian larvae and young turtles, this is also the period when the riparian trees are leafed out and require groundwater supplies. Given that most precipitation falls in the winter in the Alameda Creek watershed, vegetation must find deep sources of moisture to survive the dry summer[3]. There are extant and historic/impacted sycamore woodlands in close proximity to ACRP. Approximately half of the historically occurring Sycamore Alluvial Woodland has already been destroyed or altered in southern Alameda County due to gravel mining, and the creation of Del Valle and San Antonio reservoirs contributed heavily to that loss.[4] What will be the effects on the remnant sycamore groves and the recruitment of young riparian trees when there is summer groundwater harvesting? Recent advances in stable isotope research[5] may provide tools for determining which sources of water are supporting the extant trees and whether they will be placed at risk by the project.

## 5. Piecemeal Review – ACRP inextricably linked to Little Yosemite Fish Passage and the Calaveras Dam Replacement Projects, yet reviewed separately

The ACRP proposes to increase the total amount of water SFPUC will recapture (average of 9,820 acre-feet annually compared to the 6,300 acre-feet enumerated in the 2008 Water System Improvement Program of 2008). This volume of water includes flows bypassed at the Alameda Creek Diversion Dam (ACDD) and releases from Calaveras Reservoir that were intended to facilitate the movement of anadromous fish along the length of Alameda Creek[6]. It is worrisome that the scoping document states on page 6 that the ACRP will be operated "in a manner that would assure the amounts recaptured **correlate** [emphasis added] with amounts released and/or bypassed" rather than **equivalent** to the amount released or bypassed. To what extent will groundwater extraction exceed releases and bypasses, and how can this be reviewed outside the original EIR for CDRP? In the Little Yosemite reach, SFPUC has also proposed to construct weirs across three pool features with the intent of facilitating upstream passage of anadromous fish. All these projects are intricately connected. Holistic, rather than separate, evaluation is needed and inconsistencies need to be resolved.

The feasibility of water recapture in the Sunol Valley is directly relevant to decision making regarding flows and fish passage structures further upstream. For the Little Yosemite Fish Passage Project, there is considerable uncertainty about whether the boulders may be passable at high flows[7]. Given this uncertainty and the likely harms[8] to resident native amphibians by the weir construction, SAVE THE FROGS! questions the necessity of modifying the natural channel in Little Yosemite to make it passable at mid-range flow volumes. If operation of the Recapture project can compensate the overall water supply for lost storage opportunities when flows bypass the ACDD, would it be possible to bypass enough water to make Little Yosemite passable to steelhead without weirs? Such alternatives analyses should be included in an EIR that encompasses *both* the ACRP and the Little Yosemite Fish Passage Project. It appears that these two projects are inextricably linked and each should be reviewed in light of the other. The California Environmental Quality Act forbids piece-mealing of environmental review. By issuing a Mitigated Negative Declaration for the Little Yosemite Project yet proposing to produce an EIR for the Recapture Project, SFPUC is splitting the review of two linked projects; both are directly driven by the flow schedule of the Alameda Creek Diversion Dam. Splitting the environmental review compromises the breadth and completeness of the alternatives analysis required by CEQA.

## CONCLUSION

Given the ACRP's potential to cause negative hydrologic and biological impacts, SAVE THE FROGS! expects that scientifically rigorous studies will be completed as part of this project's Environmental Impact Report. The report should (1) describe in detail the flow paths of water that recharge the groundwater basin and provide summer baseflows to San Antonio Creek and Alameda Creek; (2) quantify what percent of bypass and release flows will actually enter the groundwater and clearly illustrate whether this project is truly recapturing flows or simply mining groundwater in excess of amounts released and bypassed; (3) evaluate the impacts of groundwater extraction on riparian flora and fauna under various climate change scenarios which may exacerbate fluctuations

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[3] Shafroth, P. B., J. C. Stromberg, and D. T. Patten. 2000. Woody riparian vegetation response to different alluvial water table regimes. Western North American Naturalist, 66-76.

[4] See Figure 1 of Gillies, E. L. 1998. Effects of regulated streamflows on the Sycamore Alluvial Woodland riparian community. MS Thesis, California State University, San Jose.

[5] Oshun, J., Dietrich, W. E., Dawson, T. E., Rempe, D. M., and I. Y. Fung. 2013, December. Isotopic 'fingerprinting' of distinct water reservoirs in the critical zone and their exploitation by different tree species. In *AGU Fall Meeting Abstracts* Vol. 1, p. 0385.

[6] National Marine Fisheries Service Biological Opinion (dated March 5, 2011, pp. 49-52) stated that bypass flows at ACDD would provide suitable migration conditions in Alameda Creek **all the way to San Francisco Bay**. Specifically, "CDRP minimum flows from the southern watershed when combined with flows from the northern watershed (at the confluence with the Arroyo de la Laguna) through Niles Canyon are expected to provide suitable conditions for adult upstream migration and smolt downstream migration. These flows will arrive at the upstream end of the Alameda Creek Flood Control Channel and ACWD will provide bypass flows at their water diversion facilities for fish passage through the Flood Channel."

[7] SFPUC 2010. Assessment of fish upstream migration at natural barriers in the upper Alameda Creek sub-watershed. Technical Memorandum prepared by URS and HDR. Several statements highlight the uncertainty. For boulder feature 9 (page 4-7): "Potential passage routes through spaces between submerged boulders could have been obscured, however, and quantitative measurements of those features could not be obtained". For feature 10 (page 4-15): "It is unknown whether this feature poses a barrier to upstream migration at flows higher than 98 cfs". For feature 11(page 4-15): "…the ability to evaluate passage opportunities along the left bank channel was limited."

[8] See SAVE THE FROGS! appeal of the mitigated negative declaration.

between series of extremely wet and extremely dry years; and (4) detail the likely impacts on amphibians and reptiles, as described above. Because the dynamic interactions among surface water, ground water, and rock moisture are extremely complex, we would like to see direct observations and controlled physical tests made to trace water sources and address our questions about impacts on in-stream flow conditions.

SAVE THE FROGS! thanks the SFPUC for the opportunity to comment during the scoping phase of the project. We look forward to reviewing the DEIR when it is released. Kindly add our organization to the distribution list so we may receive direct notification of the document's completion.

Sincerely,

Kerry Kriger

Kerry Kriger, Ph.D.
SAVE THE FROGS! Founder, Executive Director & Ecologist

*This letter was sent via e-mail to:*
*Sarah.B.Jones@sfgov.org*
*Steve.Smith@sfgov.org*
*KCapone@sfwater.org*
*TRamirez@sfwater.org*

*Western pond turtles (Emys marmorata) in Alameda Creek, spring 2015.*

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**From:** Pat & Jim O'Laughlin [mailto:jtopol3@comcast.net]
**Sent:** Monday, July 27, 2015 9:35 AM
**To:** Jones, Sarah (CPC)
**Cc:** Smith, Steve (CWP)
**Subject:** Alameda Creek Recapture Project

Dear Ms. Jones:
As a resident of Sunol,CA, I would like to submit the following comments and questions for consideration in the process of preparing an Environmental Impact Report for the Alameda Creek Recapture Project. (Case No.: 2015-004827ENV )

My comments and questions are based on the information presented at the Public Scoping Meeting held in Sunol on July 9,2015.

My first general comment, and question, is related to why this recapture project is needed. It may seem apparent that recovering water for future use is a good idea, especially at the time of a drought. But is it really necessary or a cost effective process?The average recapture of 9,820 acre-feet per year is a lot of water, but when put in perspective it is not really significant. This is especially true when the Calaveras Dam project will increase the capacity of the current reservoir by 60,000 acre feet.The permitting process ,as I understand it, provided for the release of the water that you propose to recover, for the purpose of improving the environment for endangered steelhead. If this is the case, should there not be a contribution to this significant environmental improvement by the agency that will benifit the most. Since this local watershed is only 13% of the total SFPUC source of water the recovered amount is really not as important, or essential, to meet the goals for the system as presented at your meeting. It would seem appropriate for the agency to contribute to the restoration of the environment for the steelhead that was damaged at a time when EIR's were not available to protect the environment. I would hope that there is strong consideration to look at the overall issue from this perspective and perhaps not proceed with the project.

It would also seem appropriate to focus on the management of the watershed in such a manner that an equal, or greater, amount of water would be conserved within the watershed and be available for use. This could be done by applying the principles of permaculture which are being used around the world for just such goals. The research and practices of noted authorities such as Geoff Lawton of the Permaculture Research Institute, Bill Mollison, Mark Shepard, and others could achieve much more in terms of environmental improvement and water resource utilization than this proposed project.

I also have a question related to flow schedule and recapture schedule. It seems that the plan is to recover the water during the driest time of the year instead of the wettest time of the year. Would it not be more efficient to recover the water in the winter months? Since the whole project is based on multi year averages and the relationship to the total system, it would seem the the goal should be to get the water into the system, and when it occurs during a given year would not be critical. Certainly the system would have the capacity to receive and store the water at any time during the year. Would it not? If all capacity was at 100%, then that is all the more reason not to be recapturing since there would not be a real need during that year. Your yield goals could be met on a yearly basis.

Under your proposed project, would the release schedule and volume meet the needs of steelhead restoration? This was not clear at your presentation.

There needs to be a real focus on the potential negative impacts of this project on the groundwater of the valley. Recapturing during the driest period of the year increases the possibility of such negative impact. As was stated that there is no hard date to show that there will not be a negative impact. This need to be thoroughly investigated and if there is a negative impact the project should not proceed.

Visual impact should also be looked at. The current pit has not been reclaimed and the SFPUC has granted a waiver to such action for another 24 years. This ugly encroachment on the environment should be corrected as a part of this project. Adding the various components of the project will just intensify the industrialization look of the abandoned quarry pit. This would be a good time to clean it up and restore it. Since the SFPUC granted the quarry operator the right to do nothing for the next 24 years, they should assume the responsibility for the necessary action. I am sure that the SFPUC can work with the quarry operator to correct this condition.

Additional questions that were not covered in the presentation are:
- What is the cost of the project?
- How much electricity be used and what would it cost?
- Does the existing Pump Station Pipeline take water out of the South Bay Aquaduct ? How much?
- What approvals will Alameda County have to provide for this project?
- Exactly what is required of the SFPUC in regards to increased flow into Alameda Creek for steelhead habitat ? This was not clear in the presentation.

In summary, I would like to see the analysis that justifies the need for the project and the impacts of not doing the project. I would also like to see an aggressive focus on a management program for the watershed based on permaculture principles that would more than achieve the goals of this project. Of most importance is to insure that the groundwater of the valley , the visual environment and the environment for the steelhead are protected and enhanced.

Thank you for the opportunity to comment and ask questions related to the preparation of the Environmental Impact Report.

Sincerely,
Jim O'Laughlin

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# APPENDIX WSIP

## WSIP PEIR Mitigation Measures, Applicability to the Proposed Project

## SFPUC Alameda Creek Recapture Project (Environmental Planning Case No. 2015-004827ENV)

The Alameda Creek Recapture Project (ACRP or proposed project) was analyzed under its former name—the Alameda Creek Fishery Enhancement Project—at a program-level in the Water System Improvement Program (WSIP) Program Environmental Impact Report (PEIR)[1] as one of the facility improvement projects under the WSIP. The PEIR identified programmatic mitigation measures, and under Resolution No. 08-200, the San Francisco Public Utilities Commission (SFPUC) adopted the WSIP Mitigation Monitoring and Reporting Program that identifies programmatic mitigation measures applicable to the WSIP facility improvements projects, including the ACRP. This ACRP Environmental Impact Report (EIR) provides a detailed, project-level analysis of the proposed project based on site-specific and up-to-date information developed subsequent to the preparation of the PEIR. This section lists the WSIP PEIR programmatic mitigation measures identified for the Alameda Creek Fishery Enhancement Project and describes how these measures now apply to the ACRP based on the current project-level impact analysis.

**Table C-1** lists all the programmatic mitigation measures identified in the WSIP PEIR in the first column. The second column indicates with a "Y" or "N" whether or not the PEIR identified the programmatic mitigation measure to be applicable to the Alameda Creek Fishery Enhancement project. The third column discusses if and how these measures apply to the ACRP based on the project-level analysis in this EIR. For the programmatic mitigation measures that are applicable, the table identifies the comparable project-level mitigation measure identified in the ACRP EIR that either relies on the programmatic measures or identifies an equivalent or better site-specific mitigation measure to replace the programmatic mitigation measure. The table also provides an explanation for those programmatic mitigation measures that are not applicable to the proposed project.

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[1] San Francisco Planning Department, *Final Program Environmental Impact Report for the San Francisco Public Utilities Commission's Water System Improvement Program*, San Francisco Planning Department File No. 2005.0159E, State Clearinghouse No. 2005092026. Certified October 30, 2008.

## TABLE C-1
## PEIR MITIGATION MEASURES – CONSISTENCY REVIEW FOR THE ALAMEDA CREEK RECAPTURE PROJECT

| PEIR Mitigation Measure(s) | Applicable to Alameda Creek Fishery Enhancement Project in PEIR (Y/N)? | Applicability of Programmatic Mitigation Measure to ACRP |
|---|---|---|
| **Land Use and Visual Resources** | | |
| **Measure 4.3-2, Facility Siting Studies:** Conduct project-specific facility siting studies for non-SFPUC land and implement these studies' recommendations to avoid or minimize impacts on existing land uses. | N | ACRP facilities would be located entirely within Alameda watershed lands owned by the CCSF so that there would be no impact on existing land uses and this PEIR measure does not apply to the ACRP. |
| **Measure 4.3-4a, Architectural Design:** Design permanent new, aboveground facilities to be compatible with existing visual character of the site and surrounding area. | Y | The proposed aboveground facilities, including the overhead power lines, electrical control building, and electrical transformer, would have a similar appearance as the surrounding SFPUC water supply facilities and buildings such that no supplemental design measures would be required. Further, existing topography and vegetation would provide partial screening of the proposed aboveground facilities that would reduce potential visual impacts of the project facilities. Although project implementation would require some vegetation removal during project construction, Mitigation Measure M-BI-1e (Prepare and Implement a Vegetation Restoration Plan and Compensatory Mitigation) includes provisions to address vegetation removal impacts so that the aboveground facilities would be compatible with the existing visual character of the site and surrounding area and this PEIR measure does not apply to the ACRP. |
| **Measure 4.3-4b, Landscaping Plans:** Prepare and implement landscaping plans to restore (recontour, revegetate, landscape) sites to preconstruction conditions. Monitor landscape plantings. | Y | See Mitigation Measure M-BI-1e (Prepare and Implement a Vegetation Restoration Plan and Compensatory Mitigation).<br>The project-level mitigation measure for biological resources requires site restoration with naturally occurring vegetation similar to surrounding habitats or to their site potential, as feasible, and monitoring of restored areas and replacement plantings. This mitigation measure replaces the requirement for preparation and implementation of a landscaping plan in accordance with the PEIR mitigation measure. |
| **Measure 4.3-4c, Landscape Screens:** Include new plantings and landscape berms to screen views of new structures and equipment from scenic roads. | Y | The proposed aboveground facilities would be similar in appearance as other SFPUC water infrastructure facilities in the Sunol Valley and would be partially screened from Calaveras Road by intervening vegetation and topography. Mitigation Measure M-BI-1e (Prepare and Implement a Vegetation Restoration Plan and Compensatory Mitigation) includes provisions for tree replacement to address tree removal impacts on scenic roads. The aboveground project improvements would not require additional screening. |
| **Measure 4.3-4d, Minimize Tree Removal:** Minimize or avoid the removal of trees that screen existing and proposed WSIP facility sites; implement tree replacement plan. | Y | See Mitigation Measures M-BI-1a (General Protection Measures) and M-BI-1e (Prepare and Implement a Vegetation Restoration Plan and Compensatory Mitigation). |

## TABLE C-1 (Continued)
## PEIR MITIGATION MEASURES – CONSISTENCY REVIEW FOR THE ALAMEDA CREEK RECAPTURE PROJECT

| PEIR Mitigation Measure(s) | Applicable to Alameda Creek Fishery Enhancement Project in PEIR (Y/N)? | Applicability of Programmatic Mitigation Measure to ACRP |
|---|---|---|
| **Land Use (cont.)** | | |
| **Measure 4.3-4d** (cont.) | | The project-level mitigation measures require implementation of protective measures to avoid or minimize impacts on mature native trees during construction, and if removal is necessary, to plant replacement trees at or in close proximity to the removal sites to the extent feasible. If replanting trees on the same location is not feasible or could result in damage to the proposed improvements, the SFPUC in consultation with the applicable resource agencies shall designate a suitable planting site elsewhere in the project vicinity. |
| **Measure 4.3-5, Reduce Lighting Effects:** Use cut-off shields and nonglare fixture design, direct lighting onsite and downward, prevent use of highly reflective building materials or finishes. | Y | As part of the proposed project and in accordance with the Alameda Watershed Management Plan (WMP), nighttime lighting at the new electrical control building would be motion-activated, and directed downward and shielded so it is not highly visible or obtrusive. No mitigation is necessary. See Impact AE-3, The proposed project would not create a new permanent source of substantial light and glare, so this PEIR measure does not apply to the ACRP. |
| **Geology** | | |
| **Measure 4.4-1, Quantified Landslide Analysis:** Avoid sites with landslide hazards; where they cannot be avoided, conduct site-specific slope stability analyses and implement recommendations. | Y | The proposed project includes construction within the slope of quarry Pit F2 and along the earthen berm containing the Department of Water Resources (DWR) South Bay Aqueduct. A slope stability analysis at Pit F2 was prepared as part of the project-specific geotechnical report. The results of the slope stability analysis indicate the quarry pit slopes are stable under static conditions. The construction contractor(s) would be required to implement the recommendations made in the ACRP Final Geotechnical Evaluation Report to ensure that construction activities within and adjacent to the quarry pit do not cause it to become unstable during construction. The ACRP Final Geotechnical Evaluation Report confirmed that, based on the subsurface conditions at the site, jack-and-bore tunneling methods would be an acceptable means of crossing the South Bay Aqueduct and would not result in slope instability or affect the integrity of the South Bay Aqueduct. See Impact GE 1: The project would not be located on a geologic unit that could become unstable as a result of project construction. Therefore, this PEIR measure does not apply to the ACRP. |
| **Measure 4.4-4, Subsidence Monitoring Program:** Monitor subsidence and implement corrective actions as warranted. | N | Not applicable; the project does not involve tunneling. |

## TABLE C-1 (Continued)
## PEIR MITIGATION MEASURES – CONSISTENCY REVIEW FOR THE ALAMEDA CREEK RECAPTURE PROJECT

| PEIR Mitigation Measure(s) | Applicable to Alameda Creek Fishery Enhancement Project in PEIR (Y/N)? | Applicability of Programmatic Mitigation Measure to ACRP |
|---|---|---|
| **Geology (cont.)** | | |
| **Measure 4.4-9, Characterize Extent of Expansive and Corrosive Soil:** Characterize the presence of expansive/corrosive soils; implement recommendations. | Y | The presence of expansive and corrosive soils was evaluated as part of the project-specific geotechnical report. Soils in the project area generally exhibit a low to high shrink/swell potential. The proposed project would result in minor modifications to the soils in the project area associated with site clearing, grading, paving and backfilling, but it would not alter the properties of the soils. Implementation of the project would not cause or worsen the risks associated with expansive or corrosive soils; therefore, there would be no change regarding substantial risks to life or property due to expansive or corrosive soils compared to existing conditions. In addition, all of the aboveground project improvements would be designed per the recommendations of the ACRP Final Geotechnical Evaluation Report. See Impact GE-10: The project would not create substantial risks to life or property due to expansive or corrosive soils. Therefore, this PEIR measure does not apply to the ACRP. |
| **Hydrology** | | |
| **Measure 4.5-2, Site-Specific Groundwater Analysis and Identified Measures:** Conduct project-specific analysis of dewatering and implement measures to ensure that groundwater resources and the beneficial uses of groundwater are not adversely affected. | N | Not necessary. Any project-related effects of construction dewatering on the shallow groundwater table would be temporary in nature, as dewatering would be required only during certain phases of construction, and only if groundwater is encountered. See Impact HY-1: Project construction would not substantially degrade water quality as a result of dewatering effluent discharges, increased soil erosion and sedimentation of downstream water bodies, or an accidental release of hazardous chemicals; and Impact HY-2: Operation of the ACRP would not substantially alter the movement of subsurface water or substantially affect groundwater recharge in the Sunol Valley such that it would affect the production rate of pre-existing nearby wells. Therefore, this PEIR measure does not apply to the ACRP. |
| **Measure 4.5-4a, Flood Flow Protection Measures:** Preclude exposure of stockpiled soils, hazardous materials, and construction materials to flood flows. | Y | No mitigation is necessary based on project-specific design. The detailed project information indicates staging areas would be located outside of the designated 100-year FEMA flood hazard zone and would therefore not be exposed to flood flows. In addition, the ACRP would be subject to the National Pollutant Discharge Elimination System (NPDES) Construction General Permit requirements and would require preparation of a Stormwater Pollution Protection Plan (SWPPP). Preparation and implementation of a SWPPP would avoid significant water quality impacts during and after project construction activities and would require that the construction contractor implement site-specific BMPs to protect water quality during project construction activities. Therefore, this PEIR measure does not apply to the ACRP. |

## TABLE C-1 (Continued)
## PEIR MITIGATION MEASURES – CONSISTENCY REVIEW FOR THE ALAMEDA CREEK RECAPTURE PROJECT

| PEIR Mitigation Measure(s) | Applicable to Alameda Creek Fishery Enhancement Project in PEIR (Y/N)? | Applicability of Programmatic Mitigation Measure to ACRP |
|---|---|---|
| **Hydrology (cont.)** | | |
| **Measure 4.5-4b, Site-Specific Flooding Analysis and Identified Measures:** Implement design measures to preclude projects from causing flooding or damage from redirected flood flows. | Y | No mitigation is necessary based on project-specific design. The project-level analysis determined the ACRP would have no effect on flood hazards because it would have no effect on the size of floods produced by storms over the watershed, the size of floods caused by dam failure, or on water levels in the area subject to flooding, and would comply with the San Francisco Floodplain Management Ordinance. See Impact HY-4: Operation of the ACRP would not alter flood hazards. Therefore, this PEIR measure does not apply to the ACRP. |
| **Measure 4.5-5**, **Stormwater Treatment and Groundwater Monitoring:** If treated stormwater is used to maintain Lake Merced water levels, monitor surface water and groundwater quality in the vicinity of Lake Merced. Identify and implement corrective actions (e.g., treatment). | N | Not applicable; this PEIR measure applies only to Groundwater Projects in the San Francisco that have the potential to affect water levels in or near Lake Merced. |
| **Measure 4.5-6, Appropriate Source Controls and Site Design Measures:** For projects located in areas not covered by a municipal stormwater permit and disturbing less than one acre of land during construction, implement appropriate source control and site design measures. These measures will ensure compliance with applicable water quality criteria and goals and protect the beneficial uses of the receiving water. | N | Not applicable; the proposed project would result in more than 1 acre of construction disturbance and would be subject to the NPDES Construction General Permit requirements. The proposed project would require development and implementation of a SWPPP that includes site-specific best management practices (BMPs) to prevent discharges of nonpoint-source pollutants in construction-related stormwater runoff into downstream water bodies, including Alameda and San Antonio Creeks. See Impact HY-1: Project construction would not substantially degrade water quality as a result of dewatering effluent discharges, increased soil erosion and sedimentation of downstream water bodies, or an accidental release of hazardous chemicals. |
| **Biology** | | |
| **Measure 4.6-1a, Wetlands Assessment:** Wetland scientist will determine whether wetlands could be affected by the project, and, if so, perform a wetland delineation and develop mitigation. | Y | See Mitigation Measures M-BI-1a (General Protection Measures), M-BI-1b (Worker Training and Awareness Program), M-BI-1e (Prepare and Implement a Vegetation Restoration Plan and Compensatory Mitigation) and M-BI-2 (Avoidance and Protection Measures for Riparian Habitats and Wetlands). A wetlands assessment performed for an adjacent project determined that the seasonal wetland just south of, and outside of, the southeastern corner of Pit F2, wetland tributary in San Antonio Creek, and instream wetlands within Alameda Creek are assumed to be federally protected wetlands, replacing the need to perform a wetland delineation. Project-level mitigation measures to address impact to wetlands discussed as part of Impact BI-3 will require avoidance, worker training, revegetation and restoration activities for impacts to upland areas, and fencing to avoid water quality impacts during construction activities. This PEIR measure applies to the ACRP. |

## TABLE C-1 (Continued)
## PEIR MITIGATION MEASURES – CONSISTENCY REVIEW FOR THE ALAMEDA CREEK RECAPTURE PROJECT

| PEIR Mitigation Measure(s) | Applicable to Alameda Creek Fishery Enhancement Project in PEIR (Y/N)? | Applicability of Programmatic Mitigation Measure to ACRP |
|---|---|---|
| **Biology (cont.)** | | |
| **Measure 4.6-1b, Compensation for Wetlands and Other Biological Resources:** If a WSIP project will affect jurisdictional wetlands, implement avoidance measures, restoration procedures, and compensatory creation or enhancement to ensure no net loss of wetland extent or function. Compensate for sensitive riparian and upland habitats supporting key special-status species. Obtain permits for each project and comply with applicable regulations addressing sensitive habitats and species. The Habitat Reserve Program is an alternative for implementing offsite habitat compensation. | Y | See Mitigation Measure M-BI-2: Avoidance and Protection Measures for Riparian Habitats and Wetlands; Mitigation Measures M-BI-1a, 1b, and 1e (General Protection Measures, Worker Training and Awareness Program, Vegetation Restoration Plan and Compensatory Mitigation); and Mitigation Measure M-BI-6a, 6b, and 6c (Baseline riparian habitat mapping, Annual riparian habitat monitoring and reporting, Habitat enhancement, Subreaches B and C1 to achieve no net loss of tree-supporting riparian alliances, )<br>These project-level mitigation measures require avoidance of wetlands and protection of wetlands that cannot be avoided, and site restoration with naturally occurring vegetation similar to surrounding habitats or to their site potential, as feasible, and monitoring of restored areas and replacement plantings for construction-related impacts. For operational impacts on riparian habitats, the project-level mitigation measures require baseline mapping, annual monitoring and reporting, and habitat enhancement as appropriate. These mitigation measures are consistent with the PEIR mitigation measure and is specific to the project requirements. |
| **Measure 4.6-2, Habitat Restoration/Tree Replacement:** Restore temporarily affected sensitive habitats. Replace trees designated as heritage trees (or similar local designation) consistent with requirements of local ordinances. Minimize loss of sensitive habitats by coordinating WSIP projects. | Y | See Mitigation Measure M-BI-1e (Prepare and Implement a Vegetation Restoration Plan and Compensatory Mitigation).<br>The project-level measure is consistent with the PEIR measure and provides additional details that define the trees to be avoided/protected and tree replacement requirements. |
| **Measure 4.6-3a, Protection Measures During Construction for Key Special-Status Species and Other Species of Concern:** Where key special-status species and other species of concern are potentially present, implement general practice measures (preconstruction surveys, worker awareness program, environmental inspector, minimization of habitat loss). | Y | See Mitigation Measures M-BI-1b (Worker Training and Awareness Program), M-BI-1c (Prevent Movement of Sensitive Wildlife Species through the Work Areas), Mitigation Measure M-BI-1d (Preconstruction Surveys and Construction Monitoring and Protocols for California Tiger Salamander, California Red-Legged Frog, and Alameda Whipsnake), Mitigation Measure M-BI-1e (Prepare and Implement a Vegetation Restoration Plan and Compensatory Mitigation), Mitigation Measure M-BI-1f (Measures to Minimize Disturbance to Western Burrowing Owl), Mitigation Measure M-BI-1g ( Measures to Minimize Disturbance to Special-Status Bird Species), Mitigation Measure M-BI-1h (Conduct Preconstruction Surveys for Special-Status Bats Found and Implement Avoidance and Minimization Measures), and Mitigation Measure M-BI-1i (Avoidance and Minimization Measures for American Badger).<br>The project-level measures are consistent with the PEIR measure and provide additional site- and project-specific details where key special-status species and other species of concern are potentially present. An environmental inspector in not required, but a biological monitor is required under Mitigation Measure M-BI-1c and Mitigation Measure M-BI-1d. |

## TABLE C-1 (Continued)
## PEIR MITIGATION MEASURES – CONSISTENCY REVIEW FOR THE ALAMEDA CREEK RECAPTURE PROJECT

| PEIR Mitigation Measure(s) | | Applicable to Alameda Creek Fishery Enhancement Project in PEIR (Y/N)? | Applicability of Programmatic Mitigation Measure to ACRP |
|---|---|---|---|
| **Biology (cont.)** | | | |
| **Measure 4.6-3b, Standard Mitigation Measures for Key Special-Status Plants and Animals:** Implement measures to reduce impacts on key special-status species.<br>***See below for specific species and corresponding sub-PEIR mitigation number.*** | | | |
| **Invertebrates** | | | |
| Valley Elderberry Longhorn Beetle | I.1 | N | Species not identified in project vicinity. |
| **Vernal Pool Crustaceans** (Vernal Pool Fairy Shrimp; Conservancy Fairy Shrimp; Vernal Pool Tadpole Shrimp) | I.2 | N | Species not identified in project vicinity. |
| Bay Checkerspot Butterfly; Callippe Silverspot Butterfly | I.3 | N | Species not identified in project vicinity. |
| **Fish** | | | |
| Central Valley Fall- and Late-Fall-Run DPS Chinook Salmon; Central Valley DPS Steelhead; Green Sturgeon Southern District DPS; Central Coast DPS Steelhead; Rainbow Trout | F.1 | Y | No mitigation is necessary based on project-specific design. Species not present under construction scenario, and construction would not degrade the quality of habitat in Alameda Creek or interfere with the movement of common native fish species (See Impact BI-10). Based on hydrologic modeling that has been conducted to conservatively simulate operational effects to Alameda Creek surface water flows, analysis of historical flow data, and analysis of surface and subsurface water interactions long-term operation of the proposed ACRP is not anticipated to result in substantial changes to winter and spring flows or associated aquatic habitat conditions for migrating steelhead in Alameda Creek. See Impact BI-12: Project operations would not substantially interfere with the movement or migration of special-status fish species, including CCC steelhead DPS. This PEIR measure does not apply to the ACRP. |
| **Reptiles and Amphibians** | | | |
| California Red-Legged Frog; Foothill Yellow-Legged Frog | RA.1 | Y | See Mitigation Measures M BI 1b (Worker Training and Awareness Program), M-BI-1c (Prevent Movement of Sensitive Wildlife Species through the Work Areas), Mitigation Measure M-BI-1d (Preconstruction Surveys and Construction Monitoring and Protocols for California Tiger Salamander, California Red-Legged Frog, and Alameda Whipsnake), and Mitigation Measure M-BI-1e (Prepare and Implement a Vegetation Restoration Plan and Compensatory Mitigation).<br>The project-level measures are consistent with the PEIR measure and include site-specific protection measures for all special status species potentially present in the project area. |

## TABLE C-1 (Continued)
## PEIR MITIGATION MEASURES – CONSISTENCY REVIEW FOR THE ALAMEDA CREEK RECAPTURE PROJECT

| PEIR Mitigation Measure(s) | | Applicable to Alameda Creek Fishery Enhancement Project in PEIR (Y/N)? | Applicability of Programmatic Mitigation Measure to ACRP |
|---|---|---|---|
| **Biology (cont.)** | | | |
| **Measure 4.6-3b** (cont.) **Reptiles and Amphibians** (cont.) | | | |
| California Tiger Salamander | RA.2 | Y | See Mitigation Measures M BI 1b (Worker Training and Awareness Program), M-BI-1c (Prevent Movement of Sensitive Wildlife Species through the Work Areas), Mitigation Measure M-BI-1d (Preconstruction Surveys and Construction Monitoring and Protocols for California Tiger Salamander, California Red-Legged Frog, and Alameda Whipsnake), and Mitigation Measure M-BI-1e (Prepare and Implement a Vegetation Restoration Plan and Compensatory Mitigation).<br>The project-level measures are consistent with the PEIR measure and include site-specific protection measures for all special status species potentially present in the project area. |
| San Francisco Garter Snake | RA.3 | N | Species not identified in project vicinity. |
| Alameda Whipsnake | RA.4 | Y | See Mitigation Measures M BI 1b (Worker Training and Awareness Program), M-BI-1c (Prevent Movement of Sensitive Wildlife Species through the Work Areas), Mitigation Measure M-BI-1d (Preconstruction Surveys and Construction Monitoring and Protocols for California Tiger Salamander, California Red-Legged Frog, and Alameda Whipsnake), and Mitigation Measure M-BI-1e (Prepare and Implement a Vegetation Restoration Plan and Compensatory Mitigation).<br>The project-level measures are consistent with the PEIR measure and include site-specific protection measures for all special status species potentially present in the project area. |
| **Birds** | | | |
| Swainson's Hawk | B.1 | N | Species not identified in project vicinity. |
| Western Burrowing Owl | B.2 and B.3 | Y | See Mitigation Measures M BI 1b (Worker Training and Awareness Program), M-BI-1c (Prevent Movement of Sensitive Wildlife Species through the Work Areas), Mitigation Measure M-BI-1e (Prepare and Implement a Vegetation Restoration Plan and Compensatory Mitigation), and Mitigation Measure M-BI-1f (Measures to Minimize Disturbance to Western Burrowing Owl).<br>The project-level measures are consistent with the PEIR measure and include site-specific protection measures for all special status species potentially present in the project area. |

## TABLE C-1 (Continued)
## PEIR MITIGATION MEASURES – CONSISTENCY REVIEW FOR THE ALAMEDA CREEK RECAPTURE PROJECT

| PEIR Mitigation Measure(s) | | Applicable to Alameda Creek Fishery Enhancement Project in PEIR (Y/N)? | Applicability of Programmatic Mitigation Measure to ACRP |
|---|---|---|---|
| **Biology (cont.)** | | | |
| **Measure 4.6-3b** (cont.) **Birds** (cont.) | | | |
| Raptors (including Bald Eagle) | B.4 | N | See Mitigation Measures M BI 1b (Worker Training and Awareness Program), M-BI-1c (Prevent Movement of Sensitive Wildlife Species through the Work Areas), Mitigation Measure M-BI-1e (Prepare and Implement a Vegetation Restoration Plan and Compensatory Mitigation), and Mitigation Measure M-BI-1g (Measures to Minimize Disturbance to Special-Status Bird Species).<br>The project-level measures are consistent with the PEIR measure and include site-specific protection measures for all special status species potentially present in the project area. |
| Least Bell's Vireo | B.5 | N | Species not identified in project vicinity. |
| California Black Rail, California Clapper Rail | B.6 | N | Species not identified in project vicinity. |
| Western Snowy Plover | B.7 | N | Species not identified in project vicinity. |
| **Mammals** | | | |
| Salt Marsh Harvest Mouse | M.1 | N | Species not identified in project vicinity. |
| San Joaquin Kit Fox | M.2 | N | Species not identified in project vicinity. |
| Riparian Woodrat | M.3 | N | Species not identified in project vicinity. |
| **Plants** | | | |
| **Vernal Pool Plants** (Succulent Owl's Clover; Hoover's Spurge; Colusa Grass; San Joaquin Valley Orcutt Grass; Greene's Tuctoria; Hairy Orcutt Grass) | P.1 | N | Species not identified in project vicinity. |
| **Riparian Plants** | | | |
| Delta Button-Celery | P.2 | N | Species not identified in project vicinity. |
| Large-Flowered Fiddleneck | P.3 | N | Species not identified in project vicinity. |
| San Francisco Woolly Sunflower; Marin Western Flax; Fountain Thistle | P.4 | N | Species not identified in project vicinity. |

### TABLE C-1 (Continued)
### PEIR MITIGATION MEASURES – CONSISTENCY REVIEW FOR THE ALAMEDA CREEK RECAPTURE PROJECT

| PEIR Mitigation Measure(s) | Applicable to Alameda Creek Fishery Enhancement Project in PEIR (Y/N)? | Applicability of Programmatic Mitigation Measure to ACRP |
|---|---|---|
| **Biology (cont.)** | | |
| **Measure 4.6-4, Pipeline and Water Treatment Plant Treated Water Discharge Restrictions:** Design planned discharges from the WSIP pipelines and water treatment plants to natural water bodies to minimize impacts on riparian and aquatic resources and to avoid or minimize temperature effects on aquatic resources. | N | The project-level analysis determined that mandatory compliance with the requirements of the National Pollutant Discharge Elimination System (NPDES) Construction General Permit and preparation of a Stormwater Pollution Protection Plan (SWPPP) would avoid significant water quality impacts during and after project construction activities and would require that the construction contractor implement site-specific BMPs to protect water quality during project construction activities. This would address impacts on riparian and aquatic resources. Therefore, this PEIR measure does not apply to the ACRP. |
| **Cultural** | | |
| **Measure 4.7-1, Suspend Construction Work if Paleontological Resource Is Identified:** Suspend work and notify a qualified paleontologist when a paleontological resource is discovered at any of the project sites. The paleontologist will document the discovery as needed, evaluate the potential resource, and assess the significance of the find under CEQA criteria. Temporarily halt or divert excavation within 50 feet of a fossil find until the discovery is examined by a paleontologist. If avoidance is not feasible, the paleontologist will prepare an excavation plan. | Y | See Mitigation Measure M-GE-3 (Accidental Discovery of Paleontological Resources).<br>The project-level measures are consistent with the PEIR measures and include measures specific to earthwork associated with the construction of the mooring piers. |
| **Measure 4.7-2a, Archaeological Testing, Monitoring, and Treatment of Human Remains:** Determine if implementation of an archaeological testing or archaeological monitoring program or both is the appropriate strategy for avoidance of potential adverse effects on significant archaeological resources. Review any requirements approved by the State Historic Preservation Officer. Prepare an archaeological testing plan, archaeological monitoring plan, final archeological resources report and, if applicable, an archaeological data recovery plan. The treatment of human remains and of associated or unassociated funerary objects discovered during any soil-disturbing activity will comply with applicable state laws. | Y | See Mitigation Measure M-CUL-2 (Accidental Discovery of Human Remains).<br>Although no known human burial locations have been identified within the project area, the EIR measure addresses the possibility of discovery during construction activities. |
| **Measure 4.7-2b, Accidental Discovery Measures:** Distribute archaeological resource "ALERT" sheet to contractors. If an archaeological resource may be present within the project site, an archaeological consultant will evaluate it and make a recommendation as to what action (e.g., preservation in situ) is warranted. The SFPUC will implement appropriate measures. | Y | See Mitigation Measure M-CUL-1 (Accidental Discovery of Archaeological Resources).<br>Although no previously documented archaeological resources have been identified within the project area, the EIR measure addresses the possibility of discovery during construction activities. |

## TABLE C-1 (Continued)
## PEIR MITIGATION MEASURES – CONSISTENCY REVIEW FOR THE ALAMEDA CREEK RECAPTURE PROJECT

| PEIR Mitigation Measure(s) | Applicable to Alameda Creek Fishery Enhancement Project in PEIR (Y/N)? | Applicability of Programmatic Mitigation Measure to ACRP |
|---|---|---|
| **Cultural (cont.)** | | |
| **Measure 4.7-3, Protection of Historic Districts:** A qualified historian will assess the city's water system facilities affected by WSIP facility projects for their potential contribution to a historic district. If a historic district would be affected by one or more proposed WSIP facility project(s), develop and implement mitigation measures for effects with attention to the potential district as a whole. If a historic district is identified at the project level, it should be recorded as such, using National/California Register criteria of significance. Document the district by completing the State of California Department of Parks and Recreation Form 523 and submit to the State Historic Preservation Officer. | N | There are no documented historical resources within the project area. Therefore, this PEIR measure does not apply to the ACRP. |
| **Measure 4.7-4a, Alternatives Identification and Resource Relocation:** Identify feasible project alternatives to eliminate or reduce the need for demolition or removal of a historic resource to the greatest extent possible. If preservation of the affected historical resource at the current site is determined to be infeasible, the structure will be stabilized and relocated to other appropriate nearby sites, if feasible. After relocation, the resource will be treated according to the Secretary of the Interior's *Standards for the Treatment of Historic Properties.* If the affected historic resource is to be demolished, consult with local historical societies and governmental agencies regarding salvage of materials for public information or reuse in other locations. | N | No historic resources would be demolished or removed as a result of the project. Therefore, this PEIR measure does not apply to the ACRP. |
| **Measure 4.7-4b, Historical Resources Documentation:** Prepare documentation of historic resources prior to any construction work associated with demolition or removal. The appropriate level of documentation will be selected by a qualified professional who meets the standards for history, architectural history, and/or architecture (as appropriate) set forth by the Secretary of the Interior's *Professional Qualification Standards* (36 CFR 61) in consultation with a preservation specialist assigned by the San Francisco Planning Department and the local jurisdiction, if deemed appropriate by the Planning Department. | N | No historic resources would be demolished or removed as a result of the project. Therefore, this PEIR measure does not apply to the ACRP. |
| **Measure 4.7-4c, Secretary of the Interior's Standards for the Treatment of Historic Properties:** Prepare materials describing and depicting the proposed project. Review the proposed project for compliance with the Secretary of the Interior's *Standards for the Treatment of Historic Properties*. If a project is determined to be inconsistent with the *Standards for the Treatment of Historic Properties*, pursue and implement redesign of the project such that consistency with the standards is achieved. | N | No historic properties would be altered as a result of project implementation. Therefore, this PEIR measure does not apply to the ACRP. |

## TABLE C-1 (Continued)
## PEIR MITIGATION MEASURES – CONSISTENCY REVIEW FOR THE ALAMEDA CREEK RECAPTURE PROJECT

| PEIR Mitigation Measure(s) | Applicable to Alameda Creek Fishery Enhancement Project in PEIR (Y/N)? | Applicability of Programmatic Mitigation Measure to ACRP |
|---|---|---|
| **Cultural (cont.)** | | |
| **Measure 4.7-4d, Historic Resources Survey and Redesign:** Undertake a historic resources survey to identify and evaluate potential historic resources that may exist in the project's area of potential effect. If a survey identifies one or more historical resources, assess the impact the project may have on those historical resources. If the project will cause a substantial adverse change to a historic resource, assign a preservation specialist to review the proposed project for compliance with the Secretary of the Interior's *Standards for the Treatment of Historic Properties*. If the project is determined to be inconsistent with those standards, pursue and implement redesign of the project such that consistency with the standards is achieved. | N | The field survey was conducted as part of background for the project and is documented in Section 5.5.1.4, Architectural Methods, Survey, and Results. |
| **Measure 4.7-4e, Historic Resources Protection Plan:** A qualified historian will prepare a plan that specifies procedures for protecting and monitoring historic resources during construction. | N | No historic properties would be altered as a result of project implementation. Therefore, this PEIR measure does not apply to the ACRP. |
| **Measure 4.7-4f, Preconstruction Surveys and Vibration Monitoring:** Include geotechnical investigations if vibration-related impacts could affect historic resources. Follow recommendations of the final geotechnical reports. Conduct a preconstruction survey of existing conditions and monitor the adjacent buildings for damage during construction, if recommended. | N | There are no documented historical resources within the project area. Therefore, this PEIR measure does not apply to the ACRP. |
| **Traffic** | | |
| **Measure 4.8-1a, Traffic Control Plan Measures:** Elements of the traffic control plan could include: circulation and detour plans, designated truck routes, sufficient staging area, access to driveways, use of standard construction specifications for controlling construction vehicle movements, restrictions on truck trips during peak morning and evening commute hours, lane closure restrictions, maintenance of alternate one-way traffic flow, detour signing, pedestrian and bicycle access and circulation, equipment and materials storage, construction worker parking, roadside safety protocols, considerations for sensitive land uses, coordination with local transit service providers, roadway repair, and conformance with the state's *Manual of Traffic Controls for Construction and Maintenance Work Areas*. | N | The SFPUC Standard Construction Measures (traffic control measures) would be applicable to construction of the ACRP; this measure requires that all projects implement traffic control measures sufficient to maintain traffic and pedestrian circulation on streets affected by construction, including measures such as flaggers, construction warning signs, scheduling truck trips during non-peak hours, and coordinating with local emergency responder to maintain emergency access. Implementation of the standard construction measures would achieve the same objective as this PEIR measure. |

### TABLE C-1 (Continued)
### PEIR MITIGATION MEASURES – CONSISTENCY REVIEW FOR THE ALAMEDA CREEK RECAPTURE PROJECT

| PEIR Mitigation Measure(s) | Applicable to Alameda Creek Fishery Enhancement Project in PEIR (Y/N)? | Applicability of Programmatic Mitigation Measure to ACRP |
|---|---|---|
| **Traffic (cont.)** | | |
| **Measure 4.8-1b, Coordination of Individual Traffic Control Plans:** In the event that more than one construction contract is issued for work along existing or new pipelines, and where construction could occur within and/or across multiple streets in the same vicinity, coordinate the traffic control plans in order to mitigate the impact of traffic disruption by including measures that address overlapping construction schedules and activities, truck arrivals and departures, lane closures and detours, and the adequacy of on-street staging requirements. | N | The SFPUC Standard Construction Measures (traffic control measures) would be applicable to construction of the ACRP. The limited number of truck trips (no more than one truck trip per hour) and construction worker vehicle trips (maximum of 68 per day) would not result in a substantial or cumulatively considerable contribution to potential cumulative traffic safety hazard impacts. Implementation of the standard construction measures would achieve the same objective as this PEIR measure. |
| **Measure 4.8-4, Accommodation of Displaced Public Parking Supply for Recreational Visitors:** Include an additional measure in the traffic control plans to accommodate any anticipated visitor parking demand that would be displaced by proposed projects at public recreational facilities. | N | No recreational parking would be displaced under the project. Therefore, this PEIR measure does not apply to the ACRP. |
| **Air Quality** | | |
| **Measure 4.9-1a, SJVAPCD Dust Control Measures:** Include San Joaquin Valley Air Pollution Control District (SJVAPCD) Basic Control Measures in contract specifications for all construction sites. Include SJVAPCD Enhanced Control Measures in contract specifications when required to mitigate significant $PM_{10}$ impacts. Include SJVAPCD Additional Control Measures in contract specifications for construction sites that are large in area, located near sensitive receptors, or which for any other reason warrant additional emissions reductions. Include SJVAPCD Rule 9510, Indirect Source Review, Section 6.1, Construction Equipment Emissions in contract specifications for any project subject to discretionary approval by a public agency that ultimately results in the construction of a new building, facility, or structure or reconstruction of a building, facility, or structure for the purpose of increasing capacity or activity and also involving 9,000 square feet of space. | N | The project is not located within the jurisdiction of the SJVAPCD. Therefore, this PEIR measure does not apply to the ACRP. |
| **Measure 4.9-1b, SJVAPCD Exhaust Control Measures:** Include SJVAPCD Exhaust Control Measures in contract specifications, where applicable, for heavy-duty equipment to limit exhaust emissions within the San Joaquin Region. | N | The project is not located within the jurisdiction of the SJVAPCD. |

## TABLE C-1 (Continued)
## PEIR MITIGATION MEASURES – CONSISTENCY REVIEW FOR THE ALAMEDA CREEK RECAPTURE PROJECT

| PEIR Mitigation Measure(s) | Applicable to Alameda Creek Fishery Enhancement Project in PEIR (Y/N)? | Applicability of Programmatic Mitigation Measure to ACRP |
|---|---|---|
| **Air Quality (cont.)** | | |
| **Measure 4.9-1c, BAAQMD Dust Control Measures:** For projects in the Sunol Valley, Bay Division, Peninsula, and San Francisco Regions, include Bay Area Air Quality Management District (BAAQMD) Basic Control Measures in contract specifications for all construction sites. Include BAAQMD Enhanced Control Measures in contract specifications for sites over four acres. Include BAAQMD Optional Control Measures in contract specifications for sites that are large in area, located near sensitive receptors, or which for any other reason warrant additional emissions reductions. | Y | See Mitigation Measure M-AQ-1 (BAAQMD Basic Construction Measures).<br>The project-level mitigation is consistent with the BAAQMD guidelines for assessing and mitigating air quality impacts. |
| **Measure 4.9-1d, BAAQMD Exhaust Control Measures:** For projects in the Sunol Valley, Bay Division, Peninsula, and San Francisco Regions, include BAAQMD Exhaust Control Measures to limit exhaust emissions, where applicable. | Y | See Mitigation Measure M-AQ-1 (BAAQMD Basic Construction Measures).<br>The project-level mitigation is consistent with the BAAQMD guidelines for assessing and mitigating air quality impacts. For all projects, the BAAQMD recommends implementation of its Basic Construction Measures whether or not construction-related exhaust emissions exceed the applicable significance thresholds. |
| **Measure 4.9-2a, Health Risk Screening or Use of Soot Filters:** Complete a health risk screening if truck volumes associated with a particular project along a particular haul route exceed 40,000 truck trips over the entire construction period. If a potentially significant impact is indicated, complete a site-specific health risk assessment. Consider diesel particulate matter (DPM) emission rates in separate project-level analysis at the time of construction. Develop a mitigation program based on the site-specific health risk assessment implementing methods of reducing DPM emission or exposure to a less-than-significant level. | N | The health risk assessment conducted for the proposed project determined that construction emissions sources would be separated from the nearest sensitive receptors by a distance of 1,400 feet, which is greater than the 1,000-foot screening distance used by the BAAQMD for the application of its quantitative health risk thresholds. Exposure to TAC emissions over a relatively short exposure period of the 21-month construction duration with a buffer distance of at least 1,400 feet separating the emissions sources and nearest sensitive receptors would not expose nearby sensitive receptors to substantial pollutant concentration. Therefore, this PEIR measure does not apply to the ACRP. |
| **Measure 4.9-2b, Vacate SFPUC Land Managers' Residences in Sunol Valley:** Vacate the two SFPUC Land Managers' residences in the Sunol Valley during construction of the Calaveras Dam or SVWTP – Treated Water Reservoirs projects or complete a health risk screening (and, if warranted, a health risk assessment) to determine health risks at these residences from either of these two projects. | N | The health risk assessment conducted for the proposed project determined that construction emissions sources would be separated from the nearest sensitive receptors by a distance of 1,400 feet, which is greater than the 1,000-foot screening distance used by the BAAQMD for the application of its quantitative health risk thresholds. Exposure to TAC emissions over a relatively short exposure period of the 21-month construction duration with a buffer distance of at least 1,400 feet separating the emissions sources and nearest sensitive receptors would not expose nearby sensitive receptors to substantial pollutant concentration. Therefore, this PEIR measure does not apply to the ACRP. |
| **Measure 4.9-3, Tunnel Gas Odor Control:** Add water scrubbers and appropriate chemicals to tunnel ventilation systems if odorous gases become a nuisance odor problem (i.e., odor complaints are received). | N | The project does not include tunneling. Therefore, this PEIR measure does not apply to the ACRP. |

### TABLE C-1 (Continued)
### PEIR MITIGATION MEASURES – CONSISTENCY REVIEW FOR THE ALAMEDA CREEK RECAPTURE PROJECT

| PEIR Mitigation Measure(s) | Applicable to Alameda Creek Fishery Enhancement Project in PEIR (Y/N)? | Applicability of Programmatic Mitigation Measure to ACRP |
|---|---|---|
| **Noise/Vibration** | | |
| **Measure 4.10-1a, Noise Controls:** For all WSIP projects located within 500 feet of any noise-sensitive receptors, implement appropriate noise controls to reduce daytime construction noise levels to meet the 70-dBA daytime speech interference criterion to the extent feasible. For all WSIP projects involving nighttime construction and located within 3,000 feet of any noise-sensitive receptors, implement appropriate noise controls to maintain noise levels at or below any applicable ordinance nighttime noise limits or the 50-dBA nighttime sleep interference criterion to the extent feasible. | Y | No mitigation is necessary based on project-specific design. Construction-related daytime noise levels were determined to be less than significant. There would be no nighttime construction associated with the proposed project. See Impact NO-1: Construction of the project would not result in a substantial temporary increase in ambient noise levels at the closest residential receptors, and would not expose persons to substantial noise levels in excess of standards established in the Alameda County Noise Ordinance. Therefore, this PEIR measure does not apply to the ACRP. |
| **Measure 4.10-1b, Vacate SFPUC Caretaker's Residence at Tesla Portal:** Vacate caretaker's residence at Tesla Portal during construction of the Advanced Disinfection and Tesla Portal Disinfection Station projects as well as those portions of the San Joaquin Pipeline System and Rehabilitation of Existing San Joaquin Pipelines projects located at Tesla Portal. | N | The project is not located at the Tesla Portal. Therefore, this PEIR measure does not apply to the ACRP. |
| **Measure 4.10-2a, Limit Hourly Truck Volumes:** Haul and delivery truck routes for all WSIP projects will, to the extent feasible, avoid local residential streets and follow local designated truck routes. Total project-related haul and delivery truck volumes on any particular haul truck route will be limited to 80 trucks per hour. | N | Although two residences on Athenour Way and the SFPUC watershed keeper's residence on Andrade Road exist in the Sunol Valley, none of the construction access routes are located on residential streets. Construction-related haul and delivery trucks and worker vehicles would use Calaveras Road to access the site. Truck volumes would vary day to day and would not exceed 80 trucks per day. See Impact NO-1: Construction of the project would not result in a substantial temporary increase in ambient noise levels at the closest residential receptors, and would not expose persons to substantial noise levels in excess of standards established in the Alameda County Noise Ordinance. Therefore, this PEIR measure does not apply to the ACRP. |
| **Measure 4.10-2b, Restrict Truck Operations:** Prohibit haul and delivery trucks from operating within 200 feet of any residential uses during the nighttime hours. For receptors beyond 200 feet from a haul route, limit noise levels to the 50-dBA sleep interference criterion at the closest receptor. | N | Not applicable; project-related haul and delivery trucks would not operate along Calaveras Road during the nighttime or evening hours (10 p.m. to 7 a.m.). |
| **Measure 4.10-2c, Vacate SFPUC Land Manager's Residence:** Vacate Land Manager's residence adjacent to Alameda East Portal during offsite truck operations associated with the New Irvington Tunnel project, if truck operations occur during the nighttime hours (10 p.m. to 7 a.m.) and are estimated to exceed the 50-dBA sleep interference criterion at this residence. | N | Not applicable; project-related haul and delivery trucks would not operate along Calaveras Road during nighttime hours (10 p.m. to 7 a.m.). |

## TABLE C-1 (Continued)
## PEIR MITIGATION MEASURES – CONSISTENCY REVIEW FOR THE ALAMEDA CREEK RECAPTURE PROJECT

| PEIR Mitigation Measure(s) | Applicable to Alameda Creek Fishery Enhancement Project in PEIR (Y/N)? | Applicability of Programmatic Mitigation Measure to ACRP |
|---|---|---|
| **Noise/Vibration (cont.)** | | |
| **Measure 4.10-3a, Vibration Controls to Prevent Cosmetic or Structural Damage:** Incorporate restrictions into all contract specifications (primarily for sheetpile driving, pile driving, or tunnel construction activities), whereby surface vibration will be limited to 0.2 inch/second peak particle velocity (PPV) for continuous vibration (e.g., vibratory equipment and impact pile drivers) and 0.5 inch/second PPV for controlled detonations at the closest receptors to ensure that cosmetic or structural damage does not occur. | N | Not applicable; the project's vibration impacts were determined to be less than significant. See Impact NO-2: Construction activities would not result in excessive groundborne vibration. |
| **Measure 4.10-3b, Limit Vibration Levels At or Below Vibration Perception Threshold:** Maintain vibration levels at or below the vibration perception threshold at adjacent properties to the extent feasible during nighttime. If vibration complaints are received, operational adjustments will be made to reduce vibration annoyance effects. | N | Not applicable; the project's vibration impacts were determined to be less than significant. See Impact NO-2: Construction activities would not result in excessive groundborne vibration. |
| **Measure 4.10-3c, Limit Tunnel-Related Detonation to Daylight Hours:** Limit controlled detonation associated with tunnel construction to daylight hours, Monday through Saturday. | N | Not applicable; the project does not include tunneling. |
| **Services/Utilities** | | |
| **Measure 4.11-1a, Notify Neighbors of Potential Utility Service Disruption:** Notify residents and businesses in project area of potential utility service disruption two to four days in advance of construction. | Y | This mitigation was included in the PEIR, however no mitigation is necessary based on up-to-date information. This criterion is not included in the San Francisco Planning Department's August 2015 CEQA Checklist, and this issue is not evaluated in the ACRP EIR. Therefore, this PEIR measure does not apply to the ACRP. |
| **Measure 4.11-1b, Locate Utility Lines Prior to Excavation:** Locate overhead and underground utility lines prior to excavation work. | Y | This mitigation was included in the PEIR, however no mitigation is necessary based on up-to-date information. This criterion is not included in the San Francisco Planning Department's August 2015 CEQA Checklist, and this issue is not evaluated in the ACRP EIR. Therefore, this PEIR measure does not apply to the ACRP. |
| **Measure 4.11-1c, Confirmation of Utility Line Information:** Find the exact location of underground utilities by safe and acceptable means. Confirm information regarding the size, color, and location of existing utilities before construction activities commence. | Y | This mitigation was included in the PEIR, however no mitigation is necessary based on up-to-date information. This criterion is not included in the San Francisco Planning Department's August 2015 CEQA Checklist, and this issue is not evaluated in the ACRP EIR. Therefore, this PEIR measure does not apply to the ACRP. |
| **Measure 4.11-1d, Safeguard Employees from Potential Accidents Related to Underground Utilities:** While any excavation is open, protect, support, or remove underground utilities as necessary to safeguard employees. | Y | This mitigation was included in the PEIR, however no mitigation is necessary based on up-to-date information. This criterion is not included in the San Francisco Planning Department's August 2015 CEQA Checklist, and this issue is not evaluated in the ACRP EIR. Therefore, this PEIR measure does not apply to the ACRP. |

### TABLE C-1 (Continued)
### PEIR MITIGATION MEASURES – CONSISTENCY REVIEW FOR THE ALAMEDA CREEK RECAPTURE PROJECT

| PEIR Mitigation Measure(s) | Applicable to Alameda Creek Fishery Enhancement Project in PEIR (Y/N)? | Applicability of Programmatic Mitigation Measure to ACRP |
|---|---|---|
| **Services/Utilities (cont.)** | | |
| **Measure 4.11-1e, Notify Local Fire Departments:** Notify local fire departments any time damage to a gas utility results in a leak or suspected leak, or whenever damage to any utility results in a threat to public safety. | Y | This mitigation was included in the PEIR, however no mitigation is necessary based on up-to-date information. This criterion is not included in the San Francisco Planning Department's August 2015 CEQA Checklist, and this issue is not evaluated in the ACRP EIR. Therefore, this PEIR measure does not apply to the ACRP. |
| **Measure 4.11-1f, Emergency Response Plan:** Develop an emergency response plan in the event of a leak or explosion prior to commencing construction activities. | Y | This mitigation was included in the PEIR, however no mitigation is necessary based on project-specific design. The SFPUC would implement Standard Construction Measures pertaining to hazardous materials during project planning, construction, and operation. Therefore, this PEIR measure does not apply to the ACRP. |
| **Measure 4.11-1g, Prompt Reconnection of Utilities:** Promptly reconnect any disconnected utility lines. | Y | This mitigation was included in the PEIR, however no mitigation is necessary based on up-to-date information. This criterion is not included in the San Francisco Planning Department's August 2015 CEQA Checklist, and this issue is not evaluated in the ACRP EIR. Therefore, this PEIR measure does not apply to the ACRP. |
| **Measure 4.11-1h, Coordinate Final Construction Plans with Affected Utilities:** Coordinate final construction plans and specifications with affected utilities. | Y | This mitigation was included in the PEIR, however no mitigation is necessary based on up-to-date information. This criterion is not included in the San Francisco Planning Department's August 2015 CEQA Checklist, and this issue is not evaluated in the ACRP EIR. Therefore, this PEIR measure does not apply to the ACRP. |
| **Measure 4.11-2, Waste Reduction Measures:** Incorporate into contract specifications for each WSIP project the requirement to obtain any necessary waste management permits prior to construction and to comply with conditions of approval attached to project implementation. | N | SFPUC estimates that roughly 90 percent of the waste generated during construction would be diverted by placing in the spoils area in the project area or through recycling of construction debris, which would meet or exceed the State of California's and Alameda County's waste diversion goals. See Impact UT-2: Project construction would not result in a substantial adverse effect related to compliance with federal, state, and local statutes and regulations pertaining to solid waste. Therefore, this PEIR measure does not apply to the ACRP. |
| **Recreation** | | |
| **Measure 4.12-1, Coordination with Golf Course/Recreational Facility Managers:** Coordinate with managers of golf courses or other recreational facilities directly affected by pipeline construction to minimize adverse impacts on golfers and other recreational users. | N | The project would not affect golf courses or other designated recreational facilities. Therefore, this PEIR measure does not apply to the ACRP. |
| **Measure 4.12-2, Appropriate Siting of Proposed Facilities:** Locate WSIP project facilities on park and recreation properties in consultation with park planning staff to minimize the direct loss of recreation and play space and to minimize inconvenience to park and recreation users. | N | The project does not include construction on park or recreation properties. Therefore, this PEIR measure does not apply to the ACRP. |

### TABLE C-1 (Continued)
### PEIR MITIGATION MEASURES – CONSISTENCY REVIEW FOR THE ALAMEDA CREEK RECAPTURE PROJECT

| PEIR Mitigation Measure(s) | Applicable to Alameda Creek Fishery Enhancement Project in PEIR (Y/N)? | Applicability of Programmatic Mitigation Measure to ACRP |
|---|---|---|
| **Agriculture** | | |
| **Measure 4.13-1a, Supplemental Noticing and Soil Stockpiling:** For the San Joaquin Pipeline projects (San Joaquin System and Rehabilitation of Existing San Joaquin Pipeline), stockpile and replace topsoil in mapped areas of Prime and Unique Farmland and Farmland of Statewide Importance that would be temporarily disturbed by pipeline construction, unless other actions are required under specific agreements with individual landowners. | N | The project is not located in the San Joaquin Region. Therefore, this PEIR measure does not apply to the ACRP. |
| **Measure 4.13-1b, Avoidance or Soil Stockpiling:** Minimize any potential impacts on agricultural lands in the Sunol Valley by avoiding these resources wherever possible. Where this is not possible, stockpile, replace, and hydroseed topsoil to prevent erosion, unless other actions are required as a result of contracts affecting use of the property or under specific agreements with individual landowners. | Y | No mitigation is necessary based on project-specific information. However, although not specifically targeted at minimizing impacts on agricultural lands, Mitigation Measure M-BI-1e (Prepare and Implement a Vegetation Restoration Plan and Compensatory Mitigation) would restore disturbed lands to preconstruction conditions or better and would minimize spread of weeds. The project-level analysis determined that although the Permanent Spoils Site B is designated as Unique Farmland on the 2012 Farmland Mapping and Monitoring Program (FMMP) maps published in 2014, given that Permanent Spoils Site B has not been in agricultural production since 2012, it is anticipated that the Unique Farmland designation will be removed in future FMMP map updates. Use of this site for the permanent placement of spoils generated during construction of the proposed ACRP would not result in a change in the current use of the site nor affect future uses of the site. |
| **Measure 4.13-2, Siting Facilities to Avoid Prime Farmland:** Avoid areas identified as Prime Farmland, Unique Farmland, or Farmland of Statewide Importance. If avoidance is not feasible, adopt a permanent set-aside for an equivalent acreage of similarly valued farmland in the area. | N | The project-level analysis determined that although the Permanent Spoils Site B is designated as Unique Farmland on the 2012FMMP maps, published in 2014, given that Permanent Spoils Site B has not been in agricultural production since 2012, it is anticipated that the Unique Farmland designation will be removed in future FMMP map updates. Use of this site for the permanent placement of spoils generated during construction of the proposed ACRP would not result in a change in the current use of the site nor affect future uses of the site. Therefore, this PEIR measure does not apply to the ACRP. |
| **Hazards** | | |
| **Measure 4.14-1a, Site Health and Safety Plan:** For all projects where the site assessment indicates the potential to encounter hazardous materials, prepare a site health and safety plan identifying the chemicals present, potential health and safety hazards, monitoring, soil-handling methods, appropriate personnel protective equipment, and emergency response procedures. | N | The construction contractors would be required to implement the SFPUC standard construction measures for hazardous materials. If hazardous materials would be disturbed, the SFPUC would prepare and implement a plan for treating, containing, and/or removing the hazardous materials in accordance with any applicable local, State and federal regulations so as to avoid any adverse exposure to the material during and after construction. As part of the SFPUC standard construction requirements, protection measures would also be implemented to prevent the release of hazardous materials used during construction. Therefore, this PEIR measure does not apply to the ACRP. |

## TABLE C-1 (Continued)
## PEIR MITIGATION MEASURES – CONSISTENCY REVIEW FOR THE ALAMEDA CREEK RECAPTURE PROJECT

| PEIR Mitigation Measure(s) | Applicable to Alameda Creek Fishery Enhancement Project in PEIR (Y/N)? | Applicability of Programmatic Mitigation Measure to ACRP |
|---|---|---|
| **Hazards (cont.)** | | |
| **Measure 4.14-1b, Materials Disposal Plan:** For all projects where the site assessment indicates the potential to encounter hazardous materials in the soil, prepare a materials disposal plan that specifies the disposal method and approved disposal site for the soil. | N | The construction contractors would be required to implement the SFPUC standard construction measures for hazardous materials. If hazardous materials would be disturbed, the SFPUC would prepare and implement a plan for treating, containing, and/or removing the hazardous materials in accordance with any applicable local, State and federal regulations so as to avoid any adverse exposure to the material during and after construction. Therefore, this PEIR measure does not apply to the ACRP. |
| **Measure 4.14-1c, Coordination with Property Owners and Regulatory Agencies:** Based on regulatory agency file reviews, assess the potential to encounter unacceptable levels of hazardous materials at known environmental cases, for construction activities to cause groundwater plume migration or interfere with ongoing remediations at known environmental cases, and for increased water levels in reservoirs or lakes to inundate known environmental cases. Modify construction or remediation activities. | N | The project would not interfere with the investigation or remediation of a known environmental case. See Section 5.17.1.1, Hazardous Materials in Soil and Groundwater. Therefore, this PEIR measure does not apply to the ACRP. |
| **Measure 4.14-2, Health Risk Screening and Airborne Asbestos Monitoring Plan:** For tunneling projects where soil or rock may contain naturally occurring asbestos, conduct a health risk screening assessment to identify acceptable levels of asbestos in tunnel emissions. Prepare an airborne asbestos monitoring plan for approval by the BAAQMD. | N | The project would not disturb a rock unit or soil that contains naturally occurring asbestos. See Section 5.17.2.1, Federal and State Regulations. Therefore, this PEIR measure does not apply to the ACRP. |
| **Measure 4.14-5, Hazardous Building Materials Surveys and Abatement:** For all WSIP projects involving demolition or renovation of existing facilities, perform a hazardous building materials survey for each structure prior to demolition or renovation activities. If any friable asbestos-containing materials, lead-containing materials, or hazardous components of building materials are identified, implement adequate abatement practices prior to demolition or renovation. | N | The project would require demolition of an approximately 100-foot-long section of the existing Sunol Pump Station Pipeline, a concrete manhole, and the existing inactive 100-foot-long aboveground emergency intertie pipeline associated with the South Bay Aqueduct. In addition, a 300-foot segment of a 22-inch-diameter PG&E natural gas transmission pipeline needs to be removed before the electrical control building can be constructed. Impacts related to the inadvertent release of hazardous chemicals during project construction would be less than significant with implementation of the SFPUC standard construction measures for hazardous materials. The SFPUC would also implement Alameda WMP actions that pertain to spills of hazardous materials. Therefore, this PEIR measure does not apply to the ACRP. |

## TABLE C-1 (Continued)
## PEIR MITIGATION MEASURES – CONSISTENCY REVIEW FOR THE ALAMEDA CREEK RECAPTURE PROJECT

| PEIR Mitigation Measure(s) | Applicable to Alameda Creek Fishery Enhancement Project in PEIR (Y/N)? | Applicability of Programmatic Mitigation Measure to ACRP |
|---|---|---|
| **Energy** | | |
| **Measure 4.15-2, Incorporation of Energy Efficiency Measures:** Consistent with the Energy Action Plan II priorities for reducing energy usage, ensure that energy-efficient equipment is used in all WSIP projects. Prepare a repair and maintenance plan for each facility to minimize power use. Evaluate the potential for use of renewable energy resources. | Y | Applicable to the ACRP.<br>See Mitigation Measure M-ME-4, which incorporates this PEIR measure verbatim into the project-level EIR. |
| **Collective Impacts (These are considered cumulative mitigation measures in project-level CEQA documents)** | | |
| **Measure 4.16-1a, Construction Coordination at Irvington Portal:** If construction schedules of multiple WSIP projects occurring at and near Irvington Portal coincide or overlap, the SFPUC will coordinate with construction contractor(s) and neighbors to minimize disturbance of residents in the adjacent neighborhood to the extent practicable. Such coordination will need to balance the duration of construction with the magnitude of construction-related impacts on the same sensitive receptors. | N | The project is not located at the Irvington Portal. |
| **Measure 4.16-4a, Bioregional Habitat Restoration Measures:** Address the following bioregional effects and implement conservation principles when implementing habitat compensation mitigation required for individual WSIP facility projects: compound impacts on functional units of habitat as WSIP projects simplify vegetation structure and increase "edge" (the boundary between two different habitats); increased habitat impacts due to the spread of weedy, non-native plant species; genetic diversity impacts on small populations; impacts on wildlife movement due to habitat fragmentation; suppression of natural disturbance regimes; and reduced population recovery opportunities from stochastic events. | N | The project's contribution to cumulative effects on biological resources would be mitigated with project-specific mitigation measures and therefore would not require implementation of bioregional habitat restoration measures. See Impact C-BI-1: Causation of contribution to cumulative impacts on terrestrial biological resources. Therefore, this PEIR measure does not apply to the ACRP. |
| **Measure 4.16-4b, Coordination of Construction Staging and Access:** Coordinate construction contractor(s) to minimize surface disturbance when construction schedules for WSIP projects affecting the same areas overlap. | N | SFPUC is already coordinating construction schedules, staging, and access issues for SFPUC projects in the Sunol Valley. Most of the other WSIP projects in the Sunol Valley have already been completed. Therefore, this PEIR measure does not apply to the ACRP. |
| **Measure 4.16-6a, SFPUC WSIP Projects Construction Coordinator:** Identify a qualified construction coordinator to coordinate project-specific traffic control plans; develop a public information campaign to inform the public of construction activities, detour routes, and alternate routes; and work with local and regional agencies to pursue additional traffic mitigation measures and incorporate such measures into the project-specific traffic control plans. | Y | The SFPUC Standard Construction Measures (traffic control measures) would be applicable to construction of the ACRP; this measure requires that all projects implement traffic control measures sufficient to maintain traffic and pedestrian circulation on streets affected by construction, including measures such as flaggers, construction warning signs, scheduling truck trips during non-peak hours, and coordinating with local emergency responder to maintain emergency access. The limited number of truck trips (no more than one truck trip per hour) and construction worker vehicle trips (maximum of 68 per day) would not result in a substantial or cumulatively considerable contribution to potential cumulative traffic safety hazard impacts. Therefore, this PEIR measure does not apply to the ACRP. |

### TABLE C-1 (Continued)
### PEIR MITIGATION MEASURES – CONSISTENCY REVIEW FOR THE ALAMEDA CREEK RECAPTURE PROJECT

| PEIR Mitigation Measure(s) | Applicable to Alameda Creek Fishery Enhancement Project in PEIR (Y/N)? | Applicability of Programmatic Mitigation Measure to ACRP |
|---|---|---|
| **Collective Impacts (cont.)** | | |
| **Measure 4.16-6b, Combined San Joaquin Traffic Control Plan:** Develop a San Joaquin Traffic Control Plan that coordinates the project-specific traffic control plans and identifies additional measures (consistent with the standards of San Joaquin County, Stanislaus County, and Caltrans) to minimize the combined impacts of multiple WSIP project construction traffic on I-580, Chrisman Road, and Vernalis Road. | N | The project is not located in San Joaquin County. |
| **Measure 4.16-6c, Combined Sunol Valley Traffic Control Plan:** Develop a Sunol Valley Traffic Control Plan that coordinates the project-specific traffic control plans and identifies additional measures (consistent with the standards of Alameda County and Caltrans) to minimize the impacts of construction traffic on Calaveras Road and I-680. | Y | The SFPUC Standard Construction Measures (traffic control measures) would be applicable to construction of the ACRP. The limited number of truck trips (no more than one truck trip per hour) and construction worker vehicle trips (maximum of 68 per day) would not result in a substantial or cumulatively considerable contribution to potential cumulative traffic safety hazard impacts. Furthermore, most WSIP projects in the Sunol Valley have already been completed. Therefore, this PEIR measure does not apply to the ACRP. |
| **Measure 4.16-7a, Dust and Exhaust Control Measures for All WSIP Projects:** Require implementation of Air Quality Measures 4.9-1a thru 4.9-1d for all WSIP projects to address collective construction-related air quality impacts. | Y | Specified air quality measures are already required under project-level Mitigation Measures M-AQ-1 (BAAQMD General Construction Measures). |
| **Measure 4.16-7b, Health Risk Screening or Use of Soot Filters for All Projects in the San Joaquin and Sunol Valley Regions:** Require Measure 4.9-2a for all WSIP projects in the San Joaquin and Sunol Valley Regions to address collective DPM impacts. When this requirement is applied to the New Irvington Tunnel project, it will be applied to both the Sunol Valley and Fremont tunnel portals, taking into account truck traffic from other WSIP projects in the vicinity of both portals. | Y | See Mitigation Measure M-AQ 1 (BAAQMD Basic Construction Measures).<br>The project's contribution to cumulative impacts are addressed by Mitigation Measure M-AQ-1. With mitigation, the ACRP's contribution to cumulative air quality impacts related to criteria pollutants and precursor emissions during construction would not be cumulatively considerable. |
| **Measure 4.16-7c, Vacate SFPUC Land Managers' Residences for All Projects in the Sunol Valley Region:** Require Measure 4.9-2b for all WSIP projects in the Sunol Valley Region to address collective DPM impacts. | Y | No mitigation is necessary based on project-specific design. Vacation of the land manager's residence would not be required as a result of project-implementation because the project's contribution to cumulative DPM emissions would not be cumulatively considerable. Therefore, this PEIR measure does not apply to the ACRP. |
| **Measure 4.16-8a, Limiting Hourly Truck Volumes and Restricting Truck Operations on Haul Routes for Multiple WSIP Projects:** Apply Measures 4.10-2a and 4.10-2b to total haul and delivery truck volumes attributable to all WSIP projects on any particular haul truck route (including haul routes in the Tesla Portal, Irvington Portal, and Lower Crystal Springs Dam vicinities as well as haul routes in the San Francisco Region) to address collective truck-related noise impacts. | N | Based on project traffic volumes for all Sunol Valley projects and the proximity of sensitive receptors, cumulative impacts related to temporary noise disturbance along construction access routes would be less than significant. Therefore, this PEIR measure does not apply to the ACRP. |

### TABLE C-1 (Continued)
### PEIR MITIGATION MEASURES – CONSISTENCY REVIEW FOR THE ALAMEDA CREEK RECAPTURE PROJECT

| PEIR Mitigation Measure(s) | Applicable to Alameda Creek Fishery Enhancement Project in PEIR (Y/N)? | Applicability of Programmatic Mitigation Measure to ACRP |
|---|---|---|
| **Collective Impacts (cont.)** | | |
| **Measure 4.16-8b, Vacate Land Manager's Residence for All Projects in Sunol Valley Region:** To address collective noise impacts, vacate Land Manager's residence adjacent to Alameda East Portal during construction truck operations associated with all WSIP projects in this region if collective daytime truck volumes exceed the 70-dBA speech interference criterion or nighttime truck volumes exceed the 50-dBA sleep interference criterion. | Y | No mitigation is necessary based on project-specific design. Based on project traffic volumes for all Sunol Valley projects and the proximity of the Land Manager's residence, noise levels from cumulative traffic on Calaveras Road would not exceed the 70-dBA speech interference criteria, and the proposed project would not include nighttime haul truck traffic. Therefore, this PEIR measure does not apply to the ACRP. |
| **Cumulative Effects** | | |
| **Measure 4.17-6, SFPUC WSIP Projects Construction Coordinator – Other Agencies:** The SFPUC WSIP construction coordinator designated in accordance with Measure 4.16-6a will also consider the effects of any traffic generated by SFPUC maintenance activities and other SFPUC projects; and coordinate with Caltrans, other county agencies, and local jurisdictions regarding construction of other private and public development projects so as to minimize traffic impacts on local access roads. | Y | The SFPUC Standard Construction Measures (traffic control measures) would be applicable to construction of the ACRP. The limited number of truck trips (no more than one truck trip per hour) and construction worker vehicle trips (maximum of 68 per day) would not result in a substantial or cumulatively considerable contribution to potential cumulative traffic safety hazard impacts. Therefore, this PEIR measure does not apply to the ACRP. |
| **Measure 4.17-8, Coordination of Truck Traffic on Local Streets:** The SFPUC WSIP construction coordinator designated in Measure 4.17-6 will also be responsible for coordinating truck traffic generated on these same streets by SFPUC maintenance activities and other SFPUC projects so that SFPUC-related truck noise increases are maintained at or below threshold levels specified in Measures 4.10-2a and 4.10-2b to the extent feasible. | Y | The SFPUC Standard Construction Measures (traffic control measures) would be applicable to construction of the ACRP. The limited number of truck trips (no more than one truck trip per hour) and construction worker vehicle trips (maximum of 68 per day) would not result in a substantial or cumulatively considerable contribution to potential cumulative traffic safety hazard impacts. Therefore, this PEIR measure does not apply to the ACRP. |

NOTES:

(a) See WSIP PEIR, Volume 4, Chapter 6, Table 6-2, for description of standard programmatic biological resources mitigation measures that correspond to each special status species.

# APPENDIX AQ

# Emissions Calculations for Air Quality and Greenhouse Gas Emissions Analyses

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# Alameda Creek Recapture Project

## Construction - CAP and GHG Emissions

### UNMITIGATED CONSTRUCTION EMISSIONS - AVERAGE DAILY CRITERIA AIR POLLUTANTS

| Source | # of workdays | Average Daily Emissions (lbs/day) | | | |
|---|---|---|---|---|---|
| | | ROG | NOx | PM-10 | PM-2.5 |
| Off-road construction equipment | 284 | 4.48 | 46.23 | 1.87 | 1.75 |
| On-road mobile sources | | 0.07 | 1.53 | 0.02 | 0.02 |
| Total Project Average | | 4.55 | 47.75 | 1.89 | 1.77 |
| BAAQMD Threshold | | 54 | 54 | 82 | 54 |
| Significant? | | No | No | No | No |

### ANNUAL GHG EMISSIONS FROM CONSTRUCTION - OFF ROAD + ON ROAD

| Emissions Source | GHG Emissions (tons) | | | |
|---|---|---|---|---|
| | $CO_2$ | $CH_4$ | $N_2O$ | $CO_2e$ |
| Offroad Construction Equipment | 956.36 | 0.23 | 0.00 | 961.61 |
| Onroad Vehicles | 66.36 | 0.01 | 0.00 | 66.97 |
| PROJECT TOTAL OVER ENTIRE CONSTRUCTION PERIOD | 1,022.71 | 0.24 | 0.00 | 1,029 |

34.3

### TOTAL GHG EMISSIONS

| Project Component | OFF ROAD CONSTRUCTION EQUIPMENT | | | | ONROAD VEHICLES | | TOTAL | |
|---|---|---|---|---|---|---|---|---|
| | GHG Emissions (tons) | | | | GHG Emissions (tons) | | HG Emissions (tons | |
| | $CO_2$ | $CH_4$ | $N_2O$ | $CO_2e$ | $CO_2$ | $CO_2e$ | $CO_2$ | $CO_2e$ |
| Component 1 - Turbine Pumps and Barge Flotation System | 184.3 | 0.04 | 0.00 | 185.2 | 15.5 | 15.7 | 200 | 201 |
| Component 2 - Mooring system | 40.0 | 0.01 | 0.00 | 40.2 | 5.3 | 5.4 | 45 | 46 |
| Component 3 - Electrical Control Building and Transformer | 279.5 | 0.08 | 0.00 | 281.3 | 21.4 | 21.5 | 301 | 303 |
| Component 4 - Pipeline Work | 426.9 | 0.09 | 0.00 | 429.0 | 19.2 | 19.4 | 446 | 448 |
| Component 5 - Spoils Disposal | 25.7 | 0.01 | 0.00 | 25.9 | 4.9 | 4.9 | 31 | 31 |
| PROJECT TOTAL OVER ENTIRE CONSTRUCTION PERIOD | 956.4 | 0.23 | 0.00 | 961.6 | 66.4 | 67.0 | 1023 | 1029 |

# Alameda Creek Recapture Project

## Construction - CAP and GHG Emissions

**Results of CalEEMod run for construction equipment**

| Component | # of workdays | CalEEMod Annual emissions (tons) | | | | | | | Daily Emissions (lb/day) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | ROG | NOx | PM-10 (exhaust) | PM-2.5 (exhaust) | CO$_2$ | CH$_4$ | N$_2$O | ROG | NOx | PM-10 (exhaust) | PM-2.5 (exhaust) |
| Component 1 - Turbine Pumps and Barge Flotation System | 60 | 0.12 | 1.32 | 0.05 | 0.05 | 168.76 | 0.03 | 0.00 | 3.90 | 43.95 | 1.66 | 1.57 |
| Component 2 - Mooring system | 24 | 0.04 | 0.27 | 0.01 | 0.01 | 34.69 | 0.01 | 0.00 | 3.59 | 22.77 | 1.12 | 1.08 |
| Component 3 - Electrical Control Building and Transformer | 96 | 0.19 | 2.02 | 0.08 | 0.07 | 258.11 | 0.08 | 0.00 | 3.89 | 42.08 | 1.64 | 1.51 |
| Component 4 - Pipeline Work | 80 | 0.28 | 2.81 | 0.12 | 0.11 | 407.65 | 0.09 | 0.00 | 6.90 | 70.21 | 2.96 | 2.77 |
| Component 5 - Spoils Disposal | 24 | 0.01 | 0.14 | 0.01 | 0.01 | 20.79 | 0.01 | 0.00 | 1.12 | 12.03 | 0.47 | 0.43 |
| TOTAL | 284 | 0.64 | 6.56 | 0.27 | 0.25 | 890.00 | 0.22 | 0.00 | 4.48 | 46.23 | 1.87 | 1.75 |

**Summary of Onroad emissions from worker commute and material haul trips**

| Construction Period | # of workdays | EMFAC2014 Emissions (lb/day) | | | | Estimated Emissions (tons) for entire project construction | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | ROG | NOx | PM-10 (exhaust) | PM-2.5 (exhaust) | ROG | NOx | PM-10 (exhaust) | PM-2.5 (exhaust) | CO$_2$ | CH$_4$ | N$_2$O |
| Total project | 284 | 0.07 | 1.53 | 0.02 | 0.02 | 0.01 | 0.22 | 0.00 | 0.00 | 66.36 | 0.01 | 0.00 |

# Alameda Creek Recapture Project

## Construction - CAP and GHG Emissions

| **Overall construction timeline:** | Fall 2017 to Summer 2019 (about 21 months) | | | | | |
|---|---|---|---|---|---|---|
| | No overlapping of phases | | | | | |
| **Project Component** | **Assumed Construction Year** | **# of workdays** | **workers/ day** | **Worker trips/day** | **Material delivery trips/day** | **Offsite haul trips/day** |
| Component 1 - Turbine Pumps and Barge Flotation System | 2017 | 60 | 10 | 20 | 4 | 0 |
| Component 2 - Mooring system | 2018 | 24 | 6 | 12 | 4 | 0 |
| Component 3 - Electrical Control Building and Transformer | 2018 | 96 | 6 | 12 | 4 | 0 |
| Component 4 - Pipeline Work | 2018 | 80 | 8 | 16 | 4 | 0 |
| Component 5 - Spoils Disposal | 2018 | 24 | 4 | 8 | 0 | 4 |

**Assumed one-way trip lengths**

| | |
|---|---|
| Worker trips | 12.5 |
| Material Delivery Trips | 25 |
| Offsite Haul Trips | 25 |

**Details of Onroad emissions estimation using EMFAC2014 factors**

| **Component 1** | **miles/day** | **EMFAC2014 Emission Factors (g/mile)** | | | | | | | **Estimated Emissions (lbs/day)** | | | | **Estimated Emissions (tons/day)** | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **ROG** | **NOx** | **PM-10** | **PM-2.5** | **$CO_2$** | **$CH_4$** | **$N_2O$** | **ROG** | **NOx** | **PM-10** | **PM-2.5** | **$CO_2$** | **$CH_4$** | **$N_2O$** |
| Worker trips - LDT1 | 250 | 0.06 | 0.21 | 0.00 | 0.00 | 357.59 | 0.20 | 0.02 | 0.03 | 0.12 | 0.00 | 0.00 | 0.09 | 0.00 | 0.00 |
| Material Delivery Trips - T7 | 100 | 0.21 | 6.54 | 0.07 | 0.07 | 1689.32 | 0.01 | 0.00 | 0.05 | 1.44 | 0.02 | 0.01 | 0.17 | 0.00 | 0.00 |
| Offsite Haul Trips - T7 | 0 | 0.21 | 6.54 | 0.07 | 0.07 | 1689.32 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **Component 1 Onroad Daily Emissions** | | | | | | | | | 0.08 | 1.56 | 0.02 | 0.02 | 0.26 | 0.00 | 0.00 |

| **Component 2** | **miles/day** | **EMFAC2014 Emission Factors (g/mile)** | | | | | | | **Estimated Emissions (lbs/day)** | | | | **Estimated Emissions (tons/day)** | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **ROG** | **NOx** | **PM-10** | **PM-2.5** | **$CO_2$** | **$CH_4$** | **$N_2O$** | **ROG** | **NOx** | **PM-10** | **PM-2.5** | **$CO_2$** | **$CH_4$** | **$N_2O$** |
| Worker trips | 150 | 0.06 | 0.21 | 0.00 | 0.00 | 357.59 | 0.20 | 0.02 | 0.02 | 0.07 | 0.00 | 0.00 | 0.05 | 0.00 | 0.00 |
| Material Delivery Trips | 100 | 0.21 | 6.54 | 0.07 | 0.07 | 1689.32 | 0.01 | 0.00 | 0.05 | 1.44 | 0.02 | 0.01 | 0.17 | 0.00 | 0.00 |
| Offsite Haul Trips | 0 | 0.21 | 6.54 | 0.07 | 0.07 | 1689.32 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **Component 2 Onroad Daily Emissions** | | | | | | | | | 0.06 | 1.51 | 0.02 | 0.02 | 0.22 | 0.00 | 0.00 |

| **Component 3** | **miles/day** | **EMFAC2014 Emission Factors (g/mile)** | | | | | | | **Estimated Emissions (lbs/day)** | | | | **Estimated Emissions (tons/day)** | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **ROG** | **NOx** | **PM-10** | **PM-2.5** | **$CO_2$** | **$CH_4$** | **$N_2O$** | **ROG** | **NOx** | **PM-10** | **PM-2.5** | **$CO_2$** | **$CH_4$** | **$N_2O$** |
| Worker trips | 150 | 0.06 | 0.21 | 0.00 | 0.00 | 357.59 | 0.20 | 0.02 | 0.02 | 0.07 | 0.00 | 0.00 | 0.05 | 0.00 | 0.00 |
| Material Delivery Trips | 100 | 0.21 | 6.54 | 0.07 | 0.07 | 1689.32 | 0.01 | 0.00 | 0.05 | 1.44 | 0.02 | 0.01 | 0.17 | 0.00 | 0.00 |
| Offsite Haul Trips | 0 | 0.21 | 6.54 | 0.07 | 0.07 | 1689.32 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **Component 3 Onroad Daily Emissions** | | | | | | | | | 0.06 | 1.51 | 0.02 | 0.02 | 0.22 | 0.00 | 0.00 |

| **Component 4** | **miles/day** | **EMFAC2014 Emission Factors (g/mile)** | | | | | | | **Estimated Emissions (lbs/day)** | | | | **Estimated Emissions (tons/day)** | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **ROG** | **NOx** | **PM-10** | **PM-2.5** | **$CO_2$** | **$CH_4$** | **$N_2O$** | **ROG** | **NOx** | **PM-10** | **PM-2.5** | **$CO_2$** | **$CH_4$** | **$N_2O$** |
| Worker trips | 200 | 0.06 | 0.21 | 0.00 | 0.00 | 357.59 | 0.20 | 0.02 | 0.02 | 0.09 | 0.00 | 0.00 | 0.07 | 0.00 | 0.00 |
| Material Delivery Trips | 100 | 0.21 | 6.54 | 0.07 | 0.07 | 1689.32 | 0.01 | 0.00 | 0.05 | 1.44 | 0.02 | 0.01 | 0.17 | 0.00 | 0.00 |
| Offsite Haul Trips | 0 | 0.21 | 6.54 | 0.07 | 0.07 | 1689.32 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **Component 4 Onroad Daily Emissions** | | | | | | | | | 0.07 | 1.54 | 0.02 | 0.02 | 0.24 | 0.00 | 0.00 |

| **Component 5** | **miles/day** | **EMFAC2014 Emission Factors (g/mile)** | | | | | | | **Estimated Emissions (lbs/day)** | | | | **Estimated Emissions (tons/day)** | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **ROG** | **NOx** | **PM-10** | **PM-2.5** | **$CO_2$** | **$CH_4$** | **$N_2O$** | **ROG** | **NOx** | **PM-10** | **PM-2.5** | **$CO_2$** | **$CH_4$** | **$N_2O$** |
| Worker trips | 100 | 0.06 | 0.21 | 0.00 | 0.00 | 357.59 | 0.20 | 0.02 | 0.01 | 0.05 | 0.00 | 0.00 | 0.04 | 0.00 | 0.00 |
| Material Delivery Trips | 0 | 0.21 | 6.54 | 0.07 | 0.07 | 1689.32 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Offsite Haul Trips | 100 | 0.21 | 6.54 | 0.07 | 0.07 | 1689.32 | 0.01 | 0.00 | 0.05 | 1.44 | 0.02 | 0.01 | 0.17 | 0.00 | 0.00 |
| **Component 5 Onroad Daily Emissions** | | | | | | | | | 0.06 | 1.49 | 0.02 | 0.02 | 0.20 | 0.00 | 0.00 |

NOTES:

CO2 on-road emission factors were derived using EMFAC2014 for 2017; CH4 and N2O emission factors are from TRC, 2015, Table 13.4.

| | |
|---|---|
| 0.00220462 | Conversion from grams to pounds |
| 1000000 | Conversion from grams to tons |
| 2000 | Conversion from pounds to tons |

# ACRP - June 2016

### Alameda County, Annual

## 2.0 Emissions Summary

### 2.1 Overall Construction

**Unmitigated Construction**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | tons/yr | | | | | | | | | | MT/yr | | | | | |
| 2017 | 0.1169 | 1.3184 | 0.7066 | 1.8000e-003 | 0.0000 | 0.0499 | 0.0499 | 0.0000 | 0.0472 | 0.0472 | 0.0000 | 168.7623 | 168.7623 | 0.0341 | 0.0000 | 169.4785 |
| 2018 | 0.5192 | 5.2459 | 3.0519 | 7.9300e-003 | 0.1445 | 0.2161 | 0.3607 | 0.0795 | 0.2016 | 0.2810 | 0.0000 | 721.2364 | 721.2364 | 0.1867 | 0.0000 | 725.1574 |
| **Total** | **0.6361** | **6.5642** | **3.7585** | **9.7300e-003** | **0.1445** | **0.2660** | **0.4105** | **0.0795** | **0.2487** | **0.3282** | **0.0000** | **889.9987** | **889.9987** | **0.2208** | **0.0000** | **894.6359** |

## 3.0 Construction Detail

**Construction Phase**

| Phase Number | Phase Name | Phase Type | Start Date | End Date | Num Days Week | Num Days | Phase Description |
|---|---|---|---|---|---|---|---|
| 1 | Turbine pumps and barge flotation system | Demolition | 10/2/2017 | 12/9/2017 | 6 | 60 | |
| 2 | Mooring System | Site Preparation | 1/8/2018 | 2/3/2018 | 6 | 24 | |
| 3 | Electrical Control Building and Transformer | Grading | 3/5/2018 | 6/23/2018 | 6 | 96 | |
| 4 | Pipeline work | Building Construction | 7/9/2018 | 10/9/2018 | 6 | 80 | |
| 5 | Spoils Disposal | Paving | 11/5/2018 | 12/1/2018 | 6 | 24 | |

**OffRoad Equipment**

| Phase Name | Offroad Equipment Type | Amount | Usage Hours | Horse Power | Load Factor |
|---|---|---|---|---|---|
| Turbine pumps and barge flotation system | Air Compressors | 1 | 8.00 | 300 | 0.48 |
| Turbine pumps and barge flotation system | Cranes | 1 | 8.00 | 275 | 0.29 |
| Turbine pumps and barge flotation system | Cranes | 1 | 8.00 | 563 | 0.29 |
| Turbine pumps and barge flotation system | Generator Sets | 1 | 8.00 | 150 | 0.74 |
| Turbine pumps and barge flotation system | Off-Highway Trucks | 2 | 6.00 | 300 | 0.38 |
| Mooring System | Bore/Drill Rigs | 1 | 0.70 | 200 | 0.50 |
| Mooring System | Cranes | 1 | 0.70 | 250 | 0.29 |
| Mooring System | Graders | 1 | 6.00 | 265 | 0.41 |
| Mooring System | Off-Highway Trucks | 1 | 6.00 | 325 | 0.38 |
| Mooring System | Off-Highway Trucks | 3 | 0.13 | 400 | 0.38 |
| Mooring System | Pumps | 4 | 8.00 | 50 | 0.74 |
| Electrical Control Building and Transformer | Excavators | 1 | 4.00 | 372 | 0.38 |
| Electrical Control Building and Transformer | Graders | 1 | 4.00 | 265 | 0.41 |
| Electrical Control Building and Transformer | Off-Highway Trucks | 4 | 6.00 | 400 | 0.38 |
| Electrical Control Building and Transformer | Rubber Tired Dozers | 1 | 4.00 | 500 | 0.40 |
| Pipeline work | Air Compressors | 1 | 8.00 | 300 | 0.48 |
| Pipeline work | Cranes | 1 | 8.00 | 250 | 0.29 |
| Pipeline work | Excavators | 1 | 6.00 | 372 | 0.38 |
| Pipeline work | Generator Sets | 1 | 8.00 | 150 | 0.74 |
| Pipeline work | Off-Highway Trucks | 3 | 6.00 | 325 | 0.38 |
| Pipeline work | Off-Highway Trucks | 1 | 8.00 | 325 | 0.38 |
| Pipeline work | Other Construction Equipment | 1 | 4.00 | 50 | 0.42 |
| Pipeline work | Other Construction Equipment | 2 | 8.00 | 90 | 0.42 |
| Pipeline work | Other Construction Equipment | 1 | 8.00 | 400 | 0.42 |
| Pipeline work | Tractors/Loaders/Backhoes | 1 | 6.00 | 125 | 0.37 |
| Pipeline work | Welders | 1 | 8.00 | 250 | 0.45 |
| Spoils Disposal | Off-Highway Trucks | 2 | 6.00 | 325 | 0.38 |
| Spoils Disposal | Tractors/Loaders/Backhoes | 1 | 6.00 | 125 | 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 |
|---|---|---|---|---|---|---|---|---|---|---|
| Turbine pumps and barge flotation system | 6 | 0.00 | 0.00 | 0.00 | 12.50 | 25.00 | 25.00 | LD_Mix | HDT_Mix | HHDT |
| Mooring System | 11 | 0.00 | 0.00 | 0.00 | 12.50 | 25.00 | 25.00 | LD_Mix | HDT_Mix | HHDT |
| Electrical Control Building and | 7 | 0.00 | 0.00 | 0.00 | 12.50 | 25.00 | 25.00 | LD_Mix | HDT_Mix | HHDT |
| Pipeline work | 14 | 0.00 | 0.00 | 0.00 | 12.50 | 25.00 | 25.00 | LD_Mix | HDT_Mix | HHDT |
| Spoils Disposal | 3 | 0.00 | 0.00 | 0.00 | 12.50 | 25.00 | 25.00 | LD_Mix | HDT_Mix | HHDT |

## 3.2 Turbine pumps and barge flotation system - 2017

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.1169 | 1.3184 | 0.7066 | 1.8000e-003 | | 0.0499 | 0.0499 | | 0.0472 | 0.0472 | 0.0000 | 168.7623 | 168.7623 | 0.0341 | 0.0000 | 169.4785 |
| **Total** | **0.1169** | **1.3184** | **0.7066** | **1.8000e-003** | | **0.0499** | **0.0499** | | **0.0472** | **0.0472** | **0.0000** | **168.7623** | **168.7623** | **0.0341** | **0.0000** | **169.4785** |

## 3.3 Mooring System - 2018

**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 | | | | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0431 | 0.2732 | 0.2025 | 4.2000e-004 | | 0.0134 | 0.0134 | | 0.0130 | 0.0130 | 0.0000 | 34.6884 | 34.6884 | 8.2400e-003 | 0.0000 | 34.8615 |
| **Total** | **0.0431** | **0.2732** | **0.2025** | **4.2000e-004** | **0.0000** | **0.0134** | **0.0134** | **0.0000** | **0.0130** | **0.0130** | **0.0000** | **34.6884** | **34.6884** | **8.2400e-003** | **0.0000** | **34.8615** |

## 3.4 Electrical Control Building and Transformer - 2018

**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 | | | | | 0.1445 | 0.0000 | 0.1445 | 0.0795 | 0.0000 | 0.0795 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.1868 | 2.0198 | 1.1639 | 2.8300e-003 | | 0.0789 | 0.0789 | | 0.0726 | 0.0726 | 0.0000 | 258.1076 | 258.1076 | 0.0804 | 0.0000 | 259.7950 |
| **Total** | **0.1868** | **2.0198** | **1.1639** | **2.8300e-003** | **0.1445** | **0.0789** | **0.2234** | **0.0795** | **0.0726** | **0.1520** | **0.0000** | **258.1076** | **258.1076** | **0.0804** | **0.0000** | **259.7950** |

## 3.5 Pipeline work - 2018

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.2759 | 2.8085 | 1.6013 | 4.4600e-003 | | 0.1182 | 0.1182 | | 0.1108 | 0.1108 | 0.0000 | 407.6522 | 407.6522 | 0.0917 | 0.0000 | 409.5767 |
| **Total** | **0.2759** | **2.8085** | **1.6013** | **4.4600e-003** | | **0.1182** | **0.1182** | | **0.1108** | **0.1108** | **0.0000** | **407.6522** | **407.6522** | **0.0917** | **0.0000** | **409.5767** |

## 3.6 Spoils Disposal - 2018

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.0134 | 0.1444 | 0.0842 | 2.3000e-004 | | 5.5900e-003 | 5.5900e-003 | | 5.1500e-003 | 5.1500e-003 | 0.0000 | 20.7883 | 20.7883 | 6.4700e-003 | 0.0000 | 20.9242 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **0.0134** | **0.1444** | **0.0842** | **2.3000e-004** | | **5.5900e-003** | **5.5900e-003** | | **5.1500e-003** | **5.1500e-003** | **0.0000** | **20.7883** | **20.7883** | **6.4700e-003** | **0.0000** | **20.9242** |

EMFAC2014 (v1.0.7) Emission Rates
Region Type: County
Region: Alameda
Calendar Year: 2017
Season: Annual
Vehicle Classification: EMFAC2011 Categories
Units: miles/day for VMT, trips/day for Trips, g/mile for RUNEX, PMBW and PMTW, g/trip for STREX, HTSK and RUNLS, g/vehicle/day for IDLEX, RESTL and DIURN

| Region | CalYr | VehClass | MdlYr | Speed | Fuel | Population | VMT | Trips | ROG_RUNEX | ROG_IDLEX | ROG_STREX | ROG_HOTSOAK |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alameda | 2017 | LDT1 | Aggregated | Aggregated | GAS | 52877.02684 | 1821823.792 | 320095.5267 | 0.055424141 | 0 | 0.390237936 | 0.362072213 |
| Alameda | 2017 | LDT1 | Aggregated | Aggregated | DSL | 91.88094767 | 1897.433546 | 439.6441331 | 0.215806857 | 0 | 0 | 0 |
| Alameda | 2017 | LDT1 | Aggregated | Aggregated | ELEC | 52.53572448 | 1797.96505 | 325.8087493 | 0 | 0 | 0 | 0.004883985 |
| Alameda | 2017 | T7 single construction | Aggregated | Aggregated | DSL | 633.1107399 | 53713.13277 | 0 | 0.20701989 | 1.478982196 | 0 | 0 |

| ROG_RUNLOSS | ROG_RESTLOSS | ROG_DIURN | TOG_RUNEX | TOG_IDLEX | TOG_STREX | TOG_HOTSOAK | TOG_RUNLOSS | TOG_RESTLOSS | TOG_DIURN | CO_RUNEX |
|---|---|---|---|---|---|---|---|---|---|---|
| 1.339958325 | 0.609030532 | 0.751575438 | 0.075663712 | 0 | 0.426993424 | 0.362072213 | 1.339958325 | 0.609030532 | 0.751575438 | 2.026928087 |
| 0 | 0 | 0 | 0.245681759 | 0 | 0 | 0 | 0 | 0 | 0 | 1.246155913 |
| 0 | 0.004020951 | 0.014405 | 0 | 0 | 0 | 0.004883985 | 0 | 0.004020951 | 0.014405 | 0 |
| 0 | 0 | 0 | 0.235676386 | 1.683708648 | 0 | 0 | 0 | 0 | 0 | 0.752275759 |

| CO_IDLEX | CO_STREX | NOx_RUNEX | NOx_IDLEX | NOx_STREX | CO2_RUNEX | CO2_IDLEX | CO2_STREX | PM10_RUNEX | PM10_IDLEX | PM10_STREX | PM10_PMTW |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 5.237705937 | 0.211837379 | 0 | 0.299733044 | 357.5872158 | 0 | 79.31474323 | 0.003040444 | 0 | 0.004378947 | 0.008000002 |
| 0 | 0 | 1.302236072 | 0 | 0 | 393.6034646 | 0 | 0 | 0.170093891 | 0 | 0 | 0.008000002 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.008000002 |
| 5.889664867 | 0 | 6.542962041 | 31.44426428 | 0 | 1689.321419 | 3802.310764 | 0 | 0.070211827 | 0.151722909 | 0 | 0.03600001 |

| PM10_PMBW | PM2_5_RUNEX | PM2_5_IDLEX | PM2_5_STREX | PM2_5_PMTW | PM2_5_PMBW | SOx_RUNEX | SOx_IDLEX | SOx_STREX |
|---|---|---|---|---|---|---|---|---|
| 0.036750011 | 0.002801353 | 0 | 0.004037364 | 0.002000001 | 0.015750005 | 0.003603361 | 0 | 0.000886807 |
| 0.036750011 | 0.162735704 | 0 | 0 | 0.002000001 | 0.015750005 | 0.003757583 | 0 | 0 |
| 0.036750011 | 0 | 0 | 0 | 0.002000001 | 0.015750005 | 0 | 0 | 0 |
| 0.061740018 | 0.067174494 | 0.145159444 | 0 | 0.009000003 | 0.026460008 | 0.016116916 | 0.036275822 | 0 |

# OPERATIONAL GHG EMISSIONS

| | | |
|---|---|---|
| Electricity requirement of the ACRP | 3785740 | kWh/year |
| No. of days of operation/year | 121 | days |
| Annual power requirement | 1.3 | MW |

| GHGs from Electricity Consumption | | | |
|---|---|---|---|
| GHG | Emission Factor (lb/kWh) | Electricity Consumption kWhr | CO2e* (metric tons) |
| CO2 | 0.30700 | 3,785,740 | 527.18 |
| CH4 | 0.00003112 | 3,785,740 | 1.12 |
| N20 | 0.0000567 | 3,785,740 | 30.18 |
| | | Total = | 558 |

NOTES:

1. The emission factor for CO2 was obtained from PG&E, 2015. Emission factors for CH4 and N2O are USEPA's eGRID2012 Annual Emissions Output Rates
2. Proposed electricity consumption estimate for project based on data provided by SFPUC based on 7,200 AFY average annual recapture volume.
3. *Global Warming Potential for CH4 = 21; GWP for N2O = 310 (CCAR, 2009).

SOURCES:

1. California Climate Action Registry (CCAR), 2009. General Reporting Protocol, Reporting Entity-Wide Greenhouse Gas Emissions, Version 3.1, January 2009. Tables C.3 and C.6.
2. Pacific Gas and Electric Company (PG&E), 2015. Greenhouse Gas Emission Factors - Guidance for PG&E Customers, November 2015

3. USEPA, eGRID2012 Annual Emission Output Rates. Available at http://www.epa.gov/sites/production/files/2015-10/documents/egrid2012_ghgoutputrates_0.pdf

# APPENDIX BIO1

# Terrestrial Biological Resources TM

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# BIO1a – USFWS Species List

U.S. Fish and Wildlife Service

# Trust Resources List

**This resource list is to be used for planning purposes only — it is not an official species list.**

**Endangered Species Act species list information for your project is available online and listed below for the following FWS Field Offices:**

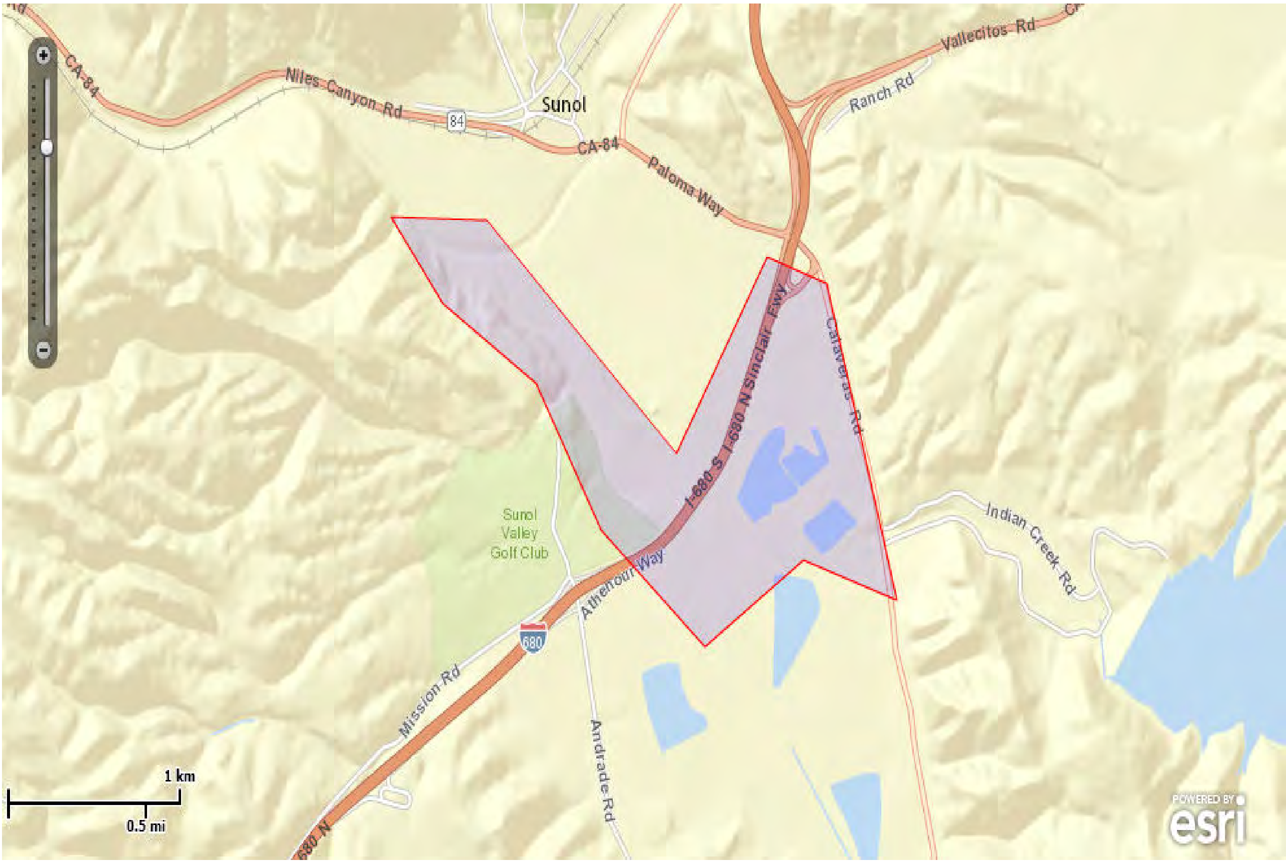
**Sacramento Fish and Wildlife Office**
FEDERAL BUILDING
2800 COTTAGE WAY, ROOM W-2605
SACRAMENTO, CA 95825
(916) 414-6600

## *Project Name:*

Alameda Creek Recapture Project

# Trust Resources List

## *Project Location Map:*



## *Project Counties:*

Alameda, CA

## *Geographic coordinates (Open Geospatial Consortium Well-Known Text, NAD83):*

MULTIPOLYGON (((-121.8974773 37.5897819, -121.8911259 37.5896459, -121.8785946 37.5801235, -121.8725864 37.5881496, -121.8686382 37.5870613, -121.8640034 37.5741375, -121.8701832 37.5757701, -121.8767063 37.5722327, -121.8835728 37.5769945, -121.8878643 37.5829804, -121.8940441 37.5862452, -121.8974773 37.5897819)))

## *Project Type:*

** Other **

## *Endangered Species Act Species List (USFWS Endangered Species Program).*

There are a total of **13** threatened or endangered species on your species list. Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fishes may appear on the species list because a project could cause downstream effects on the species. Critical habitats listed under the **Has Critical Habitat** column may or may not lie within your project area. See the **Critical habitats within your project area** section below for critical habitat that lies within your project area. Please contact the designated FWS office if you have questions.

### Species that should be considered in an effects analysis for your project:

| Amphibians | Status | | Has Critical Habitat | Contact |
|---|---|---|---|---|
| California Tiger Salamander (*Ambystoma californiense*)<br>Population: U.S.A. (CA - Sonoma County) | Endangered | species info | Final designated critical habitat | Sacramento Fish And Wildlife Office |
| California red-legged frog (*Rana draytonii*)<br>Population: Entire | Threatened | species info | Final designated critical habitat | Sacramento Fish And Wildlife Office |
| Birds | | | | |
| California Least tern (*Sterna antillarum browni*) | Endangered | species info | | Sacramento Fish And Wildlife Office |
| Crustaceans | | | | |
| Conservancy fairy shrimp (*Branchinecta conservatio*)<br>Population: Entire | Endangered | species info | Final designated critical habitat | Sacramento Fish And Wildlife Office |
| Vernal Pool fairy shrimp (*Branchinecta lynchi*)<br>Population: Entire | Threatened | species info | Final designated critical habitat | Sacramento Fish And Wildlife Office |
| Vernal Pool tadpole shrimp (*Lepidurus packardi*)<br>Population: Entire | Endangered | species info | Final designated critical habitat | Sacramento Fish And Wildlife Office |
| Fishes | | | | |
| Delta smelt (*Hypomesus transpacificus*)<br>Population: Entire | Threatened | species info | Final designated critical habitat | Sacramento Fish And Wildlife Office |

| | | | | |
|---|---|---|---|---|
| steelhead<br>(*Oncorhynchus (=salmo) mykiss*)<br>Population: Northern California DPS | Threatened | species info | Final designated critical habitat | Sacramento Fish And Wildlife Office |
| Flowering Plants | | | | |
| Contra Costa goldfields<br>(*Lasthenia conjugens*) | Endangered | species info | Final designated critical habitat | Sacramento Fish And Wildlife Office |
| Insects | | | | |
| Bay Checkerspot butterfly<br>(*Euphydryas editha bayensis*)<br>Population: Entire | Threatened | species info | Final designated critical habitat | Sacramento Fish And Wildlife Office |
| Mammals | | | | |
| Salt Marsh Harvest mouse<br>(*Reithrodontomys raviventris*)<br>Population: U.S.A.(CA) | Endangered | species info | | Sacramento Fish And Wildlife Office |
| San Joaquin Kit fox<br>(*Vulpes macrotis mutica*)<br>Population: U.S.A(CA) | Endangered | species info | | Sacramento Fish And Wildlife Office |
| Reptiles | | | | |
| Alameda whipsnake<br>(*Masticophis lateralis euryxanthus*)<br>Population: Entire | Threatened | species info | Final designated critical habitat | Sacramento Fish And Wildlife Office |

**Critical habitats within your project area:**

*There are no critical habitats within your project area.*

## *FWS National Wildlife Refuges (USFWS National Wildlife Refuges Program).*

*There are no refuges found within the vicinity of your project.*

# Trust Resources List

## *FWS Migratory Birds (USFWS Migratory Bird Program).*

The protection of birds is regulated by the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA). Any activity, intentional or unintentional, resulting in take of migratory birds, including eagles, is prohibited unless otherwise permitted by the U.S. Fish and Wildlife Service (50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)). The MBTA has no provision for allowing take of migratory birds that may be unintentionally killed or injured by otherwise lawful activities. For more information regarding these Acts see: http://www.fws.gov/migratorybirds/RegulationsandPolicies.html.

All project proponents are responsible for complying with the appropriate regulations protecting birds when planning and developing a project. To meet these conservation obligations, proponents should identify potential or existing project-related impacts to migratory birds and their habitat and develop and implement conservation measures that avoid, minimize, or compensate for these impacts. The Service's Birds of Conservation Concern (2008) report identifies species, subspecies, and populations of all migratory nongame birds that, without additional conservation actions, are likely to become listed under the Endangered Species Act as amended (16 U.S.C 1531 et seq.).

For information about Birds of Conservation Concern, go to:
http://www.fws.gov/migratorybirds/CurrentBirdIssues/Management/BCC.html.

To search and view summaries of year-round bird occurrence data within your project area, go to the Avian Knowledge Network Histogram Tool links in the Bird Conservation Tools section at: http://www.fws.gov/migratorybirds/CCMB2.htm.

For information about conservation measures that help avoid or minimize impacts to birds, please visit:
http://www.fws.gov/migratorybirds/CCMB2.htm.

**Migratory birds of concern that may be affected by your project:**
There are **26** birds on your Migratory birds of concern list. The underlying data layers used to generate the migratory bird list of concern will continue to be updated regularly as new and better information is obtained. User feedback is one method of identifying any needed improvements. Therefore, users are encouraged to submit comments about any questions regarding species ranges (e.g., a bird on the USFWS BCC list you know does not occur in the specified location appears on the list, or a BCC species that you know does occur there is not appearing on the list). Comments should be sent to the ECOS Help Desk.

| Species Name | Bird of Conservation Concern (BCC) | Species Profile | Seasonal Occurrence in Project Area |
|---|---|---|---|
| Allen's Hummingbird (*Selasphorus sasin*) | Yes | species info | Breeding |

# Trust Resources List

| | | | |
|---|---|---|---|
| Bald eagle (*Haliaeetus leucocephalus*) | Yes | species info | Year-round |
| Bell's Sparrow (*Amphispiza belli*) | Yes | species info | Year-round |
| Black Oystercatcher (*Haematopus bachmani*) | Yes | species info | Year-round |
| Black rail (*Laterallus jamaicensis*) | Yes | species info | Breeding |
| Black-chinned Sparrow (*Spizella atrogularis*) | Yes | species info | Breeding |
| Burrowing Owl (*Athene cunicularia*) | Yes | species info | Year-round |
| California spotted Owl (*Strix occidentalis occidentalis*) | Yes | species info | Year-round |
| Costa's Hummingbird (*Calypte costae*) | Yes | species info | Breeding |
| Fox Sparrow (*Passerella liaca*) | Yes | species info | Wintering |
| Lawrence's Goldfinch (*Carduelis lawrencei*) | Yes | species info | Breeding |
| Least Bittern (*Ixobrychus exilis*) | Yes | species info | Breeding |
| Lesser Yellowlegs (*Tringa flavipes*) | Yes | species info | Wintering |
| Lewis's Woodpecker (*Melanerpes lewis*) | Yes | species info | Wintering |
| Loggerhead Shrike (*Lanius ludovicianus*) | Yes | species info | Wintering |
| Long-Billed curlew (*Numenius americanus*) | Yes | species info | Wintering |
| Marbled Godwit (*Limosa fedoa*) | Yes | species info | Wintering |
| Nuttall's Woodpecker (*Picoides nuttallii*) | Yes | species info | Year-round |
| Oak Titmouse (*Baeolophus inornatus*) | Yes | species info | Year-round |
| Olive-Sided flycatcher (*Contopus cooperi*) | Yes | species info | Breeding |
| Peregrine Falcon (*Falco peregrinus*) | Yes | species info | Year-round |

| | | | |
|---|---|---|---|
| Short-billed Dowitcher (*Limnodromus griseus*) | Yes | species info | Wintering |
| Short-eared Owl (*Asio flammeus*) | Yes | species info | Wintering |
| Swainson's hawk (*Buteo swainsoni*) | Yes | species info | Wintering |
| tricolored blackbird (*Agelaius tricolor*) | Yes | species info | Year-round |
| Yellow-billed Magpie (*Pica nuttalli*) | Yes | species info | Year-round |

## *NWI Wetlands (USFWS National Wetlands Inventory).*

The U.S. Fish and Wildlife Service is the principal Federal agency that provides information on the extent and status of wetlands in the U.S., via the National Wetlands Inventory Program (NWI). In addition to impacts to wetlands within your immediate project area, wetlands outside of your project area may need to be considered in any evaluation of project impacts, due to the hydrologic nature of wetlands (for example, project activities may affect local hydrology within, and outside of, your immediate project area). It may be helpful to refer to the USFWS National Wetland Inventory website. The designated FWS office can also assist you. Impacts to wetlands and other aquatic habitats from your project may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal Statutes. Project Proponents should discuss the relationship of these requirements to their project with the Regulatory Program of the appropriate U.S. Army Corps of Engineers District.

**Data Limitations, Exclusions and Precautions**

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery and/or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

# Trust Resources List

**Exclusions** - Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

**Precautions** - Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

**The following wetland types intersect your project area in one or more locations:**

| Wetland Types | NWI Classification Code | Total Acres |
|---|---|---|
| Freshwater Emergent Wetland | PEM1C | 0.5278 |
| Freshwater Emergent Wetland | PEMC | 7.3681 |
| Freshwater Pond | PUBHx | 2.1123 |
| Riverine | R4SBAx | 0.6109 |
| Riverine | R3UBH | 51.0402 |
| Riverine | R4SBC | 9.2907 |
| Riverine | R3UBHx | 2.3741 |
| Riverine | R4SBA | 4.3691 |
| Riverine | R4SBCx | 0.9333 |
| Riverine | R3USC | 1.2199 |
| Riverine | R4USF | 22.2653 |

# BIO1b – CDFW CNDDB Wildlife Species List

# Selected Elements by Scientific Name

## California Department of Fish and Wildlife

## California Natural Diversity Database

**Query Criteria:** Quad is (La Costa Valley (3712157) or Niles (3712158))

| Species | Element Code | Federal Status | State Status | Global Rank | State Rank | Rare Plant Rank/CDFW SSC or FP |
|---|---|---|---|---|---|---|
| ***Accipiter cooperii***<br>Cooper's hawk | ABNKC12040 | None | None | G5 | S4 | WL |
| ***Accipiter striatus***<br>sharp-shinned hawk | ABNKC12020 | None | None | G5 | S4 | WL |
| ***Agelaius tricolor***<br>tricolored blackbird | ABPBXB0020 | None | None | G2G3 | S1S2 | SSC |
| ***Ambystoma californiense***<br>California tiger salamander | AAAAA01180 | Threatened | Threatened | G2G3 | S2S3 | SSC |
| ***Antrozous pallidus***<br>pallid bat | AMACC10010 | None | None | G5 | S3 | SSC |
| ***Aquila chrysaetos***<br>golden eagle | ABNKC22010 | None | None | G5 | S3 | FP |
| ***Ardea herodias***<br>great blue heron | ABNGA04010 | None | None | G5 | S4 | |
| ***Athene cunicularia***<br>burrowing owl | ABNSB10010 | None | None | G4 | S3 | SSC |
| ***Bombus occidentalis***<br>western bumble bee | IIHYM24250 | None | None | G2G3 | S1 | |
| ***Campanula exigua***<br>chaparral harebell | PDCAM020A0 | None | None | G2 | S2 | 1B.2 |
| ***Centromadia parryi ssp. congdonii***<br>Congdon's tarplant | PDAST4R0P1 | None | None | G3T2 | S2 | 1B.1 |
| ***Clarkia concinna ssp. automixa***<br>Santa Clara red ribbons | PDONA050A1 | None | None | G5?T3 | S3 | 4.3 |
| ***Corynorhinus townsendii***<br>Townsend's big-eared bat | AMACC08010 | None | Candidate Threatened | G3G4 | S2 | SSC |
| ***Delphinium californicum ssp. interius***<br>Hospital Canyon larkspur | PDRAN0B0A2 | None | None | G3T3 | S3 | 1B.2 |
| ***Emys marmorata***<br>western pond turtle | ARAAD02030 | None | None | G3G4 | S3 | SSC |
| ***Extriplex joaquinana***<br>San Joaquin spearscale | PDCHE041F3 | None | None | G2 | S2 | 1B.2 |
| ***Falco mexicanus***<br>prairie falcon | ABNKD06090 | None | None | G5 | S4 | WL |
| ***Falco peregrinus anatum***<br>American peregrine falcon | ABNKD06071 | Delisted | Delisted | G4T4 | S3S4 | FP |
| ***Lasiurus cinereus***<br>hoary bat | AMACC05030 | None | None | G5 | S4 | |
| ***Laterallus jamaicensis coturniculus***<br>California black rail | ABNME03041 | None | Threatened | G3G4T1 | S1 | FP |

| Species | Element Code | Federal Status | State Status | Global Rank | State Rank | Rare Plant Rank/CDFW SSC or FP |
|---|---|---|---|---|---|---|
| ***Linderiella occidentalis***<br>California linderiella | ICBRA06010 | None | None | G2G3 | S2S3 | |
| ***Masticophis lateralis euryxanthus***<br>Alameda whipsnake | ARADB21031 | Threatened | Threatened | G4T2 | S2 | |
| ***Melospiza melodia pusillula***<br>Alameda song sparrow | ABPBXA301S | None | None | G5T2? | S2? | SSC |
| ***Myotis yumanensis***<br>Yuma myotis | AMACC01020 | None | None | G5 | S4 | |
| ***Neotoma fuscipes annectens***<br>San Francisco dusky-footed woodrat | AMAFF08082 | None | None | G5T2T3 | S2S3 | SSC |
| ***Oncorhynchus mykiss irideus***<br>steelhead - central California coast DPS | AFCHA0209G | Threatened | None | G5T2T3Q | S2S3 | |
| ***Puccinellia simplex***<br>California alkali grass | PMPOA53110 | None | None | G2G3 | S2S3 | 1B.2 |
| ***Rana boylii***<br>foothill yellow-legged frog | AAABH01050 | None | None | G3 | S3 | SSC |
| ***Rana draytonii***<br>California red-legged frog | AAABH01022 | Threatened | None | G2G3 | S2S3 | SSC |
| ***Streptanthus albidus ssp. peramoenus***<br>most beautiful jewelflower | PDBRA2G012 | None | None | G2T2 | S2 | 1B.2 |
| ***Stuckenia filiformis ssp. alpina***<br>slender-leaved pondweed | PMPOT03091 | None | None | G5T5 | S3 | 2B.2 |
| ***Suaeda californica***<br>California seablite | PDCHE0P020 | Endangered | None | G1 | S1 | 1B.1 |
| ***Sycamore Alluvial Woodland***<br>Sycamore Alluvial Woodland | CTT62100CA | None | None | G1 | S1.1 | |

**Record Count: 33**

# BIO1c – CDFW CNDDB Plant Species and Sensitive Natural Communities List

# Selected Elements by Scientific Name

## California Department of Fish and Wildlife

## California Natural Diversity Database

**Query Criteria:** Taxonomic Group is (Dune or Scrub or Herbaceous or Marsh or Riparian or Woodland or Forest or Alpine or Inland Waters or Marine or Estuarine or Riverine or Palustrine or Ferns or Gymnosperms or Monocots or Dicots or Lichens or Bryophytes or Fungi) and Quad is (Calaveras Reservoir (3712147) or Dublin (3712168) or Hayward (3712261) or La Costa Valley (3712157) or Livermore (3712167) or Milpitas (3712148) or Mountain View (3712241) or Newark (3712251) or Niles (3712158))

| Species | Element Code | Federal Status | State Status | Global Rank | State Rank | Rare Plant Rank/CDFW SSC or FP |
|---|---|---|---|---|---|---|
| ***Astragalus tener var. tener***<br>alkali milk-vetch | PDFAB0F8R1 | None | None | G2T2 | S2 | 1B.2 |
| ***Atriplex depressa***<br>brittlescale | PDCHE042L0 | None | None | G2 | S2 | 1B.2 |
| ***Atriplex minuscula***<br>lesser saltscale | PDCHE042M0 | None | None | G2 | S2 | 1B.1 |
| ***Balsamorhiza macrolepis***<br>big-scale balsamroot | PDAST11061 | None | None | G2 | S2 | 1B.2 |
| ***Campanula exigua***<br>chaparral harebell | PDCAM020A0 | None | None | G2 | S2 | 1B.2 |
| ***Centromadia parryi ssp. congdonii***<br>Congdon's tarplant | PDAST4R0P1 | None | None | G3T2 | S2 | 1B.1 |
| ***Chloropyron maritimum ssp. palustre***<br>Point Reyes salty bird's-beak | PDSCR0J0C3 | None | None | G4?T2 | S2 | 1B.2 |
| ***Chloropyron palmatum***<br>palmate-bracted salty bird's-beak | PDSCR0J0J0 | Endangered | Endangered | G1 | S1 | 1B.1 |
| ***Chorizanthe robusta var. robusta***<br>robust spineflower | PDPGN040Q2 | Endangered | None | G2T1 | S1 | 1B.1 |
| ***Clarkia concinna ssp. automixa***<br>Santa Clara red ribbons | PDONA050A1 | None | None | G5?T3 | S3 | 4.3 |
| ***Delphinium californicum ssp. interius***<br>Hospital Canyon larkspur | PDRAN0B0A2 | None | None | G3T3 | S3 | 1B.2 |
| ***Eryngium aristulatum var. hooveri***<br>Hoover's button-celery | PDAPI0Z043 | None | None | G5T1 | S1 | 1B.1 |
| ***Extriplex joaquinana***<br>San Joaquin spearscale | PDCHE041F3 | None | None | G2 | S2 | 1B.2 |
| ***Fritillaria liliacea***<br>fragrant fritillary | PMLIL0V0C0 | None | None | G2 | S2 | 1B.2 |
| ***Helianthella castanea***<br>Diablo helianthella | PDAST4M020 | None | None | G2 | S2 | 1B.2 |
| ***Hoita strobilina***<br>Loma Prieta hoita | PDFAB5Z030 | None | None | G2 | S2 | 1B.1 |
| ***Holocarpha macradenia***<br>Santa Cruz tarplant | PDAST4X020 | Threatened | Endangered | G1 | S1 | 1B.1 |
| ***Lasthenia conjugens***<br>Contra Costa goldfields | PDAST5L040 | Endangered | None | G1 | S1 | 1B.1 |
| ***Malacothamnus arcuatus***<br>arcuate bush-mallow | PDMAL0Q0E0 | None | None | G2Q | S2 | 1B.2 |

| Species | Element Code | Federal Status | State Status | Global Rank | State Rank | Rare Plant Rank/CDFW SSC or FP |
|---|---|---|---|---|---|---|
| ***Malacothamnus hallii***<br>Hall's bush-mallow | PDMAL0Q0F0 | None | None | G2 | S2 | 1B.2 |
| ***Monolopia gracilens***<br>woodland woollythreads | PDAST6G010 | None | None | G3 | S3 | 1B.2 |
| ***Navarretia prostrata***<br>prostrate vernal pool navarretia | PDPLM0C0Q0 | None | None | G2 | S2 | 1B.1 |
| ***Northern Coastal Salt Marsh***<br>Northern Coastal Salt Marsh | CTT52110CA | None | None | G3 | S3.2 | |
| ***Plagiobothrys glaber***<br>hairless popcornflower | PDBOR0V0B0 | None | None | GH | SH | 1A |
| ***Polemonium carneum***<br>Oregon polemonium | PDPLM0E050 | None | None | G3G4 | S2 | 2B.2 |
| ***Puccinellia simplex***<br>California alkali grass | PMPOA53110 | None | None | G2G3 | S2S3 | 1B.2 |
| ***Senecio aphanactis***<br>chaparral ragwort | PDAST8H060 | None | None | G3 | S2 | 2B.2 |
| ***Sidalcea malachroides***<br>maple-leaved checkerbloom | PDMAL110E0 | None | None | G3 | S3 | 4.2 |
| ***Streptanthus albidus ssp. peramoenus***<br>most beautiful jewelflower | PDBRA2G012 | None | None | G2T2 | S2 | 1B.2 |
| ***Stuckenia filiformis ssp. alpina***<br>slender-leaved pondweed | PMPOT03091 | None | None | G5T5 | S3 | 2B.2 |
| ***Suaeda californica***<br>California seablite | PDCHE0P020 | Endangered | None | G1 | S1 | 1B.1 |
| ***Sycamore Alluvial Woodland***<br>Sycamore Alluvial Woodland | CTT62100CA | None | None | G1 | S1.1 | |
| ***Trifolium hydrophilum***<br>saline clover | PDFAB400R5 | None | None | G2 | S2 | 1B.2 |
| ***Tropidocarpum capparideum***<br>caper-fruited tropidocarpum | PDBRA2R010 | None | None | G1 | S1 | 1B.1 |
| ***Valley Needlegrass Grassland***<br>Valley Needlegrass Grassland | CTT42110CA | None | None | G3 | S3.1 | |
| ***Valley Sink Scrub***<br>Valley Sink Scrub | CTT36210CA | None | None | G1 | S1.1 | |

**Record Count: 36**

# BIO1d – CNPS Plant List

CNPS California Native Plant Society Rare and Endangered Plant Inventory

Home | About the Inventory | CNPS Home | Join CNPS | Simple Search | Advanced Search

## Plant List

**51** matches found. *Click on scientific name for details*

**Search Criteria**

Rare Plant Rank is one of **[1A, 1B, 2A, 2B, 3, 4]**, FESA is one of **[Endangered, Threatened, Species of Concern, Not Listed]**, CESA is one of **[Endangered, Threatened, Rare, Not Listed]**, Found in 9 Quads around **37121E7**

Modify Search Criteria | Export to Excel | Modify Columns | Modify Sort | Display Photos

| Scientific Name | Common Name | Family | Lifeform | Rare Plant Rank | State Rank | Global Rank |
|---|---|---|---|---|---|---|
| Acanthomintha lanceolata | Santa Clara thorn-mint | Lamiaceae | annual herb | 4.2 | S4 | G4 |
| Amsinckia lunaris | bent-flowered fiddleneck | Boraginaceae | annual herb | 1B.2 | S2? | G2? |
| Androsace elongata ssp. acuta | California androsace | Primulaceae | annual herb | 4.2 | S3S4 | G5?T3T4 |
| Astragalus tener var. tener | alkali milk-vetch | Fabaceae | annual herb | 1B.2 | S2 | G2T2 |
| Atriplex cordulata var. cordulata | heartscale | Chenopodiaceae | annual herb | 1B.2 | S2 | G3T2 |
| Atriplex coronata var. coronata | crownscale | Chenopodiaceae | annual herb | 4.2 | S3 | G4T3 |
| Atriplex depressa | brittlescale | Chenopodiaceae | annual herb | 1B.2 | S2 | G2 |
| Atriplex minuscula | lesser saltscale | Chenopodiaceae | annual herb | 1B.1 | S2 | G2 |
| Balsamorhiza macrolepis | big-scale balsamroot | Asteraceae | perennial herb | 1B.2 | S2 | G2 |
| Blepharizonia plumosa | big tarplant | Asteraceae | annual herb | 1B.1 | S2 | G2 |
| Boechera rubicundula | Mt. Day rockcress | Brassicaceae | perennial herb | 1B.1 | S1 | G1 |
| California macrophylla | round-leaved filaree | Geraniaceae | annual herb | 1B.2 | S3? | G3? |
| Calochortus umbellatus | Oakland star-tulip | Liliaceae | perennial bulbiferous | 4.2 | S4 | G4 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | herb | | | |
| Calyptridium parryi var. hesseae | Santa Cruz Mountains pussypaws | Montiaceae | annual herb | 1B.1 | S2 | G3G4T2 |
| Campanula exigua | chaparral harebell | Campanulaceae | annual herb | 1B.2 | S2 | G2 |
| Centromadia parryi ssp. congdonii | Congdon's tarplant | Asteraceae | annual herb | 1B.1 | S2 | G3T2 |
| Chloropyron maritimum ssp. palustre | Point Reyes bird's-beak | Orobanchaceae | annual herb (hemiparasitic) | 1B.2 | S2 | G4?T2 |
| Chloropyron molle ssp. hispidum | hispid bird's-beak | Orobanchaceae | annual herb (hemiparasitic) | 1B.1 | S2 | G2T2 |
| Chloropyron palmatum | palmate-bracted bird's-beak | Orobanchaceae | annual herb (hemiparasitic) | 1B.1 | S1 | G1 |
| Clarkia breweri | Brewer's clarkia | Onagraceae | annual herb | 4.2 | S4 | G4 |
| Clarkia concinna ssp. automixa | Santa Clara red ribbons | Onagraceae | annual herb | 4.3 | S3 | G5?T3 |
| Deinandra bacigalupii | Livermore tarplant | Asteraceae | annual herb | 1B.2 | S1 | G1 |
| Delphinium californicum ssp. interius | Hospital Canyon larkspur | Ranunculaceae | perennial herb | 1B.2 | S3 | G3T3 |
| Eriophyllum jepsonii | Jepson's woolly sunflower | Asteraceae | perennial herb | 4.3 | S3 | G3 |
| Eryngium aristulatum var. hooveri | Hoover's button-celery | Apiaceae | annual / perennial herb | 1B.1 | S1 | G5T1 |
| Extriplex joaquinana | San Joaquin spearscale | Chenopodiaceae | annual herb | 1B.2 | S2 | G2 |
| Fritillaria agrestis | stinkbells | Liliaceae | perennial bulbiferous herb | 4.2 | S3 | G3 |
| Fritillaria liliacea | fragrant fritillary | Liliaceae | perennial bulbiferous herb | 1B.2 | S2 | G2 |
| Helianthella castanea | Diablo helianthella | Asteraceae | perennial herb | 1B.2 | S2 | G2 |
| Lasthenia conjugens | Contra Costa goldfields | Asteraceae | annual herb | 1B.1 | S1 | G1 |
| Legenere limosa | legenere | Campanulaceae | annual herb | 1B.1 | S2 | G2 |
| Leptosiphon acicularis | bristly leptosiphon | Polemoniaceae | annual herb | 4.2 | S3 | G3 |
| Leptosiphon ambiguus | serpentine leptosiphon | Polemoniaceae | annual herb | 4.2 | S4 | G4 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Leptosyne hamiltonii | Mt. Hamilton coreopsis | Asteraceae | annual herb | 1B.2 | S2 | G2 |
| Lessingia hololeuca | woolly-headed lessingia | Asteraceae | annual herb | 3 | S3? | G3? |
| Malacothamnus arcuatus | arcuate bush-mallow | Malvaceae | perennial evergreen shrub | 1B.2 | S2 | G2Q |
| Malacothamnus hallii | Hall's bush-mallow | Malvaceae | perennial evergreen shrub | 1B.2 | S2 | G2 |
| Mielichhoferia elongata | elongate copper moss | Mielichhoferiaceae | moss | 4.3 | S4 | G5 |
| Monardella antonina ssp. antonina | San Antonio Hills monardella | Lamiaceae | perennial rhizomatous herb | 3 | S1S3 | G4T1T3Q |
| Myosurus minimus ssp. apus | little mousetail | Ranunculaceae | annual herb | 3.1 | S2 | G5T2Q |
| Navarretia nigelliformis ssp. nigelliformis | adobe navarretia | Polemoniaceae | annual herb | 4.2 | S3 | G4T3 |
| Navarretia prostrata | prostrate vernal pool navarretia | Polemoniaceae | annual herb | 1B.1 | S2 | G2 |
| Plagiobothrys glaber | hairless popcornflower | Boraginaceae | annual herb | 1A | SH | GH |
| Polemonium carneum | Oregon polemonium | Polemoniaceae | perennial herb | 2B.2 | S2 | G3G4 |
| Puccinellia simplex | California alkali grass | Poaceae | annual herb | 1B.2 | S2S3 | G2G3 |
| Sidalcea malachroides | maple-leaved checkerbloom | Malvaceae | perennial herb | 4.2 | S3 | G3 |
| Streptanthus albidus ssp. peramoenus | most beautiful jewelflower | Brassicaceae | annual herb | 1B.2 | S2 | G2T2 |
| Stuckenia filiformis ssp. alpina | slender-leaved pondweed | Potamogetonaceae | perennial rhizomatous herb | 2B.2 | S3 | G5T5 |
| Suaeda californica | California seablite | Chenopodiaceae | perennial evergreen shrub | 1B.1 | S1 | G1 |
| Trifolium hydrophilum | saline clover | Fabaceae | annual herb | 1B.2 | S2 | G2 |
| Tropidocarpum capparideum | caper-fruited tropidocarpum | Brassicaceae | annual herb | 1B.1 | S1 | G1 |

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# BIO1e – Special-Status Species Considered Tables

### TABLE 1
### FULL LIST OF SENSITIVE WILDLIFE SPECIES POTENTIALLY PRESENT IN THE ALAMEDA CREEK RECAPTURE PROJECT SURVEY AREA

| Common Name<br>Scientific Name | Listing Status FESA/ CESA/CDFW | General Habitat Requirements | Potential for Species Occurrence Within the Survey area |
|---|---|---|---|
| FEDERAL AND STATE LISTED SPECIES OR PROPOSED FOR LISTING | | | |
| Animals | | | |
| *Invertebrates* | | | |
| Conservancy fairy shrimp<br>*Branchinecta conservatio* | FE/-- | Vernal pools. | **Absent.** No suitable habitat present within the survey area. |
| Vernal pool fairy shrimp<br>*Branchinecta lynchi* | FT/-- | Vernal pools. | **Absent.** No suitable habitat present within the survey area. |
| Bay checkerspot butterfly<br>*Euphydryas editha bayansis* | FT/-- | Serpentine or similar soils with its host plant dwarf plantain or purple owl's clover. | **Absent.** Outside of the known range of this species and no suitable habitat present within the survey area. |
| Vernal pool tadpole shrimp<br>*Lepidurus packardi* | FE/-- | Vernal pools. | **Absent.** No suitable habitat present within the survey area. |
| *Amphibians* | | | |
| California tiger salamander<br>*Ambystoma californiense* | FT/ST | Occur in grasslands occupied by burrowing mammals; breed in ponds, vernal pools, and slow-moving or receding streams. | **High potential.** Numerous breeding locations are known within 1.2 miles of the survey area (CDFW, 2016). Additionally, several adults have been observed within 1 mile of the survey area. Non-native grassland with small mammal burrows within the survey area provide upland habitat. |
| California red-legged frog<br>*Rana draytonii* | FT/SSC | Breed in stock ponds, pools, and slow-moving streams. | **High potential.** This species has been observed in Alameda Creek within the survey area, 3 miles upstream, and 0.2 mile downstream of the survey area, and from San Antonio Creek approximately 0.4 mile upstream of the survey area (CDFW, 2016; SFPUC, 2010a and 2015). Alameda Creek and San Antonio Creek provide habitat and species has potential to disperse through upland areas. |
| *Reptiles* | | | |
| Alameda whipsnake<br>*Masticophis lateralis euryxanthus* | FT/ST | Coastal scrub, grassland, open oak woodland. Prefers rocky openings for basking, foraging. | **Moderate potential.** This species has been documented within 5 miles of the survey area (CDFW, 2016). Core habitat is absent, but some foraging and dispersal habitat is present in the survey area. |
| *Birds* | | | |
| American peregrine falcon<br>*Falco peregrinus anatum* | FD/SD/FP | Nests on cliffs, tall buildings, high bridges, and specially-designed towers. | **Low potential.** Suitable nesting habitat is absent from the survey area. |
| Bald eagle<br>*Haliaeetus leucocephalus* | FD/SE/FP | Nest in mountainous habitats near reservoirs, lakes and rivers, usually in coniferous trees, close to permanent water. | **Low potential.** Suitable nesting habitat is absent from the survey area, although quarry pits could be used for foraging. Closest documented nesting site is 3 miles east of the survey area (SFPUC, 2011d). |
| California black rail<br>Laterallus jamaicensis coturniculus | --/ST/FP | Freshwater marshes, wet meadows, and shallow margins of saltwater margins bordering larger bays; needs water depths of about 1 inch that do not fluctuate during the year and dense vegetation for nesting habitat | **Low potential.** While patches of freshwater marsh occur within Alameda Creek and a seasonal wetland occurs in the quarry area, large expanses of undisturbed suitable habitat are not present. |

## TABLE 1 (Continued)
## FULL LIST OF SENSITIVE WILDLIFESPECIES POTENTIALLY PRESENT IN THE ALAMEDA CREEK RECAPTURE PROJECT SURVEY AREA

| Common Name<br>Scientific Name | Listing Status FESA/ CESA/CDFW | General Habitat Requirements | Potential for Species Occurrence Within the Survey area |
|---|---|---|---|
| FEDERAL AND STATE LISTED SPECIES OR PROPOSED FOR LISTING (cont.) | | | |
| Animals (cont.) | | | |
| *Birds (cont.)* | | | |
| California least tern<br>*Sterna antillarum browni* | FE/SE/FP | Nest on beaches or open areas. | **Absent.** No suitable nesting habitat present. Survey area is outside the range of this species. |
| *Mammals* | | | |
| Townsend's big-eared bat<br>*Corynorhinus townsendii* | --/SC | Roosts in caves, mines, buildings or other human-made structures for roosting. Forages in open lowland areas. Sensitive to human disturbance | **Low potential.** No suitable undisturbed roosting habitat present in the survey area. |
| Saltmarsh harvest mouse<br>*Reithrodontomys raviventris* | FE/SE/FP | Salt marsh habitat dominated by pickleweed. | **Absent.** No suitable habitat present. Survey area is outside the range of this species. |
| San Joaquin kit fox<br>*Vulpes macrotis mutica* | FE/SE | Open grassland areas. | **Absent.** Survey area is outside the range of this species. |
| FEDERAL OR STATE SPECIES OF SPECIAL CONCERN | | | |
| Animals | | | |
| *Amphibians* | | | |
| Foothill yellow-legged frog<br>*Rana boylii* | --/SSC | A year-round resident of cobble-lined streams; breeds in spring months after high water subsides. | **Low potential.** Based on habitat assessment survey, suitable habitat is absent from the survey area. This species is limited to perennial, moderate- to high-gradient portions of Alameda Creek that occur several miles upstream from the survey area. |
| *Reptiles* | | | |
| Western pond turtle<br>*Emys marmorata* | --/SSC | Lakes, ponds, reservoirs, and slow-moving streams and rivers, primarily in foothills and lowlands. | **High potential.** This species is known from Alameda Creek and San Antonio Creek (CDFW, 2016; ESA, 2009a; SFPUC, 2015). Western pond turtle may be found in quarry pits, riparian areas, and uplands. |
| Coast horned lizard<br>*Phyrnosoma coronatum* | --/SSC | Sandy areas and river washes, as well as riparian woodland clearings, chaparral, and alkali flats. | **Low to moderate potential.** Alameda Creek provide suitable river wash habitat for this species. Documented within 5 miles of the survey area (SFPUC, 2010a). |
| *Birds* | | | |
| Cooper's hawk<br>*Accipiter cooperii* | --/3503.5 | Nest sites mainly in riparian growths of deciduous trees, as in canyon bottoms on river flood-plains; also in live oaks. | **Moderate potential.** Riparian, oak, and eucalyptus trees within the survey area provide suitable nesting habitat for this species. Nearest CNDDB occurrence is approximately 2.7 miles west of survey area (CDFW, 2016). |
| Sharp-shinned hawk<br>*Accipiter striatus* | --/3503.5 | A common migrant and winter resident in California. Nests in dense, even-aged, single-layered forest canopy. | **Low potential.** Dense oak woodland nesting habitat is not present within the survey area. Nesting is documented from hills surrounding Sunol Valley, with the nearest known occurrence approximately 2.9 miles south of the survey area (SFPUC, 2015). |

### TABLE 1 (Continued)
### FULL LIST OF SENSITIVE WILDLIFESPECIES POTENTIALLY PRESENT IN THE ALAMEDA CREEK RECAPTURE PROJECT SURVEY AREA

| Common Name<br>Scientific Name | Listing Status FESA/ CESA/CDFW | General Habitat Requirements | Potential for Species Occurrence Within the Survey area |
|---|---|---|---|
| FEDERAL OR STATE SPECIES OF SPECIAL CONCERN (cont.) | | | |
| Animals (cont.) | | | |
| *Birds (cont.)* | | | |
| Tricolored blackbird<br>*Agelaius tricolor* | --/SSC | A colonial nester; nests in dense freshwater emergent vegetation. | **Moderate potential.** Breeding is known from the Sunol Valley and large flocks have been observed in the survey area (CDFW, 2016; SFPUC, 2015). Potential breeding habitat is present in the survey area. |
| Golden eagle<br>*Aquila chrysaetos* | --/CDFW Fully Protected | Nests in open areas on cliffs and in large trees. | **Moderate potential.** Larger trees near Alameda and San Antonio Creeks provide potential nesting habitat. Several occurrence records in the vicinity of the survey area (SFPUC, 2015). |
| Short-eared owl<br>*Asio flammeus* | --/SSC | Nests in grasslands, usually on the ground. | **Moderate potential.** Grasslands within the site provide nesting habitat for short-eared owl. Known nesting site along southeastern San Antonio Reservoir (SFPUC, 2010a). |
| Burrowing owl<br>*Athene cunicularia* | --/SSC | Nests and forages in low-growing grasslands that support burrowing mammals. | **Moderate potential.** Grasslands and ruderal habitat with ground squirrel burrows within the survey area provide suitable habitat for this species. This species has been documented within 5 miles of the survey area (SFPUC, 2010a). |
| Ferruginous hawk<br>*Buteo regalis* | --/3503.5 | Uncommon winter resident and migrant. Nests in foothills or prairies, on low cliffs, cut banks, shrubs, trees, or other natural or manmade elevated structures. Nest tree often isolated or in transition zones. | **Low potential.** Although there is a 1987 breeding record within 5 miles of the survey area (SFPUC, 2010a), the survey area is outside of the typical breeding range of this species and this species has low potential to breed within the survey area. |
| Northern harrier<br>*Circus cyaneus* | --/SSC | Nests in coastal freshwater and saltwater marshes, nests and forages in grasslands. | **Moderate potential.** Limited nesting habitat is available adjacent to quarry pits because of site disturbance, but potential to nest in along Alameda Creek. |
| White-tailed kite (nesting)<br>*Elanus leucurus* | --/CDFW Fully Protected | Nests near wet meadows and open grasslands in dense oak, willow or other large tree stands. | **Moderate potential.** Potential nesting habitat is present in trees adjacent to Alameda and San Antonio Creeks. |
| Prairie falcon<br>*Falco mexicanus* | --/3503.5 | Uncommon permanent resident. Usually nests on cliffs overlooking open areas. | **Low potential.** Nesting habitat is absent from the survey area. The closest documented CNDDB breeding location is approximately 3.9 miles south southeast of the survey area (Brian Acord, pers. comm., 2015). |
| Loggerhead shrike<br>*Lanius ludovicianus* | --/SSC | Scrub, open woodlands, and grasslands. | **High potential.** Potential nesting habitat present in grasslands, shrubs, and trees throughout the survey area. |
| Alameda song sparrow<br>*Melospiza melodia pusillula* | --/SSC | Tidal salt marsh. | **Absent.** Nesting habitat is absent from the survey area. |
| Osprey<br>*Pandion haliaetus* | --/3503.5 | Nest on large sturdy treetops, cliffs, or human-built platforms near water. | **Low potential.** Although the quarry pits may provide some suitable foraging habitat, disturbance from quarry operations would likely preclude nesting on-site. SFPUC occurrence record in the survey area vicinity is from a resident, not breeding, bird (SFPUC, 2010a). |

## TABLE 1 (Continued)
## FULL LIST OF SENSITIVE WILDLIFESPECIES POTENTIALLY PRESENT IN THE ALAMEDA CREEK RECAPTURE PROJECT SURVEY AREA

| Common Name<br>Scientific Name | Listing Status FESA/ CESA/CDFW | General Habitat Requirements | Potential for Species Occurrence Within the Survey area |
|---|---|---|---|
| FEDERAL OR STATE SPECIES OF SPECIAL CONCERN (cont.) | | | |
| Animals (cont.) | | | |
| *Birds (cont.)* | | | |
| American white pelican<br>*Pelecanus erythrorhynchos* | --/SSC | Breed on islands in lakes or wetlands. | **Low potential.** The survey area is outside of the breeding range of this species. SFPUC occurrence record in the survey area vicinity is from a wintering, not breeding bird (SFPUC, 2010a). Low potential to use the quarry pits during wintering. |
| *Mammals* | | | |
| Pallid bat<br>*Antrozous pallidus* | --/SSC | Day roosts are mainly in caves, crevices and mines; also found in buildings and under bark. Forages in open lowland areas. | **Moderate potential.** Potential roosting habitat is available in large diameter trees. |
| Tule elk<br>*Cervus elaphus nannodes* | --/--/Local protection | The San Antonio elk herd is a resident herd from hills surrounding the San Antonio Reservoir. | **Low potential.** Tule elk are present on the slopes east of Calaveras Road, but would not be expected to cross the fenced road into the survey area. |
| San Francisco dusky-footed woodrat<br>*Neotoma fuscipes* | --/SSC | Occur in forests with established understory. Construct nests from woody debris. | **High potential.** This species is known to nest within the vicinity of the survey area (CDFW, 2016), suitable habitat is present in the Alameda Creek corridor and one woodrat nest was observed during the 2011 reconnaissance survey. |
| American badger<br>*Taxidea taxus* | --/SSC | Grasslands, savannas, deserts, timberline mountain meadows. | **Moderate potential.** Documented 1 mile east of the survey area (SFPUC, 2010a). Some potential habitat present in grassland within the survey area. |

**STATUS CODES:**

FEDERAL ENDANGERED SPECIES ACT (FESA)
FE = Listed as Endangered (in danger of extinction) by the Federal Government.
FT = Listed as Threatened (likely to become Endangered within the foreseeable future) by the Federal Government.
FD = Federally Delisted

CALIFORNIA ENDANGERED SPECIES ACT (CESA)/CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE (CDFW)
SE = Listed as Endangered by the State of California
ST = Listed as Threatened by the State of California
SC = State Candidate for Listing as Endangered
SD = State Delisted
SSC = California Species of Special Concern
FP = California Fully Protected
3503.5 = Section 3503.5 of the California Fish and Game Code prohibits take, possession, or destruction of any birds in the orders Falconiformes (hawks) or Strigiformes (owls), or of their nests and eggs.

SOURCES:

Acord, Brian, 2015. Personal communication with CDFW's Biogeographic Data Branch regarding suppressed location data in the vicinity of the survey area. April 28, 2015.
CDFW, California Natural Diversity Database. Rarefind 5 printout and GIS database for the Niles and La Costa Valley 7.5 minute topographic quadrangles. Accessed March 30, 2016.
SFPUC, 2010a. GIS data relating to sensitive species and other biological resources, supplied by SPFUC for the project vicinity. Shapefiles entitled "SSAnimals_pt" and "SSAnimals_py"
SFPUC, 2011d. Email from Karen Frye, San Francisco Public Utilities Commission, regarding eagle sightings. May 2, 2011.
SFPUC, 2015. Special Status Animals GIS data for the SFPUC Alameda Watershed (includes file 'SSAnimals.shp' and '2000-2014 CNDDB spreadsheet.xlsx'. Data from J. Lukins, SFPUC-NRD, 9/9/15.
USFWS, 2015. Resource List of Federal Endangered and Threatened Species that Occur in or may be Affected by the Alameda Creek Recapture Project. Retrieved April 27, 2015.

## TABLE 2
## SPECIAL-STATUS PLANTS CONSIDERED, ALAMEDA CREEK RECAPTURE PROJECT

| Common Name Scientific Name | Listing Status FESA/ CESA/CNPS | Habitat and Distribution | Elevation Range | Distribution | Blooming Period |
|---|---|---|---|---|---|
| FEDERAL AND STATE-LISTED SPECIES OR PROPOSED FOR LISTING | | | | | |
| Palmate-bracted bird's-beak<br>*Chloropyron palmatum* | E/E/1B.1 | Chenopod scrub, valley and foothill grassland, alkaline soils | 15-500 feet | ALA, COL, FRE, GLE, MAD, SJQ*, YOL | May-October |
| Robust spineflower<br>*Chorizanthe robusta* var. *robusta* | E/--/1B.1 | Cismontane woodland, coastal bluff scrub, coastal dunes; sandy terraces and bluffs or in loose sand | 5-1000 feet | Currently known from only six extended occurrences. Nearest record is an extirpated site on Oakland East quad. ALA*, MNT, MRN?, SCL*, SCR, SFO, SMT* | April-September |
| Livermore tarplant<br>*Deinandra bacigalupi* | CE/--/1B.2 | Meadows and seeps in alkaline soils | 490-610 feet | Known only from the Springtown Area of Livermore; ALA | June-October |
| Contra Costa goldfields<br>*Lasthenia conjugens* | FE/–/1B.1 | Cismontane woodland, playas, valley and foothill grassland; vernal pools, swales and low depressions in open grassy areas. | 0-1600 feet | Nearest records are in Fremont baylands and Don Pedro Wildlife Refuge. Range: ALA, CCA, MEN, MNT, MRN, NAP, SBA, SCL, SOL, SON. | March – June |
| California seablite<br>*Suaeda californica* | E/--/1B.1 | Meadows and swamps; coastal salt marsh | 0-50 feet | Largely extirpated from the Bay Area salt marshes; ALA*, CCA*, SCL*, SFO*, SLO | July-October |
| OTHER PLANT SPECIES OF CONCERN | | | | | |
| Santa Clara thorn-mint<br>*Acanthomintha lanceolata* | --/--/4.2 | Chaparral, cismontane woodland and coastal scrub, generally on serpentinite. | 260-4000 feet | Nearest records are from Calaveras Dam and Sunol Regional Wilderness. Range: ALA, FRE, MER, MNT, SBT, SCL, SJQ, STA. | March-June |
| California androsace<br>*Androsace elongata* ssp. *acuta* | --/--/4.2 | Chaparral, cismontane woodland, coastal scrub, pinyon and juniper woodland, valley and foothill grassland; meadows and seeps. Highly localized and often overlooked. | 490-4000 feet | Nearest record is in the headwaters of Arroyo del Valle. Range: ALA, CCA, COL, FRE, GLE, KRN, LAX, MER, RIV, SBD, SBT, SCL, SDG, SIS, SJQ, SLO, SMT, STA, TEH. | March-June |
| Bent-flowered fiddleneck<br>*Amsinckia lunaris* | --/--/1B.2 | Coastal bluff scrub, cismontane woodland, valley and foothill woodland; | 5-1700 feet | Many records in ALA, CCA, COL, LAK, MRN, NAP, SVT, SCL, SCR, SMT, SON, YOL | March-June |
| Alkali milk-vetch<br>*Astragalus tener* var. *tener* | --/--/1B.2 | Vernal pools, valley and foothill grassland, playas; adobe clay in vernally moist places; low ground flooded lands | 3-200 feet | Historic record in Milpitas. Many records in ALA, CCA*, MER, MNT, NAP, SBT*, SCL*, SFO*, SJQ*, SOL, SON*, STA*, YOL, with many populations extirpated. | March-June |
| Heartscale<br>*Atriplex cordulata* var. *cordulata* | --/--/1B.2 | Chenopod scrub, meadows and seeps, valley and foothill grassland; sandy, saline or alkaline sites | 0-1900 feet | Nearest records are in Springtown Area of Livermore; ALA, BUT, CCA, COL, FRE, GLE, KRN, MAD, MER, SJQ*, SLO, SOL, STA*, TUL, YOL* | April-October |

## TABLE 2 (Continued)
## SPECIAL-STATUS PLANTS CONSIDERED, ALAMEDA CREEK RECAPTURE PROJECT

| Common Name<br>Scientific Name | Listing Status FESA/ CESA/CNPS | Habitat and Distribution | Elevation Range | Potential for Species Occurrence Within the Survey area | Blooming Period |
|---|---|---|---|---|---|
| OTHER PLANT SPECIES OF CONCERN (cont.) | | | | | |
| Crownscale<br>*Atriplex coronata* var. *coronata* | --/--/4.2 | Chenopod scrub, valley and foothill grassland, vernal pools; alkaline, often clay soils | 3-2000 feet | ALA, CCA, FRE, GLE, KNG, KRN, MER, MNT, SJQ*, SLO, SOL, STA | March-October |
| Brittlescale<br>*Atriplex depressa* | --/--/1B.2 | Chenopod scrub, meadows and seeps, playas, valley and foothill grassland, vernal pools; alkaline, vernally moist clay soils | 3-1100 feet | Nearest records are in Springtown and Don Edwards NWR; ALA, CCA, COL, FRE, GLE, KRN, MER, SOL, STA, TUL, YOL | April-October |
| Lesser saltscale<br>*Atriplex minuscula* | --/--/1B.1 | Chenopod scrub, playas, valley ahd foothill grassland; alkaline, sandy soils | 40-700 feet | Many sites extirpated by agriculture. Nearest records are from Don Edwards NWR, Altamont Pass areas; ALA, BUT, FRE, KRN, MAD, MER, STA*, TUL | May-October |
| Big-scale balsamroot<br>*Balsamorhiza macrolepis* | --/--/1B.2 | Chaparral, cismontane woodland, valley and foothill grassland, sometimes on serpentinite or metamorphics | 290-5200 feet | Nearest record is in Tesla Road area; ALA, AMA, BUT, COL, ELD, LAK, MAR, NAP, PLA, SCL, SHA, SOL, SON, TEH, TUO | March-June |
| Big tarplant<br>*Blepharizonia plumosa* | --/--/1B.1 | Valley and foothill grassland, usually on clay, more frequent after wildfires, often on slopes | 90-1700 feet | Nearest record is west of Tesla; ALA, CCA, SJQ, SOL*, STA | July-October |
| Mt. Day rockcress<br>*Boechera rubicundula* | --/--/1B.1 | Chaparral on rocky slopes | +/- 4000 feet | Known from only one occurrence on Mt. Day; SCL | April-May |
| Round-leaved filaree<br>*California macrophylla* | --/--/1B.1 | Cismontane woodland, valley and foothill grassland; often on rich, low soils | 40-4000 feet | Nearest records are in Altamont Pass area; ALA, BUT*?, CCA, COL, FRE, GLE, KNG, KRN, LAK, LAS, LAX, MER, MNT, NAP, RIV, SBA, SBT, SCL, SCZ*, SDG, SJQ, SLO, SMT, SOL, SON, STA, TEH, TUL, VEN, YOL | March-May |
| Oakland star-tulip<br>*Calochortus umbellatus* | --/--/4.2 | Broadleafed upland forest, chaparral, cismontane woodland, lower montane coniferous forest, and valley and foothill grassland; often on serpentinite | 320-2300 feet | ALA, CCA, LAK, MRN, SCL, SCR*, SMT, STA | March-May |
| Santa Cruz Mountains pussypaws<br>*Calyptridium parryi* var. *hesseae* | --/--/1B.2 | Chaparral, cismontane woodland; sandy or gravelly openings | 1000-5100 feet | Nearest record is Black Mountain in the Mt. Hamilton Range. MNT, SCL, SCR, SLO, STA | May-August |
| Chaparral harebell<br>*Campanula exigua* | –/–/1B.2 | Rocky, usually serpentinite chaparral habitats; on talus slopes; sometimes in coastal scrub or chaparral, at edges of blue oak and gray pine; vernally moist areas, often very open or barren. | 900-4100 feet | Nearest record is a general locality near Sunol. Most localities are south of the Alameda watershed. Range: ALA, CCA, SBT, SCL, STA. | May – June |

## TABLE 2 (Continued)
## SPECIAL-STATUS PLANTS CONSIDERED, ALAMEDA CREEK RECAPTURE PROJECT

| Common Name Scientific Name | Listing Status FESA/ CESA/CNPS | Habitat and Distribution | Elevation Range | Potential for Species Occurrence Within the Survey area | Blooming Period |
|---|---|---|---|---|---|
| OTHER PLANT SPECIES OF CONCERN (cont.) | | | | | |
| Congdon's tarplant<br>*Centromadia parryi* ssp. *congdonii* | –/–/1B.2 | Alkaline valley and foothill grassland, probably in low areas with high residual soil moisture. | 0-750 feet | Reported in 2009 from vicinity of Andrade Road; also known from Irvington District in Fremont. Range: ALA, CCA, MNT, SCL, SLO, SMT. | May – October, uncommonly in November |
| Pt. Reyes bird's-beak<br>*Chloropyron maritimum* ssp. *palustre* | --/--/1B.2 | Marshes and swamps; coastal salt marsh | 0-40 feet | Nearest record is near Alviso; ALA*, HUM, MRN, SCL*, SFO, SMT*, SON | June-October |
| Hispid bird's-beak<br>*Chloropyron molle* spp. *hispidum* | --/--/1B.1 | Meadows and seeps, playas, valley and foothill grassland; alkaline meadows and alkali sinks with saltgrass (Distichlis) | 3-510 feet | Nearest record is Springtown area of Livermore; ALA, FRE, KRN, MER, PLA, SOL | June-September |
| Brewer's clarkia<br>*Clarkia breweri* | --/--/4.2 | Chaparral, cismontane woodland, coastal scrub, often on serpentinite | 700-3700 feet | ALA, FRE, MER, MNT, SBT, SCL, STA | April-June |
| Santa Clara red ribbons<br>*Clarkia concinna* ssp*. automixa* | –/–/4.3 | Chaparral and cismontane woodland. | 290-5000 feet | Nearest records are from Niles Canyon and Ohlone Regional Wilderness. Range: ALA, SCL | May – June, uncommonly in April and July |
| Hospital Canyon larkspur<br>*Delphinium californicum* ssp. *interius* | –/–/1B.2 | Chaparral, cismontane woodland; wet, boggy meadows, openings in soft chaparral habitat, woodland in canyons; shaded gullies, sometimes in thick undergrowth. | 750-3600 feet | Nearest records are Williams Gulch and near Arroyo Mocho. Range: ALA, CCA, MER, SBT, SCL, SJQ, SBT. | April – June |
| Jepson's woolly sunflower<br>*Eriophyllum jepsonii* | --/--/4.3 | Chaparral, dry oak woodland and coastal scrub, sometimes on serpentine. | 650-3400 feet | Nearest records are east of Del Valle Reservoir, with several occurrences along Mines Road. Range: ALA, CCA, KRN, MNT, SBT, SCL, STA, VEN | April -- June |
| Hoover's button-celery<br>*Eryngium aristulatum* var. *hooveri* | --/--/1B.1 | Vernal pools, alkaline depressions, roadside ditches and other wet places near the coast | 5-150 feet | Nearest records are along the edge of the South Bay; ALA, SBT, SCL (*?), SDG, SLO | June-August |
| San Joaquin spearscale<br>*Extriplex joaquiniana* | –/–/1B.2 | Chenopod scrub, meadows and seeps, playas, valley and foothill grassland; seasonal wetlands or alkali sink scrub. | 0-2750 feet | Nearest records are from Warm Springs in Fremont and Livermore area. Range: ALA, CCA, COL, FRE, GLE, MER, MNT, NAP, SBT, SCL* SJQ*, SLO, SOL, TUL*?, YOL | April – October |
| Stinkbells<br>*Fritillaria agrestis* | --/--/4.2 | Chaparral, cismontane woodland, pinyon and juniper woodland, valley and foothill grassland. Clay substrate, sometimes on serpentinite. Most populations small. | 30-5200 feet | Nearest record is in Mines Road area, with several additional localities along Tesla Road. Range: ALA, CCA, FRE, KRN, MEN, MER, MNT, MPA, PLA, SAC, SBA, SBT, SCL, SCR, SLO, SMT, STA, TUP, VEN, YUB | March -- June |

## TABLE 2 (Continued)
## SPECIAL-STATUS PLANTS CONSIDERED, ALAMEDA CREEK RECAPTURE PROJECT

| Common Name Scientific Name | Listing Status FESA/ CESA/CNPS | Habitat and Distribution | Elevation Range | Potential for Species Occurrence Within the Survey area | Blooming Period |
|---|---|---|---|---|---|
| OTHER PLANT SPECIES OF CONCERN (cont.) | | | | | |
| Fragrant fritillary<br>*Fritillaria liliacea* | --/--/1B.2 | Cismontane woodland, coastal prairie, coastal scrub, valley and foothill grassland; clay soils, often on serpentinite | 5-1400 feet | Nearest record is Alum Rock Park in San Jose; ALA, CCA, MNT, MRN, SBT, SCL, SFO, SMT, SOL, SON | February-April |
| Diablo helianthella<br>*Helianthella castanea* | –/–/1B.2 | Broadleafed upland forest, chaparral, cismontane woodland, coastal scrub, riparian woodland, valley and foothill woodland; openings or outcrops in scrub or forest; often in soils formed on sandstone. | 200-4300 feet | Recent studies have concluded that species present in the Alameda watershed is California helianthella. Range: ALA, CCA, MRN, SFO, SMT; most localities in CCA | March – June |
| Legenere<br>*Legenere limosa* | --/--/1B.1 | Vernal pools | 3-2900 feet | Many historical sites extirpated; ALA, LAK, MNT, NAP, PLA, SC, SCL, SHA, SJQ, SMT, SOL, SON, STA*, TEH, YUB | April-June |
| Bristly leptosiphon<br>*Leptosiphon acicularis* | --/--/4.2 | Grassy areas in woodland and chaparral; mostly coastal distribution. | 170-5300 feet | Nearest occurrences are very old and general collections from Hayward and unspecified location in Alameda County. Range: ALA, BUT, HUM, LAK, MRN, MEN, NAP, SMT, SON | April -- May |
| Serpentine leptosiphon<br>*Leptosiphon ambiguus* | --/--/4.2 | Cismontane woodland, coastal scrub, valley and foothill grassland, usually on sparse serpentinite substrate., SMT, STA | 390-3800 feet | Nearest records are in the Goat Rock area in upper Alameda Creek watershed. Range: ALA, CCA, MER, SBT, SCL, SCR, SJQ | March-June |
| Mt. Hamilton coreopsis<br>*Leptosyne hamiltonii* | –/–/1B.2 | Cismontane woodland; rocky sites; steep shale talus with open southwestern exposure | 1800-4300 feet | Nearest record is Cedar Mountain Ridge in the Mt. Hamilton Range; ALA, SCL, STA | March-May |
| Woolly-headed lessingia<br>*Lessingia hololeuca* | --/--/3 | Broadleafed upland forest, coastal scrub, lower montane coniferous forest, valley and foothill grassland; clay, serpentinite soils | 40-1100 feet | ALA, MNT, MRN, NAP, SCL, SM, SOL, SON, YOL | June-October |
| Arcuate bush-mallow<br>*Malacothamnus arcuatus* | –/–/1B.2 | Chaparral and cismontane woodland; in gravelly alluvium | 40-1200 feet | Nearest record is Alum Rock Park, San Jose; SCL, SCR, SMT | April-September |
| Hall's bush-mallow<br>*Malacothamnus hallii* | –/–/1B.2 | Chaparral and coastal scrub; some populations on serpentinite | 30-2500 feet | Nearest record is along Alviso Slough; CCA, LAK, MEN, MER, SCL, SMT, STA | May-October |
| San Antonio Hills<br>*Monardella antonina* ssp. *antonina* | –/–/3 | Chaparral, cismontane woodland. | 1700-3300 feet | Nearest records are from McGuire Peaks, Sunol Regional Wilderness, Palomares Canyon. Range: ALA?, CCA?, MNT, SBT?, SCL? | June – August |
| Little mousetail<br>*Myosurus minimus* ssp. *apus* | --/--/3.1 | Valley and foothill grassland, vernal pools; alkaline substrate | 60-2100 feet | ALA, CCA, COL, LAK, MER, RIV, SBD, SDG, SOL, TUL, YOL | March-June |

## TABLE 2 (Continued)
## SPECIAL-STATUS PLANTS CONSIDERED, ALAMEDA CREEK RECAPTURE PROJECT

| Common Name Scientific Name | Listing Status FESA/ CESA/CNPS | Habitat and Distribution | Elevation Range | Potential for Species Occurrence Within the Survey area | Blooming Period |
|---|---|---|---|---|---|
| OTHER PLANT SPECIES OF CONCERN (cont.) | | | | | |
| Adobe navarretia<br>*Navarretia nigelliformis* ssp. *Nigelliformis* | --/--/4.2 | Valley and foothill grassland, sometimes vernal pools; vernally mesic sites on clay, sometimes serpentinite | 320-3300 feet | ALA, BUT, CCA, COL. FRE, KRN, MER, MNT, PLA, SUT, TUL | April-June |
| Prostrate vernal pool navarretia<br>*Navarretia prostrata* | –/–/1B.1 | Coastal scrub, meadows and seeps, valley and foothill grassland, vernal pools; alkaline, vernally moist sites | 5-4000 feet | Nearest records are at Don Edwards NWR and Dublin; ALA, FRE, LAX, MER, MNT, ORA, RIV, SBD*?. SBT, SCL, SDG, SLO | April-July |
| Hairless popcornflower<br>*Plagioborhtys glaber* | –/–/1A | Meadows and seeps, marshes and swamps; alkaline or coastal salt marsh sites | 40-600 feet | Last confirmed sighting in 1954; ALA*, MRN*, SBT; SCL* | March-May |
| Oregon polemonium<br>*Polemonium carneum* | –/–/2B.2 | Coastal prairie, coastal scrub, lower montane coniferous forest | 0-6100 feet | Approximate record on Stonybrook Creek is nearest known occurrence; ALA, DNT, HUM, MRN, SFO, SIS, SMT, SON; OR, WA | April-September |
| California alkali grass<br>*Puccinellia simplex* | --/--/1B.2 | Meadows and seeps, saline flats; chenopod scrub, valley and foothill grasslands, vernal pools. Nearest record is 5 miles south of Livermore in Vallecitos area. Range: ALA, BUT, CCA, COL, GLE, KRN, KNG, LAK, LAX, FRE, MAD, MER, NAP, SCL, SCR, SOL, STA, SBD, SLO, YOL. | 0-3050 feet | **Not observed.** Alkaline soils, vernal pools, and chenopod scrub are unknown from the project area; species not found during suitably-timed focused surveys. | March-May |
| Maple-leaved checkerbloom<br>*Sidalcea malachroides* | --/--/4.2 | Broadleafed upland forest, coastal prairie, coastal scrub, North Coast coniferous forest, riparian woodland; often on disturbed areas | 0-2400 feet | Nearest record is from Alum Rock Park in San Jose; many localities in DNT, HUM, MEN, MNT, SCL, SCR, SON | March-April |
| Most beautiful jewel-flower<br>*Streptanthus albidus* ssp.*peramoenus* | –/–/1B.2 | Chaparral, coastal scrub woodland, and grassland; outcrops and barren areas on south- and west-facing exposures on ridges and slopes; serpentine soils. | 300-3300 feet | Nearest records are from Sunol Regional Wilderness, Goat Rock, and east of Calaveras Reservoir. Range: ALA, CCA, SCL, MNT, SLO. | April – September, uncommonly in March and October |
| Slender-leaved pondweed<br>*Stuckenia filiformis* ssp. *alpina* | –/–/2B.2 | Shallow freshwater marshes and swamps., SOL, AZ, NV, OR, + | 980-7050 feet | Record from Niles quadrangle is from Alameda Creek Area in Fremont. Range: ALA, BUT, CCA, ELD, LAS, MER, MON, MOD, MPA, PLA, SCL* SIE, SHA, SMT, SON | May – July |
| Saline clover<br>*Trifolium hydrophilum* | –/–/1B.2 | Marshes and swamps, valley and foothill grassland, vernal pools; mesic, alkaline sites | 0-1000 feet | Nearest records are from Alviso, Don Edwards NWR and Springtown in Livermore; ALA, CCA, COL?, LAK, MNT, NAP, SAC, SBT, SCL, SCR, SJQ, SLO, SMT, SOK, SON, YOL | April-June |

## TABLE 2 (Continued)
## SPECIAL-STATUS PLANTS CONSIDERED, ALAMEDA CREEK RECAPTURE PROJECT

| Common Name Scientific Name | Listing Status FESA/ CESA/CNPS | Habitat and Distribution | Elevation Range | Potential for Species Occurrence Within the Survey area | Blooming Period |
|---|---|---|---|---|---|
| OTHER PLANT SPECIES OF CONCERN (cont.) | | | | | |
| Capter-fruited tropidocarpum<br>*Tropidocarpum capparideum* | –/–/1B.1 | Valley and foothill grassland; alkaline hills | 3-1500 feet | Thought to be extinct, then rediscovered in 2000 on Ft. Hunter Liggett; ALA*, CCA*, FRE, GLE*, MNT, SCL*, SJQ*, SLO | March-April |

**STATUS CODES:**

FEDERAL ENDANGERED SPECIES ACT (FESA)
FE = Listed as Endangered (in danger of extinction) by the Federal Government.
FT = Listed as Threatened (likely to become Endangered within the foreseeable future) by the Federal Government.
FC = Candidate to become a *proposed* species.

CALIFORNIA ENDANGERED SPECIES ACT (CESA)/ CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE (CDFW)
CE = Listed as Endangered by the State of California.
CT = Listed as Threatened by the State of California.
CC= Candidate to become a *proposed* species.
CSC = California Species of Special Concern.

California Rare Plant Rank (Formerly known as CNPS List):
1A = Plants presumed extinct in California.
1B = Plants rare, threatened, or endangered in California and elsewhere.
2A = Plants presumed extirpated in California.
2B = Plants rare, threatened, or endangered in California, but more common elsewhere.
3 = Plants about which more information is needed.
4 = Plants of limited distribution.

An extension reflecting the level of threat to each species is appended to each CRPR as follows:
.1 – Seriously threatened in California.
.2 – Moderately threatened in California.
.3 – Not very threatened in California.

[b] Distribution range is based on County codes, as follows:

County abbreviations: AMA--Amador; BUT-- Butte; CAL-- Calaveras; CCA--Contra Costa; COL—Colusa; DNT--Del Norte; ELD—El Dorado; FRE—Fresno; GLE—Glenn; HUM—Humboldt; KRN—Kern; LAK—Lake; LAS—Lassen; LAX--Los Angeles; MAD—Madera; MOD—Modoc; MEN—Mendocino; MER—Merced; MNT—Monterey; MPA—Mariposa; MRN—Marin; NEV—Nevada; ORA—Orange; PLA—Placer; PLU—Plumas; RIV—Riverside; SAC—Sacramento; SBA--Santa Barbara; SBD--San Bernardino; SBT--San Benito; SCL--Santa Clara; SCR--Santa Cruz; SCT--Santa Catalina Island; SCZ--Santa Cruz Island; SDG--San Diego; SFO--San Francisco; SHA—Shasta; SIE—Sierra; SIS—Siskiyou; SJQ--San Joaquin; SMI--San Miguel Island; SMT--San Mateo; SNI--San Nicolas Island; SOL—Solano; SON—Sonoma; SRO--Santa Rosa Island; TEH—Tehama; TRI—Trinity; TUL—Tulare; VEN—Ventura; YOL—Yolo; YUB—Yuba
* indicates species presumed extirpated from county; ? indicates questionable record

SOURCES:

California Department of Fish and Wildlife (CDFW), California Natural Diversity Database (CNDDB) Rarefind version 5 printout and GIS database for plants, Niles, La Costa Valley, Calaveras Reservoir, Milpitas, Newark, Hayward, Mountain View, Livermore, and Dublin 7.5 minute topographic quadrangles. Accessed April 27, 2015 and March 9, 2016.
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San Francisco Public Utilities Commission (SFPUC). 2008. GIS data relating to special-status species and other biological resources, supplied by SPFUC for the project vicinity.
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# BIO1f – Terrestrial Biological Resources Report

# SAN FRANCISCO PUBLIC UTILITIES COMMISSION ALAMEDA CREEK RECAPTURE PROJECT

## Terrestrial Biological Resources Report

Prepared for
San Francisco Public Utilities
Commission and San Francisco
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November 2016

Prepared by Environmental Science Associates
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# CHAPTER 1
# Introduction

## 1.1 Background and Purpose for the Terrestrial Biological Resources Report

This Terrestrial Biological Resources Report documents sensitive natural communities and special-status species potentially occurring within the project area[1] for the San Francisco Public Utilities Commission (SFPUC) Alameda Creek Recapture Project (ACRP or proposed project). The intent and scope of this report is to identify the habitat types present in the project area and in any areas where indirect project impacts could occur (hereafter referred to as the terrestrial biological resources survey area or survey area), describe in detail any habitat types considered to be sensitive terrestrial natural communities, and assess the likelihood for special-status wildlife and plant species to occur within the survey area. The report also includes the results of focused surveys conducted to determine the presence/absence of special-status plant species within the survey area. Special-status fish species and aquatic resources within Alameda Creek will be addressed in a separate technical memorandum.

The ACRP is the last of several key regional facility improvement projects of the SFPUC's Water System Improvement Program (WSIP) to be implemented. All of the key regional projects are needed to meet established level of service goals and system performance objectives for the SFPUC regional water system (San Francisco Planning Department, 2008a).

## 1.2 Project Location

The proposed ACRP is in unincorporated Alameda County, south of the Interstate 680 (I-680)/ State Route 84 (SR 84) interchange and west of Calaveras Road. The proposed facilities would be in the Sunol Valley[2] on the east side of Alameda Creek, approximately 6 miles north of Calaveras Reservoir and 1 mile west of San Antonio Reservoir. The ACRP is located within SFPUC Alameda watershed lands[3] owned by the City and County of San Francisco (CCSF).

Existing SFPUC facilities within the Sunol Valley include numerous transmission facilities (the Alameda Siphons, Coast Range Tunnel, Irvington Tunnel, Alameda East Portal, Alameda West Portal, Calaveras Pipeline, San Antonio Pipeline, San Antonio Backup Pipeline, Sunol Pump

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[1] Project area refers to the general area within which all construction-related disturbance would occur.

[2] The Sunol Valley is a north-south trending valley that extends approximately 5 miles from the confluence of Alameda and Welch Creeks in the south to Niles Canyon in the north. The Sunol Valley is drained by Alameda Creek.

[3] The Alameda watershed refers to lands owned by the CCSF and managed by the SFPUC as part of the SFPUC regional water system; the Alameda watershed lands are located within the much larger hydrologic boundary of the Alameda Creek watershed.

Station Pipeline, Sunol Pump Station, and San Antonio Pump Station); water treatment facilities (Sunol Valley Water Treatment Plant [SVWTP]), Sunol Valley Chloramination Facility, a fluoride facility, and a chemical facility); the Hetch Hetchy Water & Power (HHWP) Calaveras Substation; and the California Department of Water Resources (DWR) South Bay Aqueduct. Other land uses in the project vicinity include commercial gravel quarries, commercial nurseries, the Pacific Gas & Electric Company (PG&E) Sunol Substation, several private residences, grazing land, and regional open space. Commercial gravel quarries exist along Alameda Creek at the north end of Sunol Valley, between the Alameda Siphons to the south and the confluence with Arroyo de la Laguna to the north. A commercial gravel quarry operated by Hanson Aggregates under Surface Mining Permit 24 (SMP-24) is partially within the project area (see **Figure 1**). Oliver De Silva operates a quarry under Surface Mining Permit 30 (SMP-30) that is located immediately south of the project area. A third quarry operated by Hanson Aggregates under Surface Mining Permit 32 (SMP-32) is located north of I-680. Most of the SMP-24 area and all of the SMP-30 and SMP-32 areas are on SFPUC Alameda watershed lands that are leased from the CCSF. As a result of the aggregate processing facilities and large quarry pits in the Sunol Valley, this reach of Alameda Creek is referred to as the Quarry Reach.[4]

The nearest urban areas are the unincorporated town of Sunol (approximately 1 mile northwest of the project area) and the city of Fremont (approximately 4 miles to the west). Regional access to the project area is provided by I-680 and SR 84; local access is provided by Calaveras Road.

## 1.3 Project Summary

The purpose of the ACRP is to recover a portion of the water that the SFPUC will release from Calaveras Reservoir or bypass around the Alameda Creek Diversion Dam (ACDD), pursuant to the future operations plan for Calaveras Reservoir under the Calaveras Dam Replacement project (CDRP). Through the permitting process for the CDRP, the SFPUC, in coordination with the California Department of Fish and Wildlife (CDFW) and National Marine Fisheries Service (NMFS), agreed to two in-stream flow schedules that satisfy requirements of the Federal Endangered Species Act and provisions of the California Fish and Game Code. These flow schedules will be implemented as part of Calaveras Reservoir’s future operations plan to enhance spawning, rearing, and migration habitat for steelhead in Alameda and Calaveras Creeks below the Alameda Creek Diversion Dam and Calaveras Dam, respectively. The ACRP would recover water from Alameda Creek and convey the water into the SFPUC regional water system.

The primary goal of the ACRP is to recapture water that the SFPUC will release from Calaveras Reservoir and bypass around the ACDD when the SFPUC implements the instream flow schedules required as part of the regulatory permits for future operations of Calaveras Reservoir. The recaptured water would maintain the historical contribution from the Alameda Watershed to the SFPUC regional water system, in accordance with the CCSF existing water rights. The project-specific objectives of the ACRP are as follows:

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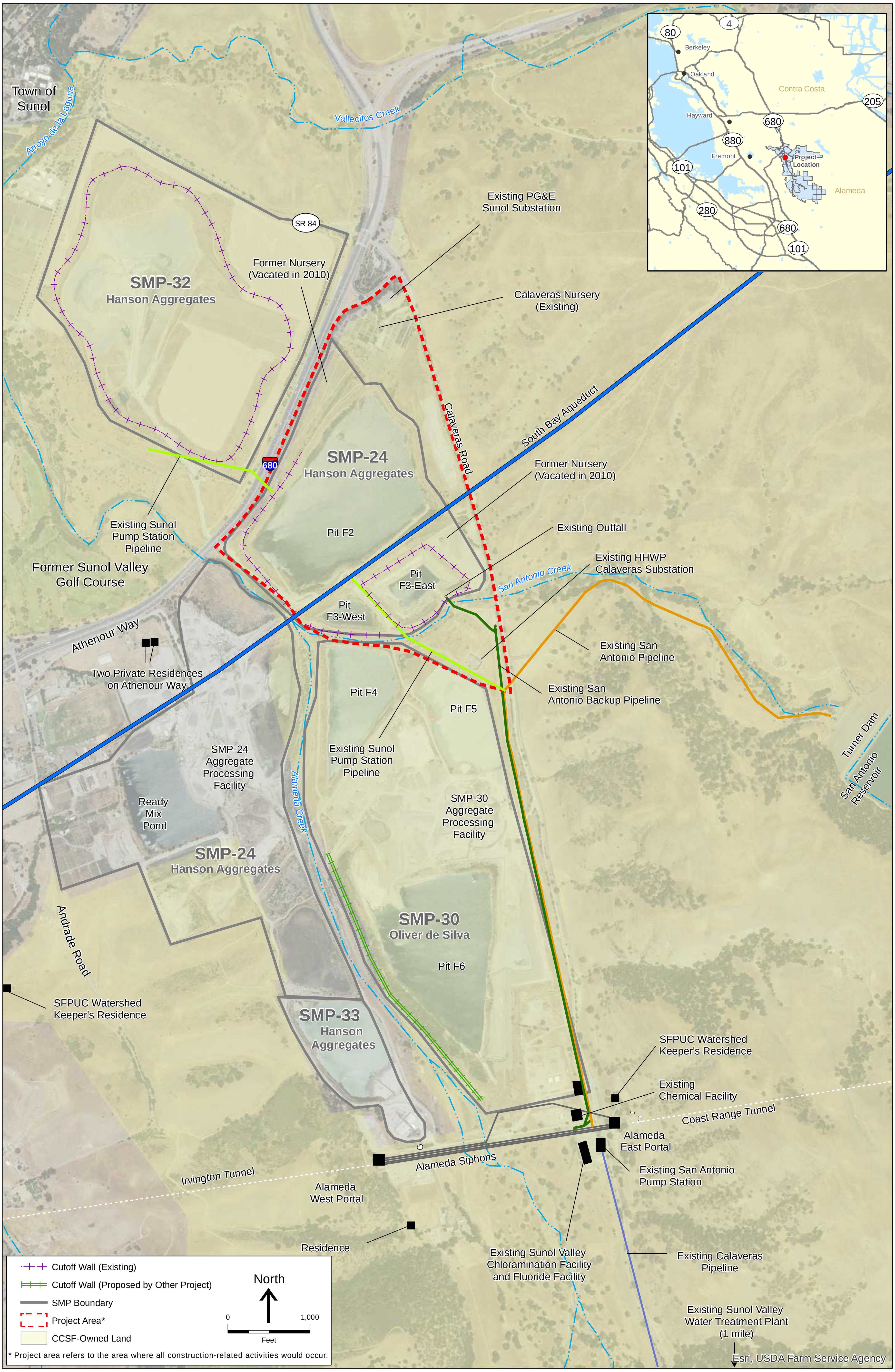
[4] The Quarry Reach of Alameda Creek extends from the Alameda Siphons in the south to I-680 in the north. Sand and gravel mining is a predominant land use along this reach.



SFPUC Alameda Creek Recapture Project

SOURCE: ESA, 2015; Date of aerial photo is 2014.

**Figure 1**
Project Vicinity Map

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- Recapture the water that would have otherwise been stored in Calaveras Reservoir due to the release and bypass of flows from Calaveras Dam and the ACDD, respectively, to meet instream flow requirements, thereby maintaining the historical annual transfers from the Alameda Watershed system to the SFPUC regional water system.
- Minimize impacts on water supply during drought, system maintenance, and in the event of water supply problems or transmission disruptions in the Hetch Hetchy system.
- Maximize local watershed supplies.
- Maximize the use of existing SFPUC facilities and infrastructure.
- Provide a sufficient flow to the SVWTP to meet its minimum operating requirements.

## 1.4 Survey Area, Survey Dates, and Surveying Personnel

The survey area for this habitat assessment is comprised of the project area as well as the Alameda Creek riparian corridor extending between its confluence with San Antonio Creek and Arroyo de la Laguna, the boundaries of which are shown in **Figure 2**. The survey area encompasses the ACRP project area as well as all other areas where indirect effects could occur.

Environmental Science Associates (ESA) and Orion Environmental Associates biologists conducted reconnaissance-level biological surveys in support of this analysis on December 1, 2010; December 10, 2010; January 11, 2011; May 4, May 12, and October 23, 2015. Focused special-status botanical surveys were carried out on April 8 and May 13, 2011; and April 1, May 4, and May 12, 2015. The 2010 and 2011 surveys were conducted during planning phases for this project and included the existing project area, but did not include the Alameda Creek riparian corridor between I-680 and Arroyo de la Laguna. This area was covered in detail in 2015.

## 1.5 Methods

### 1.5.1 Definitions

***Special-status species*** are defined as species that meet one or more of the following criteria:

- Listed, proposed, or candidate for listing as rare, threatened, or endangered by the (CDFW, 2015a, b) or the U.S. Fish and Wildlife Service (USFWS; USFWS 2015);
- Species designated by CDFW as species of special concern or fully protected species;
- Species protected by the federal Migratory Bird Treaty Act (MTBA) and California Fish and Game Code.
- Plants that appear as Rank 1 or 2 on lists of rare and endangered plants maintained by the California Native Plant Society (CNPS, 2015);
- Plants that appear on CNPS Rank 3 or 4 lists.

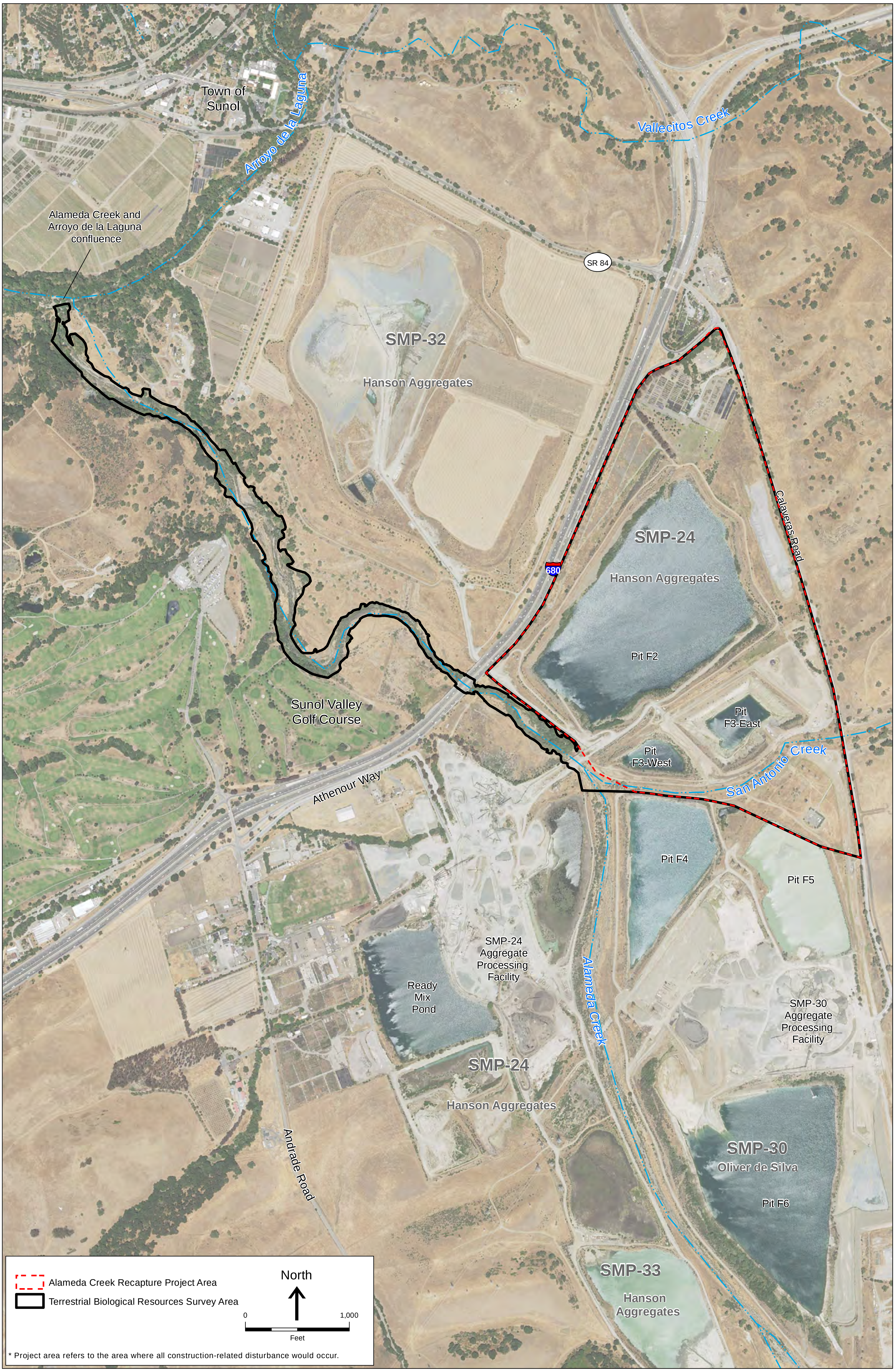
***Potential to occur*** is an assessment based on study of the habitat and distribution of special-status species, investigation of known occurrence records, and familiarity with the survey area based on field surveys. An assessment of "present" means the species was either observed during project surveys or reliable observations have already been reported from the site. High potential to occur indicates that the survey area is within the known distribution of the species, occurrence records are nearby, and habitat found there appears suitable and of high quality. Moderate potential to occur indicates that the survey area is within the known distribution of the species and habitat may be suitable. Low potential to occur means the species is either outside the known geographic range of the species, suitable habitat was not seen during field surveys, or both.

***Sensitive natural communities*** are defined as vegetation associations or alliances (CNDDB, 2015a, b) with a global (G) or state (S) rarity ranking of 1, 2 or 3. These are vegetation types considered to be rare and threatened throughout their range. For the purposes of identifying sensitive natural communities, definitions and membership rules follow Sawyer et al. (2009). Another criterion for a sensitive natural community under CEQA is any riparian habitat. The CEQA checklist, Question IV.b calls for an assessment of potential project adverse effect on “any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the California Department of Fish and Game [Wildlife] or U.S. Fish and Wildlife Service.”

***Habitat types*** are mapping units with distinct physical and vegetation characteristics found within the survey area. Where possible, the definitions match those of vegetation alliances as defined by Sawyer et al. (2009). Where broader categories were needed to match the scale of mapping, habitat types were consistent with the Draft Alameda Watershed Habitat Conservation Plan (SFPUC, 2010a). As will be discussed in the results section, a number of distinctive habitat types were found within the survey area that did not match these mapping units, either because they are essentially unvegetated; they are highly disturbed and a stable assemblage of vegetation has not yet developed; or vegetation has been intentionally established and maintained. In these instances, a descriptive name has been assigned to the habitat type and a definition is provided in the results section.

## 1.5.2 Review of Available Information

The California Natural Diversity Database (CNDDB) was consulted for records of sensitive biological resources in the project vicinity (CDFW, 2015a; 2015b) and an official species list of potential endangered or threatened species that may occur within the survey area was obtained from the USFWS (USFWS, 2015). For special-status wildlife species, the CNDDB was reviewed for a list of potential species that may occur within the La Costa Valley and Niles USFWS 7.5 minute quadrangles (CDFW, 2015a). **Appendix C** contains the full list of special-status wildlife species considered. For special-status plants, a nine-quadrangle query centered on the La Costa Valley quadrangle was conducted for both CNDDB records (CDFW, 2015b) and the California Native Plant Society Electronic Inventory (CNPS, 2015) was used to compile a list of considered special-status plant species. **Appendix D** contains the full list of special-status plant species considered. Additional biological data and sensitive species occurrence records were provided by the SFPUC as shapefiles in Geographic Information System (GIS) format (SFPUC, 2010b).



SOURCE: ESA, 2015; Date of aerial photo is 2014.

**Figure 2**
Terrestrial Biological Resources Survey Area

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The primary sources for review of information about natural communities are CNDDB occurrence records (for sensitive natural communities); for natural vegetation, the primary sources are *A Manual of California Vegetation* (Sawyer et al., 2009) and the *Alameda Watershed HCP* (SFPUC, 2010a).

A number of surveys have been carried out in the vicinity of the ACRP for other WSIP projects. The following documents were reviewed for relevant information regarding biological resources in the project vicinity:

- *Initial Study/Mitigated Negative Declaration for the San Francisco Public Utilities Commission Alameda Siphons Seismic Reliability Upgrade Project* (San Francisco Planning Department, 2008b)
- *Alameda Siphons Seismic Reliability Upgrade Project Biological Assessment* (Irvington Partners Joint Venture, 2008)
- *Final Environmental Impact Report for the San Francisco Public Utilities Commission New Irvington Tunnel Project* (San Francisco Planning Department, 2009a)
- *Final Environmental Impact Report for the San Francisco Public Utilities Commission Sunol Valley Water Treatment Plant Expansion and Treated Water Reservoir Project* (San Francisco Planning Department, 2009b)
- *San Antonio Backup Pipeline Botanical Survey Report* (May and Associates, 2008)
- *Special-status Plant Surveys for San Antonio Backup Pipeline Project*, Memo from B.M. Leitner and M. Lowe (ESA+Orion, 2010a)
- *SFPUC San Antonio Backup Pipeline Project Terrestrial Habitat Assessment* (ESA, 2009a)
- *SFPUC Habitat Reserve Program: Alameda Watershed Biological Resources* (ESA+Orion, 2010b).

General information sources were also reviewed concerning the occurrence of special-status plants and sensitive natural communities in the SFPUC Alameda watershed and environs. These included the following:

- *Alameda Watershed Management Plan* (SFPUC, 2001)
- *Final Environmental Impact Report for the Alameda Watershed Management Plan* (San Francisco Planning Department, 2000*)*
- *Draft Alameda Watershed Habitat Conservation Plan* (SFPUC, 2010a)
- *Focused Rare Plant Survey Report, Alameda Watershed, Alameda and Santa Clara Counties, California* (Nomad Ecology, 2009)

A review of these information sources resulted in a list of 37 special-status wildlife species and 50 special-status plant species considered (see Appendices C and D). Occurrence records in CNDDB and other sources (Consortium of California Herbaria, 2015; Calflora, 2016; SFPUC, 2010b) were investigated for each of these species to provide familiarity with the details of their habitat, plant and wildlife associates, and other ecological details. Based on the review of existing information, this list was refined into a group of 25 wildlife species and 15 plant species that are either known from the region or have potential to occur within the survey area. These wildlife and plant species are discussed in Sections 2.3 and 2.4, respectively.

### 1.5.3 Field Surveys

Habitat mapping was carried out on various dates in 2010 and 2011 as part of project planning, and verified, revised, and expanded in 2015. During reconnaissance surveys conducted on May 4, May 12, and October 23, 2015, ESA and Orion biologists mapped habitats[5] and assessed the presence, location, quality and extent of sensitive natural communities and the potential presence of special-status plant and wildlife species based on habitats present in the survey area. The entire survey area was either walked or driven to the extent necessary to map and characterize habitats, and to assess the potential habitat for special-status plant and wildlife species. Habitats were mapped using the nomenclature used in the Draft Alameda Watershed Habitat Conservation Plan (SFPUC, 2010a), with slight modifications to reflect the scale of mapping. The habitats were mapped by hand on aerial photographs and the data digitized into GIS format. All plant and animal species encountered were noted and identified to the extent possible. Those plants not identifiable in the field were collected for identification. A list was compiled of wildlife and plant species observed and is presented in **Appendix E** and **F**, respectively.

A detailed characterization of riparian vegetation was carried out along Alameda Creek opposite Pit F2 within the survey area to describe current conditions, provide a basis to anticipate future baseline conditions and to analyze potential impacts of the project. Although initially conceived as a sampling effort using several belt transects, this approach was revised in favor of a method that would capture vegetation characteristics more comprehensively throughout this section of Alameda Creek. Large-scale 2014 Google Earth images shown at an elevation of 1,004 feet were printed at a scale of approximately 1"=50' and the dominant vegetation was mapped in this portion of the survey area. Mapping was field-verified on May 4 and 12, 2015. Every 25 feet, a transect was established perpendicular to the channel, and the extent of the dominant (i.e., tallest) riparian habitat type was measured on the airphotos. The large number of transects (n=47) thus sampled was concluded to be a better approach for characterizing the current extent of riparian habitat types.

Focused surveys were carried out on April 8, 2011; May 13, 2011; April 1, May 4, and May 12, 2015 for special-status plants. The surveys were timed to coincide with the period when the target species were most readily detectable. ESA and Orion biologists walked over all parts of the survey area, noting all species observed and giving particular attention to those areas with the most natural, undisturbed habitat and those with habitat similar to that known for the target species. Surveys were conducted in accordance with CNPS Botanical Survey Guidelines (CNPS, 2001), and California Department of Fish and Wildlife's guidelines for assessing the effects of proposed projects on rare, threatened and endangered plants and natural communities (CDFG,

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[5] The terms “habitats” and “habitat types” are used here in lieu of “natural communities” for consistency with other surveys and with the Draft Alameda Watershed Habitat Conservation Plan (SFPUC, 2010a).

2009). Surveys were timed as much as possible to coincide with the periods of optimum detectability and identifiability of special-status species known from the region.

If any special-status plants were encountered, location, habitat and population data were collected sufficient to complete standardized field survey forms for submittal to CNPS and CNDDB.

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# CHAPTER 2

# Habitat Types and Sensitive Biological Resources within the Survey Area

## 2.1 Environmental Setting

Sunol Valley is part of the San Francisco Bay Area sub-region of the California Floristic Province (Baldwin et al., 2012). Oriented in a north-south direction, the Sunol Valley is surrounded by numerous low-elevation ridges (less than 2,000 feet) that drain to Alameda Creek. Alameda Creek is the longest drainage in the greater Alameda Creek watershed, which in turn is the largest watershed in the San Francisco Bay Area, draining an approximately 688-square-mile area that ultimately empties into the southern portion of San Francisco Bay. The Sunol Valley has a Mediterranean climate with relatively mild, wet winters and warm, dry summers.

Much of the Sunol Valley floor is currently mined for sand and gravel. The surrounding hillsides are largely undeveloped and support cattle grazing within non-native grassland and oak woodland habitats. The hills, associated stock ponds, San Antonio Reservoir, Alameda Creek and other local creeks, and the Sunol Regional Wilderness Area provide habitat for a variety of sensitive species.

Alameda Creek flows from its headwaters near Mount Hamilton, through the Sunol Valley, and eventually to San Francisco Bay. In general, flow within Alameda Creek is flashy with high flows during the winter and spring and low flows during the summer and fall. However, the hydrology of Alameda Creek has changed in the past century from the addition of upstream reservoirs that reduce high flows.

In the Sunol Valley, including the survey area, Alameda Creek has a low gradient channel (average of 0.3 percent). The Alameda Creek channel in the Sunol Valley is generally broad and braided. In the upper parts of the watershed the creek includes some perennial reaches with pools that persist throughout the summer, but the reach in the Sunol Valley is intermittent because much of the water flows underground through the porous alluvial soils into the adjacent quarry pits or subsurface groundwater. The creek typically resurfaces downstream of the Arroyo de la Laguna confluence and Niles Canyon.

Upper San Antonio Creek is an intermittent drainage that originates approximately 9 miles east of Alameda Creek and flows westward into San Antonio Reservoir, which is formed by James Turner Dam (Turner Dam). From the base of Turner Dam, the San Antonio Creek channel continues west, eventually joining Alameda Creek within the survey area. The cone valve at the base of Turner Dam is operated only infrequently for maintenance and emergency releases from the reservoir, and to release quality-impaired Hetch Hetchy water out of the regional water system via a connection between the cone valve and the San Antonio Pipeline. For most of the year, flow in San Antonio Creek below Turner Dam is limited to seepage from San Antonio Reservoir that is continually released into the creek via two drain pipes at a rate of approximately 20 gallons per minute (gpm) (Camp Dresser McKee Inc., 2007). Despite the seepage flows, San Antonio Creek is typically dry in the reach downstream of Calaveras Road that includes the survey area.

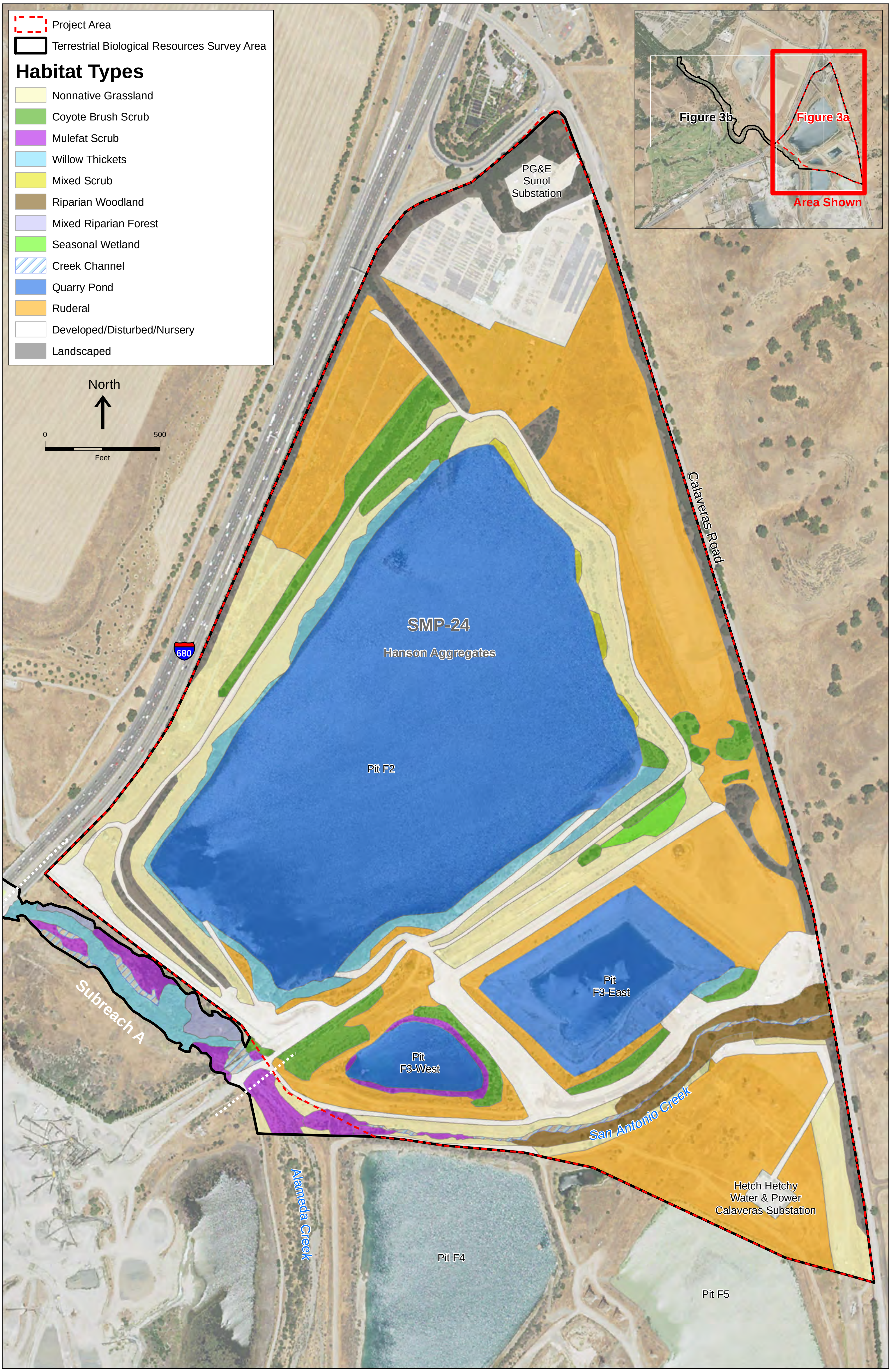
## 2.2 Habitat Types

The majority of the project area within the survey area has been heavily disturbed from past land uses including quarry operations, commercial nursery operations, and construction of other SFPUC projects. Alameda Creek in the Sunol Valley has been altered by realignment, grade controls at pipeline crossings, infiltration galleries, impoundments, and regulated discharges, all of which affect the shape and width of the floodplain and the type and distribution of vegetation it supports.

The survey area supports non-native grassland, coyote brush scrub, mulefat scrub, willow thickets, mixed scrub, riparian woodland, mixed riparian forest, seasonal wetland, creek channel, quarry pond, ruderal, developed/disturbed/nursery, and landscaped habitats. **Figures 3a** and **3b** show the distribution of these habitat types within the survey area. Appendix A shows representative photographs of each habitat type found within the survey area. Appendix B presents a crosswalk of habitat terminology used in this report compared with terminology used in various resource documents.

### 2.2.1 Non-native Grassland

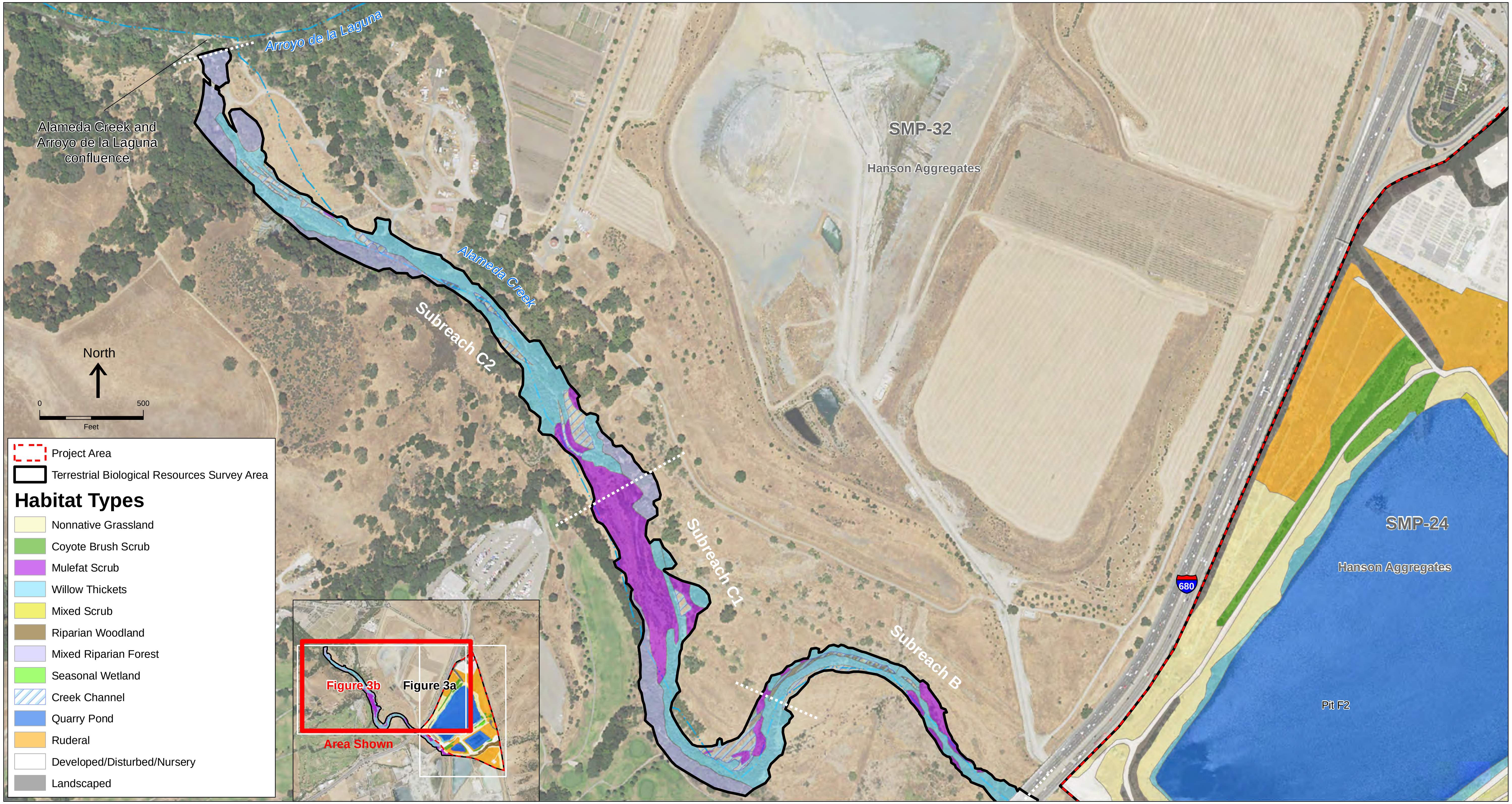
Non-native grassland consists of a dense to sparse cover of non-native annual grasses of medium height. Throughout its range, this habitat type is found on a wide variety of soils and slopes, from valley bottoms to steep slopes, and heavy clay soils to sandy or rocky soils. The dominant species vary based on location and soils, and from year to year depending on precipitation patterns and levels of residual dry matter. The dominant non-native species in the survey area include the grasses ripgut brome (*Bromus diandrus*), soft brome (*B. hordeaceus*), red brome (*B. madritensis*), wild oats (*Avena fatua, A. barbata*), Italian ryegrass (*Festuca perennis* formerly *Lolium multiflorum*), and annual fescue (*Festuca* spp. formerly *Vulpia* spp.) species, stork's bill (*Erodium* spp.), and smooth catsear (*Hypochaeris glabra*). In less-disturbed areas, nonnative grassland also supports a considerable variety of native grasses and forbs. Under favorable conditions, these may create showy, colorful displays in the spring. Typical native herb species in nonnative grassland include California poppy (*Eschscholzia californica*), sky lupine (*Lupinus nanus*), miniature lupine (*L. bicolor*), and shining pepperweed (*Lepidium nitidum* var. *nitidum*). Non-native grassland may also support some very persistent invasive non-native annual herbs, such as shortpod mustard (*Hirschfeldia incana*), poison hemlock (*Conium maculatum*), Italian thistle *(Carduus pycnocephalus*), stinkwort (*Dittrichia graveolens*), and yellow star thistle (*Centaurea solstitialis*). Where these broadleaf species are dominant, vegetation may be mapped as ruderal. Nonnative grassland is not a sensitive natural community (Sawyer et al., 2009).



SOURCE: ESA, 2015; Date of aerial photo is 2014.

SFPUC Alameda Creek Recapture Project

**Figure 3a**
Habitat Types



SOURCE: ESA, 2015; Date of aerial photo is 2014.

SFPUC Alameda Creek Recapture Project

**Figure 3b**

Habitat Types

In the survey area, nonnative grassland is generally found in areas of coarser soils (i.e., sandy rather than clay-dominated) with limited residual soil moisture. Species richness is generally very low and is overwhelmingly dominated by a few species of non-native grasses with few native herbs. More recently-disturbed sites often support herb-dominated developed/ruderal habitat rather than nonnative grassland; nonnative grassland sites left undisturbed for many years in the survey area are eventually replaced by coyote brush scrub. Nonnative grassland was mapped in the survey area along San Antonio Creek above the active channel, on the higher edge of quarry pit F2, and along berms (see **Appendix A**, **Photo 1**).

During the reconnaissance level survey, small mammal burrows were noted within the non-native grasslands. These grasslands likely support low densities of small and medium-sized mammals like California vole (*Microtus californicus*), Botta's pocket gopher (*Thomomys bottae*), California ground squirrel (*Otospermophilus beecheyi*), Audubon's cottontail (*Sylvilagus audubonі*), and black-tailed jackrabbit (*Lepus californicus*). Western rattlesnake (*Crotalus viridis helleri*) and Pacific gopher snake (*Pituophis catenifer catenifer*) are also common in grasslands with small mammal populations.

The grasslands provide foraging habitat for large raptors like red-tailed hawk and nesting habitat for passerines like the western meadowlark (*Sturnella neglecta*). The occasional shrub or tree also provides roosting and nesting habitat for birds and cover for other wildlife.

### 2.2.2 Coyote Brush Scrub

Coyote brush scrub is a low, dense shrub community with scattered grassy openings. This natural community is dominated by coyote brush (*Baccharis pilularis*), usually with smaller amounts of bush monkeyflower (*Mimulus aurantiacus*), coastal sage (*Artemisia californica*) and Pacific poison oak (*Toxicodendron diversilobum*). In the Alameda watershed, it is usually found on exposed steep, north-facing slopes. In deeper and less sloping soils on south-facing slopes, it grades into nonnative grassland; in steeper and rockier areas it grades into Diablan sage scrub; in less exposed areas it grades into any one of several oak woodland communities. Coyote brush scrub forms as a seral (successional) stage following disturbance in relatively mesic sites, following non-native grassland and eventually being replaced by oak woodland, forest, or coastal scrub in the absence of further disturbance. Coyote brush scrub is not a sensitive natural community (Sawyer et al., 2009).

In the survey area coyote brush scrub is relatively uncommon, limited to slopes on the berms surrounding Pits F2, F3-East and F3-West. In these areas, coyote brush scrub is strongly dominated by a single species, coyote brush, with limited amounts of bush monkeyflower and coastal sage and some mulefat (*Baccharis salicifolia*). The inner slopes of Pit F2 contain a fine-textured mosaic of coyote brush, mulefat, and willow; this mosaic is mapped as mixed scrub and is described in a later section (see Appendix A, Photo 2). Openings in coyote brush scrub typically contain nonnative grassland species.

Common wildlife species found in scrub habitat include common mammalian species such as Botta's pocket gopher, house mouse (*Mus musculus*), California vole, and raccoon (*Procyon lotor*), and striped skunk (*Mephitis mephitis*). Reptile species common to these areas include kingsnake

(*Lampropeltis getulus*), Pacific gopher snake, and western fence lizard (*Sceloporus occidentalis*). These species in turn attract larger predators and scavengers, particularly to scrub edges and nearby grassland clearings. These areas provide nesting and perching habitat for scrub jay (*Aphelocoma californica*), and mockingbirds (*Mimus polyglottos*), and also serve as a food bank of insects and seeds.

### 2.2.3 Mulefat Scrub

Mulefat scrub is a very open, rather tall shrub community strongly dominated by mulefat. Mulefat scrub is found primarily in larger stream channels that carry flow in the winter but are dry in the summer. Mulefat depends on access to moderately shallow groundwater, so it is usually closely associated with active channels. The continued existence of the mulefat scrub natural community along creeks is dependent on disturbance caused by frequent flooding. Other species found in mulefat scrub include California brickellbush (*Brickellia californica*) and many weedy annual species. Sandbar willow and arroyo willow are found in areas with higher or more consistent year-round groundwater. Mulefat scrub is equivalent to the mulefat thicket vegetation alliance. It is not a sensitive natural community as defined by CNDDB based on rarity, (Sawyer et al., 2009), although when it is associated with riparian systems such as along Alameda Creek it is considered a sensitive natural community under CEQA.

In the survey area, mulefat scrub is found in the lower portion of San Antonio Creek, in a narrow band near the water's edge at Pit F3-West, and in many locations along Alameda Creek from I-680 to the confluence with Arroyo de la Laguna (see **Appendix A**, **Photo 3**). Along Alameda Creek it sometimes forms a narrow band at the periphery of willow riparian scrub but was too narrow to map at the scale of the habitat map. Although mulefat grows on the side Pit F3-West where groundwater seepage allows this species to thrive, this area lacks other physical features of the natural stream channels where the mulefat scrub community is often found.

Mulefat scrub supports wildlife species typical of other scrub habitats. This includes small mammals such as brush rabbit and Botta’s pocket gopher, reptiles such as western rattlesnake and gopher snake and passerines such as white-crowned sparrow (*Zonotrichia leucophrys*) and mockingbird.

### 2.2.4 Willow Thickets

The willow-dominated riparian habitats in the survey area are a mosaic of two alliances identified by Sawyer et al. (2009), arroyo willow (*Salix lasiolepis*) thickets and sandbar willow (*Salix exigua*) thickets. In themselves, these alliances are not sensitive natural communities by CNDDB based on rarity because their state and global ranks are 4 and 5; however when occurring as riparian habitats along Alameda Creek willow thickets are considered sensitive natural communities under CEQA. Willow thickets associated with Pit F2 are created by and largely depend upon ongoing quarry operations; as a result, these areas are not considered sensitive natural communities. The two types of willow thickets (arroyo willow and sandbar willow) are briefly described below.

Arroyo willow thickets are low, dense, closed-canopy riparian forests dominated by arroyo willow. They are found in areas with moist soil year-round, either near ponds, near permanent streams, or in canyons with ephemeral flow or seepage. Soils vary from relatively fine-grained (in smaller arroyos) to fine sand and gravel bars near the larger creeks and streams. In the Alameda watershed, arroyo willow is the most common dominant species, but red willow (*S. laevigata*) is also frequent, along with occasional sandbar willow, mulefat, and California blackberry (*Rubus ursinus*).

Sandbar willow thickets are a scrubby streamside vegetation type, varying from open to impenetrable, found on temporarily flooded floodplains, depositions along rivers and streams, and at springs. Sandbar willow requires freshly deposited alluvium on which to germinate, so this vegetation type is typically found in active channels. It is usually the first woody riparian type to colonize point bars and cut banks, followed eventually by cottonwood (*Populus fremontii*) and other taller, longer-lived species (Sawyer et al., 2009).

Willow thickets are found along most of Alameda Creek between San Antonio Creek and Arroyo de la Laguna (see Appendix A, Photo 5). Willow thickets are also found within areas characterized by quarry operations (see Appendix A, Photo 4). Bands of arroyo and sandbar willow grow on the side slopes of quarry Pit F2 where seepage or water levels are sufficient to support willows.

Willow thickets support a variety of wildlife due to the presence of water and relatively dense vegetation cover. Willow thickets along Alameda Creek provides a greater value to wildlife than the quarry pit walls since it has been subject to less intensive disturbance and is in close proximity to creek resources. However, wildlife common to willow thickets would likely be found in any of these areas (see the discussions of mixed scrub and riparian woodland, below).

## 2.2.5 Mixed Scrub

The term mixed scrub was created to describe extensive areas supporting a fine-textured mosaic of nonnative grassland, coyote brush scrub, willow thickets and mulefat scrub (described above) in areas too small to distinguish at the mapping scale for this report. Mixed scrub is not recognized as a natural community by CDFW (Sawyer et al., 2009) and none of the vegetation alliances it contains are sensitive based on rarity. Further, it is mapped in quarry areas that are not considered riparian; therefore is not treated here as a sensitive natural community. The plant composition has formed in response to seepage as well as potentially other periodic disturbance. Mixed scrub occurs in patches along the eastern edge of quarry Pit F2 (see Appendix A, Photo 4).

These areas would provide habitat for wildlife species common in the coyote brush, mulefat, and willow thickets.

## 2.2.6 Riparian Woodland

Riparian woodland is a mix of trees found in moderate to mesic upland conditions but are associated with ephemeral streams or the floodplains of larger streams in otherwise dry, grass-dominated landscapes. It typically is an open woodland with low to moderately tall trees including coast live oak (*Quercus agrifolia*) with valley oak (*Quercus lobata*) and California buckeye (*Aesculus californica*), with an open understory consisting of blue wildrye (*Elymus glaucus* ssp. *glaucus*), coastal sagebrush, coyote brush, California rose *(Rosa californica*), California blackberry, common elderberry, California beeplant (*Scrophularia californica*), and poison oak. Native species frequently dominate the understory. In sites with more permanent access to surface and groundwater, riparian woodland habitat grades into willow forest and scrub. In the survey area it grades into nonnative grassland and disturbed habitats in upland conditions. Riparian woodland contains small areas of California buckeye groves and Central Coast live oak riparian forest, both of which have CNDDB ranks of G3 and S3 and are therefore considered sensitive natural communities (CDFG, 2010). Because this habitat type is found only in association with streams and is found only on streambanks, all examples of the habitat type are considered riparian and therefore a sensitive natural community under CEQA.

In the survey area, riparian woodland habitat is found along San Antonio Creek, where it covers the steep slopes above the creek channel, especially on the north-facing slopes (see Appendix A, Photo 6). There, it is strongly dominated by California buckeye, with a few coast live oaks, California sycamores, valley oaks, and associated shrubs such as common elderberry. The understory is typical of nonnative grassland.

Typically, riparian habitat supports a large variety of wildlife species—including passerines such as Bewick’s wren (*Thryomanes bewickii*) and black phoebe (*Sayornis nigricans*), as well as many species of bats. Within the survey area, the structure and extent of riparian habitat is so limited along San Antonio Creek that this habitat is not expected to support species other than those found in non-native grassland.

### 2.2.7 Mixed Riparian Forest

Mixed riparian forest is comprised of taller, longer-lived riparian vegetation dominated by a variety of riparian trees. Within the survey area much of this habitat type most closely corresponds to black willow (*Salix gooddingii*) thickets alliance as described by Sawyer et al. (2009), although other species may dominate within portions of this mapping unit. Black willow thickets have a rank of S3 and are considered sensitive by CDFW. Since this habitat type is riparian, it is considered sensitive based on the CEQA criterion defining all riparian habitats as sensitive natural community.

Black willow thickets have open to continuous tree canopy dominated by black willow. They are found in terraces along large rivers and canyons and along rocky floodplains of small, intermittent streams, seeps, and springs. Within the survey area, mixed riparian forest occurs along Alameda Creek interspersed within the willow thickets and mulefat scrub habitats (see **Appendix A**, **Photo 7**). In addition to black willow, tree species within the mixed riparian forest include arroyo willow and sandbar willow, with occasional Fremont cottonwood, red willow (*Salix laevigata*), white alder (*Alnus rhombifolia*) and California sycamore (*Platanus racemosa*), occasionally with a mulefat understory.

Wildlife species that may be found in mixed riparian forest include a variety of wildlife species as described above for willow thickets and riparian woodland. A great blue heron (*Ardea herodias*) rookery was observed in large California sycamore trees on the Alameda Creek floodplain within the survey area.

## 2.2.8 Seasonal Wetland

Seasonal wetland is characterized by at least seasonally saturated soils and usually dense grass and grasslike plants. In well-established seasonal wetlands the soils are deep and highly organic. Dominant species may include spikerush (*Eleocharis* spp.), sedges (*Carex* spp.), nutsedges (*Cyperus* spp.) and rushes (*Juncus* spp.), as well as some perennial dicots, such as verbena (*Verbena lasiostachys*).

Seasonal wetland was observed south of the southeastern corner of Pit F2 (see Appendix A, Photo 2). Since this area has not been previously identified as a wetland, it may have developed relatively recently, perhaps as a result of changes in grading or groundwater levels. The predominant species noted in this seasonal wetland was nutsedge (*Cyperus eragrostis*). Nutsedge seasonal wetland is not considered sensitive natural community. Although within the survey area, the nutsedge seasonal wetland is outside of the construction footprint.

The seasonal wetland does not appear to support standing water for long periods of time, so wildlife use would likely be similar to that of the surrounding grassland areas and include passerines, small mammals, and reptiles. When saturated soils or standing water is present, this wetland may be used by adult Sierran treefrog (*Pseudacris sierra*).

## 2.2.9 Creek Channel and Instream Wetlands

Creek channel includes either the active channels or higher flow channels of ephemeral or seasonal streams (see Appendix A, Photos 6 and 8). In-channel pools and instream wetlands are also included in this mapping unit. Creek channel was mapped within the survey area along the active channels of both San Antonio and Alameda Creeks. These areas are either unvegetated, support some emergent wetland vegetation, seasonal wetland vegetation, or support sparse weedy annual plants similar to those found in ruderal and mulefat scrub habitat types. However, vegetation is limited by disturbance during high flow events. Creek channel is not recognized as a natural community (Sawyer et al., 2009) and therefore is not considered a sensitive natural community by CNDDB based on rarity; however, active creek channels are included within the CEQA definition of riparian habitat and therefore are considered sensitive natural communities.

Some small areas within the creek channel that are dominated by aquatic or wetland vegetation may be within state or federal jurisdiction. Two general types of instream wetlands occur within the creek channel: those that support perennial wetland vegetation and those that support seasonal wetland vegetation. Instream perennial wetlands are found at the shallow margins of more or less permanent pools in the deeper portions of the active channel, and in some cases these support taller emergent wetland species such as tule (*Bolboschoenus* spp.), cattails (*Typha* spp.) and spikerush. Vegetation alliances included in this sub-habitat type include cattail marshes, pale spikerush marshes, and bulrush marsh. Instream seasonal wetlands are found on the periphery of the instream pools where the seasonal rise and fall of subsurface water provides suitable conditions for the development of this vegetation. They are also found as isolated pools in low areas away from the active channel. These wetlands are fed by seepage when groundwater elevations are high. Typical species in these instream seasonal wetlands include nutsedge, rushes, and rabbitfoot grass (*Polypogon monspeliensis*).

Instream wetlands are found within the creek floodplain and are therefore considered riparian habitats. Under CEQA definition, instream wetlands would be considered sensitive vegetation communities. They may also be considered federally protected wetlands as defined by Section 404 of the Clean Water Act, which is evaluated under CEQA. Within the survey area, instream wetlands were found in all of the subreaches, although often in narrow or limited patches too small to map at the scale of the habitat map shown in Figure 5.14-1 and are included in the creek channel mapping unit. Wetland tributary (seasonal wetland) was also delineated within San Antonio Creek near the confluence of Alameda Creek as part of the SABPL delineation (USACE, 2011).

Within the survey area, San Antonio Creek confluence does not receive direct NPDES discharges from the adjacent quarry operations and typically lacks continuous flow during most of the year. Currently, flow in this reach of San Antonio Creek is dependent on seasonal precipitation and local runoff; releases from Turner Dam, an impoundment on San Antonio Creek several miles to the east, are generally insufficient to cause flow in this reach of the creek. San Antonio Creek was dry during March and May 2015 surveys. The channel was an estimated 6 to 30 feet in width at ordinary high water and the substrate was mostly silt and sand.

Most of the Alameda Creek channel is covered by riparian trees and shrubs, but some portions downstream of I-680 do not have vegetative cover. Alameda Creek is a naturally flashy stream. Stream flow and pool conditions along Alameda Creek within the survey area are described below.

### Alameda Creek between San Antonio Creek Confluence and I-680 Culvert (Subreach A)

During the May 2015 survey, both San Antonio Creek and Alameda Creek were dry at the confluence. Water was present approximately 50 feet below the confluence and a quarry access road that crosses Alameda Creek immediately downstream of the confluence. In this area, isolated seepage pools were present within Alameda Creek. These pools were generally small, up to 16 feet in length and less than 3 feet deep, with abundant duckweed in the water, and emergent vegetation margins. These pools were occupied by adult and juvenile bullfrogs (*Lithobates catesbeianus*) during the May 2015 and October 2015 surveys. Additional flowing water was encountered downstream of these isolated pools. Alameda Creek in this reach has abundant emergent vegetation, high riparian cover, and slow-moving water dominated by pool habitat with interspersed riffle habitat. The habitat in this reach is likely quite dynamic with changes in pool locations dependent on woody debris dams that form and move during high flow events. Substrate in this reach was dominated by silt and fine sediment with some gravels in the isolated riffles.

### Alameda Creek from I-680 Culvert Downstream Approximately 1,500 Feet (Subreach B)

In this reach, Alameda Creek is dominated by a series of long glides, with high algal cover, and dense riparian vegetation on the creek margins. Water depths were up to 3 feet deep and water was generally very slow moving. Largemouth bass (*Micropterus salmoides*) and bullfrog tadpoles were observed in this reach.

### Alameda Creek from Approximately 1,500 Feet Downstream of I-680 to Arroyo de la Laguna Confluence (Subreaches C1 and C2)

There is an increase in cobble substrate and habitat diversity with a few riffle/pool complexes present. Largemouth bass and bullfrog tadpoles were observed in this reach. Both riparian vegetation cover and flows decrease as Alameda Creek approaches Arroyo de la Laguna. During May 2015 habitat surveys, There was no flowing water in Alameda Creek along the approximately 3,000-foot section of creek located upstream of Arroyo de la Laguna. However, several isolated pools with standing water and emergent vegetation were present within this predominantly dry reach.

## 2.2.10 Quarry Pond

Quarry ponds are the areas of open water within the pits created by quarry operations (see Appendix A, Photos 9, 10, and 11). Within the survey area, the largest of these ponds is Pit F2; much smaller in size is Pit F3-East and smallest is Pit F3-West. The ponds are fed by groundwater seepage, but also are managed by the quarry operators. These ponds did not support any emergent aquatic vegetation, which generally depends on fairly stable water levels. However, Pit F2 and F3-West supported discontinuous rings of willow and mixed scrub vegetation around their perimeter at the time of the surveys in 2015, as well as areas of nonnative grassland.

The pond would likely support Sierran treefrog and possibly western toad as well as various waterfowl.

## 2.2.11 Ruderal

Ruderal is a term created to describe sites that have experienced disturbance that resulted in removal of the natural vegetation, but at least some vegetation has returned. Typically, ruderal vegetation is sparse and consists of a low diversity of weedy species, typically broadleaf rather than grassy. Typical species found in ruderal habitats in the survey area include shortpod mustard, stinkwort, poison hemlock, milk thistle (*Silybum marianum*), bristly ox-tongue (*Helminthotheca echioides = Picris echioides*) and fennel (*Foeniculum vulgare*). Areas dominated by pampas grass (*Cortaderia selloana*) have also been included in this habitat type. Shrubs are sometimes present, such as coyote brush, but these tend to be sparse. Ruderal is not recognized as a natural community (Sawyer et al., 2009) and therefore is not considered a sensitive natural community by CDFW.

Ruderal is the most extensive upland habitat type mapped within the survey area, which has been extensively and repeatedly disturbed over the decades from a variety of extractive and infrastructure development activities (see Appendix A, Photos 12 and 13). The uplands south of San Antonio Creek support ruderal vegetation, as well as the areas between the quarry pits and Calaveras Road, and former nursery areas abandoned for several years also have developed ruderal vegetation. The species composition varies from site to site, depending on site conditions and the history of past disturbance.

Ruderal areas provide marginal wildlife habitat due to high levels of human disturbance and high cover of non-native vegetation. These areas contain a limited number of small mammal burrows and only a few California ground squirrel burrows located within friable soils These areas may serve as a movement corridor for common wildlife species such as jackrabbit (*Lepus californicus*) and mule deer (*Odocoileus hemionus*) and nesting habitat for common birds such as American crow (*Corvus brachyrhynchos*), house finch (*Carpodacus mexicanus*), mourning dove (*Zenaida macroura*), and killdeer (*Charadrius vociferus*). Large expanses of tall mustard may also provide nesting habitat for passerines.

### 2.2.12 Developed/Disturbed/Nursery

The developed/disturbed/nursery habitat type describes sites that have experienced disturbance so recently that little or no vegetation has become established, or where the site is maintained in a vegetation-free condition, such as for roads or for nursery management. These sites are characterized by open, bare soil, although other man-made features may also be present, such as sheds, buildings, roads and parking areas. This habitat type is not recognized as a natural community (Sawyer et al., 2009) and therefore is not considered a sensitive resource by CDFW.

Disturbed habitat areas within the survey area include: some of the recently-completed work areas for the San Antonio Backup Pipeline, in and around Pit F3-East; the maintained nursery areas at the northern end of the survey area between Calaveras Road and I-680; access roads (see Appendix A, Photo 14); and areas maintained free of vegetation as part of quarry operations on the west side of Pit F-2.

Soils in developed/disturbed/nursery habitat areas are typically compact, lined with gravel or paved and provide limited habitat for burrowing wildlife species. These areas would only be used occasionally by common wildlife species tolerant of human disturbance. These areas may serve as a refuge for common birds, but would not provide ideal wildlife habitat because of constant human disturbance.

### 2.2.13 Landscaped

The landscaped habitat type describes areas where the predominant vegetation, usually trees and shrubs, have been planted and persist, with or without maintenance such as irrigation. It is not recognized as a natural community by CDFW (Sawyer et al., 2009) and therefore is not considered a sensitive natural community. Landscaped habitat was mapped along the western edges of Pit F2, where cottonwood (*Populus* sp.) and oleander (*Nereum oleander*) have been planted in rows along the perimeter road; along I-680 where walnut (*Juglans* sp.) have been planted; at the northern portion of the survey area between Pit F2 and I-680 where a row of tall blue gum eucalyptus (*Eucalyptus globulus*) trees extends in a more or less north-south row; near the nursery at the northern tip of the survey area where scattered redwoods (*Sequoia sempervirens*) have been planted; along Calaveras Road where cork oak (*Quercus suber*) and other oaks (*Quercus* sp.) have been planted; and in the vicinity of the PG&E Sunol Substation south of San Antonio Creek, where oleander and common elderberry have been planted. The trees and shrubs may provide potential roosting and nesting habitat for the common bird species listed above. The larger trees may also provide habitat for birds of prey such as the red-tailed hawk (*Buteo jamaicensis*).

## 2.3 Special-status Wildlife Species

Based on habitat present within the survey area and locally documented occurrences, several special-status wildlife species have potential to occur within the survey area. Appendix C contains a full list of special-status wildlife species considered, which was compiled from a CNDDB search of the La Costa Valley and Niles USGS 7.5-minute quadrangles (CDFW, 2015). **Table C-1** in Appendix C includes a description of the potential for each special-status species from the CNDDB and USFWS search to occur within the survey area. **Table 1** below includes a list of all special-status species that have been observed within 5 miles of the survey area or have potential to occur in the survey area. See **Figure 4** for a map of special-status species occurrences within 5 miles of the survey area. A description of each special-status species that has a moderate potential or higher to occur in the survey area is detailed below.

Appendix E contains a full list of all wildlife species observed in the survey area during the reconnaissance survey.

### 2.3.1 Federal and/or State Listed Species

#### California Tiger Salamander

##### *Status*

The central California Distinct Population Segment (DPS) of California tiger salamander (*Ambystoma californiense*) is federally listed as threatened and is a state threatened species.

##### *General Ecology and Distribution*

California tiger salamander is principally an upland species found in annual grasslands and in the grassy understory of valley-foothill hardwood habitats in Central and Northern California. They require underground refuges (usually ground squirrel or other small mammal burrows), where they spend the majority of their annual cycle. Between December and February, when seasonal ponds begin to fill, adult California tiger salamanders engage in mass migrations to aquatic sites during a few rainy nights and are explosive breeders[6] (Barry and Shaffer, 1994).

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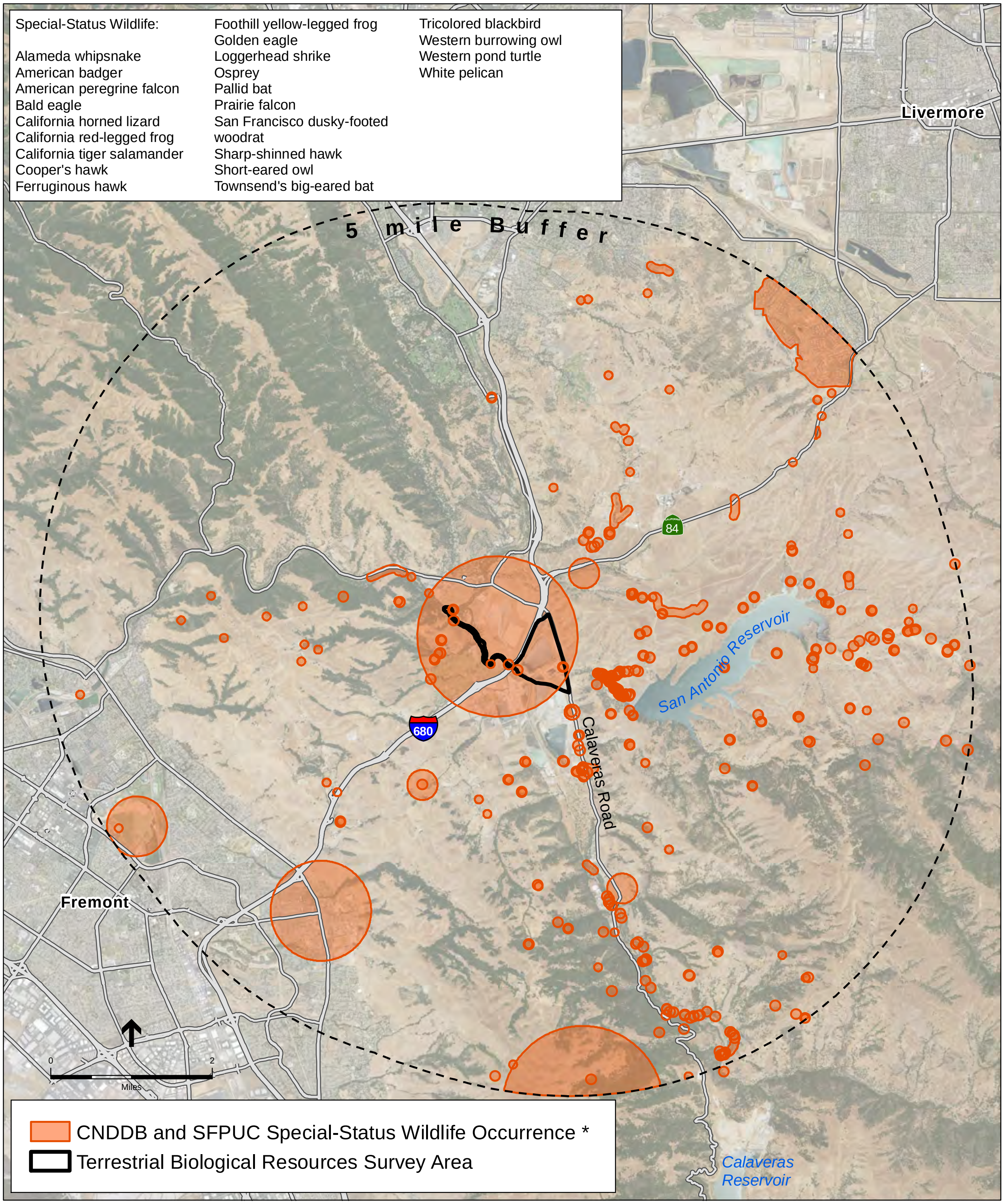
[6] A species in which the breeding season is very short; in the case of tiger salamander, this usually occurs at the time of the first heavy rains of the rainy season.



SFPUC Alameda Creek Recapture Project

**Figure 4**

Special-Status Wildlife within 5 Miles of the Survey Area

* The occurrences shown on this map represent the known locations of the species listed here as of the date of this version of CNDDB (04/2015) and other species observed during SFPUC surveys or projects. There may be additional occurrences or additional species within this area which have not yet been surveyed and/or mapped. Details on documented locations of special-status species is withheld according to CNDDB guidelines due to the sensitivity of the information.

SOURCE: CDFW, 2015; Dettman, 2009; SFPUC, 2010b; SFPUC, 2011a; SFPUC, 2011b; SFPUC, 2011c; SFPUC, 2011d; SFPUC, 2015; ESA, 2009a

## TABLE 1
## FOCUSED LIST OF SPECIAL STATUS WILDLIFE SPECIES CONSIDERED FOR THE ALAMEDA CREEK RECAPTURE PROJECT

| Common Name<br>Scientific Name | Listing Status FESA/ CESA/CDFW | General Habitat Requirements | Potential for Species Occurrence Within the Survey area |
|---|---|---|---|
| **FEDERAL AND STATE LISTED SPECIES, DE-LISTED SPECIES, OR PROPOSED FOR LISTING** | | | |
| Amphibians | | | |
| California tiger salamander<br>*Ambystoma californiense* | FT/ST | Occurs in grasslands occupied by burrowing mammals; breed in ponds, vernal pools, and slow-moving or receding streams. | **High potential.** Numerous breeding locations are known within 1.2 miles of the survey area (CDFW, 2015a). Additionally, several adults have been observed within 1 mile of the survey area. Non-native grassland with small mammal burrows within the survey area provide upland habitat. |
| California red-legged frog<br>*Rana draytonii* | FT/SSC | Breed in stock ponds, pools, and slow-moving streams. | **High potential.** This species has been observed in Alameda Creek within the survey area, 3 miles upstream, and 0.2 mile downstream of the survey area, and from San Antonio Creek approximately 0.4 mile upstream of the survey area (CDFW, 2015a; SFPUC, 2010b and 2015). Portions of Alameda Creek, particularly the reach downstream of I-680, provide potential breeding and non-breeding aquatic habitat, and San Antonio Creek provides non-breeding aquatic habitat. This species has potential to disperse through upland areas. |
| Reptiles | | | |
| Alameda whipsnake<br>*Masticophis lateralis euryxanthus* | FT/ST | Coastal scrub, grassland, and open oak woodland. Prefers rocky openings for basking, foraging. | **Moderate potential.** This species has been documented within 5 miles of the survey area (CDFW, 2015a). Core habitat is absent, but some foraging and dispersal habitat is present in the survey area. |
| Birds | | | |
| American peregrine falcon<br>*Falco peregrinus anatum* | FD/SD/FP | Nests on cliffs, tall buildings, high bridges, and specially-designed towers. | **Low potential.** Suitable nesting habitat is absent from the survey area. |
| Bald eagle<br>*Haliaeetus leucocephalus* | FD/SE/FP | Nest in mountainous habitats near reservoirs, lakes and rivers, usually in coniferous trees, close to permanent water. | **Low potential.** Suitable nesting habitat is absent from the survey area, although quarry pits could be used for foraging. Closest documented nesting site is 3 miles east of the survey area (SFPUC, 2011c; 2011d). |
| Mammals | | | |
| Townsend's big-eared bat<br>*Corynorhinus townsendii* | --/SC/SSC | Roosts in caves, mines, buildings or structures. Forages in open lowlands. | **Low potential.** No suitable undisturbed roosting habitat present in the survey area. |

## TABLE 1 (Continued)
## FOCUSED LIST OF SPECIAL STATUS WILDLIFE SPECIES CONSIDERED FOR THE ALAMEDA CREEK RECAPTURE PROJECT

| Common Name<br>Scientific Name | Listing Status FESA/ CESA/CDFW | General Habitat Requirements | Potential for Species Occurrence Within the Survey area |
|---|---|---|---|
| **OTHER SPECIAL STATUS SPECIES** | | | |
| Amphibians | | | |
| Foothill yellow-legged frog<br>*Rana boylii* | --/SSC | A year-round resident of cobble-lined streams; breeds in spring months after high water subsides. | **Low potential.** Based on habitat assessment survey, suitable habitat is absent from the survey area. This species is limited to perennial, moderate- to high-gradient portions of Alameda Creek that occur several miles upstream from the survey area. |
| Reptiles | | | |
| Western pond turtle<br>*Emys marmorata* | --/SSC | Lakes, ponds, reservoirs, and slow-moving streams and rivers, primarily in foothills and lowlands. | **High potential.** This species is known from Alameda Creek and San Antonio Creek (CDFW, 2015a; ESA, 2009a; SFPUC, 2015). Western pond turtle may be found in quarry pits, riparian areas, and uplands. |
| Coast horned lizard<br>*Phyrnosoma coronatum* | --/SSC | Sandy areas and river washes, as well as riparian woodland clearings, chaparral, and alkali flats. | **Low to moderate potential.** Alameda Creek provide suitable river wash habitat for this species. Documented within 5 miles of the survey area (SFPUC, 2010b). |
| Birds | | | |
| Cooper's hawk<br>*Accipiter cooperii* | --/3503.5 | Nest sites mainly in riparian growths of deciduous trees, as in canyon bottoms on river flood-plains; also in live oaks. | **Moderate potential.** Riparian, oak, and eucalyptus trees within the survey area provide suitable nesting habitat for this species. Nearest CNDDB occurrence is approximately 2.7 miles west of survey area (CDFW, 2015a). |
| Sharp-shinned hawk<br>*Accipiter striatus* | --/3503.5 | A common migrant and winter resident in California. Nests in dense, even-aged, single-layered forest canopy. | **Low potential.** Dense oak woodland nesting habitat is not present within the survey area. Nesting is documented from hills surrounding Sunol Valley, with the nearest known occurrence approximately 2.9 miles south of the survey area (SFPUC, 2015). |
| Tricolored blackbird<br>*Agelaius tricolor* | --/SSC | A colonial nester; nests in dense freshwater emergent vegetation. | **Moderate potential.** Breeding is known from the Sunol Valley and large flocks have been observed in the survey area (CDFW, 2015a; SFPUC, 2015). Potential breeding habitat is present in the survey area. |
| Golden eagle<br>*Aquila chrysaetos* | --/FP | Nests in open areas on cliffs and in large trees. | **Moderate potential.** Larger trees near Alameda and San Antonio Creeks provide potential nesting habitat. Several occurrence records in the vicinity of the survey area (SFPUC, 2015). |

### TABLE 1 (Continued)
### FOCUSED LIST OF SPECIAL STATUS WILDLIFE SPECIES CONSIDERED FOR THE ALAMEDA CREEK RECAPTURE PROJECT

| Common Name<br>Scientific Name | Listing Status FESA/ CESA/CDFW | General Habitat Requirements | Potential for Species Occurrence Within the Survey area |
|---|---|---|---|
| **OTHER SPECIAL STATUS SPECIES** | | | |
| Birds (cont.) | | | |
| Short-eared owl<br>*Asio flammeus* | --/SSC | Nests in grasslands, usually on the ground. | **Moderate potential.** Grasslands within the site provide nesting habitat for short-eared owl. Known nesting site along southeastern San Antonio Reservoir (SFPUC, 2010b). |
| Burrowing owl<br>*Athene cunicularia* | --/SSC | Nests and forages in low-growing grasslands that support burrowing mammals. | **Moderate potential.** Grasslands and ruderal habitat with ground squirrel burrows within the survey area provide suitable habitat for this species. This species has been documented within 5 miles of the survey area (SFPUC, 2010b). |
| Ferruginous hawk<br>*Buteo regalis* | --/3503.5 | Uncommon winter resident and migrant. Nests in foothills or prairies, on low cliffs, cut banks, shrubs, trees, or other natural or manmade elevated structures. Nest tree often isolated or in transition zones. | **Low potential.** Although there is a 1987 breeding record within 5 miles of the survey area (SFPUC, 2010b), the survey area is outside of the typical breeding range of this species and this species has low potential to breed within the survey area. |
| Northern harrier<br>*Circus cyaneus* | --/SSC | Nests in coastal freshwater and saltwater marshes, nests and forages in grasslands. | **Moderate potential.** Limited nesting habitat is available adjacent to quarry pits because of site disturbance, but potential to nest in along Alameda Creek. |
| White-tailed kite (nesting)<br>*Elanus leucurus* | --/FP | Nests near wet meadows and open grasslands in dense oak, willow or other large tree stands. | **Moderate potential.** Potential nesting habitat is present in trees adjacent to Alameda and San Antonio Creeks. |
| Prairie falcon<br>*Falco mexicanus* | --/3503.5 | Uncommon permanent resident. Usually nests on cliffs overlooking open areas. | **Low potential.** Nesting habitat is absent from the survey area. The closest documented CNDDB breeding location is approximately 3.9 miles south southeast of the survey area (Brian Acord, pers. comm., 2015). |
| Loggerhead shrike<br>*Lanius ludovicianus* | --/SSC | Scrub, open woodlands, and grasslands. | **High potential.** Potential nesting habitat present in grasslands, shrubs, and trees throughout the survey area. |
| Osprey<br>*Pandion haliaetus* | --/3503.5 | Nest on large sturdy treetops, cliffs, or human-built platforms near water. | **Low potential.** Although the quarry pits may provide some suitable foraging habitat, disturbance from quarry operations would likely preclude nesting on-site. SFPUC occurrence record in the survey area vicinity is from a resident, not breeding, bird (SFPUC, 2010b). |

## TABLE 1 (Continued)
## FOCUSED LIST OF SPECIAL STATUS WILDLIFE SPECIES CONSIDERED FOR THE ALAMEDA CREEK RECAPTURE PROJECT

| Common Name<br>Scientific Name | Listing Status FESA/ CESA/CDFW | General Habitat Requirements | Potential for Species Occurrence Within the Survey area |
|---|---|---|---|
| **OTHER SPECIAL STATUS SPECIES** | | | |
| Birds (cont.) | | | |
| American white pelican<br>*Pelecanus erythrorhynchos* | --/SSC | Breed on islands in lakes or wetlands. | **Low potential.** The survey area is outside of the breeding range of this species. SFPUC occurrence record in the survey area vicinity is from a wintering, not breeding bird (SFPUC, 2010b). Low potential to use the quarry pits during wintering. |
| Mammals | | | |
| Pallid bat<br>*Antrozous pallidus* | --/SSC | Day roosts are mainly in caves, crevices and mines; also found in buildings and under bark. Forages in open lowland areas. | **Moderate potential.** Potential roosting habitat is available in large diameter trees. |
| Mammals | | | |
| San Francisco dusky-footed woodrat<br>*Neotoma fuscipes* | --/SSC | Occur in forests with established understory. Construct nests from woody debris. | **High potential.** This species is known to nest within the vicinity of the survey area (CDFW, 2015a), suitable habitat is present in the Alameda Creek corridor and one woodrat nest was observed during the 2011 reconnaissance survey. |
| American badger<br>*Taxidea taxus* | --/SSC | Grasslands, savannas, deserts, timberline mountain meadows. | **Moderate potential.** Documented 1 mile east of the survey area (SFPUC, 2010b). Some potential habitat present in grassland within the survey area. |

**STATUS CODES:**

FEDERAL ENDANGERED SPECIES ACT (FESA)
FE = Listed as Endangered (in danger of extinction) by the Federal Government.
FT = Listed as Threatened (likely to become Endangered within the foreseeable future) by the Federal Government.
FD = Federally Delisted

CALIFORNIA ENDANGERED SPECIES ACT (CESA)/CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE (CDFW)
SE = Listed as Endangered by the State of California
ST = Listed as Threatened by the State of California
SC = State Candidate for Listing as Endangered
SD = State Delisted
SSC = California Species of Special Concern
FP = California Fully Protected
3503.5 = Section 3503.5 of the California Fish and Game Code prohibits take, possession, or destruction of any birds in the orders Falconiformes (hawks) or Strigiformes (owls), or of their nests and eggs.

During drought years when ponds do not form, adults may spend the entire year in upland environments. Juveniles may spend 4 to 5 years in their upland burrows before reaching sexual maturity and breeding for the first time (Petranka, 1998; Trenham et al, 2000). Adults have been documented at distances of 1.2 miles or more from breeding ponds (Orloff, 2007). Typical upland sites include the burrows of California ground squirrels and valley pocket gophers.

### *Survey Area Occurrence*

California tiger salamanders have been documented from at least 48 locations within 5 miles of the survey area, including five stock ponds in the foothills within 1.2 miles of the survey area (CDFW, 2015a). Several adults have been observed in upland areas in close proximity to the survey area. In February 2011, one adult was observed less than 0.2 mile south of the survey area boundary in non-native grassland habitat east of the SMP-30 aggregate processing facility and west of Calaveras Road (SFPUC, 2011a). The adult was unearthed while excavating burrows within the SFPUC’s New Irvington Tunnel (NIT) spoils area and then relocated into adjacent grasslands outside of the work area. In February 2014, one adult was found in a pitfall trap, approximately 0.7 mile south of the survey area; it was subsequently relocated 0.08 mile to the east (SFPUC, 2015). In March 2011, one adult was observed approximately 0.8 mile southeast of the survey area, just east of Calaveras Road, during work for the Alameda Siphons project. The adult was subsequently moved outside of the construction area (SFPUC, 2011b). Additionally, three adults have been observed (one in 2009, 2011, and 2013) approximately 0.9 mile south of the survey area near the Sunol Valley Chloramination Facility in staging areas for the SFPUC’s Alameda Siphons and San Antonio Backup Pipeline and NIT projects (CDFW, 2015a). The adults were relocated to suitable habitat outside of the staging areas. The closest documented breeding ponds are located approximately 0.3 and 0.5 mile west of the survey area. In 1994, many larvae were observed in these seasonal stockponds located east of Alameda Creek and north of the Sunol Valley Golf Course (CDFW, 2015a). The next closest documented breeding pond is located approximately 0.9 mile south of the survey area east of SMP-33. Many larvae were observed in this seasonal stock pond in 1994 (CDFW, 2015a).

The survey area does not contain California tiger salamander breeding habitat. The seasonal wetland located south of Pit F2 does not provide breeding habitat for this species. No standing water was present during the May 2015 survey and, from a review of historical aerial photographs of the site, this seasonal wetland does not appear to support standing water. The quarry pits are too deep (pond depths are greater than 10 feet) to support breeding California tiger salamander.

The majority of the project area within the survey area has been heavily disturbed from commercial nursery use, quarry operations, and construction of the SFPUC WSIP projects. Portions of the survey area along Calaveras Road north and south of San Antonio Creek and the area around Pit F3-East has been recently fenced off with special-status species exclusion fencing and disturbed as part of construction for SFPUC’s SABPL. A portion of this exclusion fencing west of Pit F3-East has been removed, as observed during the reconnaissance-level survey, although segments near Calaveras Road appeared to be intact. Although these areas were revegetated following construction, the exclusion fence prohibited California tiger salamander from entering these areas during SABPL construction.

Non-native grassland within the survey area contains a small number of small mammal burrows, which would limit the extent of upland habitat and foraging opportunities for this species. However, California tiger salamanders have potential to utilize the non-native grasslands within the survey area, since the grasslands are located within 1.2 mile of several documented breeding ponds, and adult California tiger salamanders have been documented to travel within the valley floor. Coyote brush scrub, mulefat scrub, willow thickets, mixed riparian forest, and riparian woodland habitats along Alameda and San Antonio Creeks provide potential upland dispersal habitat for California tiger salamander. Although California tiger salamanders are typically found in grassland habitats, these areas are relatively undisturbed and may serve a movement corridor for this species.

Undeveloped habitats (including coyote brush scrub, mulefat scrub, willow thickets, mixed scrub, and ruderal habitats) surrounding the quarry pits may provide low quality upland dispersal habitat for California tiger salamanders. Although these areas contain some native vegetation and may be utilized by California tiger salamanders for dispersal, they contain relatively few small mammal burrows and are located within active quarry work sites.

California tiger salamanders may occasionally travel through the developed portions of the site on a transient basis, but developed areas do not contain California tiger salamander habitat.

## California Red-legged Frog

### Status

The California red-legged frog (*Rana draytonii*) is federally listed as a threatened species, and is a California species of special concern.

### General Ecology and Distribution

This ranid species is principally a pond frog that can be found in permanent or semi-permanent (seasonal or ephemeral) ponds, pools, streams, springs, marshes, and lakes. Moist woodlands, forest clearings, and grasslands also provide suitable or upland dispersal habitat for this species in the non-breeding season. Adult frogs seek waters with shoreline vegetation for breeding and protection from predators, but may be found in unvegetated waters as well. Adults consume insects such as beetles, caterpillars and isopods, while tadpoles forage on algae and detritus.

California red-legged frogs breed from January to May. Eggs are attached to vegetation in shallow water and are deposited in irregular clusters. Tadpoles grow to 3 inches before metamorphosing.

Historically, the California red-legged frog occurred along the coast from the vicinity of Point Reyes National Seashore, Marin County, and inland from Redding, Shasta County southward to northwestern Baja California, Mexico (Jennings and Hayes, 1994). The majority of California red-legged frog occurrences in the San Francisco Bay Area are from Contra Costa and Alameda Counties. Grazing practices have altered California red-legged breeding habitat. In some instances grazing has contributed to California red-legged frog decline by decreasing riparian breeding habitat (USFWS, 2002a). In other instances stock pond creation for livestock has increased breeding habitat and grazing has also kept ponds clear by removing dense vegetation.

### *Survey Area Occurrence*

California red-legged frog has been observed in Alameda Creek within the survey area, but outside of the project area. On July 24, 2014, one adult California red-legged frog was observed within Alameda Creek approximately 100 feet downstream of I-680 (SFPUC, 2015). In 1999, one adult was observed within the creek, approximately 0.1 mile north of I-680 and just east of the Sunol Valley Golf Course (CDFW, 2015a). In 2002, several California red-legged frogs were observed approximately 0.2 mile northwest of the survey area in an off-channel pond between Western Star Nursery and Alameda Creek (CDFW, 2015a). They were not observed at that location during USFWS protocol-level surveys conducted in 2008, 2009, and 2010, but two individuals were documented during the 2011 survey (ESA, 2008; ESA, 2009b; ESA, 2010; ESA, 2011). No individuals were observed during 2012, 2013, or 2014 surveys of that location (ESA, 2012; ESA, 2013; ESA, 2014). Upstream of the survey area within Alameda Creek, at a distance of approximately 3 miles, one juvenile was observed in a riffle, run, and pool complex in 1998 (CDFW, 2015a). California red-legged frogs have also been documented in San Antonio Creek, approximately 0.4 mile upstream of the survey area (SFPUC, 2015). On March 23, 2013, one adult frog was observed approximately 0.7 mile south of survey area and was moved to a pond one mile to the west (SFPUC, 2015). In February 2010, during surveys for the Alameda Siphons project, one California red-legged frog was observed within a seasonal wetland and one in an overflow ditch east of Calaveras Road, approximately 0.8 miles south of the survey area (SFPUC, 2011d). The frogs were relocated and the overflow ditch and seasonal wetland features have been removed as a result of the Alameda Siphons and NIT projects. On December 30, 2009, one California red-legged frog was observed in a small freshwater pond at the base of Pit F6, approximately 0.8 mile south of the survey area (Dettman, 2009). The closest documented California red-legged frog breeding sites are in San Antonio Creek approximately 0.5 mile east of the survey area (SFPUC, 2015) and in a small, shallow pond 1.25 miles northeast of the survey area (CDFW, 2015a).

Potential California red-legged frog habitat is present along Alameda Creek within the survey area. The isolated seepage pools located adjacent to Pit F2 contain emergent vegetation along the margin. The pools may be supported by the variable quarry discharges or seepage from the adjacent quarry. These pools provide potential breeding habitat, although the presence of bullfrogs reduce habitat quality. Other potential breeding pools are located in the creek channel downstream of I-680 These pools are dammed by woody debris and their location and size likely fluctuate when woody debris is moved during high flow events. The presence of bullfrogs in the reach, combined with the highly variable water source, reduce habitat quality. Further downstream, potential breeding pools were observed within the wetted creek channel and in isolated pools within the dry creek reach. Habitat quality is diminished in these areas due to the presence of bullfrogs and largemouth bass in the wetted creek channel. Other riffle and glide segments of the creek provide potential non-breeding aquatic habitat when water is present.

Flow along San Antonio Creek within the survey area is not continuous during the rainy season and is not sufficient to sustain breeding California red-legged frogs. Non-breeding aquatic refugia habitat may be present along San Antonio Creek following seasonal storm events, and portions of the creek corridor may provide year-round upland refugia habitat.

The quarry pits do not support emergent aquatic vegetation, such as cattails and tules, and are deep with steep side slopes. The lack of emergent vegetation for egg attachment and lack of warm, shallow tadpole rearing areas limits breeding potential. The quarry pit edges with riparian shrub or tree cover provide marginal aquatic refugia habitat. Although frogs could occur at these areas, the pit edges lack emergent aquatic vegetation, have steep side slopes, and fluctuating water levels. Additionally, several large fish were observed in Pit F2 during the May 2015 reconnaissance survey and may also be present in Pits F3-West and East. The seasonal wetland located south of Pit F2 does not support standing water deep enough to provide breeding habitat.

Coyote brush scrub, mulefat scrub, willow thickets, riparian woodland, and mixed riparian forest along Alameda and San Antonio Creeks provide potential upland dispersal habitat for California red-legged frog. These areas are relatively undisturbed and may serve a movement corridor for this species. Small mammal burrows and rock and debris piles in non-native grasslands offer refugia habitat.

As with the California tiger salamander, undeveloped habitats surrounding the quarry pits may provide low quality upland dispersal habitat for California red-legged frog. Although these areas contain some native vegetation and are located adjacent to aquatic features, they are actively disturbed by quarry operations. As described for California tiger salamander, California red-legged frogs have been recently excluded from some of these upland areas during construction of the SFPUC San Antonio Backup Pipeline Project.

Developed areas do not contain California red-legged frog habitat.

## Alameda Whipsnake

### *Status*

Alameda whipsnake (*Masticophis lateralis euryxanthus*) is a federal and state threatened species.

### *General Ecology and Distribution*

Alameda whipsnakes are dependent upon open chaparral, sage scrub, and coastal scrub. Core habitat most commonly occurs on east, southeast, south, and southwest facing slopes (USFWS, 2000). However, telemetry data indicate that although core habitat is centered on shrub communities, they extensively utilize adjacent habitats including grassland, oak savanna, and occasionally oak-bay woodland. Alameda whipsnakes use grassland habitats for periods of up to several weeks, with males using grassland habitats more frequently in the mating season and females using grassland habitats after mating occurs. Rock outcrops are an important feature of Alameda whipsnake habitat because they provide retreat opportunities and support lizard populations (USFWS, 2002b; 2005).

Historically, Alameda whipsnakes were probably found in the coastal scrub and oak woodland communities of the East Bay in Contra Costa, Alameda, western San Joaquin, and northern Santa Clara Counties (USFWS, 2002b). Currently, they are only found in the inner Coast Range in western and central Contra Costa and Alameda Counties (USFWS, 2002b). Five isolated populations of Alameda whipsnake are now recognized within its historical range: Tilden–

Briones, Oakland–Las Trampas, Hayward–Pleasanton Ridge, Sunol–Cedar Mountain, and Mt. Diablo–Black Hills (USFWS, 1997).

### *Survey Area Occurrence*

Alameda whipsnake is known from several occurrences in the La Costa Valley and Niles USGS 7.5-minute quadrangles, which includes the Sunol Valley. All locations are sensitive and thus are suppressed data, though CDFW disclosed that the nearest occurrence is approximately 4.2 miles southeast of the survey area (Brian Acord, pers. comm., 2015).

Core habitat consisting of sage scrub, chaparral, coastal scrub habitats and rock outcrops are absent from the survey area. Sage scrub is present outside of the survey area in small, discontinuous patches on the upper south and west-facing slopes east of Calaveras Road, approximately 300 feet east of the survey area. Alameda whipsnakes have been found at distances of over 4 miles from such habitat (Alvarez et al., 2005).

The non-native grassland throughout the survey area and riparian and scrub habitats along Alameda and San Antonio Creeks provide potential moderate quality habitat for the Alameda whipsnake. These areas contain small mammal burrows and are relatively undisturbed.

Undeveloped habitats (including coyote brush scrub, mulefat scrub, willow thickets, riparian woodland, and riparian forest habitats) surrounding the quarry pits may provide low quality habitat for the Alameda whipsnake. Although these areas contain some native vegetation, they are located within active quarry work sites and subject to disturbance.

Developed and aquatic portions of the site do not contain potential Alameda whipsnake habitat.

# 2.3.2 Other Special-Status Species

## Foothill Yellow-legged Frog

### *Status*

The foothill yellow-legged frog (*Rana boylii*) is a California species of special concern.

### *General Ecology and Distribution*

This ranid species historically occurred in most Pacific drainages west of the Sierra/Cascade Crest from the from the Santiam River system in Oregon to the San Gabriel River in Los Angeles (Jennings and Hayes, 1994). Their present range excludes coastal areas south of northern San Luis Obispo County and foothill areas south of Fresno County where this species is presumed extirpated (Jennings and Hayes, 1994). This species' known elevation range extends from near sea level to approximately 6,700 feet above sea level (Stebbins, 2003). The foothill yellow-legged frog is known from several perennial drainages in the Bay Area, including from the Alameda Creek watershed.

The foothill yellow-legged frog is a stream-dwelling species that requires shallow, perennial water flows. This species requires shallow, flowing water, apparently preferentially in small to moderate-sized streams situations with at least some cobble-sized substrate (Jennings and Hayes, 1988). Some researchers emphasize riffles as one of the key aspects of this species’ habitat (Stebbins, 2003; Jennings and Hayes, 1988). Jennings and Hayes (1988) note that as intermittent streams lose surface flow during late summer, riffles disappear, and this species can then be found associated with stream pools. However, yellow-legged frogs are not described from ephemeral streams that lack water during summer and fall months. Some degree of riparian vegetation coverage is preferred by foothill yellow-legged frogs, as is open habitat and sunny banks (Stebbins, 2003). This species may be excluded by dense canopy. For example, Moyle found no yellow-legged frogs at sites with greater than 90 percent shading (Moyle, 1973). Studies suggest that this species is infrequent or absent in habitats where introduced aquatic predators (i.e., predatory fishes and bullfrogs) are present (Hayes and Jennings, 1988), probably because their aquatic developmental stages are susceptible to such predators (Grinnell and Storer, 1924).

Adult foothill yellow-legged frogs feed primarily on both aquatic and terrestrial insects (Ashton et al., 1997); tadpoles preferentially graze on algae (Jennings and Hayes, 1994). Postmetamorphic larvae eat aquatic and terrestrial insects (Storer, 1925).

California yellow-legged frogs generally breed following the period of high flow discharge resulting from winter rainfall and snowmelt, which results in oviposition usually occurring between late March and early June (Storer, 1925; Grinnell et al. 1930; Jennings and Hayes, 1994). Ashton et al. (1997) report that cobble and pebble are the preferred substrate for egg mass attachment, but egg masses may be attached to other available in-water structure as well.

### *Survey Area Occurrence*

CDFW notified the SFPUC of an undocumented 2006 FYLF sighting along Alameda Creek between the treatment plant and quarry (pers. comm., Grefsrud, 2016). However, the nearest documented foothill yellow-legged frog to the survey area is located within Alameda Creek approximately 2.6 miles south of the survey area near the Sunol Valley Water Treatment Plant (SFPUC, 2015). There are also several occurrence records in Alameda Creek upstream of this record and into the Sunol Regional Wilderness (SFPUC, 2015; CDFW, 2015a). The segment of Alameda Creek where this species occurs supports year-round flows with riffle habitat, gravel, cobble and boulder substrate. Annual focused California red-legged frog surveys in Alameda Creek approximately 0.1 mile downstream of the survey area have not identified foothill yellow-legged frog, and suggested no evidence of foothill yellow-legged frog presence (ESA, 2008; ESA, 2009b; ESA, 2010; ESA, 2011).

ESA biologists performed a focused habitat assessment survey of the survey area on October 23, 2015 to assess the quality of potential foothill yellow-legged frog habitat and ascertain the potential for species’ presence. The survey included portions of Alameda Creek from the downstream confluence with Arroyo de la Laguna to the quarry discharge point near Pit F2. Survey data sheets and representative photographs of the survey area are included in Appendix G.

In all, nine pools of varying sizes were recorded within the survey area. The pools varied greatly in size and character. The five relatively small downstream pools (Appendix G, Data Sheets 2 through 4) appeared to maintain semi-permanent water with input from underground water sources. The profile of Alameda Creek in this area is that of a low gradient stream with a predominance of silt and clay substrate and organic material. The pools ranged in size from approximately 650 to 2,200 $ft^2$, these still water pools were reminiscent of habitat for California red-legged frog. Water depth ranged from 6 to 27.5 inches and the pools showed perhaps 50 percent coverage by riparian vegetation around their margins. Large numbers of bullfrog larvae, up to 50 per pool, were observed; however, no other ranid species were noted. Fish species were generally absent from these pools. These pools are not considered optimal habitat for foothill yellow-legged frog because they dry seasonally, do not support appropriate riffle habitat, contain inappropriate substrates, and also support a large population of predatory species. The likelihood that foothill yellow-legged frog would be present is also reduced due to the distance from known populations and seasonally dry instream conditions upstream from the quarry area.

The roughly 0.65-mile portion of Alameda Creek downstream from the quarry discharge point near pit F2 supports perennial water and four large pools, greater than 330 to 660 feet in length. The perennial water reach included Pool 6, 7, 8, and 9, and areas upstream of I-680. All portions of the stream upstream of Pool 6 showed perennial flows and dense riparian vegetation (see Appendix G, data sheets 4 through 6). These larger pools support bullfrog breeding, red swamp crayfish (*Procambarus clarkii*), minnows, California roach (*Hesperoleucus symmetricus*), and mosquito fish (*Gambusia affinis*) and largemouth bass. In most areas, the creek margins supported dense willow growth with water present from bank-to-bank (e.g., see Appendix G, Figures G-7 and G-8) with no protruding rocks or boulders. Upstream of Pool 7, the aquatic substrate overwhelmingly consisted of silt and clay, often overlain with organic materials. Such habitat can be used by yellow-legged frog larvae when stream conditions may otherwise support this species, though adult yellow-legged frogs typically occur in deeper water in association with instream rock features, such as large cobble or boulders that provide resting sites for adult and immature frogs or some degree of gravel or sandy substrate overlain by organic materials. Such habitat was absent from subreaches A, B, and the upstream portion of Subreach C1. Habitat quality for yellow-legged frog is also diminished in these features due to the presence of largemouth bass, bullfrogs, and crayfish. Other riffle and glide segments of the creek provide potential non-breeding aquatic habitat when water is present.

In summary, based on the findings of the October 23, 2015 habitat assessment, distance from known populations of this species, and presence of a seasonally dry channel between known populations and the survey area, Alameda Creek within the survey area may seasonally support low quality foothill yellow-legged frog movement habitat. Given the absence of established foothill yellow-legged frog source populations near the survey area, such intermittent movement through the area would be exceedingly rare.

San Antonio Creek is typically dry for most of the year and, due to its ephemeral nature and distance from documented populations, foothill yellow-legged frogs are unlikely to occur in this creek within the survey area. Since foothill yellow-legged frogs are a stream-dwelling frogs, they are not be expected to occur in the quarry pits or upland areas within the survey area.

## Western Pond Turtle

### Status

Western pond turtle (*Emys marmorata*) is a California species of special concern.

### General Ecology and Distribution

Western pond turtles are uncommon and discontinuously distributed throughout California west of the Cascade-Sierran crest (Jennings and Hayes, 1994). Western pond turtles are typically found in ponds, lakes, marshes, rivers, streams, and irrigation ditches with rocky or muddy substrates surrounded by aquatic vegetation. These watercourses usually are within woodlands, grasslands, and open forests, between sea level and 6,000-foot elevation. Turtles bask on logs or other objects when water temperatures are lower than air temperatures. Nests are located at upland sites, often up to 0.25 mile from an aquatic site (Jennings and Hayes, 1994; Stebbins, 2003; Zeiner et al, 1988). General dispersal may occur throughout upland habitat.

### Survey Area Occurrence

Western pond turtle has been documented in Alameda Creek and its tributaries and other aquatic features in the vicinity of the survey area (CDFW, 2015a; SFPUC, 2015). Western pond turtle was observed near the Alameda Creek and Arroyo de la Laguna confluence just outside of the survey area (SFPUC, 2015). The closest CNDDB documented occurrence is approximately 0.4 mile west of the survey area where one turtle was observed in a stockpond in 2010 (CDFW, 2015a). Additionally, during reconnaissance surveys for the San Antonio Backup Pipeline Project, this species was observed in San Antonio Creek at the base of Turner Dam (ESA, 2009a) approximately 0.8 mile east of the survey area.

Alameda Creek, San Antonio Creek, and SMP-24 quarry pits provide potential aquatic habitat for the western pond turtle. Non-native grassland, riparian, and scrub habitats, particularly those with friable soils, contain potential nesting and dispersal habitat for this species.

## Coast Horned Lizard

### Status

The coast horned lizard (*Phrynosoma coronatum*) is a California species of special concern.

### General Ecology and Distribution

The coast horned lizard occurs in the Sierra Nevada foothills from Butte County to Kern County and throughout the central and southern California coast. The species is found in several habitat types including areas with an exposed gravelly-sandy substrate containing scattered shrubs, clearings in riparian woodlands, dry uniform chamise chaparral, and annual grassland with scattered perennial seepweed or saltbush. Horned lizard populations reach maximum abundance in sandy loam areas and on alkali flats often dominated by iodine bush. Coast horned lizards utilize small mammal burrows or burrow into loose soils under surface objects during extended periods of inactivity or hibernation (Jennings and Hayes, 1994).

### *Survey Area Occurrence*

This species has not been documented in the Sunol Valley. The closest documented occurrence is approximately 4.8 miles east of the survey area within eastern La Costa Valley (SFPUC, 2010b). This species is typically found in alkaline areas with sandy loam soils, which are absent from the survey area. Alameda Creek contains washes that consist of cobble beds with sand. Although these areas are not alkaline, this species has potential to occur in this area.

## Cooper's Hawk

### *Status*

Cooper’s hawk (*Accipiter cooperii*) is protected under Section 3503.5 of the California Fish and Game Code.

### *General Ecology and Distribution*

Cooper’s hawks nest throughout most of the wooded portion of California (Zeiner et al., 1998). They are often found in oak, riparian, or other forest habitats and typically forage near open water or riparian vegetation. They prey on small birds and mammals and some reptiles and amphibians.

### *Survey Area Occurrence*

This species has been documented nesting at several locations within 5 miles of the survey area (CDFW, 2015a). Nests have typically been found in oak woodland or mixed oak woodland habitat. Riparian woodland along San Antonio Creek and riparian forest along Alameda Creek provide potential nesting habitat for this species.

## Tricolored Blackbird

### *Status*

The tricolored blackbird (*Agelaius tricolor*) is a California species of special concern.

### *General Ecology and Distribution*

Tricolored blackbird is a colonial species that nest in dense vegetation in and around freshwater wetlands. When nesting, tricolored blackbirds generally require freshwater wetland areas large enough to support colonies of 50 pairs or more. They prefer freshwater emergent wetlands with tall, dense cattails or tules for nesting, but will also breed in thickets of willow, blackberry, wild rose, or tall herbs. During the nonbreeding season, flocks are highly mobile and forage in grasslands, croplands, and wetlands (Shuford and Gardali, 2008).

### *Survey Area Occurrence*

Tricolored blackbirds have been documented from the Sunol Valley and in the survey area (CDFW, 2015a; SFPUC, 2015). During the 2009 reconnaissance survey for the SABPL project, a large mixed flock of tricolored and red-winged blackbirds numbering in the hundreds-to-thousands were observed flying back and forth over the SABPL and ACRP project areas. Another smaller flock of tricolored blackbirds numbering approximately 100 was also observed foraging in the floodplain of Alameda Creek south of SMP-30 and flying back and forth over the quarry area (ESA, 2009a).

Large expanses of freshwater emergent wetlands, which tricolored blackbird typically prefer for nesting, are absent from the survey area. Potential nesting habitat is present in the willow or mulefat scrub habitat located within the project area; however these areas are relatively small in extent and are subject to disturbance from the surrounding quarry operations. Breeding may occur outside of the survey area in a large freshwater marsh located southwest of Pit F3-West on the west side of Alameda Creek, which contains abundant cattails and measures roughly 6 acres in size. Since only low-quality nesting habitat is present in the project area, tricolored blackbirds would not be expected to nest here with high quality nesting habitat present nearby.

Willow thickets and mixed riparian forest along Alameda Creek within the survey area, but outside of the project area, provide suitable nesting habitat and are subject to less disturbance than in the vicinity of the quarry area.

## Golden Eagle

### *Status*

The golden eagle (*Aquila chrysaetos*) is a CDFW fully protected species.

### *General Ecology and Distribution*

Golden eagles nest in open areas on cliffs and in large trees, often constructing multiple nests in one breeding territory (Zeiner et al., 1988). They prefer open habitats such as rolling grasslands, deserts, savannahs, and early successional forest and shrub habitats, with cliffs or large trees for nesting and cover.

### *Survey Area Occurrence*

Golden eagle nests have been documented from several locations within the vicinity of the survey area, with the closest record along Alameda Creek just outside of the survey area, approximately 0.2 mile upstream of the Arroyo de la Laguna confluence (SFPUC, 2015). There are several other occurrence records east of the survey area near San Antonio Creek and San Antonio Reservoir. This species was observed flying during the site survey in 2011. Potential nesting habitat is present in the eucalyptus trees near the nursery or in the larger trees along Alameda and San Antonio Creeks.

## Short-Eared Owl

### *Status*

The short-eared owl (*Asio flammeus*) is a California species of special concern.

### *General Ecology and Distribution*

The short-eared owl is an open country bird that is seen most often at dawn and dusk. Short-eared owls usually nest on dry ground in depressions that are concealed by vegetation, sometimes nesting within burrows. Breeding is from early March through July with a typical clutch size of five to seven eggs. This owl is a widespread winter migrant with resident populations in portions of California (Shuford and Gardali, 2008). The short-eared owl is one of the most widely distributed owls in the world.

### Survey Area Occurrence

Nesting short-eared owls are documented from western La Costa Valley at a distance of 2.7 miles east of the survey area (SFPUC, 2010b). This species was not observed during the reconnaissance survey, however, non-native grasslands within the survey area provide suitable nesting habitat for this species.

## Western Burrowing Owl

### Status

The western burrowing owl (*Athene cunicularia*) is a California species of special concern.

### General Ecology and Distribution

Western burrowing owls are relatively small, semicolonial owls, and are mostly residents of open dry grasslands and desert areas. They occupy burrows for both breeding and roosting. They use burrows excavated by ground squirrels and other small mammals and will use human-made burrows and cavities. Where the number and availability of natural burrows is limited, owls may occupy human-made burrows such as drainage culverts, cavities under piles of rubble, discarded pipe, and other tunnel-like structures (Shuford and Gardali, 2008). Burrowing owls hunt from perches and are opportunistic feeders. They consume arthropods, small mammals (e.g., meadow voles), birds, amphibians, and reptiles. Insects are often taken during the day, while small mammals are taken at night (Shuford and Gardali, 2008).

### Survey Area Occurrence

The closest documented occurrence of the western burrowing owl is approximately 1 mile east of the survey area on the northern slopes of San Antonio Reservoir (SFPUC, 2010b), but there are several additional observations in the vicinity of San Antonio Reservoir. Non-native grasslands and ruderal areas within the survey area are fairly compact with few small mammal burrows. However, there is some potential for burrowing owl to occur in these areas.

## Northern Harrier

### Status

The northern harrier (*Circus cyaneus*) is a California species of special concern.

### General Ecology and Distribution

Northern harriers are found in a wide variety of habitats from Central Valley grasslands up to lodgepole pines and alpine meadow habitats. They are known to frequent meadows, grasslands, open rangelands, desert sinks, freshwater and saltwater emergent wetlands. Harriers are seldom found in wooded areas. Harriers nest on the ground, usually within patches of dense, tall vegetation in undisturbed areas (Shuford and Gardali, 2008).

### *Survey Area Occurrence*

No northern harrier nesting sites are documented within the vicinity of the survey area (CDFW, 2015a; SFPUC, 2010b). Suitable nesting habitat is present within the survey area along the edges of Alameda Creek and in the grassland and scrub habitats adjacent to the quarry pits. However, much of the quarry area is heavily disturbed, which would likely preclude nesting in that area.

## White-Tailed Kite

### *Status*

The white-tailed kite (*Elanus leucurus*) is a CDFW fully protected species.

### *General Ecology and Distribution*

White-tailed kites forage in open grasslands, meadows, farmlands, and emergent wetlands. They typically nest in oak woodlands or trees, especially along marsh or river margins, although they will use any suitable tree or shrub that is of moderate height. They are rarely found far from agricultural areas (Zeiner et al., 1988).

### *Survey Area Occurrence*

Nesting locations are not documented within the vicinity of the survey area (SFPUC, 2010b; CDFW, 2015). White-tailed kite was observed foraging east of Calaveras Road during the 2009 reconnaissance surveys for the SABPL project (ESA, 2009a) and was observed flying overhead during the December 2010 reconnaissance survey. Suitable nesting habitat is present within the trees along Alameda and San Antonio Creeks.

## Loggerhead Shrike

### *Status*

The loggerhead shrike (*Lanius ludovicianus*) is a California species of special concern.

### *General Ecology and Distribution*

Loggerhead shrikes are a California semipermanent resident species that occurs in abundance in the Central Valley and central coast where scrub habitats and open woodlands are available. Shrikes generally forage on the fringes of open habitats where suitable hunting perches are available. This species typically hunts from dead trees, tall shrubs, utility wires and fences, impaling their prey on sharp twigs, thorns, or barbed wire.

### *Survey Area Occurrence*

Nesting loggerhead shrikes have been documented approximately 2 miles east of the survey area on the northern slopes of San Antonio Reservoir (SFPUC, 2010b). Shrike populations are generally known from wooded riparian corridors and grazed lands, with breeding often associated with blackberry and willows ranging in size from individual shrubs to dense thickets. Shrikes are common throughout California and would be expected to nest and forage within the grassland and scrub habitats adjacent to the creeks and quarry pits.

## Pallid bat

### Status

The Pallid bat (*Antrozous pallidus*) is a California species of special concern.

### General Ecology and Distribution

Pallid bat occurs throughout California except for the high Sierra Nevada from Shasta to Kern Counties, and the northwestern corner of the state from Del Norte and western Siskiyou Counties to northern Mendocino County (Zeiner et. al., 1988). This large pale bat establishes maternity roosts in crevices in rocky outcrops and cliffs, caves, mines, hollowed trees, large tree cavities, and vacant buildings (Western Bat Working Group, 2005).

### Survey Area Occurrence

A pallid bat maternity colony was documented approximately 4.4 miles south southeast of the survey area in 2001 (CDFW, 2015a). Potential roosting habitat is present within the survey area in larger trees, particularly alongside Alameda and San Antonio Creeks. Quarry pits and Alameda Creek channel provide foraging habitat for insectivorous bats.

## San Francisco Dusky-footed Woodrat

### Status

The San Francisco dusky-footed woodrat (*Neotoma fuscipes*) is a California species of special concern.

### General Ecology and Distribution

This woodrat subspecies is found on the San Francisco peninsula southward to Santa Cruz County, and in the East Bay hills as well. It is a medium-sized native rodent. Dusky-footed woodrats are widespread in chaparral, woodland, and forest habitats with well-developed undergrowth, where their conical stick houses are often visible (Carraway and Verts, 1991). These houses may be as much as 6 feet tall, and contain multiple chambers used for sleeping and food storage. Reproduction occurs from February through September.

### Survey Area Occurrence

San Francisco dusky-footed woodrat nests have been documented within the Alameda Creek riparian corridor, approximately 0.5 mile northwest of the survey area (CDFW, 2015a). A woodrat nest was also observed during the 2011 reconnaissance survey along the northern segment of Alameda Creek within the survey area and in 2015 elsewhere along Alameda Creek downstream of the project area.

## American Badger

### Status

The American badger (*Taxidea taxus*) is a California species of special concern.

### General Ecology and Distribution

In North America, American badgers occur as far north as Alberta, Canada and as far south as central Mexico. In California, American badgers occur throughout the state except in humid coastal forests of northwestern California in Del Norte and Humboldt Counties. The species has been decreasing in numbers throughout California over the last century. American badgers occur in a wide variety of open, arid vegetation communities but are most commonly associated with grasslands, savannas, mountain meadows, and open areas of desert scrub. The principal habitat requirements for this species appear to be sufficient food (burrowing rodents), friable soils, and relatively open uncultivated ground. American badgers are primarily found in areas of low to moderate slope.

### Survey Area Occurrence

Badgers have been documented approximately 1 mile east of the survey area in the grassland hills and north banks of San Antonio Reservoir (SFPUC, 2010b). Although most of the grassland within the survey area is located within close vicinity of quarry operations, some mammal and ground squirrel burrows are located within the survey area. Due to a known occurrence record in the survey area vicinity, and potentially suitable grassland habitat present, badger use of the site cannot be ruled out.

# 2.4 Special-status Plant Species

A full list of special-status plant species considered as potentially occurring in the project area is included in Appendix D. This list of 50 species was compiled from California Natural Diversity Database and CNPS queries for the nine-quadrangle area centered on the La Costa Valley 7.5-minute quadrangle (CNDDB, 2015b; CNPS, 2015); USFWS official lists (USFWS 2015); and review of previous environmental studies in the vicinity of the survey area. No federal- or state-listed species were documented within 5 miles or determined to have potentially suitable habitat onsite. From the list of 50 special-status plant species considered, a list of 15 special-status plants was selected as having potential to occur. These consisted of species appearing on CNDDB and CNPS queries for the La Costa Valley and Niles quadrangles (CNDDB, 2015a; CNPS, 2015); any rare (i.e., CNPS Rank 1 or 2, candidate or listed) plant species known from the Alameda Watershed (Nomad Ecology, 2009); and rare species which, in the opinion of the investigators, should be further considered based on habitat and distribution. **Table 2** presents information on the name, status, habitat, distribution, flowering period and an assessment of the potential for the species to occur in the project area for these 15 special-status plants.

## TABLE 2
## SPECIAL-STATUS PLANTS KNOWN FROM THE REGION, ALAMEDA CREEK RECAPTURE PROJECT

| Common Name Scientific Name | Listing Status FESA/ CESA/CRPR | Habitat and Distribution$^b$ | Elevation Range | Potential for Species Occurrence Within the Survey area | Blooming Period |
|---|---|---|---|---|---|
| SPECIAL-STATUS PLANTS | | | | | |
| Chaparral harebell<br>*Campanula exigua* | –/–/1B.2 | Rocky, usually serpentinite chaparral habitats; on talus slopes; sometimes in coastal scrub or chaparral, at edges of blue oak and gray pine; vernally moist areas, often very open or barren. Nearest record is a general locality near Sunol, last seen in 1973. Most localities are south of the Alameda watershed. Range: ALA, CCA, SBT, SCL, STA. | 900-4100 feet | **Not observed.** Suitable serpentinite soil and chaparral habitats absent from the survey area; species not found during focused surveys for this and nearby projects. | May – June |
| Congdon's tarplant<br>*Centromadia parryi* ssp. *congdonii* | –/–/1B.2 | Alkaline valley and foothill grassland, probably in low areas with high residual soil moisture. Reported in 2009 from vicinity of Andrade Road; also known from Irvington District in Fremont. Range: ALA, CCA, MNT, SCL, SLO, SMT. | 0-750 feet | **Not observed.** Alkaline soils absent from the survey area; species not found during focused surveys for this and nearby projects. | May – October, uncommonly in November |
| Hospital Canyon larkspur<br>*Delphinium californicum* ssp. *interius* | –/–/1B.2 | Chaparral, cismontane woodland; wet, boggy meadows, openings in soft chaparral habitat, woodland in canyons; shaded gullies, sometimes in thick undergrowth. Nearest records are Williams Gulch and near Arroyo Mocho. Range: ALA, CCA, MER, SBT, SCL, SJQ, SBT. | 750-3600 feet | **Not observed.** Suitable chaparral and woodland habitats absent from the survey area; species not observed during suitably-timed surveys for this and nearby projects. | April – June |
| San Joaquin spearscale<br>*Extriplex joaquiniana* | –/–/1B.2 | Chenopod scrub, meadows and seeps, playas, valley and foothill grassland; seasonal wetlands or alkali sink scrub. Nearest records are from Warm Springs in Fremont and Livermore area. Range: ALA, CCA, COL, FRE, GLE, MER, MNT, NAP, SBT, SCL* SJQ*, SLO, SOL, TUL*?, YOL | 0-2750 feet | **Not observed.** Suitable alkaline habitats absent from the survey area. Species not found during suitably-timed focused surveys for this and nearby projects. | April – October |
| Diablo helianthella<br>*Helianthella castanea* | –/–/1B.2 | Broadleaved upland forest, chaparral, cismontane woodland, coastal scrub, riparian woodland, valley and foothill woodland; openings or outcrops in scrub or forest; often in soils formed on sandstone. Recent studies have concluded that species present in the Alameda watershed is California helianthella. Range: ALA, CCA, MRN, SFO, SMT; most localities in CCA | 200-4300 feet | **Not observed.** Although moderately suitable grassland habitat present in the survey area, species not found during suitably-timed focused surveys for this and other nearby projects. Project area appears to be out of range for species. | March – June |

## TABLE 2 (Continued)
## SPECIAL-STATUS PLANTS KNOWN FROM THE REGION, ALAMEDA CREEK RECAPTURE PROJECT

| Common Name<br>Scientific Name | Listing Status FESA/ CESA/CRPR | Habitat and Distribution$^b$ | Elevation Range | Potential for Species Occurrence Within the Survey area | Blooming Period |
|---|---|---|---|---|---|
| SPECIAL-STATUS PLANTS (cont.) | | | | | |
| California alkali grass<br>*Puccinellia simplex* | --/--/1B.2 | Meadows and seeps, saline flats; chenopod scrub, valley and foothill grasslands, vernal pools. Nearest record is 5 miles south of Livermore in Vallecitos area. Range: ALA, BUT, CCA, COL, GLE, KRN, KNG, LAK, LAX, FRE, MAD, MER, NAP, SCL, SCR, SOL, STA, SBD, SLO, YOL. | 0-3050 feet | **Not observed.** Alkaline soils, vernal pools, and chenopod scrub are unknown from the project area; species not found during suitably-timed focused surveys. | March-May |
| Most beautiful jewelflower<br>*Streptanthus albidus* ssp.*peramoenus* | –/–/1B.2 | Chaparral, coastal scrub woodland, and grassland; outcrops and barren areas on south- and west-facing exposures on ridges and slopes; serpentine soils. Nearest records are from Sunol Regional Wilderness, Goat Rock, and east of Calaveras Reservoir. Range: ALA, CCA, SCL, MNT, SLO. | 300-3300 feet | **Not observed.** Suitable habitats absent from survey area; species not found during suitably-timed focused surveys for this and nearby projects. | April – September, uncommonly in March and October |
| PLANT SPECIES OF INTEREST | | | | | |
| Santa Clara thorn-mint<br>*Acanthomintha lanceolata* | --/--/4.2 | Chaparral, cismontane woodland and coastal scrub, generally on serpentinite. Nearest records are from upper San Antonio Creek, Oak Ridge, Calaveras Dam and Sunol Regional Wilderness. Range: ALA, FRE, MER, MNT, SBT, SCL, SJQ, STA. | 260-4000 feet | **Not observed**. Suitable serpentine substrate absent from the survey area. Species not found during focused surveys for this project or other nearby SFPUC projects. | March-June |
| California androsace<br>*Androsace elongata* ssp*. acuta* | --/--/4.2 | Chaparral, cismontane woodland, coastal scrub, pinyon and juniper woodland, valley and foothill grassland; meadows and seeps. Highly localized and often overlooked. | 490-4000 feet | **Not observed.** Nearest record is in the headwaters of Arroyo del Valle. Range: ALA, CCA, COL, FRE, GLE, KRN, LAX, MER, RIV, SBD, SBT, SCL, SDG, SIS, SJQ, SLO, SMT, STA, TEH. | March-June |
| Santa Clara red ribbons<br>*Clarkia concinna* ssp. *automixa* | –/–/4.3 | Chaparral and cismontane woodland. Nearest records are from Niles Canyon and Poverty Ridge in Ohlone Regional Wilderness. Range: ALA, SCL, SCR | 290-5000 feet | **Not observed.** Suitable habitat absent from survey area; species not found during focused surveys for this and nearby projects. | May – June, uncommonly in April and July |
| Jepson's woolly sunflower<br>*Eriophyllum jepsonii* | --/--/4.3 | Chaparral, dry oak woodland and coastal scrub, sometimes on serpentine. Nearest records San Antonio Creek, Williams Gulch, and Upper Alameda Creek. Range: ALA, CCA, KRN, MNT, SBT, SCL, STA, VEN | 650-3400 feet | **Not observed.** Undisturbed scrub and woodland habitats absent from the survey area; species not observed during suitably-timed surveys for this and nearby projects. | April -- June |

## TABLE 2 (Continued)
## SPECIAL-STATUS PLANTS KNOWN FROM THE REGION, ALAMEDA CREEK RECAPTURE PROJECT

| Common Name<br>Scientific Name | Listing Status FESA/ CESA/CRPR | Habitat and Distribution[b] | Elevation Range | Potential for Species Occurrence Within the Survey area | Blooming Period |
|---|---|---|---|---|---|
| PLANT SPECIES OF INTEREST (cont.) | | | | | |
| Stinkbells<br>*Fritillaria agrestis* | --/--/4.2 | Chaparral, cismontane woodland, pinyon and juniper woodland, valley and foothill grassland. Clay substrate, sometimes on serpentinite. Most populations small. Nearest records are in Williams Gulch and Mines Road area, with several additional localities along Tesla Road. Range: ALA, CCA, FRE, KRN, MEN, MER, MNT, MPA, PLA, SAC, SBA, SBT, SCL, SCR, SLO, SMT, STA, TUP, VEN, YUB | 30-5200 feet | **Not observed.** Suitable undisturbed clay and serpentine-derived soils absent from the habitats absent from the survey area. Species not found during suitably-timed focused surveys for this and nearby projects. | March -- June |
| Bristly leptosiphon<br>*Leptosiphon acicularis* | --/--/4.2 | Grassy areas in woodland and chaparral; mostly coastal distribution. Nearest occurrences are very old and general collections from Hayward and unspecified location in Alameda County. Range: ALA, BUT, HUM, LAK, MRN, MEN, NAP, SMT, SON | 180-5000 feet | **Not observed.** Moderately suitable grassland habitat present in the survey area; species not found during suitably-timed focused surveys for this and nearby projects. | April -- May |
| Serpentine leptosiphon<br>*Leptosiphon ambiguus* | --/--/4.2 | Cismontane woodland, coastal scrub, valley and foothill grassland, usually on sparse serpentinite substrate. Nearest records are in the Goat Rock area in upper Alameda Creek watershed. Range: ALA, CCA, MER, SBT, SCL, SCR, SJQ, SMT, STA | 390-3800 feet | **Not observed.** Suitable serpentine grassland habitat not present in the survey area; species not found during suitably-timed focused surveys for this and nearby projects. | March-June |
| San Antonio Hills monardella<br>*Monardella antonina* ssp. *antonina* | –/–/3 | Chaparral, cismontane woodland. Nearest records are from McGuire Peaks, Sunol Regional Wilderness, Palomares Canyon. Range: ALA?, CCA?, MNT, SBT?, SCL? | 1600-3300 feet | **Not observed.** Suitable chaparral and woodland habitats absent from the survey area. | June – August |
| Slender-leaved pondweed<br>*Stuckenia filiformis* ssp. *alpina* | –/–/2B.2 | Shallow freshwater marshes and swamps. Record from Niles quadrangle. Range: ALA, BUT, CCA, ELD, LAS, MER, MON, MOD, MPA, PLA, SCL* SIE, SHA, SMT, SON, SOL, AZ, NV, OR, + | 980-7050 feet | **Not observed.** Suitable habitats absent from survey area; species not found during suitably-timed focused surveys for this and nearby projects. | May – July |

## TABLE 2 (Continued)
## SPECIAL-STATUS PLANTS KNOWN FROM THE REGION, ALAMEDA CREEK RECAPTURE PROJECT

**STATUS CODES:**

FEDERAL ENDANGERED SPECIES ACT (FESA)
FE = Listed as Endangered (in danger of extinction) by the Federal Government.
FT = Listed as Threatened (likely to become Endangered within the foreseeable future) by the Federal Government.
FC = Candidate to become a *proposed* species.

CALIFORNIA ENDANGERED SPECIES ACT (CESA)/CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE (CDFW)
CE = Listed as Endangered by the State of California.
CT = Listed as Threatened by the State of California.
CC= Candidate to become a *proposed* species.

California Rare Plant Rank (CRPR; Formerly known as CNPS List):
1A = Plants presumed extinct in California.
1B = Plants rare, threatened, or endangered in California and elsewhere.
2A = Plants presumed extirpated in California.
2B = Plants rare, threatened, or endangered in California, but more common elsewhere.
3 = Plants about which more information is needed.
4 = Plants of limited distribution.

An extension reflecting the level of threat to each species is appended to each CRPR as follows:
.1 – Seriously threatened in California.
.2 – Moderately threatened in California.
.3 – Not very threatened in California.

**SOURCES:**

California Department of Fish and Wildlife (CDFW), California Natural Diversity Database (CNDDB) Rarefind version 5, data request for the Niles, La Costa Valley, Calaveras Reservoir, Milpitas, Newark, Hayward, Mountain View, Livermore, and Dublin U.S. Geological Survey 7.5-minute topographic quadrangles, commercial version, information retrieved 5/10/2015.

California Native Plant Society (CNPS), CNPS Electronic Inventory, version 8, data request for La Costa Valley U.S. Geological Survey 7.5-minute topographic quadrangles, online application, http://cnps.site.aplus.net/cgi-bin/inv/inventory.cgi/Html?item=checkbox.htm, information retrieved 5/21/2015.

Consortium of California Herbaria, collection records for plants listed in table, http://ucjeps.berkeley.edu/consortium/, information retrieved May 7, 2015.

U.S. Fish and Wildlife Service, query for project area showing listed species, migratory birds and critical habitat.
http://ecos.fws.gov/ipac/project/FSFVRBVMYVGJ3G2H2BHCRZPOOQ/resources; information retrieved April 27, 2015.

[b] Distribution range is based on County codes, as follows:

County abbreviations: AMA--Amador; BUT-- Butte; CAL-- Calaveras; CCA--Contra Costa; COL—Colusa; DNT--Del Norte; ELD--El Dorado; FRE—Fresno; GLE—Glenn; HUM—Humboldt; KRN—Kern; LAK—Lake; LAS—Lassen; LAX--Los Angeles; MAD—Madera; MOD—Modoc; MEN—Mendocino; MER—Merced; MNT—Monterey; MPA—Mariposa; MRN—Marin; NEV—Nevada; ORA—Orange; PLA—Placer; PLU—Plumas; RIV—Riverside; SAC—Sacramento; SBA--Santa Barbara; SBD--San Bernardino; SBT--San Benito; SCL--Santa Clara; SCR--Santa Cruz; SCT--Santa Catalina Island; SCZ--Santa Cruz Island; SDG--San Diego; SFO--San Francisco; SHA—Shasta; SIE—Sierra; SIS—Siskiyou; SJQ--San Joaquin; SMI--San Miguel Island; SMT--San Mateo; SNI--San Nicolas Island; SOL—Solano; SON—Sonoma; SRO--Santa Rosa Island; TEH—Tehama; TRI—Trinity; TUL—Tulare; VEN—Ventura; YOL—Yolo; YUB—Yuba
"*" indicates species is presumed extirpated from county; "?" indicates questionable record from county

**Figure 5** presents a map of special-status plant occurrences within 5 miles of the ACRP survey area. As shown in Figure 5, seven special-status plants are known to occur within 5 miles of the survey area. Of these, three are found primarily on serpentine substrates: Santa Clara red ribbons (*Clarkia concinna* ssp. *automixa*), chaparral harebell (*Campanula exigua*), and most beautiful jewel-flower (*Streptanthus albidus* ssp. *peramoenus*). Two species, Congdon's tarplant (*Centromadia parryi* ssp. *congdonii*) and San Joaquin spearscale (*Extriplex joaquiniana*), are found in seasonal wetlands in alkaline scrub, typically on alkaline clay soils that also support alkali scrub vegetation. Hospital Canyon larkspur (*Delphinium californicum* ssp. *interius*) is found on moist scrub slopes. Slender-leaved pondweed (*Stuckenia filiformis* ssp. *alpina*) occurs in ponds and other permanent water. An eighth plant, Diablo helianthella, was included to allow for an explanation of recent analysis of species distribution, as explained further in Section 2.4.5.

In the sections that follow, the status, ecology and distribution, and an assessment of survey area occurrence will be presented for the eight special-status plants known from the region. No special-status plants, and indeed no plant species of interest, were found in the survey area during seasonally-appropriate, floristic surveys. Based on the habitats present, no special-status plants are expected to occur there.

## 2.4.1 Chaparral Harebell

### *Status*

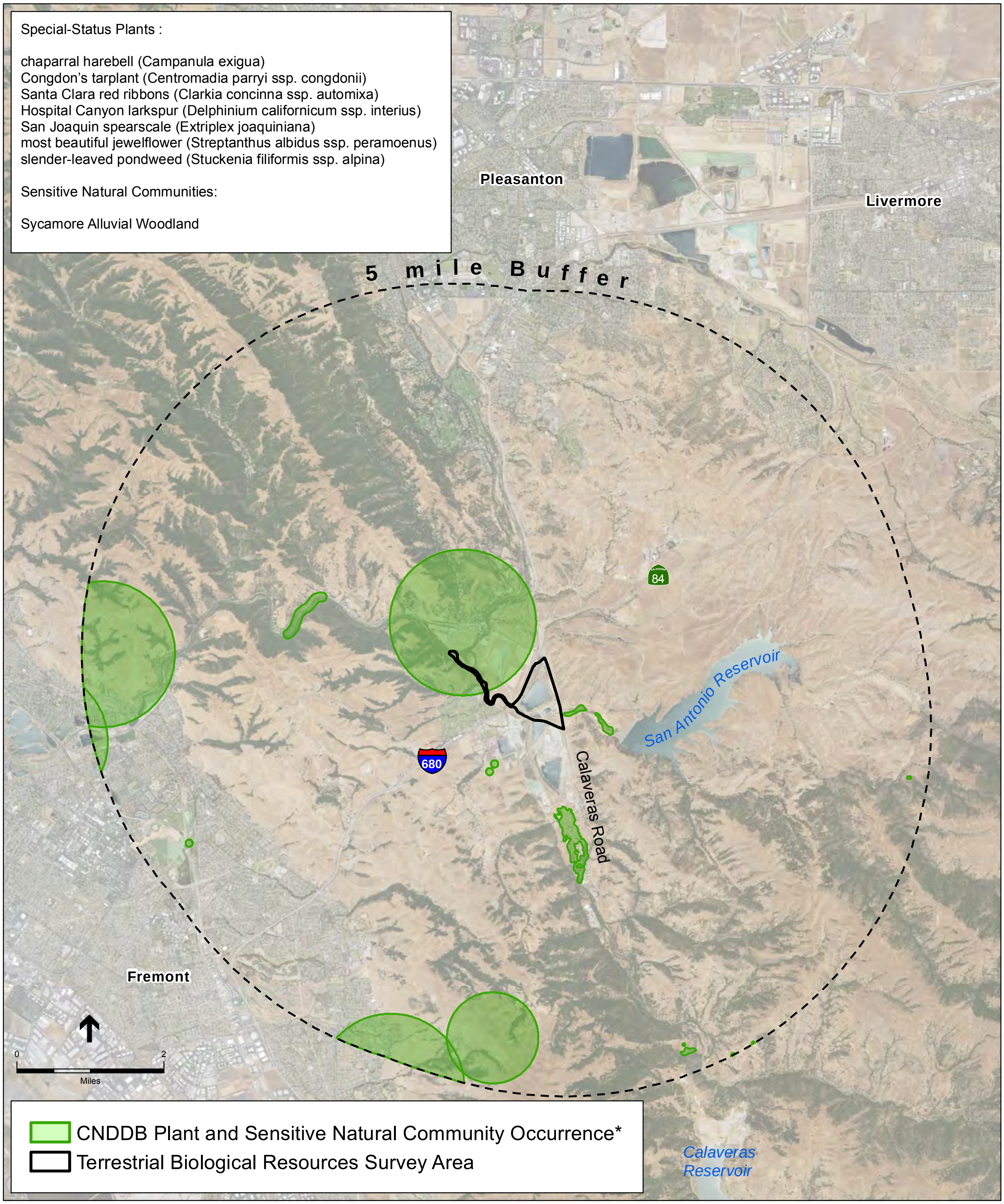
Chaparral harebell (*Campanula exigua*) is ranked as rare and endangered (Rank 1B.2) by the California Native Plant Society.

### *General Ecology and Distribution*

An annual member of the bellflower family, chaparral harebell is found on rocky sites, sometimes on talus slopes, in openings in serpentine chaparral, coastal scrub, and sometimes at the edges of blue oak (*Quercus douglasii*) and gray pine (*Pinus sabiniana*) woodland. It is usually found on poorly-developed serpentine soils. It is found at elevations of 900 to 4,100 feet in the Inner Coast Ranges of Central California, from San Benito and Stanislaus counties to Alameda and Contra Costa counties. Most records are south of the Alameda Watershed. CNDDB has a general locality reported in the vicinity of Sunol (CNDDB, 2015b); a new and very small population was observed in the upper portion of the Alameda Creek watershed near the Alameda Creek Diversion Dam (Nomad Ecology, 2009). It was noted that suitable habitat was present elsewhere but was not fully investigated.

### *Survey Area Occurrence*

The survey area lacks serpentine substrate and the habitat types and rocky talus substrate associated with this species. Suitably timed surveys were carried out in May 2015 and the species was not observed in the survey area.



SFPUC Alameda Creek Recapture Project

**Figure 5**
Special-Status Plants and Sensitive Communities within 5 Miles of the Survey Area

* The occurrences shown on this map represent the known locations of the species listed here as of the date of this version of CNDDB (04/2015). There may be additional occurrences or additional species within this area which have not yet been surveyed and/or mapped. Details on documented locations of special-status species is withheld according to CNDDB guidelines due to the sensitivity of the information.

SOURCE: CDFW, 2015

## 2.4.2 Congdon's tarplant

### Status

Congdon's tarplant (*Centromadia parryi* ssp. *congdonii*) is ranked as rare and endangered (Rank 1B.2) by the California Native Plant Society.

### General Ecology and Distribution

Congdon's tarplant is found in seasonally wet, often saline or alkaline grasslands near the coast of central California and foothill grasslands. It occurs at elevations of 0 to 750 feet. It is reported from San Luis Obispo to Alameda and Contra Costa counties, and is presumed extirpated from Santa Cruz and Solano counties. In the general region of the project, Congdon's tarplant is known from the alkaline bayshore grasslands in the Irvington District of Fremont, and from two small colonies in the vicinity of Andrade Road (Nomad Ecology, 2009). These records were of interest because they were reported from Azule clay loam, a non-alkaline soil that is not reported as saline-affected (U.S. Dept. Agric., 2016) in a field containing mostly non-native species.

### Survey Area Occurrence

Alkaline soils were not encountered in the survey area, and all of the area proposed for disturbance was highly altered, suggesting that habitat quality was poor for this species. Although at the early end of the range of flowering for this species, appropriately-timed surveys in May failed to result in the detection of Congdon's tarplant and the potential for this species to occur in the survey area was concluded to be low.

## 2.4.3 Santa Clara Red Ribbons

### Status

Santa Clara red ribbons (*Clarkia concinna* ssp. *automixa*) is ranked as uncommon and not very endangered in California (Rank 4.3) by the California Native Plant Society.

### General Ecology and Distribution

Santa Clara red ribbons is found in chaparral and oak woodland. It occurs at elevations from 90 to 290 to 5,000 feet. This subspecies ranges from Santa Cruz to Alameda counties, with most occurrences in the Santa Cruz Mountains and Inner Coast Range near San Jose.

### Survey Area Occurrence

This species was reported from Niles Canyon and the Ohlone Wilderness. Although not observed by Nomad Ecology (2009), some plants possibly identifiable to this species were found on shaded, fairly moist slopes in oak woodland. The species was not found in the survey area and suitable habitat was not present. A similar-appearing plant, *C. unguiculata*, was observed as a waif on the Alameda Creek floodplain between I-680 and the Sunol Water Temple.

## 2.4.4 Hospital Canyon Larkspur

### Status

Hospital Canyon larkspur (*Delphinium californicum* ssp. *interius*) is ranked as rare and endangered (Rank 1B.2) by the California Native Plant Society.

### General Ecology and Distribution

Hospital Canyon larkspur is found primarily found on north or south facing slopes and it is nearly always associated with chaparral or Diablan sage scrub at elevations of 830 to 2,825 feet. It is typically located in areas with partial shade, where this species spends most of its vegetative life in the shady shrub understory until its long inflorescence penetrates the top of the shrub canopy. In the general region of the project, Hospital Canyon larkspur is known from Arroyo Mocho and the easternmost portion of the San Antonio Creek watershed, in Williams Gulch. Several new records for this species were reported from Williams Gulch by Nomad Ecology in 2009, where they represent the westernmost occurrences of the species in the Mount Hamilton Range (Nomad Ecology, 2009).

### Survey Area Occurrence

Shaded chaparral and sage scrub habitats were not present in the survey area. Side canyons of Alameda Creek, just outside the survey area, were investigated during field surveys in late March and May, and the species was not detected. This species was concluded to have low potential to occur within the project area.

## 2.4.5 San Joaquin Spearscale

### Status

San Joaquin spearscale (*Extriplex joaquiniana*) is ranked as rare and endangered (Rank 1B.2) by the California Native Plant Society.

### General Ecology and Distribution

San Joaquin spearscale is found in seasonal wetlands or alkali sink scrub where water ponds during the wet season and then dries, accumulating dissolved solids. The species is reported from chenopod scrub, meadows and seeps, playas, valley and foothill grassland, seasonal wetlands, and alkali sink scrub. Known both from the South Bay, Inner Coast Ranges and San Joaquin Valley, San Joaquin spearscale has a distribution ranging from Fresno and San Benito counties northward through Monterey, Santa Clara, and Alameda counties to Colusa and Glenn counties. Nearest the project area, San Joaquin spearscale is known from the Springtown area in eastern Livermore and the alkaline flats in the Warm Springs district of Fremont.

### *Survey Area Occurrence*

Suitable alkaline habitats were not found in the survey area, and suitably-timed surveys in May 2015 did not result in the detection of the species or its habitat. As a result, San Joaquin spearscale was concluded to have low potential to occur in the survey area.

## 2.4.6 Diablo Helianthella

### *Status*

Diablo helianthella (*Helianthella castanea*) is ranked as rare and endangered (Rank 1B.2) by the California Native Plant Society.

### *General Ecology and Distribution*

Diablo helianthella is found in broadleaved upland forest, cismontane woodland, chaparral, coastal scrub, and valley and foothill grasslands. It is often found in openings and forest edges. It is found in the Coast Ranges of Central California, from San Mateo to Marin County, with most records in Contra Costa County. The nearest confirmed record of Diablo helianthella is in the hills southwest of San Ramon (Nomad Ecology, 2009), approximately 9 miles from the survey area. This species has been searched for in focused surveys for the San Antonio Backup Pipeline and New Irvington Tunnel projects, and it was not found, nor was it detected in focused special-status surveys for the Alameda watershed (Nomad Ecology, 2009). Nomad Ecology (2009) reviewed a number of records of a closely-related species, California helianthella (*Helianthella californica*), including two CNDDB records southeast of San Antonio Reservoir within 5 miles of the survey area. They concluded that all of the helianthella in the Alameda watershed was California helianthella and not Diablo helianthella.

### *Survey Area Occurrence*

Focused surveys were carried out in May 2015 for Diablo helianthella in the ACRP survey area and none was found. The high levels of disturbance and lack of suitable habitat, as well as distributional considerations, indicate that this species is not present in the project area.

## 2.4.7 Most Beautiful Jewelflower

### *Status*

Most beautiful jewelflower (*Streptanthus albidus* ssp. *peramoenus*) is ranked as rare and endangered (Rank 1B.2) by the California Native Plant Society.

### *General Ecology and Distribution*

This species is found in chaparral, coastal scrub, woodland, and grassland, on outcrops and barren areas on south- and west-facing slopes on serpentine soils. The general distribution for the species is from San Luis Obispo and Monterey counties to Alameda and Contra Costa counties. A number of populations of this species are reported from the upper Alameda Creek watershed, Arroyo Hondo, the eastern edge of Calaveras Reservoir, and just below the confluence of Alameda and Calaveras creeks.

A taxonomic evaluation of the genus *Streptanthus* in 2008 resulted in *S. albidus* (and all its subspecies) being combined within the common genus *S. glandulosus*. Although the populations in the Alameda Watershed have the dark maroon sepals characteristic of *S. glandulosus,* they also possess some characteristics of the violet-sepaled *S. albidus* ssp. *peramoenus* and have been treated as such by CNDDB and CNPS. CNPS retains the older taxonomic treatment, preserving *S. albidus* ssp. *peramoenus.*

### Survey Area Occurrence

Serpentine substrate and suitable chaparral, scrub, native grassland and woodland are not present within the ACRP survey area. Suitably-timed surveys did not reveal the presence of this species or its habitat. Most beautiful jewelflower was therefore concluded to have low potential to occur in the survey area.

## 2.4.8 Slender Pondweed

### Status

Slender pondweed (*Stuckenia filiformis* ssp.*alpina*) is ranked as fairly rare and endangered in California (Rank 2B.2) by the California Native Plant Society.

### General Ecology and Distribution

This species is found in shallow, clear water of freshwater ponds, ditches, vernal pools and marshes. The general distribution for the species is from Monterey and Santa Clara counties northward to Alameda and Contra Costa counties and in the Sierra Nevada foothills from Merced to Lassen and Modoc counties. It is also reported from a limited number of records from Washington, Oregon, and the Rocky Mountain states. There are relatively few occurrence records within this large geographic distribution.

### Survey Area Occurrence

It is reported from the Niles quadrangle locally, from the Quarry Lakes area of Fremont. The species was not addressed in the rare plant survey for the Alameda Watershed (Nomad Ecology, 2009). Habitat for this species does not appear to be well-characterized. It was not observed during field surveys, although potentially suitable habitat could be present in areas of ponded water of Alameda Creek north of I-680.

## 2.4.7 Unusual and Significant Plants

The East Bay chapter of the California Native Plant Society maintains a database of unusual and significant plants for Alameda and Contra Costa counties (Lake, 2010). These include both special-status plants (135 taxa in the East Bay) and 960 additional taxa more common than state-CNPS-listed Rank 4 plants, but which have limited abundance, have experienced declines due to habitat loss or other causes, or are at the limits of their geographic range in the East Bay. A-ranked plants (632 taxa) are known from five or fewer localities in the East Bay; B-ranked plants (191 taxa) are known from six to nine localities in the East Bay; and C-ranked plants (a watch list consisting of 137 taxa) are known from more localities but are still considered limited and vulnerable.

Within the survey area, five unusual and significant plants were observed; one A-ranked plant (durango root, *Datisca glomerata*), and four B-ranked plants: California brickellbush (*Brickellia californica*), California sycamore, Goodding's black willow, and willow dock (*Rumex salicifolius)*. All occur exclusively within riparian habitats along Alameda Creek.

## 2.5 Invasive Plants in the Survey Area

As discussed in preceding sections, much of the Alameda Creek Recapture Project area is characterized by a high degree of historical and ongoing disturbance. As a result, the vegetation is largely dominated by non-native, invasive plants. In upland habitats, the majority of species observed, as well as the majority of cover, is provided by non-native species. Five species are ranked as “highly” invasive by Cal-IPC; these are yellow star thistle, fennel, red brome, pampas grass, and Himalayan blackberry. Fifteen species are ranked as “moderately” invasive, including stinkwort, which is given a “red alert” designation because of the rapidity of its spread (Cal-IPC, 2016).

Several habitat types are dominated by invasive plants: non-native grassland has a high proportion of cover provided by red brome, as well as significant cover provided by yellow star thistle, patches of black and shortpod mustard (*Brassica nigra* and *Hirschfeldia incana*), wild radish (*Raphanus sativus*) and poison hemlock (*Conium maculatum*). Ruderal has variable species composition, but in the survey area a majority of cover is provided by invasive herbs such as black and shortpod mustard, wild radish, poison hemlock, stinkwort, fennel, and thistles. Mixed scrub and coyote brush scrub, while not dominated by these species, has an understory with a high proportion of non-native invasives. Willow thickets within the project area have a lower proportion of invasive plants, although Himalayan blackberry and stinkwort are present in these communities.

## 2.6 Sensitive Natural Communities and Habitats

Sensitive natural communities and habitats include the following: natural communities identified by the California Natural Diversity Database as having Global or State rank of 1, 2, or 3 (Sawyer et al., 2009) and all riparian habitats, which are defined as sensitive natural communities under CEQA Checklist Question IV.b. Historically, the site may have supported sensitive natural communities such as sycamore alluvial woodland and valley oak riparian forest and woodland, but these are not currently present in the survey area. Figure 5 shows the distribution of sensitive natural communities on file with CNDDB. This figure shows the examples of sycamore alluvial woodland habitat along the lower portion of San Antonio Creek and the extensive stands of sycamore alluvial woodland in the central portion of the Sunol Valley, about 1 mile south and upstream of the survey area.

The CEQA checklist, Question IV.b, includes all riparian communities within the definition of sensitive natural communities, so all of the identified natural communities associated with the Alameda Creek and San Antonio Creek floodplain within the survey area are considered sensitive. They are listed here, with an asterisk if they also are identified by CNDDB as sensitive:

- Willow thickets associated with Alameda Creek (includes arroyo willow thicket and sandbar willow thicket alliances)
- Mulefat scrub
- Creek channel (includes small areas of instream perennial wetlands and instream seasonal wetlands)
- Mixed riparian forest (includes small areas of black willow thickets*)
- Riparian woodland (includes small areas of California buckeye groves*, Central Coast live oak riparian forest*)

The seasonal wetland, outside of the Alameda Creek floodplain, although not considered a sensitive natural community, may be considered a wetland regulated by the CDFW, RWQCB, and/or Corps.

## 2.7 Summary of Results

The survey area has been subject to a long history of intensive land uses including nurseries, sand and gravel operations, and clearing and grading for WSIP projects. The majority of the project area within the survey area is altered or has been altered in the past due to these activities. Alameda Creek in the Sunol Valley has been altered by realignment, grade controls at pipeline crossings, infiltration galleries, impoundments, and regulated discharges.

No suitable habitat was found for any of the special-status plants known from the region, no special-status plants were observed during suitably-timed site surveys, and none are considered likely to occur within the ACRP survey area.

Although the CNDDB considers some willow thickets to be sensitive natural communities, only the portion closely associated with Alameda Creek is considered to be a sensitive resource in the survey area. Other habitats associated with Alameda Creek, mulefat scrub and creek channel, are also considered sensitive because they are riparian habitats.

The high degree of historic and ongoing disturbance that characterize the survey area mean that even apparently natural communities like willow thickets are constantly responding to changing hydrologic conditions due to quarry operations and watershed management. One indication of changing conditions was periodic dieback or mortality and subsequent regrowth of sandbar willow along much of Alameda Creek within the survey area; taller skeletons of dead trunks of sandbar willow were observed along with shorter live regrowth.

One riparian area of particular interest is the section of Alameda Creek just west of Pit F2. The proposed project could alter surface and subsurface flow in this area. This section of Alameda

Creek is noteworthy in that it transitions from mulefat scrub just upstream to relatively broad and dense willow thicket and mixed riparian forest, suggesting a consistently higher water table in the willow thicket and mixed riparian forest. Based on transect sampling carried out as part of this survey, the average width of the riparian zone, including floodplain and riparian vegetation, is 167 feet in this section. **Table 3** shows the result of measurement of perpendicular transects across Alameda Creek at 25-foot intervals.

**TABLE 3**
**EXTENT OF RIPARIAN HABITATS, ALAMEDA CREEK ADJACENT TO PIT F2**

| Habitat type | Acreage (based on average width in 47 sampled transects and 1,175 foot length of sample area) |
|---|---|
| Mulefat scrub | 1.21 |
| Willow thickets | 1.81 |
| Mixed riparian forest | 0.84 |
| Main channel | 0.24 |
| Side channel/floodplain | 0.31 |
| Seasonal wetland | 0.08 |
| **Total** | **4.49** |

The survey area does include habitats that are potentially suitable for special-status wildlife species. California tiger salamander breeding habitat is absent from the survey area, but this species would be expected to use the non-native grasslands within the survey area based on habitat conditions and the proximity to potential breeding sites and known occurrence records. California red-legged frog breeding habitat is also absent from the survey area, however, non-breeding aquatic refugia habitat is present within the aquatic habitats on-site. Alameda whipsnake core habitat is absent from the survey area, but this species may occur in non-native grassland, scrub, and riparian habitats through the survey area.

Tricolored blackbird has potential to nest in the willow thickets and mixed riparian forest along Alameda Creek. Western pond turtle could potentially occupy the aquatic habitats in the survey area and potential nesting and dispersal habitat is present in the adjacent uplands. Coast horned lizard has potential to occur in sandy washes associated with Alameda Creek. Cooper's hawk, Golden eagle, short-eared owl, western burrowing owl, northern harrier, white-tailed kite, and loggerhead shrike have potential to nest within the survey area.

Potential pallid bat roosting habitat is present within the larger trees within the survey area. A San Francisco dusky-footed woodrat nest was observed along Alameda Creek within the survey area and this species could occur within other portions of the creek. American badger has potential to occur in grasslands within the survey area.

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# CHAPTER 3
# References and Report Preparation

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# APPENDIX A

# Representative Photographs

**Photo 1:** Photo facing north of the non-native grassland and ruderal areas located in the southeastern corner of the survey area (May, 2015).

**Photo 2:** Photo facing north showing a developed roadway in the foreground, seasonal wetland in the center, and coyote brush scrub in the background (May, 2015).

Source: ESA, 2015

**Figure A-1**
Representative Photographs

**Photo 3:** Photo facing south showing mulefat scrub within the Alameda Creek corridor just north of the creek's confluence with San Antonio Creek (May, 2015).

**Photo 4:** Photo facing northeast showing willow thickets along the southeastern edge of Pit F2 and mixed scrub in the background (May, 2015).

Source: ESA, 2015

**Figure A-2**
Representative Photographs

**Photo 5:** Photo facing southeast showing willow thickets along Alameda Creek just northwest of Interstate 680 (May 2015).

**Photo 6:** Photo facing east showing the San Antonio Creek channel with non-native grassland on the edges and riparian woodland in the background (May, 2015).

Source: ESA, 2015

**Figure A-3**
Representative Photographs

**Photo 7:** Representative photograph of mixed riparian forest along Alameda Creek in the background with willow thickets and mulefat scrub along Alameda Creek in the foreground (May, 2015).

**Photo 8:** Representative photo of high flow channel along the edge of Alameda Creek with willow thickets on the left side of the photo (May, 2015).

Source: ESA, 2015

**Figure A-4**
Representative Photographs

**Photo 9:** Photo facing southeast of quarry pit F3-West showing mulefat scrub along the water edge and coyote brush scrub along the upper edge of the pit (May, 2015).

**Photo 10:** Photo facing southeast of quarry pit F3-East showing willow thickets along the water edge and coyote brush scrub along the upper edge of the pit (May, 2015).

Source: ESA, 2015

**Figure A-5**
Representative Photographs

**Photo 11:** Photo facing north of quarry pit F2 showing willow thickets along the water edge and non-native grassland along the upper edge of the pit (May, 2015).

**Photo 12:** Photo facing west showing ruderal areas in the foreground and Pit F2 in the background (May, 2015).

Source: ESA, 2015

**Figure A-6**
Representative Photographs

**Photo 13:** Photo facing south of ruderal areas with planted cork oak trees in the left side of the photo (May, 2015).

**Photo 14:** Representative photo of developed roadway located south of Pit F3-West (May, 2015).

Source: ESA, 2015

**Figure A-7**
Representative Photographs

# APPENDIX B

# Crosswalk of Habitats, Cover Types, Natural Communities, and Vegetation Types, Alameda Creek Recapture Project

## TABLE B-1
## CROSSWALK OF HABITATS, COVER TYPES, NATURAL COMMUNITIES, AND VEGETATION TYPES, ALAMEDA CREEK RECAPTURE PROJECT

| Alameda Creek Recapture Botanical Survey | Alameda Watershed HCP Land-Cover Types (SFPUC, 2010a) | Wildlife Habitat Relations (Mayer and Laudenslayer, 1988) | Holland Natural Communities (1986) | Sawyer et al. Vegetation Type (2009) |
|---|---|---|---|---|
| Nonnative Grassland | Nonnative Grassland | Annual Grassland | Non-native Annual Grassland | • *Bromus-Brachypodium* Semi-Natural Herbaceous Stands |
| Coyote Brush Scrub | Diablan Sage Scrub | Coastal Scrub | Northern Coyote brush Scrub | • *Baccharis pilularis* Shrubland Alliance |
| Mulefat Scrub | Included in Willow Riparian Forest and Scrub | Valley Foothill Riparian | Mule Fat Scrub | • *Baccharis salicifolia* Shrubland Alliance |
| Willow Thickets | Willow Riparian Forest and Scrub | Valley Foothill Riparian | Central Coast Riparian Scrub* | • *Salix lasiolepis* Shrubland Alliance<br>• *Salix exigua* Shrubland Alliance |
| Mixed Scrub | Disturbed/Developed | Contains elements of:<br>Annual Grassland Coastal Scrub<br>Urban<br>Valley Foothill Riparian | (no equivalent) | (no equivalent) |
| Riparian Woodland | Coast Live Oak Riparian Forest | Valley Foothill Riparian | Central Coast Live Oak Riparian Forest* | • *Aesculus californica* Woodland Alliance<br>• *Quercus agrifolia* Woodland Alliance |
| Mixed Riparian Forest | Willow Riparian Forest and Scrub | Valley Foothill Riparian | Central Coast Riparian Scrub* | • *Salix gooddingii* Woodland Alliance |
| Creek Channel | Stream | Included in Valley Foothill Riparian | (no equivalent) | (no equivalent) |
| Seasonal Wetland | Freshwater Marsh | Wet Meadow | Coastal and Valley Freshwater Marsh* | (no equivalent) |
| Quarry Pond | Quarry Pond | Lacustrine | (no equivalent) | (no equivalent) |
| Ruderal | Disturbed/Developed | Urban | (no equivalent) | • *Brassica (nigra*) and Other Mustards Semi-Natural Herbaceous Stands<br>• *Centaurea (solstitialis, melitensis*) Semi-Natural Herbaceous Stands<br>• *Conium maculatum-Foeniculum vulgare* Semi-Natural Herbaceous Stands<br>• *Cortaderia (jubata, selloana*) Semi-Natural Herbaceous Stands |
| Landscaped | Developed | Urban | (no equivalent) | (no equivalent) |
| Developed/ Disturbed/Nursery | Developed/ Disturbed | Urban | (no equivalent) | (no equivalent) |

* California Department of Fish and Wildlife sensitive natural community (CDFW, 2015).

# APPENDIX C

# Special-status Wildlife Species Considered as Potentially Occurring in the Survey Area

U.S. Fish and Wildlife Service

# Trust Resources List

**This resource list is to be used for planning purposes only — it is not an official species list.**

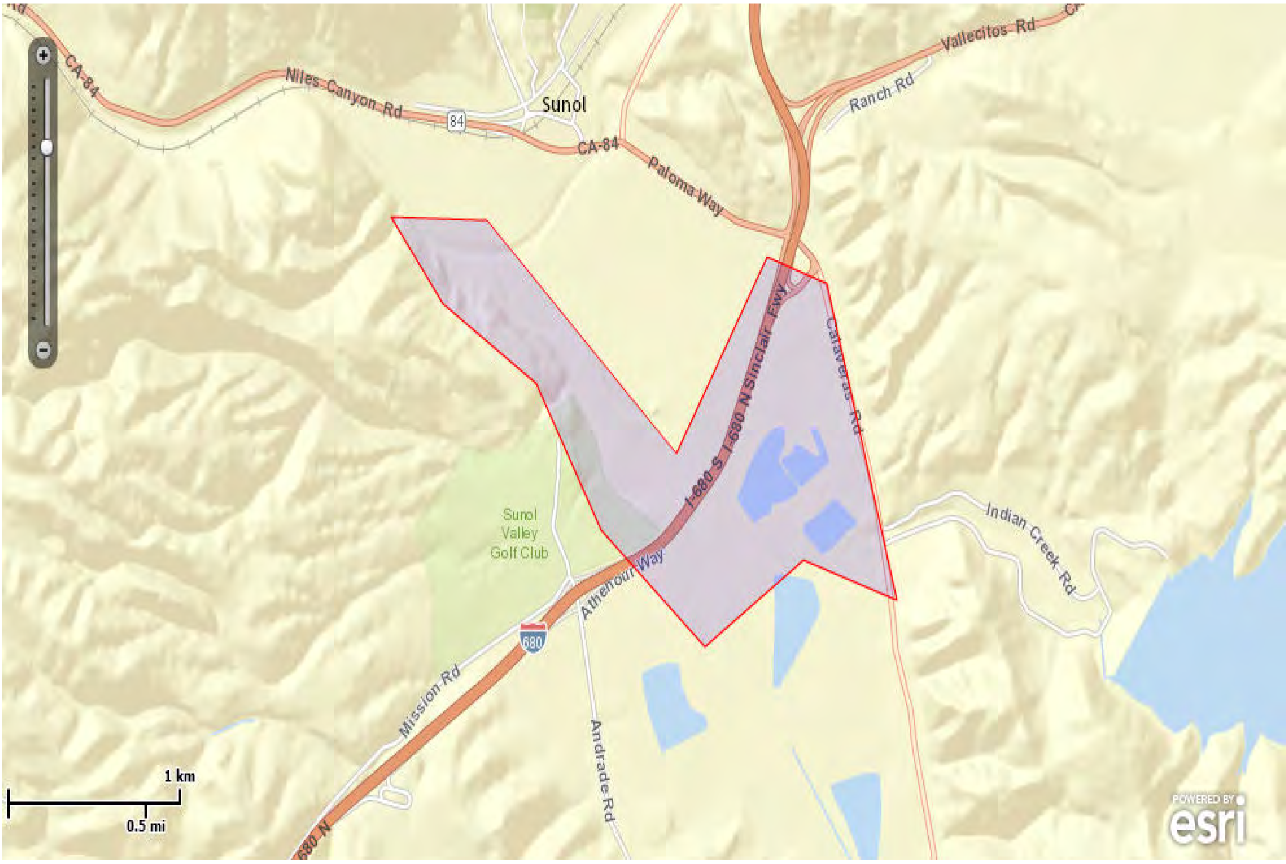
**Endangered Species Act species list information for your project is available online and listed below for the following FWS Field Offices:**

**Sacramento Fish and Wildlife Office**
FEDERAL BUILDING
2800 COTTAGE WAY, ROOM W-2605
SACRAMENTO, CA 95825
(916) 414-6600

## *Project Name:*

Alameda Creek Recapture Project

## *Project Location Map:*



## *Project Counties:*

Alameda, CA

## *Geographic coordinates (Open Geospatial Consortium Well-Known Text, NAD83):*

MULTIPOLYGON (((-121.8974773 37.5897819, -121.8911259 37.5896459, -121.8785946 37.5801235, -121.8725864 37.5881496, -121.8686382 37.5870613, -121.8640034 37.5741375, -121.8701832 37.5757701, -121.8767063 37.5722327, -121.8835728 37.5769945, -121.8878643 37.5829804, -121.8940441 37.5862452, -121.8974773 37.5897819)))

## *Project Type:*

** Other **

# Trust Resources List

## *Endangered Species Act Species List (USFWS Endangered Species Program).*

There are a total of **13** threatened or endangered species on your species list. Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fishes may appear on the species list because a project could cause downstream effects on the species. Critical habitats listed under the **Has Critical Habitat** column may or may not lie within your project area. See the **Critical habitats within your project area** section below for critical habitat that lies within your project area. Please contact the designated FWS office if you have questions.

### Species that should be considered in an effects analysis for your project:

| Amphibians | Status | | Has Critical Habitat | Contact |
|---|---|---|---|---|
| California Tiger Salamander<br>(*Ambystoma californiense*)<br>Population: U.S.A. (CA - Sonoma County) | Endangered | species info | Final designated critical habitat | Sacramento Fish And Wildlife Office |
| California red-legged frog<br>(*Rana draytonii*)<br>Population: Entire | Threatened | species info | Final designated critical habitat | Sacramento Fish And Wildlife Office |
| Birds | | | | |
| California Least tern<br>(*Sterna antillarum browni*) | Endangered | species info | | Sacramento Fish And Wildlife Office |
| Crustaceans | | | | |
| Conservancy fairy shrimp<br>(*Branchinecta conservatio*)<br>Population: Entire | Endangered | species info | Final designated critical habitat | Sacramento Fish And Wildlife Office |
| Vernal Pool fairy shrimp<br>(*Branchinecta lynchi*)<br>Population: Entire | Threatened | species info | Final designated critical habitat | Sacramento Fish And Wildlife Office |
| Vernal Pool tadpole shrimp<br>(*Lepidurus packardi*)<br>Population: Entire | Endangered | species info | Final designated critical habitat | Sacramento Fish And Wildlife Office |
| Fishes | | | | |
| Delta smelt<br>(*Hypomesus transpacificus*)<br>Population: Entire | Threatened | species info | Final designated critical habitat | Sacramento Fish And Wildlife Office |

| | | | | |
|---|---|---|---|---|
| steelhead<br>(*Oncorhynchus (=salmo) mykiss*)<br>Population: Northern California DPS | Threatened | species info | Final designated critical habitat | Sacramento Fish And Wildlife Office |
| Flowering Plants | | | | |
| Contra Costa goldfields<br>(*Lasthenia conjugens*) | Endangered | species info | Final designated critical habitat | Sacramento Fish And Wildlife Office |
| Insects | | | | |
| Bay Checkerspot butterfly<br>(*Euphydryas editha bayensis*)<br>Population: Entire | Threatened | species info | Final designated critical habitat | Sacramento Fish And Wildlife Office |
| Mammals | | | | |
| Salt Marsh Harvest mouse<br>(*Reithrodontomys raviventris*)<br>Population: U.S.A.(CA) | Endangered | species info | | Sacramento Fish And Wildlife Office |
| San Joaquin Kit fox<br>(*Vulpes macrotis mutica*)<br>Population: U.S.A(CA) | Endangered | species info | | Sacramento Fish And Wildlife Office |
| Reptiles | | | | |
| Alameda whipsnake<br>(*Masticophis lateralis euryxanthus*)<br>Population: Entire | Threatened | species info | Final designated critical habitat | Sacramento Fish And Wildlife Office |

**Critical habitats within your project area:**

*There are no critical habitats within your project area.*

## *FWS National Wildlife Refuges (USFWS National Wildlife Refuges Program).*

*There are no refuges found within the vicinity of your project.*

## *FWS Migratory Birds (USFWS Migratory Bird Program).*

The protection of birds is regulated by the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA). Any activity, intentional or unintentional, resulting in take of migratory birds, including eagles, is prohibited unless otherwise permitted by the U.S. Fish and Wildlife Service (50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)). The MBTA has no provision for allowing take of migratory birds that may be unintentionally killed or injured by otherwise lawful activities. For more information regarding these Acts see: http://www.fws.gov/migratorybirds/RegulationsandPolicies.html.

All project proponents are responsible for complying with the appropriate regulations protecting birds when planning and developing a project. To meet these conservation obligations, proponents should identify potential or existing project-related impacts to migratory birds and their habitat and develop and implement conservation measures that avoid, minimize, or compensate for these impacts. The Service's Birds of Conservation Concern (2008) report identifies species, subspecies, and populations of all migratory nongame birds that, without additional conservation actions, are likely to become listed under the Endangered Species Act as amended (16 U.S.C 1531 et seq.).

For information about Birds of Conservation Concern, go to:
http://www.fws.gov/migratorybirds/CurrentBirdIssues/Management/BCC.html.

To search and view summaries of year-round bird occurrence data within your project area, go to the Avian Knowledge Network Histogram Tool links in the Bird Conservation Tools section at: http://www.fws.gov/migratorybirds/CCMB2.htm.

For information about conservation measures that help avoid or minimize impacts to birds, please visit:
http://www.fws.gov/migratorybirds/CCMB2.htm.

**Migratory birds of concern that may be affected by your project:**
There are **26** birds on your Migratory birds of concern list. The underlying data layers used to generate the migratory bird list of concern will continue to be updated regularly as new and better information is obtained. User feedback is one method of identifying any needed improvements. Therefore, users are encouraged to submit comments about any questions regarding species ranges (e.g., a bird on the USFWS BCC list you know does not occur in the specified location appears on the list, or a BCC species that you know does occur there is not appearing on the list). Comments should be sent to the ECOS Help Desk.

| Species Name | Bird of Conservation Concern (BCC) | Species Profile | Seasonal Occurrence in Project Area |
|---|---|---|---|
| Allen's Hummingbird (*Selasphorus sasin*) | Yes | species info | Breeding |

| | | | |
|---|---|---|---|
| Bald eagle (*Haliaeetus leucocephalus*) | Yes | species info | Year-round |
| Bell's Sparrow (*Amphispiza belli*) | Yes | species info | Year-round |
| Black Oystercatcher (*Haematopus bachmani*) | Yes | species info | Year-round |
| Black rail (*Laterallus jamaicensis*) | Yes | species info | Breeding |
| Black-chinned Sparrow (*Spizella atrogularis*) | Yes | species info | Breeding |
| Burrowing Owl (*Athene cunicularia*) | Yes | species info | Year-round |
| California spotted Owl (*Strix occidentalis occidentalis*) | Yes | species info | Year-round |
| Costa's Hummingbird (*Calypte costae*) | Yes | species info | Breeding |
| Fox Sparrow (*Passerella liaca*) | Yes | species info | Wintering |
| Lawrence's Goldfinch (*Carduelis lawrencei*) | Yes | species info | Breeding |
| Least Bittern (*Ixobrychus exilis*) | Yes | species info | Breeding |
| Lesser Yellowlegs (*Tringa flavipes*) | Yes | species info | Wintering |
| Lewis's Woodpecker (*Melanerpes lewis*) | Yes | species info | Wintering |
| Loggerhead Shrike (*Lanius ludovicianus*) | Yes | species info | Wintering |
| Long-Billed curlew (*Numenius americanus*) | Yes | species info | Wintering |
| Marbled Godwit (*Limosa fedoa*) | Yes | species info | Wintering |
| Nuttall's Woodpecker (*Picoides nuttallii*) | Yes | species info | Year-round |
| Oak Titmouse (*Baeolophus inornatus*) | Yes | species info | Year-round |
| Olive-Sided flycatcher (*Contopus cooperi*) | Yes | species info | Breeding |
| Peregrine Falcon (*Falco peregrinus*) | Yes | species info | Year-round |

| | | | |
|---|---|---|---|
| Short-billed Dowitcher (*Limnodromus griseus*) | Yes | species info | Wintering |
| Short-eared Owl (*Asio flammeus*) | Yes | species info | Wintering |
| Swainson's hawk (*Buteo swainsoni*) | Yes | species info | Wintering |
| tricolored blackbird (*Agelaius tricolor*) | Yes | species info | Year-round |
| Yellow-billed Magpie (*Pica nuttalli*) | Yes | species info | Year-round |

## *NWI Wetlands (USFWS National Wetlands Inventory).*

The U.S. Fish and Wildlife Service is the principal Federal agency that provides information on the extent and status of wetlands in the U.S., via the National Wetlands Inventory Program (NWI). In addition to impacts to wetlands within your immediate project area, wetlands outside of your project area may need to be considered in any evaluation of project impacts, due to the hydrologic nature of wetlands (for example, project activities may affect local hydrology within, and outside of, your immediate project area). It may be helpful to refer to the USFWS National Wetland Inventory website. The designated FWS office can also assist you. Impacts to wetlands and other aquatic habitats from your project may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal Statutes. Project Proponents should discuss the relationship of these requirements to their project with the Regulatory Program of the appropriate U.S. Army Corps of Engineers District.

**Data Limitations, Exclusions and Precautions**

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery and/or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

# Trust Resources List

**Exclusions** - Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

**Precautions** - Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

**The following wetland types intersect your project area in one or more locations:**

| Wetland Types | NWI Classification Code | Total Acres |
|---|---|---|
| Freshwater Emergent Wetland | PEM1C | 0.5278 |
| Freshwater Emergent Wetland | PEMC | 7.3681 |
| Freshwater Pond | PUBHx | 2.1123 |
| Riverine | R4SBAx | 0.6109 |
| Riverine | R3UBH | 51.0402 |
| Riverine | R4SBC | 9.2907 |
| Riverine | R3UBHx | 2.3741 |
| Riverine | R4SBA | 4.3691 |
| Riverine | R4SBCx | 0.9333 |
| Riverine | R3USC | 1.2199 |
| Riverine | R4USF | 22.2653 |

# Selected Elements by Scientific Name

## California Department of Fish and Wildlife

## California Natural Diversity Database

**Query Criteria:** Quad is (La Costa Valley (3712157) or Niles (3712158))

| Species | Element Code | Federal Status | State Status | Global Rank | State Rank | Rare Plant Rank/CDFW SSC or FP |
|---|---|---|---|---|---|---|
| ***Accipiter cooperii***<br>Cooper's hawk | ABNKC12040 | None | None | G5 | S4 | WL |
| ***Accipiter striatus***<br>sharp-shinned hawk | ABNKC12020 | None | None | G5 | S4 | WL |
| ***Agelaius tricolor***<br>tricolored blackbird | ABPBXB0020 | None | Endangered | G2G3 | S1S2 | SSC |
| ***Ambystoma californiense***<br>California tiger salamander | AAAAA01180 | Threatened | Threatened | G2G3 | S2S3 | SSC |
| ***Antrozous pallidus***<br>pallid bat | AMACC10010 | None | None | G5 | S3 | SSC |
| ***Aquila chrysaetos***<br>golden eagle | ABNKC22010 | None | None | G5 | S3 | FP |
| ***Ardea herodias***<br>great blue heron | ABNGA04010 | None | None | G5 | S4 | |
| ***Athene cunicularia***<br>burrowing owl | ABNSB10010 | None | None | G4 | S3 | SSC |
| ***Campanula exigua***<br>chaparral harebell | PDCAM020A0 | None | None | G2 | S2 | 1B.2 |
| ***Centromadia parryi ssp. congdonii***<br>Congdon's tarplant | PDAST4R0P1 | None | None | G3T2 | S2 | 1B.1 |
| ***Clarkia concinna ssp. automixa***<br>Santa Clara red ribbons | PDONA050A1 | None | None | G5?T3 | S3 | 4.3 |
| ***Corynorhinus townsendii***<br>Townsend's big-eared bat | AMACC08010 | None | Candidate Threatened | G3G4 | S2 | SSC |
| ***Delphinium californicum ssp. interius***<br>Hospital Canyon larkspur | PDRAN0B0A2 | None | None | G3T3 | S3 | 1B.2 |
| ***Emys marmorata***<br>western pond turtle | ARAAD02030 | None | None | G3G4 | S3 | SSC |
| ***Extriplex joaquinana***<br>San Joaquin spearscale | PDCHE041F3 | None | None | G2 | S2 | 1B.2 |
| ***Falco mexicanus***<br>prairie falcon | ABNKD06090 | None | None | G5 | S4 | WL |
| ***Falco peregrinus anatum***<br>American peregrine falcon | ABNKD06071 | Delisted | Delisted | G4T4 | S3S4 | FP |
| ***Lasiurus cinereus***<br>hoary bat | AMACC05030 | None | None | G5 | S4 | |
| ***Laterallus jamaicensis coturniculus***<br>California black rail | ABNME03041 | None | Threatened | G3G4T1 | S1 | FP |
| ***Linderiella occidentalis***<br>California linderiella | ICBRA06010 | None | None | G2G3 | S2S3 | |

| Species | Element Code | Federal Status | State Status | Global Rank | State Rank | Rare Plant Rank/CDFW SSC or FP |
|---|---|---|---|---|---|---|
| ***Masticophis lateralis euryxanthus***<br>Alameda whipsnake | ARADB21031 | Threatened | Threatened | G4T2 | S2 | |
| ***Melospiza melodia pusillula***<br>Alameda song sparrow | ABPBXA301S | None | None | G5T2? | S2? | SSC |
| ***Myotis yumanensis***<br>Yuma myotis | AMACC01020 | None | None | G5 | S4 | |
| ***Neotoma fuscipes annectens***<br>San Francisco dusky-footed woodrat | AMAFF08082 | None | None | G5T2T3 | S2S3 | SSC |
| ***Oncorhynchus mykiss irideus***<br>steelhead - central California coast DPS | AFCHA0209G | Threatened | None | G5T2T3Q | S2S3 | |
| ***Rana boylii***<br>foothill yellow-legged frog | AAABH01050 | None | None | G3 | S2S3 | SSC |
| ***Rana draytonii***<br>California red-legged frog | AAABH01022 | Threatened | None | G2G3 | S2S3 | SSC |
| ***Streptanthus albidus ssp. peramoenus***<br>most beautiful jewelflower | PDBRA2G012 | None | None | G2T2 | S2 | 1B.2 |
| ***Stuckenia filiformis ssp. alpina***<br>slender-leaved pondweed | PMPOT03091 | None | None | G5T5 | S3 | 2B.2 |
| ***Sycamore Alluvial Woodland***<br>Sycamore Alluvial Woodland | CTT62100CA | None | None | G1 | S1.1 | |

**Record Count: 30**

## TABLE C-1
## FULL LIST OF SENSITIVE SPECIES POTENTIALLY PRESENT IN THE ALAMEDA CREEK RECAPTURE PROJECT SURVEY AREA

| Common Name<br>Scientific Name | Listing Status FESA/ CESA/CDFW | General Habitat Requirements | Potential for Species Occurrence Within the Survey area |
|---|---|---|---|
| FEDERAL AND STATE LISTED SPECIES OR PROPOSED FOR LISTING | | | |
| Animals | | | |
| *Invertebrates* | | | |
| Conservancy fairy shrimp<br>*Branchinecta conservatio* | FE/-- | Vernal pools. | **Absent.** No suitable habitat present within the survey area. |
| Vernal pool fairy shrimp<br>*Branchinecta lynchi* | FT/-- | Vernal pools. | **Absent.** No suitable habitat present within the survey area. |
| Bay checkerspot butterfly<br>*Euphydryas editha bayansis* | FT/-- | Serpentine or similar soils with its host plant dwarf plantain or purple owl's clover. | **Absent.** Outside of the known range of this species and no suitable habitat present within the survey area. |
| Vernal pool tadpole shrimp<br>*Lepidurus packardi* | FE/-- | Vernal pools. | **Absent.** No suitable habitat present within the survey area. |
| *Amphibians* | | | |
| California tiger salamander<br>*Ambystoma californiense* | FT/ST | Occur in grasslands occupied by burrowing mammals; breed in ponds, vernal pools, and slow-moving or receding streams. | **High potential.** Numerous breeding locations are known within 1.2 miles of the survey area (CDFW, 2015). Additionally, several adults have been observed within 1 mile of the survey area. Non-native grassland with small mammal burrows within the survey area provide upland habitat. |
| California red-legged frog<br>*Rana draytonii* | FT/SSC | Breed in stock ponds, pools, and slow-moving streams. | **High potential.** This species has been observed in Alameda Creek within the survey area, 3 miles upstream, and 0.2 mile downstream of the survey area, and from San Antonio Creek approximately 0.4 mile upstream of the survey area (CDFW, 2015; SFPUC, 2010b and 2015). Alameda Creek and San Antonio Creek provide habitat and species has potential to disperse through upland areas. |
| *Reptiles* | | | |
| Alameda whipsnake<br>*Masticophis lateralis euryxanthus* | FT/ST | Coastal scrub, grassland, open oak woodland. Prefers rocky openings for basking, foraging. | **Moderate potential.** This species has been documented within 5 miles of the survey area (CDFW, 2015). Core habitat is absent, but some foraging and dispersal habitat is present in the survey area. |
| *Birds* | | | |
| American peregrine falcon<br>*Falco peregrinus anatum* | FD/SD/FP | Nests on cliffs, tall buildings, high bridges, and specially-designed towers. | **Low potential.** Suitable nesting habitat is absent from the survey area. |
| Bald eagle<br>*Haliaeetus leucocephalus* | FD/SE/FP | Nest in mountainous habitats near reservoirs, lakes and rivers, usually in coniferous trees, close to permanent water. | **Low potential.** Suitable nesting habitat is absent from the survey area, although quarry pits could be used for foraging. Closest documented nesting site is 3 miles east of the survey area (SFPUC, 2011d). |

## TABLE C-1 (Continued)
## FULL LIST OF SENSITIVE SPECIES POTENTIALLY PRESENT IN THE ALAMEDA CREEK RECAPTURE PROJECT SURVEY AREA

| Common Name<br>Scientific Name | Listing Status FESA/ CESA/CDFW | General Habitat Requirements | Potential for Species Occurrence Within the Survey area |
|---|---|---|---|
| FEDERAL AND STATE LISTED SPECIES OR PROPOSED FOR LISTING (cont.) | | | |
| Animals (cont.) | | | |
| *Birds (cont.)* | | | |
| California black rail<br>*Laterallus jamaicensis coturniculus* | --/ST/FP | Freshwater marshes, wet meadows, and shallow margins of saltwater margins bordering larger bays; needs water depths of about 1 inch that do not fluctuate during the year and dense vegetation for nesting habitat | **Low potential.** While patches of freshwater marsh occur within Alameda Creek and a seasonal wetland occurs in the quarry area, large expanses of undisturbed suitable habitat are not present. |
| California least tern<br>*Sterna antillarum browni* | FE/SE/FP | Nest on beaches or open areas. | **Absent.** No suitable nesting habitat present. Survey area is outside the range of this species. |
| *Mammals* | | | |
| Townsend's big-eared bat<br>*Corynorhinus townsendii* | --/SC | Roosts in caves, mines, buildings or other human-made structures for roosting. Forages in open lowland areas. Sensitive to human disturbance | **Low potential.** No suitable undisturbed roosting habitat present in the survey area. |
| Saltmarsh harvest mouse<br>*Reithrodontomys raviventris* | FE/SE/FP | Salt marsh habitat dominated by pickleweed. | **Absent.** No suitable habitat present. Survey area is outside the range of this species. |
| San Joaquin kit fox<br>*Vulpes macrotis mutica* | FE/SE | Open grassland areas. | **Absent.** Survey area is outside the range of this species. |
| FEDERAL OR STATE SPECIES OF SPECIAL CONCERN | | | |
| Animals | | | |
| *Amphibians* | | | |
| Foothill yellow-legged frog<br>*Rana boylii* | --/SSC | A year-round resident of cobble-lined streams; breeds in spring months after high water subsides. | **Low potential.** Based on habitat assessment survey, suitable habitat is absent from the survey area. This species is limited to perennial, moderate- to high-gradient portions of Alameda Creek that occur several miles upstream from the survey area. |
| *Reptiles* | | | |
| Western pond turtle<br>*Emys marmorata* | --/SSC | Lakes, ponds, reservoirs, and slow-moving streams and rivers, primarily in foothills and lowlands. | **High potential.** This species is known from Alameda Creek and San Antonio Creek (CDFW, 2015; ESA, 2009a; SFPUC, 2015). Western pond turtle may be found in quarry pits, riparian areas, and uplands. |
| Coast horned lizard<br>*Phyrnosoma coronatum* | --/SSC | Sandy areas and river washes, as well as riparian woodland clearings, chaparral, and alkali flats. | **Low to moderate potential.** Alameda Creek provide suitable river wash habitat for this species. Documented within 5 miles of the survey area (SFPUC, 2010b). |
| *Birds* | | | |
| Cooper's hawk<br>*Accipiter cooperii* | --/3503.5 | Nest sites mainly in riparian growths of deciduous trees, as in canyon bottoms on river flood-plains; also in live oaks. | **Moderate potential.** Riparian, oak, and eucalyptus trees within the survey area provide suitable nesting habitat for this species. Nearest CNDDB occurrence is approximately 2.7 miles west of survey area (CDFW, 2015). |

## TABLE C-1 (Continued)
## FULL LIST OF SENSITIVE SPECIES POTENTIALLY PRESENT IN THE ALAMEDA CREEK RECAPTURE PROJECT SURVEY AREA

| Common Name<br>Scientific Name | Listing Status FESA/ CESA/CDFW | General Habitat Requirements | Potential for Species Occurrence Within the Survey area |
|---|---|---|---|
| FEDERAL OR STATE SPECIES OF SPECIAL CONCERN (cont.) | | | |
| Animals (cont.) | | | |
| *Birds (cont.)* | | | |
| Sharp-shinned hawk<br>*Accipiter striatus* | --/3503.5 | A common migrant and winter resident in California. Nests in dense, even-aged, single-layered forest canopy. | **Low potential.** Dense oak woodland nesting habitat is not present within the survey area. Nesting is documented from hills surrounding Sunol Valley, with the nearest known occurrence approximately 2.9 miles south of the survey area (SFPUC, 2015). |
| Tricolored blackbird<br>*Agelaius tricolor* | --/SSC | A colonial nester; nests in dense freshwater emergent vegetation. | **Moderate potential.** Breeding is known from the Sunol Valley and large flocks have been observed in the survey area (CDFW, 2015; SFPUC, 2015). Potential breeding habitat is present in the survey area. |
| Golden eagle<br>*Aquila chrysaetos* | --/CDFW Fully Protected | Nests in open areas on cliffs and in large trees. | **Moderate potential.** Larger trees near Alameda and San Antonio Creeks provide potential nesting habitat. Several occurrence records in the vicinity of the survey area (SFPUC, 2015). |
| Short-eared owl<br>*Asio flammeus* | --/SSC | Nests in grasslands, usually on the ground. | **Moderate potential.** Grasslands within the site provide nesting habitat for short-eared owl. Known nesting site along southeastern San Antonio Reservoir (SFPUC, 2010b). |
| Burrowing owl<br>*Athene cunicularia* | --/SSC | Nests and forages in low-growing grasslands that support burrowing mammals. | **Moderate potential.** Grasslands and ruderal habitat with ground squirrel burrows within the survey area provide suitable habitat for this species. This species has been documented within 5 miles of the survey area (SFPUC, 2010b). |
| Ferruginous hawk<br>*Buteo regalis* | --/3503.5 | Uncommon winter resident and migrant. Nests in foothills or prairies, on low cliffs, cut banks, shrubs, trees, or other natural or manmade elevated structures. Nest tree often isolated or in transition zones. | **Low potential.** Although there is a 1987 breeding record within 5 miles of the survey area (SFPUC, 2010b), the survey area is outside of the typical breeding range of this species and this species has low potential to breed within the survey area. |
| Northern harrier<br>*Circus cyaneus* | --/SSC | Nests in coastal freshwater and saltwater marshes, nests and forages in grasslands. | **Moderate potential.** Limited nesting habitat is available adjacent to quarry pits because of site disturbance, but potential to nest in along Alameda Creek. |
| White-tailed kite (nesting)<br>*Elanus leucurus* | --/CDFW Fully Protected | Nests near wet meadows and open grasslands in dense oak, willow or other large tree stands. | **Moderate potential.** Potential nesting habitat is present in trees adjacent to Alameda and San Antonio Creeks. |
| Prairie falcon<br>*Falco mexicanus* | --/3503.5 | Uncommon permanent resident. Usually nests on cliffs overlooking open areas. | **Low potential.** Nesting habitat is absent from the survey area. The closest documented CNDDB breeding location is approximately 3.9 miles south southeast of the survey area (Brian Acord, pers. comm., 2015). |
| Loggerhead shrike<br>*Lanius ludovicianus* | --/SSC | Scrub, open woodlands, and grasslands. | **High potential.** Potential nesting habitat present in grasslands, shrubs, and trees throughout the survey area. |

### TABLE C-1 (Continued) FULL LIST OF SENSITIVE SPECIES POTENTIALLY PRESENT IN THE ALAMEDA CREEK RECAPTURE PROJECT SURVEY AREA

| Common Name<br>Scientific Name | Listing Status FESA/ CESA/CDFW | General Habitat Requirements | Potential for Species Occurrence Within the Survey area |
|---|---|---|---|
| FEDERAL OR STATE SPECIES OF SPECIAL CONCERN (cont.) | | | |
| Animals (cont.) | | | |
| *Birds (cont.)* | | | |
| Alameda song sparrow<br>*Melospiza melodia pusillula* | --/SSC | Tidal salt marsh. | **Absent.** Nesting habitat is absent from the survey area. |
| Osprey<br>*Pandion haliaetus* | --/3503.5 | Nest on large sturdy treetops, cliffs, or human-built platforms near water. | **Low potential.** Although the quarry pits may provide some suitable foraging habitat, disturbance from quarry operations would likely preclude nesting on-site. SFPUC occurrence record in the survey area vicinity is from a resident, not breeding, bird (SFPUC, 2010b). |
| American white pelican<br>*Pelecanus erythrorhynchos* | --/SSC | Breed on islands in lakes or wetlands. | **Low potential.** The survey area is outside of the breeding range of this species. SFPUC occurrence record in the survey area vicinity is from a wintering, not breeding bird (SFPUC, 2010b). Low potential to use the quarry pits during wintering. |
| *Mammals* | | | |
| Pallid bat<br>*Antrozous pallidus* | --/SSC | Day roosts are mainly in caves, crevices and mines; also found in buildings and under bark. Forages in open lowland areas. | **Moderate potential.** Potential roosting habitat is available in large diameter trees. |
| Tule elk<br>*Cervus elaphus nannodes* | --/--/Local protection | The San Antonio elk herd is a resident herd from hills surrounding the San Antonio Reservoir. | **Low potential.** Tule elk are present on the slopes east of Calaveras Road, but would not be expected to cross the fenced road into the survey area. |
| San Francisco dusky-footed woodrat<br>*Neotoma fuscipes* | --/SSC | Occur in forests with established understory. Construct nests from woody debris. | **High potential.** This species is known to nest within the vicinity of the survey area (CDFW, 2015), suitable habitat is present in the Alameda Creek corridor and one woodrat nest was observed during the 2011 reconnaissance survey. |
| American badger<br>*Taxidea taxus* | --/SSC | Grasslands, savannas, deserts, timberline mountain meadows. | **Moderate potential.** Documented 1 mile east of the survey area (SFPUC, 2010b). Some potential habitat present in grassland within the survey area. |

**STATUS CODES:**

FEDERAL ENDANGERED SPECIES ACT (FESA)
FE = Listed as Endangered (in danger of extinction) by the Federal Government.
FT = Listed as Threatened (likely to become Endangered within the foreseeable future) by the Federal Government.
FD = Federally Delisted

CALIFORNIA ENDANGERED SPECIES ACT (CESA)/CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE (CDFW)
SE = Listed as Endangered by the State of California
ST = Listed as Threatened by the State of California
SC = State Candidate for Listing as Endangered
SD = State Delisted
SSC = California Species of Special Concern
FP = California Fully Protected
3503.5 = Section 3503.5 of the California Fish and Game Code prohibits take, possession, or destruction of any birds in the orders Falconiformes (hawks) or Strigiformes (owls), or of their nests and eggs.

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# APPENDIX D

# Special-status Plant Species Considered as Potentially Occurring in the Survey Area

# Selected Elements by Scientific Name

## California Department of Fish and Wildlife

## California Natural Diversity Database

**Query Criteria:** Taxonomic Group is (Dune or Scrub or Herbaceous or Marsh or Riparian or Woodland or Forest or Alpine or Inland Waters or Marine or Estuarine or Riverine or Palustrine or Ferns or Gymnosperms or Monocots or Dicots or Lichens or Bryophytes) and Quad is (La Costa Valley (3712157) or Niles (3712158) or Mendenhall Springs (3712156) or Mt. Day (3712146) or Livermore (3712167) or Calaveras Reservoir (3712147) or Milpitas (3712148) or Altamont (3712166) or Dublin (3712168) or Livermore (3712167))

| Species | Element Code | Federal Status | State Status | Global Rank | State Rank | Rare Plant Rank/CDFW SSC or FP |
|---|---|---|---|---|---|---|
| ***Astragalus tener var. tener***<br>alkali milk-vetch | PDFAB0F8R1 | None | None | G2T2 | S2 | 1B.2 |
| ***Atriplex cordulata var. cordulata***<br>heartscale | PDCHE040B0 | None | None | G3T2 | S2 | 1B.2 |
| ***Atriplex depressa***<br>brittlescale | PDCHE042L0 | None | None | G2 | S2 | 1B.2 |
| ***Atriplex minuscula***<br>lesser saltscale | PDCHE042M0 | None | None | G2 | S2 | 1B.1 |
| ***Balsamorhiza macrolepis***<br>big-scale balsamroot | PDAST11061 | None | None | G2 | S2 | 1B.2 |
| ***Blepharizonia plumosa***<br>big tarplant | PDAST1C011 | None | None | G2 | S2 | 1B.1 |
| ***Boechera rubicundula***<br>Mt. Day rockcress | PDBRA40100 | None | None | G1 | S1 | 1B.1 |
| ***California macrophylla***<br>round-leaved filaree | PDGER01070 | None | None | G2 | S2 | 1B.1 |
| ***Calyptridium parryi var. hesseae***<br>Santa Cruz Mountains pussypaws | PDPOR09052 | None | None | G3G4T2 | S2 | 1B.1 |
| ***Campanula exigua***<br>chaparral harebell | PDCAM020A0 | None | None | G2 | S2 | 1B.2 |
| ***Centromadia parryi ssp. congdonii***<br>Congdon's tarplant | PDAST4R0P1 | None | None | G3T2 | S2 | 1B.1 |
| ***Chloropyron maritimum ssp. palustre***<br>Point Reyes salty bird's-beak | PDSCR0J0C3 | None | None | G4?T2 | S2 | 1B.2 |
| ***Chloropyron molle ssp. hispidum***<br>hispid salty bird's-beak | PDSCR0J0D1 | None | None | G2T2 | S2 | 1B.1 |
| ***Chloropyron palmatum***<br>palmate-bracted salty bird's-beak | PDSCR0J0J0 | Endangered | Endangered | G1 | S1 | 1B.1 |
| ***Chorizanthe robusta var. robusta***<br>robust spineflower | PDPGN040Q2 | Endangered | None | G2T1 | S1 | 1B.1 |
| ***Clarkia concinna ssp. automixa***<br>Santa Clara red ribbons | PDONA050A1 | None | None | G5?T3 | S3 | 4.3 |
| ***Deinandra bacigalupii***<br>Livermore tarplant | PDAST4R0V0 | None | Candidate Endangered | G1 | S1 | 1B.2 |
| ***Delphinium californicum ssp. interius***<br>Hospital Canyon larkspur | PDRAN0B0A2 | None | None | G3T3 | S3 | 1B.2 |
| ***Eryngium aristulatum var. hooveri***<br>Hoover's button-celery | PDAPI0Z043 | None | None | G5T1 | S1 | 1B.1 |

| Species | Element Code | Federal Status | State Status | Global Rank | State Rank | Rare Plant Rank/CDFW SSC or FP |
|---|---|---|---|---|---|---|
| ***Extriplex joaquinana***<br>San Joaquin spearscale | PDCHE041F3 | None | None | G2 | S2 | 1B.2 |
| ***Fritillaria agrestis***<br>stinkbells | PMLIL0V010 | None | None | G3 | S3 | 4.2 |
| ***Fritillaria liliacea***<br>fragrant fritillary | PMLIL0V0C0 | None | None | G2 | S2 | 1B.2 |
| ***Helianthella castanea***<br>Diablo helianthella | PDAST4M020 | None | None | G2 | S2 | 1B.2 |
| ***Lasthenia conjugens***<br>Contra Costa goldfields | PDAST5L040 | Endangered | None | G1 | S1 | 1B.1 |
| ***Legenere limosa***<br>legenere | PDCAM0C010 | None | None | G2 | S2 | 1B.1 |
| ***Leptosyne hamiltonii***<br>Mt. Hamilton coreopsis | PDAST2L0C0 | None | None | G2 | S2 | 1B.2 |
| ***Malacothamnus arcuatus***<br>arcuate bush-mallow | PDMAL0Q0E0 | None | None | G1Q | S1 | 1B.2 |
| ***Malacothamnus hallii***<br>Hall's bush-mallow | PDMAL0Q0F0 | None | None | G2Q | S2 | 1B.2 |
| ***Navarretia prostrata***<br>prostrate vernal pool navarretia | PDPLM0C0Q0 | None | None | G2 | S2 | 1B.1 |
| ***Northern Coastal Salt Marsh***<br>Northern Coastal Salt Marsh | CTT52110CA | None | None | G3 | S3.2 | |
| ***Plagiobothrys glaber***<br>hairless popcornflower | PDBOR0V0B0 | None | None | GH | SH | 1A |
| ***Polemonium carneum***<br>Oregon polemonium | PDPLM0E050 | None | None | G3G4 | S2 | 2B.2 |
| ***Sidalcea malachroides***<br>maple-leaved checkerbloom | PDMAL110E0 | None | None | G3 | S3 | 4.2 |
| ***Streptanthus albidus ssp. peramoenus***<br>most beautiful jewelflower | PDBRA2G012 | None | None | G2T2 | S2 | 1B.2 |
| ***Stuckenia filiformis ssp. alpina***<br>slender-leaved pondweed | PMPOT03091 | None | None | G5T5 | S3 | 2B.2 |
| ***Suaeda californica***<br>California seablite | PDCHE0P020 | Endangered | None | G1 | S1 | 1B.1 |
| ***Sycamore Alluvial Woodland***<br>Sycamore Alluvial Woodland | CTT62100CA | None | None | G1 | S1.1 | |
| ***Trifolium hydrophilum***<br>saline clover | PDFAB400R5 | None | None | G2 | S2 | 1B.2 |
| ***Tropidocarpum capparideum***<br>caper-fruited tropidocarpum | PDBRA2R010 | None | None | G1 | S1 | 1B.1 |
| ***Valley Sink Scrub***<br>Valley Sink Scrub | CTT36210CA | None | None | G1 | S1.1 | |

**Record Count: 40**

# CALIFORNIA NATIVE PLANT SOCIETY SEARCH FOR 9-QUADRANGLE AREA CENTERED ON LA COSTA VALLEY 7.5' QUAD

Query dated May 21, 2015

| Scientific Name | Common Name | Family | CNPS Status | State Rank | Global Rank |
|---|---|---|---|---|---|
| Acanthomintha lanceolata | Santa Clara thorn-mint | Lamiaceae | 4.2 | S4 | G4 |
| Amsinckia lunaris | bent-flowered fiddleneck | Boraginaceae | 1B.2 | S2? | G2? |
| Androsace elongata ssp. acuta | California androsace | Primulaceae | 4.2 | S3S4 | G5?T3T4 |
| Astragalus tener var. tener | alkali milk-vetch | Fabaceae | 1B.2 | S2 | G2T2 |
| Atriplex cordulata var. cordulata | heartscale | Chenopodiaceae | 1B.2 | S2 | G3T2 |
| Atriplex coronata var. coronata | crownscale | Chenopodiaceae | 4.2 | S3 | G4T3 |
| Atriplex depressa | brittlescale | Chenopodiaceae | 1B.2 | S2 | G2 |
| Atriplex minuscula | lesser saltscale | Chenopodiaceae | 1B.1 | S2 | G2 |
| Balsamorhiza macrolepis | big-scale balsamroot | Asteraceae | 1B.2 | S2 | G2 |
| Blepharizonia plumosa | big tarplant | Asteraceae | 1B.1 | S2 | G2 |
| Boechera rubicundula | Mt. Day rockcress | Brassicaceae | 1B.1 | S1 | G1 |
| California macrophylla | round-leaved filaree | Geraniaceae | 1B.1 | S2 | G2 |
| Calochortus umbellatus | Oakland star-tulip | Liliaceae | 4.2 | S4 | G4 |
| Calyptridium parryi var. hesseae | Santa Cruz Mountains pussypaws | Montiaceae | 1B.1 | S2 | G3G4T2 |
| Campanula exigua | chaparral harebell | Campanulaceae | 1B.2 | S2 | G2 |
| Centromadia parryi ssp. congdonii | Congdon's tarplant | Asteraceae | 1B.1 | S2 | G3T2 |
| Chloropyron maritimum ssp. palustre | Point Reyes bird's-beak | Orobanchaceae | 1B.2 | S2 | G4?T2 |
| Chloropyron molle ssp. hispidum | hispid bird's-beak | Orobanchaceae | 1B.1 | S2 | G2T2 |
| Chloropyron palmatum | palmate-bracted bird's-beak | Orobanchaceae | 1B.1 | S1 | G1 |
| Clarkia breweri | Brewer's clarkia | Onagraceae | 4.2 | S4 | G4 |
| Clarkia concinna ssp. automixa | Santa Clara red ribbons | Onagraceae | 4.3 | S3 | G5?T3 |
| Deinandra bacigalupii | Livermore tarplant | Asteraceae | 1B.2 | S1 | G1 |
| Delphinium californicum ssp. interius | Hospital Canyon larkspur | Ranunculaceae | 1B.2 | S3 | G3T3 |
| Eriophyllum jepsonii | Jepson's woolly sunflower | Asteraceae | 4.3 | S3 | G3 |
| Eryngium aristulatum var. hooveri | Hoover's button-celery | Apiaceae | 1B.1 | S1 | G5T1 |
| Etriplex joaquinana | San Joaquin spearscale | Chenopodiaceae | 1B.2 | S2 | G2 |
| Fritillaria agrestis | stinkbells | Liliaceae | 4.2 | S3 | G3 |
| Fritillaria liliacea | fragrant fritillary | Liliaceae | 1B.2 | S2 | G2 |

CNPS 9-quad Query (contd)

| Scientific Name | Common Name | Family | CNPS Status | State Rank | Global Rank |
|---|---|---|---|---|---|
| Helianthella castanea | Diablo helianthella | Asteraceae | 1B.2 | S2 | G2 |
| Lasthenia conjugens | Contra Costa goldfields | Asteraceae | 1B.1 | S1 | G1 |
| Legenere limosa | legenere | Campanulaceae | 1B.1 | S2 | G2 |
| Leptosiphon acicularis | bristly leptosiphon | Polemoniaceae | 4.2 | S3 | G3 |
| Leptosiphon ambiguus | serpentine leptosiphon | Polemoniaceae | 4.2 | S4 | G4 |
| Leptosyne hamiltonii | Mt. Hamilton coreopsis | Asteraceae | 1B.2 | S2 | G2 |
| Lessingia hololeuca | woolly-headed lessingia | Asteraceae | 3 | S3? | G3? |
| Malacothamnus arcuatus | arcuate bush-mallow | Malvaceae | 1B.2 | S1 | G1Q |
| Malacothamnus hallii | Hall's bush-mallow | Malvaceae | 1B.2 | S2 | G2Q |
| Monardella antonina ssp. antonina | San Antonio Hills monardella | Lamiaceae | 3 | S1S3 | G4T1T3Q |
| Myosurus minimus ssp. apus | little mousetail | Ranunculaceae | 3.1 | S2 | G5T2Q |
| Navarretia nigelliformis ssp. nigelliformis | adobe navarretia | Polemoniaceae | 4.2 | S3 | G4T3 |
| Navarretia prostrata | prostrate vernal pool navarretia | Polemoniaceae | 1B.1 | S2 | G2 |
| Plagiobothrys glaber | hairless popcorn-flower | Boraginaceae | 1A | SH | GH |
| Polemonium carneum | Oregon polemonium | Polemoniaceae | 2B.2 | S2 | G3G4 |
| Sidalcea malachroides | maple-leaved checkerbloom | Malvaceae | 4.2 | S3 | G3 |
| Streptanthus albidus ssp. peramoenus | most beautiful jewel-flower | Brassicaceae | 1B.2 | S2 | G2T2 |
| Stuckenia filiformis ssp. alpina | slender-leaved pondweed | Potamogetonaceae | 2B.2 | S3 | G5T5 |
| Suaeda californica | California seablite | Chenopodiaceae | 1B.1 | S1 | G1 |
| Trifolium hydrophilum | saline clover | Fabaceae | 1B.2 | S2 | G2 |
| Tropidocarpum capparideum | caper-fruited tropidocarpum | Brassicaceae | 1B.1 | S1 | G1 |

## SPECIAL-STATUS PLANTS CONSIDERED, ALAMEDA CREEK RECAPTURE PROJECT

| Common Name<br>Scientific Name | Listing Status FESA/ CESA/CNPS | Habitat and Distribution | Elevation Range | Distribution | Blooming Period |
|---|---|---|---|---|---|
| FEDERAL AND STATE-LISTED SPECIES OR PROPOSED FOR LISTING | | | | | |
| Palmate-bracted bird's-beak<br>*Chloropyron palmatum* | E/E/1B.1 | Chenopod scrub, valley and foothill grassland, alkaline soils | 15-500 feet | ALA, COL, FRE, GLE, MAD, SJQ*, YOL | May-October |
| Robust spineflower<br>*Chorizanthe robusta* var. *robusta* | E/--/1B.1 | Cismontane woodland, coastal bluff scrub, coastal dunes; sandy terraces and bluffs or in loose sand | 5-1000 feet | Currently known from only six extended occurrences. Nearest record is an extirpated site on Oakland East quad. ALA*, MNT, MRN?, SCL*, SCR, SFO, SMT* | April-September |
| Livermore tarplant<br>*Deinandra bacigalupi* | CE/--/1B.2 | Meadows and seeps in alkaline soils | 490-610 feet | Known only from the Springtown Area of Livermore; ALA | June-October |
| Contra Costa goldfields<br>*Lasthenia conjugens* | FE/–/1B.1 | Cismontane woodland, playas, valley and foothill grassland; vernal pools, swales and low depressions in open grassy areas. | 0-1600 feet | Nearest records are in Fremont baylands and Don Pedro Wildlife Refuge. Range: ALA, CCA, MEN, MNT, MRN, NAP, SBA, SCL, SOL, SON. | March – June |
| California seablite<br>*Suaeda californica* | E/--/1B.1 | Meadows and swamps; coastal salt marsh | 0-50 feet | Largely extirpated from the Bay Area salt marshes; ALA*, CCA*, SCL*, SFO*, SLO | July-October |
| OTHER PLANT SPECIES OF CONCERN | | | | | |
| Santa Clara thorn-mint<br>*Acanthomintha lanceolata* | --/--/4.2 | Chaparral, cismontane woodland and coastal scrub, generally on serpentinite. | 260-4000 feet | Nearest records are from Calaveras Dam and Sunol Regional Wilderness. Range: ALA, FRE, MER, MNT, SBT, SCL, SJQ, STA. | March-June |
| California androsace<br>*Androsace elongata* ssp. *acuta* | --/--/4.2 | Chaparral, cismontane woodland, coastal scrub, pinyon and juniper woodland, valley and foothill grassland; meadows and seeps. Highly localized and often overlooked. | 490-4000 feet | Nearest record is in the headwaters of Arroyo del Valle. Range: ALA, CCA, COL, FRE, GLE, KRN, LAX, MER, RIV, SBD, SBT, SCL, SDG, SIS, SJQ, SLO, SMT, STA, TEH. | March-June |
| Bent-flowered fiddleneck<br>*Amsinckia lunaris* | --/--/1B.2 | Coastal bluff scrub, cismontane woodland, valley and foothill woodland; | 5-1700 feet | Many records in ALA, CCA, COL, LAK, MRN, NAP, SVT, SCL, SCR, SMT, SON, YOL | March-June |
| Alkali milk-vetch<br>*Astragalus tener* var*. tener* | --/--/1B.2 | Vernal pools, valley and foothill grassland, playas; adobe clay in vernally moist places; low ground flooded lands | 3-200 feet | Historic record in Milpitas. Many records in ALA, CCA*, MER, MNT, NAP, SBT*, SCL*, SFO*, SJQ*, SOL, SON*, STA*, YOL, with many populations extirpated. | March-June |
| Heartscale<br>*Atriplex cordulata* var*. cordulata* | --/--/1B.2 | Chenopod scrub, meadows and seeps, valley and foothill grassland; sandy, saline or alkaline sites | 0-1900 feet | Nearest records are in Springtown Area of Livermore; ALA, BUT, CCA, COL, FRE, GLE, KRN, MAD, MER, SJQ*, SLO, SOL, STA*, TUL, YOL* | April-October |
| Crownscale<br>*Atriplex coronata* var*. coronata* | --/--/4.2 | Chenopod scrub, valley and foothill grassland, vernal pools; alkaline, often clay soils | 3-2000 feet | ALA, CCA, FRE, GLE, KNG, KRN, MER, MNT, SJQ*, SLO, SOL, STA | March-October |

### SPECIAL-STATUS PLANTS CONSIDERED, ALAMEDA CREEK RECAPTURE PROJECT (Continued)

| Common Name Scientific Name | Listing Status FESA/ CESA/CNPS | Habitat and Distribution | Elevation Range | Potential for Species Occurrence Within the Survey area | Blooming Period |
|---|---|---|---|---|---|
| OTHER PLANT SPECIES OF CONCERN (cont.) | | | | | |
| Brittlescale<br>*Atriplex depressa* | --/--/1B.2 | Chenopod scrub, meadows and seeps, playas, valley and foothill grassland, vernal pools; alkaline, vernally moist clay soils | 3-1100 feet | Nearest records are in Springtown and Don Edwards NWR; ALA, CCA, COL, FRE, GLE, KRN, MER, SOL, STA, TUL, YOL | April-October |
| Lesser saltscale<br>*Atriplex minuscula* | --/--/1B.1 | Chenopod scrub, playas, valley ahd foothill grassland; alkaline, sandy soils | 40-700 feet | Many sites extirpated by agriculture. Nearest records are from Don Edwards NWR, Altamont Pass areas; ALA, BUT, FRE, KRN, MAD, MER, STA*, TUL | May-October |
| Big-scale balsamroot<br>*Balsamorhiza macrolepis* | --/--/1B.2 | Chaparral, cismontane woodland, valley and foothill grassland, sometimes on serpentinite or metamorphics | 290-5200 feet | Nearest record is in Tesla Road area; ALA, AMA, BUT, COL, ELD, LAK, MAR, NAP, PLA, SCL, SHA, SOL, SON, TEH, TUO | March-June |
| Big tarplant<br>*Blepharizonia plumosa* | --/--/1B.1 | Valley and foothill grassland, usually on clay, more frequent after wildfires, often on slopes | 90-1700 feet | Nearest record is west of Tesla; ALA, CCA, SJQ, SOL*, STA | July-October |
| Mt. Day rockcress<br>*Boechera rubicundula* | --/--/1B.1 | Chaparral on rocky slopes | +/- 4000 feet | Known from only one occurrence on Mt. Day; SCL | April-May |
| Round-leaved filaree<br>*California macrophylla* | --/--/1B.1 | Cismontane woodland, valley and foothill grassland; often on rich, low soils | 40-4000 feet | Nearest records are in Altamont Pass area; ALA, BUT*?, CCA, COL, FRE, GLE, KNG, KRN, LAK, LAS, LAX, MER, MNT, NAP, RIV, SBA, SBT, SCL, SCZ*, SDG, SJQ, SLO, SMT, SOL, SON, STA, TEH, TUL, VEN, YOL | March-May |
| Oakland star-tulip<br>*Calochortus umbellatus* | --/--/4.2 | Broadleafed upland forest, chaparral, cismontane woodland, lower montane coniferous forest, and valley and foothill grassland; often on serpentinite | 320-2300 feet | ALA, CCA, LAK, MRN, SCL, SCR*, SMT, STA | March-May |
| Santa Cruz Mountains pussypaws<br>*Calyptridium parryi* var. *hesseae* | --/--/1B.2 | Chaparral, cismontane woodland; sandy or gravelly openings | 1000-5100 feet | Nearest record is Black Mountain in the Mt. Hamilton Range. MNT, SCL, SCR, SLO, STA | May-August |
| Chaparral harebell<br>*Campanula exigua* | –/–/1B.2 | Rocky, usually serpentinite chaparral habitats; on talus slopes; sometimes in coastal scrub or chaparral, at edges of blue oak and gray pine; vernally moist areas, often very open or barren. | 900-4100 feet | Nearest record is a general locality near Sunol. Most localities are south of the Alameda watershed. Range: ALA, CCA, SBT, SCL, STA. | May – June |
| Congdon's tarplant<br>*Centromadia parryi* ssp. *congdonii* | –/–/1B.2 | Alkaline valley and foothill grassland, probably in low areas with high residual soil moisture. | 0-750 feet | Reported in 2009 from vicinity of Andrade Road; also known from Irvington District in Fremont. Range: ALA, CCA, MNT, SCL, SLO, SMT. | May – October, uncommonly in November |

### SPECIAL-STATUS PLANTS CONSIDERED, ALAMEDA CREEK RECAPTURE PROJECT (Continued)

| **Common Name<br>Scientific Name** | **Listing Status FESA/ CESA/CNPS** | **Habitat and Distribution** | **Elevation Range** | **Potential for Species Occurrence Within the Survey area** | **Blooming Period** |
|---|---|---|---|---|---|
| OTHER PLANT SPECIES OF CONCERN (cont.) | | | | | |
| Pt. Reyes bird's-beak<br>*Chloropyron maritimum* ssp. *palustre* | --/--/1B.2 | Marshes and swamps; coastal salt marsh | 0-40 feet | Nearest record is near Alviso; ALA*, HUM, MRN, SCL*, SFO, SMT*, SON | June-October |
| Hispid bird's-beak<br>*Chloropyron molle* spp*. hispidum* | --/--/1B.1 | Meadows and seeps, playas, valley and foothill grassland; alkaline meadows and alkali sinks with saltgrass (Distichlis) | 3-510 feet | Nearest record is Springtown area of Livermore; ALA, FRE, KRN, MER, PLA, SOL | June-September |
| Brewer's clarkia<br>*Clarkia breweri* | --/--/4.2 | Chaparral, cismontane woodland, coastal scrub, often on serpentinite | 700-3700 feet | ALA, FRE, MER, MNT, SBT, SCL, STA | April-June |
| Santa Clara red ribbons<br>*Clarkia concinna* ssp*. automixa* | –/–/4.3 | Chaparral and cismontane woodland. | 290-5000 feet | Nearest records are from Niles Canyon and Ohlone Regional Wilderness. Range: ALA, SCL | May – June, uncommonly in April and July |
| Hospital Canyon larkspur<br>*Delphinium californicum* ssp. *interius* | –/–/1B.2 | Chaparral, cismontane woodland; wet, boggy meadows, openings in soft chaparral habitat, woodland in canyons; shaded gullies, sometimes in thick undergrowth. | 750-3600 feet | Nearest records are Williams Gulch and near Arroyo Mocho. Range: ALA, CCA, MER, SBT, SCL, SJQ, SBT. | April – June |
| Jepson's woolly sunflower<br>*Eriophyllum jepsonii* | --/--/4.3 | Chaparral, dry oak woodland and coastal scrub, sometimes on serpentine. | 650-3400 feet | Nearest records are east of Del Valle Reservoir, with several occurrences along Mines Road. Range: ALA, CCA, KRN, MNT, SBT, SCL, STA, VEN | April -- June |
| Hoover's button-celery<br>*Eryngium aristulatum* var. *hooveri* | --/--/1B.1 | Vernal pools, alkaline depressions, roadside ditches and other wet places near the coast | 5-150 feet | Nearest records are along the edge of the South Bay; ALA, SBT, SCL (*?), SDG, SLO | June-August |
| San Joaquin spearscale<br>*Extriplex joaquiniana* | –/–/1B.2 | Chenopod scrub, meadows and seeps, playas, valley and foothill grassland; seasonal wetlands or alkali sink scrub. | 0-2750 feet | Nearest records are from Warm Springs in Fremont and Livermore area. Range: ALA, CCA, COL, FRE, GLE, MER, MNT, NAP, SBT, SCL* SJQ*, SLO, SOL, TUL*?, YOL | April – October |
| Stinkbells<br>*Fritillaria agrestis* | --/--/4.2 | Chaparral, cismontane woodland, pinyon and juniper woodland, valley and foothill grassland. Clay substrate, sometimes on serpentinite. Most populations small. | 30-5200 feet | Nearest record is in Mines Road area, with several additional localities along Tesla Road. Range: ALA, CCA, FRE, KRN, MEN, MER, MNT, MPA, PLA, SAC, SBA, SBT, SCL, SCR, SLO, SMT, STA, TUP, VEN, YUB | March -- June |
| Fragrant fritillary<br>*Fritillaria liliacea* | --/--/1B.2 | Cismontane woodland, coastal prairie, coastal scrub, valley and foothill grassland; clay soils, often on serpentinite | 5-1400 feet | Nearest record is Alum Rock Park in San Jose; ALA, CCA, MNT, MRN, SBT, SCL, SFO, SMT, SOL, SON | February-April |

## SPECIAL-STATUS PLANTS CONSIDERED, ALAMEDA CREEK RECAPTURE PROJECT (Continued)

| Common Name<br>Scientific Name | Listing Status FESA/ CESA/CNPS | Habitat and Distribution | Elevation Range | Potential for Species Occurrence Within the Survey area | Blooming Period |
|---|---|---|---|---|---|
| OTHER PLANT SPECIES OF CONCERN (cont.) | | | | | |
| Diablo helianthella<br>*Helianthella castanea* | –/–/1B.2 | Broadleafed upland forest, chaparral, cismontane woodland, coastal scrub, riparian woodland, valley and foothill woodland; openings or outcrops in scrub or forest; often in soils formed on sandstone. | 200-4300 feet | Recent studies have concluded that species present in the Alameda watershed is California helianthella. Range: ALA, CCA, MRN, SFO, SMT; most localities in CCA | March – June |
| Legenere<br>*Legenere limosa* | --/--/1B.1 | Vernal pools | 3-2900 feet | Many historical sites extirpated; ALA, LAK, MNT, NAP, PLA, SC, SCL, SHA, SJQ, SMT, SOL, SON, STA*, TEH, YUB | April-June |
| Bristly leptosiphon<br>*Leptosiphon acicularis* | --/--/4.2 | Grassy areas in woodland and chaparral; mostly coastal distribution. | 170-5300 feet | Nearest occurrences are very old and general collections from Hayward and unspecified location in Alameda County. Range: ALA, BUT, HUM, LAK, MRN, MEN, NAP, SMT, SON | April -- May |
| Serpentine leptosiphon<br>*Leptosiphon ambiguus* | --/--/4.2 | Cismontane woodland, coastal scrub, valley and foothill grassland, usually on sparse serpentinite substrate., SMT, STA | 390-3800 feet | Nearest records are in the Goat Rock area in upper Alameda Creek watershed. Range: ALA, CCA, MER, SBT, SCL, SCR, SJQ | March-June |
| Mt. Hamilton coreopsis<br>*Leptosyne hamiltonii* | –/–/1B.2 | Cismontane woodland; rocky sites; steep shale talus with open southwestern exposure | 1800-4300 feet | Nearest record is Cedar Mountain Ridge in the Mt. Hamilton Range; ALA, SCL, STA | March-May |
| Woolly-headed lessingia<br>*Lessingia hololeuca* | --/--/3 | Broadleafed upland forest, coastal scrub, lower montane coniferous forest, valley and foothill grassland; clay, serpentinite soils | 40-1100 feet | ALA, MNT, MRN, NAP, SCL, SM, SOL, SON, YOL | June-October |
| Arcuate bush-mallow<br>*Malacothamnus arcuatus* | –/–/1B.2 | Chaparral and cismontane woodland; in gravelly alluvium | 40-1200 feet | Nearest record is Alum Rock Park, San Jose; SCL, SCR, SMT | April-September |
| Hall's bush-mallow<br>*Malacothamnus hallii* | –/–/1B.2 | Chaparral and coastal scrub; some populations on serpentinite | 30-2500 feet | Nearest record is along Alviso Slough; CCA, LAK, MEN, MER, SCL, SMT, STA | May-October |
| San Antonio Hills<br>*Monardella antonina* ssp. *antonina* | –/–/3 | Chaparral, cismontane woodland. | 1700-3300 feet | Nearest records are from McGuire Peaks, Sunol Regional Wilderness, Palomares Canyon. Range: ALA?, CCA?, MNT, SBT?, SCL? | June – August |
| Little mousetail<br>*Myosurus minimus* ssp*. apus* | --/--/3.1 | Valley and foothill grassland, vernal pools; alkaline substrate | 60-2100 feet | ALA, CCA, COL, LAK, MER, RIV, SBD, SDG, SOL, TUL, YOL | March-June |
| Adobe navarretia<br>*Navarretia nigelliformis* ssp. *nigelliformis* | --/--/4.2 | Valley and foothill grassland, sometimes vernal pools; vernally mesic sites on clay, sometimes serpentinite | 320-3300 feet | ALA, BUT, CCA, COL. FRE, KRN, MER, MNT, PLA, SUT, TUL | April-June |

## SPECIAL-STATUS PLANTS CONSIDERED, ALAMEDA CREEK RECAPTURE PROJECT (Continued)

| Common Name Scientific Name | Listing Status FESA/ CESA/CNPS | Habitat and Distribution | Elevation Range | Potential for Species Occurrence Within the Survey area | Blooming Period |
|---|---|---|---|---|---|
| OTHER PLANT SPECIES OF CONCERN (cont.) | | | | | |
| Prostrate vernal pool navarretia<br>*Navarretia prostrata* | –/–/1B.1 | Coastal scrub, meadows and seeps, valley and foothill grassland, vernal pools; alkaline, vernally moist sites | 5-4000 feet | Nearest records are at Don Edwards NWR and Dublin; ALA, FRE, LAX, MER, MNT, ORA, RIV, SBD*?. SBT, SCL, SDG, SLO | April-July |
| Hairless popcornflower<br>*Plagioborhtys glaber* | –/–/1A | Meadows and seeps, marshes and swamps; alkaline or coastal salt marsh sites | 40-600 feet | Last confirmed sighting in 1954; ALA*, MRN*, SBT; SCL* | March-May |
| Oregon polemonium<br>*Polemonium carneum* | –/–/2B.2 | Coastal prairie, coastal scrub, lower montane coniferous forest | 0-6100 feet | Approximate record on Stonybrook Creek is nearest known occurrence; ALA, DNT, HUM, MRN, SFO, SIS, SMT, SON; OR, WA | April-September |
| California alkali grass<br>*Puccinellia simplex* | --/--/1B.2 | Meadows and seeps, saline flats; chenopod scrub, valley and foothill grasslands, vernal pools. Nearest record is 5 miles south of Livermore in Vallecitos area. Range: ALA, BUT, CCA, COL, GLE, KRN, KNG, LAK, LAX, FRE, MAD, MER, NAP, SCL, SCR, SOL, STA, SBD, SLO, YOL. | 0-3050 feet | **Not observed.** Alkaline soils, vernal pools, and chenopod scrub are unknown from the project area; species not found during suitably-timed focused surveys. | March-May |
| Maple-leaved checkerbloom<br>*Sidalcea malachroides* | --/--/4.2 | Broadleafed upland forest, coastal prairie, coastal scrub, North Coast coniferous forest, riparian woodland; often on disturbed areas | 0-2400 feet | Nearest record is from Alum Rock Park in San Jose; many localities in DNT, HUM, MEN, MNT, SCL, SCR, SON | March-April |
| Most beautiful jewel-flower<br>*Streptanthus albidus* ssp.*peramoenus* | –/–/1B.2 | Chaparral, coastal scrub woodland, and grassland; outcrops and barren areas on south- and west-facing exposures on ridges and slopes; serpentine soils. | 300-3300 feet | Nearest records are from Sunol Regional Wilderness, Goat Rock, and east of Calaveras Reservoir. Range: ALA, CCA, SCL, MNT, SLO. | April – September, uncommonly in March and October |
| Slender-leaved pondweed<br>*Stuckenia filiformis* ssp. *alpina* | –/–/2B.2 | Shallow freshwater marshes and swamps., SOL, AZ, NV, OR, + | 980-7050 feet | Record from Niles quadrangle is from Alameda Creek Area in Fremont. Range: ALA, BUT, CCA, ELD, LAS, MER, MON, MOD, MPA, PLA, SCL* SIE, SHA, SMT, SON | May – July |
| Saline clover<br>*Trifolium hydrophilum* | –/–/1B.2 | Marshes and swamps, valley and foothill grassland, vernal pools; mesic, alkaline sites | 0-1000 feet | Nearest records are from Alviso, Don Edwards NWR and Springtown in Livermore; ALA, CCA, COL?, LAK, MNT, NAP, SAC, SBT, SCL, SCR, SJQ, SLO, SMT, SOK, SON, YOL | April-June |
| Capter-fruited tropidocarpum<br>*Tropidocarpum capparideum* | –/–/1B.1 | Valley and foothill grassland; alkaline hills | 3-1500 feet | Thought to be extinct, then rediscovered in 2000 on Ft. Hunter Liggett; ALA*, CCA*, FRE, GLE*, MNT, SCL*, SJQ*, SLO | March-April |

## SPECIAL-STATUS PLANTS CONSIDERED, ALAMEDA CREEK RECAPTURE PROJECT (Continued)

**STATUS CODES:**

FEDERAL ENDANGERED SPECIES ACT (FESA)
FE = Listed as Endangered (in danger of extinction) by the Federal Government.
FT = Listed as Threatened (likely to become Endangered within the foreseeable future) by the Federal Government.
FC = Candidate to become a *proposed* species.

CALIFORNIA ENDANGERED SPECIES ACT (CESA)/ CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE (CDFW)
CE = Listed as Endangered by the State of California.
CT = Listed as Threatened by the State of California.
CC= Candidate to become a *proposed* species.
CSC = California Species of Special Concern.

California Rare Plant Rank (Formerly known as CNPS List):
1A = Plants presumed extinct in California.
1B = Plants rare, threatened, or endangered in California and elsewhere.
2A = Plants presumed extirpated in California.
2B = Plants rare, threatened, or endangered in California, but more common elsewhere.
3 = Plants about which more information is needed.
4 = Plants of limited distribution.

An extension reflecting the level of threat to each species is appended to each CRPR as follows:
.1 – Seriously threatened in California.
.2 – Moderately threatened in California.
.3 – Not very threatened in California.

[b] Distribution range is based on County codes, as follows:

County abbreviations: AMA--Amador; BUT-- Butte; CAL-- Calaveras; CCA--Contra Costa; COL—Colusa; DNT--Del Norte; ELD—El Dorado; FRE—Fresno; GLE—Glenn; HUM—Humboldt; KRN—Kern; LAK—Lake; LAS—Lassen; LAX--Los Angeles; MAD—Madera; MOD—Modoc; MEN—Mendocino; MER—Merced; MNT—Monterey; MPA—Mariposa; MRN—Marin; NEV—Nevada; ORA—Orange; PLA—Placer; PLU—Plumas; RIV—Riverside; SAC—Sacramento; SBA--Santa Barbara; SBD--San Bernardino; SBT--San Benito; SCL--Santa Clara; SCR--Santa Cruz; SCT--Santa Catalina Island; SCZ--Santa Cruz Island; SDG--San Diego; SFO--San Francisco; SHA—Shasta; SIE—Sierra; SIS—Siskiyou; SJQ--San Joaquin; SMI--San Miguel Island; SMT--San Mateo; SNI--San Nicolas Island; SOL—Solano; SON—Sonoma; SRO--Santa Rosa Island; TEH—Tehama; TRI—Trinity; TUL—Tulare; VEN—Ventura; YOL—Yolo; YUB—Yuba
* indicates species presumed extirpated from county; ? indicates questionable record

SOURCES:

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# APPENDIX E

## List of Wildlife Species Observed within the Survey Area

## WILDLIFE SPECIES OBSERVED WITHIN THE SURVEY AREA

| Common Name | Scientific Name |
|---|---|
| Amphibians | |
| Sierran treefrog | *Pseudacris sierra* |
| Reptiles | |
| Western fence lizard | *Sceloporus occidentalis* |
| San Francisco alligator lizard | *Elgaria coerulea coerulea* |
| Birds | |
| Western grebe | *Aechmophorus occidentalis* |
| Red-winged blackbirds | *Agelaius phoeniceus* |
| Mallard | *Anas platyrhynchos* |
| Western scrub jay | *Aphelocoma californica* |
| Golden eagle | *Aquila chrysaetos* |
| Great blue heron | *Ardea herodias* |
| Ring-necked duck | *Aythya collaris* |
| Canada goose | *Branta canadensis* |
| Bufflehead | *Bucephala albeola* |
| Red-tailed hawk | *Buteo jamaicensis* |
| Turkey vulture | *Cathartes aura* |
| Killdeer | *Charadrius vociferus* |
| American crow | *Corvus brachyrhynchos* |
| Snowy egret | *Egretta thula* |
| White-tailed kite | *Elanus leucurus* |
| Brewer’s blackbird | *Euphagus cyanocephalus* |
| American coot | *Fulica americana* |
| Cliff swallow | *Petrochelidon pyrrhonota* |
| Song sparrow | *Melospiza melodia* |
| Savannah sparrow | *Passerculus sandwichensis* |
| Double-crested cormorant | *Phalacrocorax auritus* |
| California towhee | *Pipilo crissalis* |
| Bushtit | *Psaltriparus minimus* |
| Black phoebe | *Sayornis nigricans* |
| Say’s phoebe | *Sayornis saya* |
| Western meadowlark | *Sturnella neglecta* |
| Robin | *Turdus migratorius* |
| Mammals | |
| Black-tailed jackrabbit | *Lepus californicus* |
| Mule deer | *Odocoileus hemionus* |
| Raccoon | *Procyon lotor* |

# APPENDIX F

# List of Plant Species Observed within the Survey Area

## TABLE F-1
## PLANTS OBSERVED IN THE SURVEY AREA

| Family, Genus, Species | Synonymy | Common Name |
|---|---|---|
| ADOXACEAE | | MUSKROOT FAMILY |
| *Sambucus nigra* ssp. *caerulea* | *Sambucus mexicana* | Blue elderberry |
| | | |
| AGAVACEAE | | AGAVE FAMILY |
| *Chlorogalum pomeridianum* var. *pomeridianum* | | Common soaproot |
| | | |
| ANACARDIACEAE | | SUMAC OR CASHEW FAMILY |
| *Toxicodendron diversilobum* | | Poison oak |
| | | |
| APIACEAE | | CARROT FAMILY |
| *Conium maculatum* | | Poison hemlock |
| *Foeniculum vulgare* | | Fennel |
| *Heracleum maximum* | *Heracleum lanatum* | Common cowparsnip |
| *Sanicula crassicaulis* | | Pacific sanicle |
| *Torilis arvensis* | | Field hedge parsley |
| *Torilis nodosa* | | Wild parsley |
| | | |
| APOCYNACEAE | | DOGBANE FAMILY |
| *Nerium oleander* | | Oleander |
| *Vinca major* | | Vinca |
| | | |
| ASCLEPIADACEAE | | MILKWEED FAMILY |
| *Asclepias fascicularis* | | Milkweed |
| | | |
| ASTERACEAE | | SUNFLOWER FAMILY |
| *Achillea millefolium* | | Yarrow |
| *Achyrachaena mollis* | | Blow wives |
| *Agoseris heterophylla* | | Mountain dandelion |
| *Artemisia californica* | | Coastal sage brush |
| *Artemisia douglasiana* | | California mugwort |
| *Baccharis pilularis* ssp. *consanguinea* | | Coyote brush |
| *Baccharis salicifolia* | *B. glutinosa* | Mule fat., seep willow |
| *Brickellia californica* | | California brickellia |
| *Carduus pycnocephalus* ssp. *pycnocephalus* | | Italian thistle |
| *Centaurea calcitrapa* | | Purple star thistle |
| *Centaurea melitensis* | | Tocalote |
| *Centaurea solstitialis* | | Yellow starthistle |
| *Cirsium* sp. | | Thistle |
| *Cirsium vulgare* | | Bullthistle |
| *Crepis vesicaria* ssp. *taraxacifolia* | | Weedy hawksbeard |
| *Dittrichia graveolens* | | Stinkwort |
| *Helenium bigelovii* | | Bigelow's sneezeweed |
| *Helminthotheca echioides* | *Picris echioides* | Bristly ox-tongue |
| *Heterotheca grandiflora* | | Telegraph weed |
| *Hypochaeris glabra* | | Smooth cats ear |
| *Logfia gallica* | *Filago g.* | Narrowleaf cottonrose |
| *Madia exigua* | | Small tarweed |
| *Matricaria discoidea* | *Chamomilla suaveolens* | Pineapple weed, rayless chamomile |
| *Microseris douglasii* ssp. *douglasii* | | Douglas' microseris |
| *Senecio vulgaris* | | Common groundsel |
| *Silybum marianum* | | Milk thistle |
| *Sonchus arvensis* | | Perennial sow thistle |
| *Sonchus oleraceus* | *cf.* | Sow thistle |
| *Taraxacum officinale* | | Red seeded dandelion |
| *Xanthium spinosum* | | Spiny cocklebur |
| | | |
| AZOLLACEAE | | MOSQUITO FERN FAMILY |
| *Azolla filiculoides* | | American water fern, mosquito fern |
| | | |
| BETULACEAE | | BIRCH FAMILY |
| *Alnus rhombifolia* | | White alder |
| | | |
| *BORAGINACEAE* | | FORGET-ME-NOT FAMILY |
| *Amsinckia menziesii* | | Fiddleneck |
| *Nemophila heterophylla* | | Canyon nemophila |

## TABLE F-1 (Continued)
## PLANTS OBSERVED IN THE SURVEY AREA

| Family, Genus, Species | Synonymy | Common Name |
|---|---|---|
| BRASSICACEAE | | MUSTARD FAMILY |
| *Barbarea orthoceras* | | Winter cress |
| *Capsella bursa-pastoris* | | Shepherd's purse |
| *Caulanthus lasiophyllus* | *Guillenia lasiophylla* | California mustard |
| *Hirschfeldia incana* | | Mediterranean mustard |
| *Lepidium nitidum* | *L. n. var howellii; var. oreganum* | Shining pepper grass |
| *Nasturtium officinale* | *Rorippa nasturtium-aquaticum* | Watercress |
| *Raphanus sativus* | | Jointed charlock |
| CAPRIFOLIACEAE | | HONEYSUCKLE FAMILY |
| *Lonicera hispidula* | *L. h. var. vacillans* | Pink honeysuckle |
| *Symphoricarpos albus* var. *laevigatus* | | Snowberry |
| CARYOPHYLLACEAE | | PINK FAMILY |
| *Cerastium glomeratum* | | Large mouse ears |
| *Spergularia rubra* | | Purple sand spurry |
| *Stellaria media* | | Chickweed |
| CHENOPODIACEAE | | GOOSEFOOT FAMILY |
| *Chenopodium californicum* | | Soaproot |
| *Salsola tragus* | | Russian thistle |
| CONVOVULACEAE | | MORNING-GLORY FAMILY |
| *Convolvulus arvensis* | | Field bindweed |
| CRASSULACEAE | | STONECROP FAMILY |
| *Crassula connata* | | Sand pygmy weed |
| CUCURBITACEAE | | MELON FAMILY |
| *Marah fabacea* | *M. fabaceus* | California man-root |
| CYPERACEAE | | SEDGE FAMILY |
| *Carex nudata* | | Torrent sedge |
| *Cyperus eragrostis* | | Tall cyperus |
| *Eleocharis macrostachya* | | Spike rush |
| *Schoenoplectus* sp. | | Tule |
| DATISCACEAE | | DURANGO ROOT FAMILY |
| *Datisca glomerata* | | Durango root |
| DIPSACACEAE | | TEASEL FAMILY |
| *Dipsacus* sp. | | Teasel |
| DRYOPTERIDACEAE | | WOOD FERN FAMILY |
| *Dryopteris arguta* | | Wood fern |
| EQUISETACEAE | | HORSETAIL FAMILY |
| *Equisetum* sp. | | Horsetail |
| ERICACEAE | | HEATH FAMILY |
| *Arbutus menziesii* | | Madrono |
| FABACEAE | | PEA FAMILY |
| *Acmispon americanus* | *Lotus purshianus var. p* | |
| *Acmispon glaber* | *Lotus scoparius* | Deerweed, California broom |
| *Lathyrus vestitus* | | Common pacific pea |
| *Lotus corniculatus* | | Bird's foot trefoil |
| *Lupinus bicolor* | | Lupine |
| *Lupinus nanus* | | Valley sky lupine |
| *Medicago polymorpha* | | California burclover |
| *Melilotus albus* | *Melilotus alba* | White sweetclover |
| *Melilotus indicus* | *Melilotus indica* | Annual yellow sweetclover |
| *Trifolium* sp | | Clover |

## TABLE F-1 (Continued)
## PLANTS OBSERVED IN THE SURVEY AREA

| **Family, Genus, Species** | **Synonymy** | **Common Name** |
|---|---|---|
| *Trifolium campestre* | | Hop clover |
| *Trifolium dubium* | | Shamrock |
| *Trifolium fragiferum* | | Strawberry clover |
| *Trifolium hirtum* | | Rose clover |
| *Trifolium subterraneum* | | Subterranean clover |
| *Vicia americana* | | American vetch |
| *Vicia sativa* ssp. *sativa* | | Common vetch |
| | | |
| FAGACEAE | | OAK FAMILY |
| *Quercus agrifolia* var. *agrifolia* | | Coast live oak |
| *Quercus lobata* | | Valley oak |
| | | |
| GENTIANACEAE | | GENTIAN FAMILY |
| *Zeltnera* sp. | | Centaury |
| | | |
| GERANIACEAE | | GERANIUM FAMILY |
| *Erodium botrys* | | Big heron's bill |
| *Erodium cicutarium* | | Coastal heron's bill |
| *Erodium moschatum* | | Whitestem filaree |
| *Geranium dissectum* | | Wild geranium |
| *Geranium molle* | | Crane's bill geranium |
| | | |
| GROSSULARIACEAE | | GOOSEBERRY FAMILY |
| *Ribes* sp. | | Gooseberry |
| | | |
| IRIDACEAE | | IRIS FAMILY |
| *Sisyrinchium bellum* | | Blue eyed grass |
| JUGLANDACEAE | | WALNUT FAMILY |
| *Juglans hindsii* | *Juglans californica var. h.* | Northern California black walnut |
| | | |
| JUNCACEAE | | RUSH FAMILY |
| *Juncus bufonius var. bufonius* | | Toad rush |
| *Juncus mexicanus* | | Mexican rush |
| *Juncus xiphioides* | | Iris leaved rush |
| | | |
| LAMIACEAE | | MINT FAMILY |
| *Clinopodium douglasii* | *Satureja douglasii* | Yerba buena |
| *Marrubium vulgare* | | White horehound |
| *Mentha pulegium* | | Pennyroyal |
| *Mentha spicata* | | Spearmint |
| *Monardella villosa* ssp. *villosa* | | Coyote mint |
| *Stachys ajugoides* | | Hedge nettle |
| | | |
| LAURACEAE | | LAUREL FAMILY |
| *Umbellularia californica* | | California laurel |
| | | |
| LILIACEAE | | LILY FAMILY |
| *Calochortus albus* | | White fairy lantern |
| | | |
| LYTHRACEAE | | LOOSESTRIFE FAMILY |
| *Lythrum* sp. | | Loosestrife |
| | | |
| MALVACEAE | | MALLOW FAMILY |
| *Malva parviflora* | | Cheeseweed |
| | | |
| MONTIACEAE | | MONTIA FAMILY |
| *Calandrinia ciliata* | | Redmaids |
| *Claytonia perfoliata* ssp. *perfoliata* | | Claytonia |
| | | |
| MYRSINIACEAE | | MYRSINE FAMILY |
| *Anagallis arvensis* | | Scarlet pimpernel |

## TABLE F-1 (Continued)
## PLANTS OBSERVED IN THE SURVEY AREA

| Family, Genus, Species | Synonymy | Common Name |
|---|---|---|
| MYRTACEAE | | MYRTLE FAMILY |
| *Eucalyptus camaldulensis* | | Red gum |
| *Eucalyptus globulus* | | Blue gum |
| | | |
| OLEACEAE | | OLIVE FAMILY |
| *Olea europaea* | | Olive |
| | | |
| ONAGRACEAE | | EVENING PRIMROSE FAMILY |
| *Clarkia* sp. | | Clarkia |
| *Clarkia unguiculata* | | Woodland clarkia |
| *Epilobium brachycarpum* | | Willow herb |
| *Epilobium minutum* | | Minute willowherb |
| OROBANCHACEAE | | BROOMRAPE FAILY |
| *Bellardia trixago* | | Mediterranean lineseed |
| *Castilleja affinis* ssp. *affinis* | | Wight's indian paint brush |
| | | |
| OXALIDACEAE | | OXALIS FAMILY |
| *Oxalis corniculata* | | Creeping wood sorrel |
| | | |
| PAPAVERACEAE | | POPPY FAMILY |
| *Eschscholzia californica* | | California poppy |
| | | |
| PHRYMACEAE | | LOPSEED FAMILY |
| *Mimulus aurantiacus* | | Sticky monkeyflower |
| | | |
| PLANTAGINACEAE | | PLANTAIN FAMILY |
| *Collinsia heterophylla* | | Chinese houses |
| *Plantago erecta* | | California plantain |
| *Plantago lanceolata* | | Ribwort |
| *Veronica peregrina* ssp. *xalapensis* | | Speedwell |
| | | |
| PLATANACEAE | | PLANE TREE FAMILY |
| *Platanus racemosa* | | California sycamore |
| | | |
| POACEAE | | GRASS FAMILY |
| *Aira caryophyllea* | | Silvery hairgrass |
| *Arundo donax* | | Giant reed |
| *Avena barbata* | | Slim oat |
| *Avena fatua* | | Wildoats |
| *Bromus diandrus* | | Ripgut brome |
| *Bromus hordeaceus* | | Soft chess |
| *Bromus madritensis* ssp. *rubens* | | Foxtail brome |
| *Cortaderia jubata* | | Andean pampas grass |
| *Cortaderia selloana* | | Pampas grass |
| *Cynodon dactylon* | | Bermuda grass |
| *Cynosurus echinatus* | | Dogtail grass |
| *Distichlis spicata* | | Salt grass |
| *Elymus glaucus* ssp. *glaucus* | | Blue wild rye |
| *Festuca bromoides* | | Brome fescue |
| *Festuca microstachys* | *Vulpia microstachys* | Few-flowered fescue |
| *Festuca myuros* | *Vulpia myuros* | Rattail sixweeks grass |
| *Festuca perennis* | *Lolium multiflorum* | Rye grass |
| *Hordeum marinum* ssp. *gussoneanum* | | Barley |
| *Hordeum murinum* ssp. *leporinum* | | Farmer's foxtail |
| *Melica torreyana* | | Torrey's melica |
| *Poa annua* | | Annual blue grass |
| *Polypogon monspeliensis* | | Annual beard grass |
| *Stipa miliacea* | *Piptatherum miliaceum* | Smilo grass |
| *Stipa pulchra* | *Nassella pulchra* | Purple needle grass |
| | | |
| POLYGONACEAE | | BUCKWHEAT FAMILY |
| *Eriogonum nudum* | | Naked buckwheat |
| *Polygonum aviculare* ssp. *depressum* | *Polygonum arenastrum* | Common knotweed |
| *Pterostegia drymarioides* | | Fairy mist |

## TABLE F-1 (Continued)
## PLANTS OBSERVED IN THE SURVEY AREA

| Family, Genus, Species | Synonymy | Common Name |
|---|---|---|
| *Rumex californicus* | *Rumex salicifolius var. denticulatus* | California dock |
| *Rumex crispus* | | Rhubarb |
| POLYPODIACEAE | | POLYPODY FAMILY |
| *Polypodium calirhiza* | *Check if californicum* | Licorice fern |
| PTERIDACEAE | | BRAKE FAMILY |
| *Adiantum jordanii* | | California maidenhair |
| *Pentagramma triangularis* ssp. *triangularis* | | Gold back fern |
| RANUNCULACEAE | | BUTTERCUP FAMILY |
| *Ranunculus californicus* var. *californicus* | | California buttercup |
| RHAMNACEAE | | BUCKTHORN FAMILY |
| *Frangula californica* ssp. *californica* | *Rhamnus californica ssp. californica* | California coffeeberry |
| ROSACEAE | | ROSE FAMILY |
| *Aphanes occidentalis* | | Lady's mantle |
| *Heteromeles arbutifolia* | | Toyon |
| *Rosa californica* | | California wild rose |
| *Rubus armeniacus* | *Rubus discolor* | Himalayan blackberry |
| *Rubus ursinus* | | California blackberry |
| RUBIACEAE | | MADDER FAMILY |
| *Galium aparine* | | Cleavers |
| SALICACEAE | | WILLOW FAMILY |
| *Populus fremontii* ssp. *fremontii* | | Cottonwood |
| *Salix exigua* | | Narrowleaf willow |
| *Salix gooddingii* | | Gooding's willow |
| *Salix laevigata* | | Polished willow |
| *Salix lasiolepis* | | Arroyo willow |
| SAPINDACEAE | | SOAPBERRY FAMILY |
| *Acer macrophyllum* | | Bigleaf maple |
| *Aesculus californica* | | Buckeye |
| SAXIFRAGACEAE | | SAXIFRAGE FAMILY |
| *Lithophragma heterophyllum* | | Woodland star |
| SCROPHULARIACEAE | | FIGWORT FAMILY |
| *Scrophularia californica* | | California bee plant |
| *Verbascum thapsus* | | Woolly mullein |
| SOLANACEAE | | NIGHTSHADE FAMILY |
| *Datura wrightii* | | Jimsonweed |
| *Nicotiana glauca* | | Tree tobacco |
| *Solanum umbelliferum* | | Blue witch |
| THEMIDACEAE | | CLUSTER LILY FAMILY |
| *Dichelostemma capitatum* | | Blue dicks or wild hyacinth |
| *Triteleia laxa* | | Ithuriel's spear |
| TYPHACEAE | | CATTAIL FAMILY |
| *Typha angustifolia* | | Narrow leaf cattail |
| URTICACEAE | | NETTLE FAMILY |
| *Urtica dioica* ssp. *holosericea* | | Stinging nettle |
| VERBENACEAE | | VERBENA FAMILY |
| *Phyla nodiflora* | | Common lippia |

# APPENDIX G

# Foothill Yellow-legged Frog Habitat Assessment Data Sheets

SOURCE: ESA

SFPUC Alameda Creek Recapture Project . 209484

**Figure G-1a**

Location of Pools Identified in the Alameda Creek Study Area between the Discharge near Pit F2 and Downstream Confluence with Arroyo de la Laguna; October 23, 2015

0945 start

## Foothill Yellow-Legged Frog
## Creek Site Habitat Assessment

Date: mm 10 dd 23 yy 15 Site #: 1 Subsite #: 1 Creek Name/Location: Alameda Ck.
USGS Quad: Niles Township: ____ Range: ____ Section: ____ ¼ Section: ____ Elevation: ____
GPS File Name: ____ Weather: *Sky*: *Overcast* [✓ *Partly Overcast*] *Clear* *Wind*: *Inclement* *Fair* [✓ *Ideal*]
Total Site Length: ____ Creek Aspect: W Discharge (cfs) 0 Water Temp: (edgewater) — (main channel) —
Observers: BTP MEG Initial Site Visit ☒ Follow-up Site Visit ☐ Air temp: 15.5° C
Photograph # (index to notebook): 1 Roll/Disc/Card #: ____

**AMPHIBIAN HABITAT TYPES**

- [✓ Pool]
- Cascade/Pool
- Isolated/Scour Pool
- Pool Tail-Out/Pool Backwater
- Side Pool
- Bedrock Pool
- Side/Split Channel
- Low Gradient Riffle
- Run
- Other ____

Site/Subsite: Length: Dry Width: ____ Approximate Area (m²): ____

**HABITAT FEATURES**

% Margin Vegetation: 100% Type: forbs grass sedge rush blackberry other: willows
Dom.: ☐ ☐ ☐ ☐ ☐ ☐
% Emergent Vegetation: 0% Type: grass sedge rush pondweed other: N/A
Dom.: ☐ ☐ ☐ ☐ ☐
% Submerged Vegetation: 0% Type: algae rooted aquatic veg other: N/A
Dom.: ☐ ☐ ☐
% Cover Aquatic: 0 Type: rootwad aquatic veg. woody debris gaps between substrate other: ____
Dom.: ☐ ☐ ☐ ☐ ☐
% Cover Terrestrial: 100% Dry creek. Type: duff/leaf litter burrows woody debris undercut bank other: ____
Dom.: ☐ ☐ ☐ ☐ ☐
% Overhanging Vegetation: N/A Type: willow blackberry alder dogwood other: ____
Dom.: ☐ ☐ ☐ ☐ ☐
% Riparian Canopy: 80% Type: willow ash alder maple oak conifer other: Sycamore, mulefat.
Dom.: ☒ ☐ ☐ ☐ ☐ ☐ ☐

Aquatic Substrate (%): silt/clay ____ sand 20 gravel/pebble 40 cobble 40 boulder ____ bedrock ____
Substrate Embeddedness: low (< 25%) moderate (25-50%) [✓ high (> 50%)]
Dominant Substrate Shape: angular sub-angular [✓ rounded]
Creek Habitat: riffle: ____ run: ____ glide: ____ pool: ____ cascade/pool: ____ step-pool: ____ Dry pocket water: ____
Creek Gradient: [✓ low (0-2%)] moderate (2-4%) high (4-10+%)
Creek Gradient Change: [✓ No] Yes higher lower Change in Creek Habitat: N/A
Rosgen Channel Type: A B C D DA [✓ E] F G
Wetted Channel Width: 0 m Bankfull Width: ____
Water Turbidity: Dry low moderate high Water Color: clear discolored (tannins, etc.)
Bank Gradient: [✓ low (<15°)] R / L mod (15-40°) R / L high (>40°) R / L Active Bank Erosion: Yes No
Tributary Nearby: [✓ Yes] No Location: [✓ U/S] D/S LB RB Distance: ____ Perennial [✓ Ephemeral]

Upland Habitat Type: mixed conifer foothill hardwood/conifer foothill hardwood scrub/shrub other: Grassland, sycamore
Fish Present: Yes [✓ No] Type: salmonid centrarchid cyprinid other: ____
Herpetofauna & Life Stage (A J T E) tree frog ____ bullfrog ____ w. pond turtle ____ garter snake ____ other: ____
Other Species Observed: ____
Impacts to Amphibian Habitat: grazing recreation industrial other: ____ low mod high
Comments: Dry at confluence with Arroyo de la Laguna. Dense riparian dominated by willows - sandbar 1° & arroyo 2°. Sparse sycamore canopy. Substrate is sandy cobble.

QA/QC (initials): BP Date: 11/5/2015

Source: ESA

**Figure G-1**

Typical dry habitat in Alameda Creek at the confluence with Arroyo de la Laguna
Photo date: October 23, 2015

1014 PST

## Foothill Yellow-Legged Frog
## Creek Site Habitat Assessment

Date: mm 10 dd 23 yy 15 Site #: 2 Subsite #: 2 Creek Name/Location: Alameda Crk.
USGS Quad: Niles Township: ______ Range: ______ Section: ______ ¼ Section: ______ Elevation: ______
GPS File Name: ______ Weather: *Sky*: [✓ *Overcast*] [✓ *Partly Overcast*] *Clear* *Wind*: *Inclement* *Fair* [✓ *Ideal*]
Total Site Length: 10 m Creek Aspect: W Discharge (cfs) 0 Water Temp: (edgewater) 11° C (main channel) 11°C
Observers: BTP MEG Initial Site Visit ☑ Follow-up Site Visit ☐ Air temp 20°
Photograph # (index to notebook): ______ Roll/Disc/Card #: ______

**AMPHIBIAN HABITAT TYPES**

- [✓ Pool]
- Cascade/Pool
- Isolated/Scour Pool
- Pool Tail-Out/Pool Backwater
- Side Pool
- Bedrock Pool
- Side/Split Channel
- Low Gradient Riffle
- Run
- Other ______

Site/Subsite: Length: 10 m Width: 6 m Approximate Area ($m^2$): 60 $m^2$

**HABITAT FEATURES**

% Margin Vegetation: 60 Type: forbs ☑ grass ☐ sedge ☐ rush ☐ blackberry ☐ other: ☐ ______
% Emergent Vegetation: 1 % Type: grass ☐ sedge ☐ rush ☐ pondweed ☐ other: cattail ☐
% Submerged Vegetation: 0 % Type: algae ☐ rooted aquatic veg ☐ other: ☐ ______
% Cover Aquatic: 0 % Type: rootwad ☐ aquatic veg. ☐ woody debris ☐ gaps between substrate ☐ other: ☐ ______
% Cover Terrestrial: 50% Type: duff/leaf litter ☑ burrows ☐ woody debris ☑ undercut bank ☐ other: grasses ☐
% Overhanging Vegetation: 10 % Type: willow ☑ blackberry ☐ alder ☐ dogwood ☐ other: ☐ ______
% Riparian Canopy: 10 % Type: willow ☑ ash ☐ alder ☐ maple ☐ oak ☐ conifer ☐ other: ☐ ______

Aquatic Substrate (%): silt/clay 80% sand ______ gravel/pebble ______ cobble 20% boulder ______ bedrock ______
Substrate Embeddedness: low (< 25%) moderate (25-50%) [✓ high (> 50%)]
Dominant Substrate Shape: angular sub-angular [✓ rounded]
Creek Habitat: riffle: ______ run: ______ glide: ______ pool: ✓ cascade/pool: ______ step-pool: ______ pocket water: ______
Creek Gradient: [✓ low (0-2%)] moderate (2-4%) high (4-10+%)
Creek Gradient Change: [✓ No] Yes higher lower Change in Creek Habitat: ______
Rosgen Channel Type: A B C D DA [✓ E] F G
Wetted Channel Width: 6 m Bankfull Width: 12 m
Water Turbidity: low [✓ moderate] high Water Color: clear [✓ discolored] (tannins, etc.)
Bank Gradient: low (<15°) R / L mod (15-40°) R / L high (>40°) R / L Active Bank Erosion: Yes No
Tributary Nearby: [✓ Yes] No Location: [✓ U/S] D/S LB RB Distance: ______ [✓ Perennial] Ephemeral

Upland Habitat Type: mixed conifer foothill hardwood/conifer foothill hardwood scrub/shrub other: Bay / sycamore
Fish Present: Yes [✓ No] Type: salmonid centrarchid cyprinid other: ______
Herpetofauna & Life Stage (A J [✓ T] E) tree frog ______ bullfrog 15 w. pond turtle ______ garter snake ______ other: ______
Other Species Observed: ______
Impacts to Amphibian Habitat: grazing recreation industrial other: ______ low mod high
Comments: Site 2 - first water in creek upstream from Arroyo de la Laguna. Bullfrogs present; perhaps 50 larvae observed & 15 verified to species. No adults noted. Pool is potential CRLF breeding site, Bullfrog breeding above barrier as well
Water depth: max = 40 cm, avg. 20 cm.; 31 cm depth above barrier.
70 cm depth in large pond above barrier
No FYLF potential.

QA/QC (initials): BP Date: 11/3/2015

Source: ESA

**Figure G-2**

Upstream from Arroyo de la Laguna, the first pools in Alameda Creek were found above and below a concrete impoundment structure (bottom). Pool 1, downstream from the structure, is in the top photo. Photo date: October 23, 2015

1030 PST

## Foothill Yellow-Legged Frog
## Creek Site Habitat Assessment

Date: mm 10 dd 23 yy 2015 Site #: 3 Subsite #: ______ Creek Name/Location: Alameda Ck.
USGS Quad: Niles Township: ______ Range: ______ Section: ______ ¼ Section: ______ Elevation: ______
GPS File Name: ______ Weather: *Sky:* [✓ *Overcast*] *Partly Overcast* *Clear* *Wind:* *Inclement* *Fair* [✓ *Ideal*]
Total Site Length: ______ Creek Aspect: W Discharge (cfs) 0 Water Temp: (edgewater) 11° (main channel) ______
Observers: BTP MEG Initial Site Visit ☒ Follow-up Site Visit ☐
Photograph # (index to notebook): ______ ______ ______ ______ ______ ______ ______ ______ ______ ______ Roll/Disc/Card #: ______

**AMPHIBIAN HABITAT TYPES**

- [✓ Pool]
- Cascade/Pool
- Isolated/Scour Pool
- Pool Tail-Out/Pool Backwater
- Side Pool
- Bedrock Pool
- Side/Split Channel
- Low Gradient Riffle
- Run
- Other ______

Site/Subsite: Length: 25 m Width: 8 m Approximate Area (m²): ______

**HABITAT FEATURES**

% Margin Vegetation: 30% Type: forbs grass sedge rush blackberry other: ______
Dom.: ☒ ☐ ☐ ☐ ☐ ☐
% Emergent Vegetation: 5% Type: grass sedge rush pondweed other: cattails
Dom.: ☐ ☐ ☐ ☐ ☐
% Submerged Vegetation: 0 Type: algae rooted aquatic veg other: ______
Dom.: ☐ ☐ ☐
% Cover Aquatic: 0% Type: rootwad aquatic veg. woody debris gaps between substrate other: ______
Dom.: ☐ ☐ ☐ ☐ ☐
% Cover Terrestrial: 0% Type: duff/leaf litter burrows woody debris undercut bank other: ______
Dom.: ☐ ☐ ☐ ☐ ☐
% Overhanging Vegetation: 0% Type: willow blackberry alder dogwood other: ______
Dom.: ☐ ☐ ☐ ☐ ☐
% Riparian Canopy: 100% Type: willow ash alder maple oak conifer other: ______
Dom.: ☒ ☐ ☐ ☐ ☐ ☐ ☐

Aquatic Substrate (%): silt/clay 90% sand ______ gravel/pebble ______ cobble 10% boulder ______ bedrock ______
Substrate Embeddedness: low (< 25%) moderate (25-50%) [✓ high (> 50%)]
Dominant Substrate Shape: angular sub-angular [✓ rounded]
Creek Habitat: riffle: ______ run: ______ glide: ______ pool: 100% cascade/pool: ______ step-pool: ______ pocket water: ______
Creek Gradient: [✓ low (0-2%)] moderate (2-4%) high (4-10+%)
Creek Gradient Change: [✓ No] Yes higher lower Change in Creek Habitat: ______
Rosgen Channel Type: A B C D DA [✓ E] F G
Wetted Channel Width: ______ Bankfull Width: ______
Water Turbidity: low moderate [✓ high] Water Color: clear [✓ discolored] (tannins, etc.)
Bank Gradient: [✓ low (<15°)] R / L mod (15-40°) R / L high (>40°) R / L Active Bank Erosion: Yes [✓ No]
Tributary Nearby: [✓ Yes] No Location: [✓ U/S] D/S LB RB Distance: ______ [✓ Perennial] Ephemeral

Upland Habitat Type: mixed conifer foothill hardwood/conifer foothill hardwood scrub/shrub other: ______
Fish Present: Yes [✓ No] Type: salmonid centrarchid cyprinid other: ______
Herpetofauna & Life Stage ([✓ A] J [✓ T] E) tree frog ______ bullfrog 5 w. pond turtle ______ garter snake ______ other: Unk.
Other Species Observed: Red swamp crayfish
Impacts to Amphibian Habitat: grazing recreation industrial other: ______ low mod high
Comments: Third pool, second above barrier. Lg. ranid flushed on approach. 5 bullfrog larvae observed. Ψ CRLF breeding, low Ψ FYLF

4th pool – 4 m x 25 m, depth 15 cm avg 50 cm max, bullfrog larvae, ~50+, minnows present, one sculpin and red swamp crayfish observed. Ψ CRLF breeding, low Ψ FYLF.

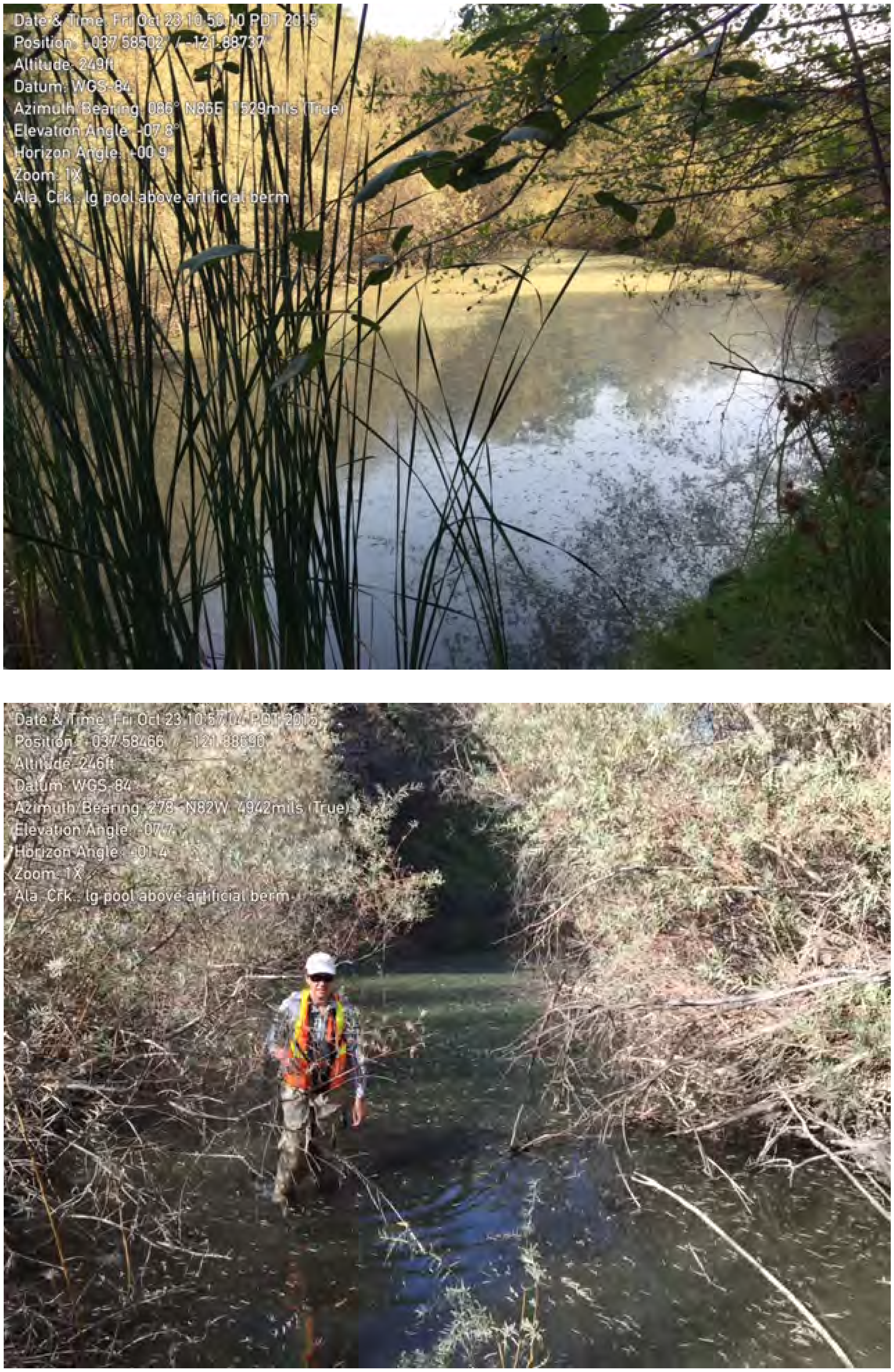
Dry upstream of Pool 4. Dense willow, sycamore, mule fat.

QA/QC (initials): BP Date: 11/3/2015

Source: ESA

**Figure G-3**

Pool 2 is a shallow feature above the concrete impoundment structure
Photo date: October 23, 2015



Source: ESA

**Figure G-3**

Pool 3, above the concrete impoundment structure is a large perennial feature that supports bullfrog breeding. Inappropriate substrate and lack of flows indicate poor habitat quality for foothill yellow-legged frog. Photo date: October 23, 2015

1120 PDT

## Foothill Yellow-Legged Frog
## Creek Site Habitat Assessment

Date: mm 10 dd 23 yy 15 Site #: 4 Subsite #: ____ Creek Name/Location: Alameda Creek.
USGS Quad: Niles Township: ____ Range: ____ Section: ____ ¼ Section: ____ Elevation: ____
GPS File Name: ____ Weather: *Sky:* [✓ *Overcast*] *Partly Overcast* *Clear* *Wind:* *Inclement* *Fair* [✓ *Ideal*]
Total Site Length: ____ Creek Aspect: W Discharge (cfs) 0 Water Temp: (edgewater) 11° (main channel) ____
Observers: BTP MEG Initial Site Visit ☑ Follow-up Site Visit ☐
Photograph # (index to notebook): ____ Roll/Disc/Card #: ____

**AMPHIBIAN HABITAT TYPES**

- [✓ Pool]
- Cascade/Pool
- Isolated/Scour Pool
- Pool Tail-Out/Pool Backwater
- Side Pool
- Bedrock Pool
- Side/Split Channel
- Low Gradient Riffle
- Run
- Other ____

Site/Subsite: Length: 100 m+ Width: 12 m Approximate Area ($m^2$): ____

**HABITAT FEATURES**

% Margin Vegetation: 5 Type: forbs grass sedge rush blackberry other: Cattail, willow
Dom.: ☐ ☐ ☑ ☐ ☐ ☑
% Emergent Vegetation: 0 Type: grass sedge rush pondweed other: ____
Dom.: ☐ ☐ ☐ ☐ ☐
% Submerged Vegetation: 0 Type: algae rooted aquatic veg other: ____
Dom.: ☐ ☐ ☐
% Cover Aquatic: ~~8~~5% Type: rootwad aquatic veg. woody debris gaps between substrate other: ____
Dom.: ☑ ☐ ☐ ☐ ☐
% Cover Terrestrial: 80% Type: duff/leaf litter burrows woody debris undercut bank other: ____
Dom.: ☑ ☐ ☑ ☐ ☐
% Overhanging Vegetation: 10 Type: willow blackberry alder dogwood other: Cattail
Dom.: ☑ ☐ ☐ ☐ ☑
% Riparian Canopy: 70% Type: willow ash alder maple oak conifer other: Sycamore.
Dom.: ☑ ☐ ☐ ☐ ☐ ☐ ☐

Aquatic Substrate (%): silt/clay ____ sand ✓ 50 gravel/pebble ✓ 50 cobble ____ boulder ____ bedrock ____
Substrate Embeddedness: [✓ low] (< 25%) moderate (25-50%) high (> 50%)
Dominant Substrate Shape: angular sub-angular [✓ rounded]
Creek Habitat: riffle: ____ run: ____ glide: ____ pool: 100% cascade/pool: ____ step-pool: ____ pocket water: ____
Creek Gradient: [✓ low] (0-2%) moderate (2-4%) high (4-10+%)
Creek Gradient Change: [✓ No] Yes higher lower Change in Creek Habitat: ____
Rosgen Channel Type: A B C D DA [✓ E] F G
Wetted Channel Width: 4 m. Bankfull Width: 12 m
Water Turbidity: [✓ low] moderate high Water Color: [✓ clear] discolored (tannins, etc.)
Bank Gradient: [✓ low] (<15°) R / L mod (15-40°) R / L high (>40°) R / L Active Bank Erosion: Yes No
Tributary Nearby: [✓ Yes] No Location: [✓ U/S] D/S LB RB Distance: ____ [✓ Perennial] Ephemeral

Upland Habitat Type: mixed conifer foothill hardwood/conifer foothill hardwood [✓ scrub/shrub] other: ____
Fish Present: Yes [✓ No] Type: salmonid centrarchid cyprinid other: ____
Herpetofauna & Life Stage (A J T E) tree frog ____ bullfrog ____ w. pond turtle ____ garter snake ____ other: None
Other Species Observed: ____
Impacts to Amphibian Habitat: grazing recreation industrial other: ____ low mod high
Comments: Pool # 5. Shaded pool, sand/gravel substrate. Extensive duff, clear water. No herps observed. Moderate potential CRLF breeding; high likelihood for newt breeding.
Pool # 6. Fed by quarry releases (likely); 15 cm max depth 15 m x 3 m. No amphibians, though invertebrates present – ostracods & water boatmen. Extensive algae.
Well upstream of Pool 6. – shallow water flowing over cobble, algae-lined pools. (Pool 7) Depth is 32 cm.
1220 PDT Pool 8 – very large pool: <50 m x 8 m.; surrounded by willow, sycamore overstory. Gambusia present – 100s; Calif. roach present, Potential CRLF breeding; no FYLF – no flow and inappropriate substrate (silty clay w/ organics). Depth > 1.4'. Red swamp crayfish.
QA/QC (initials): BP Date: 11/3/2015 Flow into Pool 8 is about 1/4 CFS.

Source: ESA

**Figure G-4**

Pool 4 is a small shallow feature above the concrete impoundment structure . Photo date: October 23, 2015

Source: ESA

**Figure G-5**
Pool 5 is a small, shaded perennial pool with a sand/gravel substrate, extensive organics, and tea-colored water. Photo date: October 23, 2015

Source: ESA

**Figure G-6**

Pool 6 (top) supports flowing water and cobble substrate, but is inappropriate for foothill yellow-legged frog; Pool 7 (bottom) does not provide appropriate conditions for this species

Photo date: October 23, 2015

Source: ESA

**Figure G-7**

Pool 8 is a large (>100m long) perennial feature with an extensive riparian overstory and substrate dominated by silt and organics
Photo date: October 23, 2015

## Foothill Yellow-Legged Frog
## Creek Site Habitat Assessment

Date: mm 10 dd 23 yy 2015 Site #: 5 Subsite #: ____ Creek Name/Location: No Creek above Pool 8
USGS Quad: Niles Township: ____ Range: ____ Section: ____ ¼ Section: ____ Elevation: ____
GPS File Name: ____ Weather: *Sky:* [✓ *Overcast*] *Partly Overcast* *Clear* *Wind:* *Inclement* *Fair* [✓ *Ideal*]
Total Site Length: 100 mt Creek Aspect: W Discharge (cfs) 0.25 Water Temp: (edgewater) 11 C (main channel) ____
Observers: BTP MEG Initial Site Visit ☐ Follow-up Site Visit ☐
Photograph # (index to notebook): ____ ____ ____ ____ ____ ____ ____ ____ ____ ____ Roll/Disc/Card #: ____

**AMPHIBIAN HABITAT TYPES**

- Pool
- Cascade/Pool
- Isolated/Scour Pool
- Pool Tail-Out/Pool Backwater
- Side Pool
- Bedrock Pool
- Side/Split Channel
- Low Gradient Riffle
- [✓ Run] shallow.
- Other ____

Site/Subsite: Length: ____ Width: ____ Approximate Area (m²): ____

**HABITAT FEATURES**

% Margin Vegetation: ____ Type: forbs grass sedge rush blackberry other: ____
Dom.: ☐ ☐ ☐ ☐ ☐ ☐

% Emergent Vegetation: 0 Type: grass sedge rush pondweed other: ____
Dom.: ☐ ☐ ☐ ☐ ☐

% Submerged Vegetation: 0 Type: algae rooted aquatic veg other: ____
Dom.: ☐ ☐ ☐

% Cover Aquatic: 100% Type: rootwad aquatic veg. woody debris gaps between substrate other: duff
Dom.: ☐ ☐ ☐ ☐ ☐

% Cover Terrestrial: 50% Type: duff/leaf litter burrows woody debris undercut bank other: ____
Dom.: ☑ ☐ ☐ ☐ ☐

% Overhanging Vegetation: 80% Type: willow blackberry alder dogwood other: ____
Dom.: ☑ ☐ ☐ ☐ ☐

% Riparian Canopy: ____ Type: willow ash alder maple oak conifer other: ____
Dom.: ☐ ☐ ☐ ☐ ☐ ☐ ☐

Aquatic Substrate (%): silt/clay 90% sand ____ gravel/pebble ____ cobble ____ boulder ____ bedrock ____
Substrate Embeddedness: low (< 25%) moderate (25-50%) high (> 50%) N/A
Dominant Substrate Shape: angular sub-angular rounded
Creek Habitat: riffle: ✓ run: ✓ glide: ____ pool: ____ cascade/pool: ____ step-pool: ____ pocket water: ____
Creek Gradient: [✓ low] (0-2%) moderate (2-4%) high (4-10+%)
Creek Gradient Change: [✓ No] Yes higher lower Change in Creek Habitat: ____
Rosgen Channel Type: A B C D DA [✓ E] F G
Wetted Channel Width: 1.5 m Bankfull Width: 3 m
Water Turbidity: [✓ low] ~~moderate~~ high Water Color: [✓ clear] discolored (tannins, etc.)
Bank Gradient: [✓ low] (<15°) R / L [✓ mod] (15-40°) R / L high (>40°) R / L Active Bank Erosion: Yes [✓ No]
Tributary Nearby: [✓ Yes] No Location: [✓ U/S] D/S LB RB Distance: ____ [✓ Perennial] Ephemeral

Upland Habitat Type: mixed conifer foothill hardwood/conifer foothill hardwood [✓ scrub/shrub] other: ____
Fish Present: [✓ Yes] ~~No~~ Type: salmonid centrarchid [✓ cyprinid] other: ____
Herpetofauna & Life Stage (A J T E) tree frog ____ bullfrog ____ w. pond turtle ____ garter snake ____ other: ____
Other Species Observed: ____
Impacts to Amphibian Habitat: grazing recreation industrial other: ____ low mod high
Comments: Above Pool 8, shallow flow over organics.
Pool 9— lined w/ cattails & willows, 63 cm max depth. Silt/clay over cobble. Crayfish,
minnows present

QA/QC (initials): ____ Date: ____

SFPUC Alameda Creek Recapture Project . 209484

Source: ESA

**Figure G-8**

Downstream of I-580, Alameda Creek is perennially wet area and supports large pools with silt substrate and an extensive riparian overstory. Photos show habitat below I-680 (top) and Pool 9 (bottom). Photo date: October 23, 2015

## Foothill Yellow-Legged Frog
## Creek Site Habitat Assessment

Date: mm 10 dd 23 yy 15 Site #: 6 Subsite #: ______ Creek Name/Location: Alameda Creek above I-680
USGS Quad: Niles Township: ______ Range: ______ Section: ______ ¼ Section: ______ Elevation: ______
GPS File Name: ______ Weather: *Sky*: [✓ *Overcast*] *Partly Overcast* *Clear* *Wind*: *Inclement* *Fair* [✓ *Ideal*]
Total Site Length: ______ Creek Aspect: W Discharge (cfs) ~0.5 Water Temp: (edgewater) 18° C (main channel) ______
Observers: BTP MEG Initial Site Visit ☑ Follow-up Site Visit ☐
Photograph # (index to notebook): ______ Roll/Disc/Card #: ______

**AMPHIBIAN HABITAT TYPES**

- [✓ Pool]
- Cascade/Pool
- Isolated/Scour Pool
- Pool Tail-Out/Pool Backwater
- Side Pool
- Bedrock Pool
- Side/Split Channel
- Low Gradient Riffle
- [✓ Run]
- Other ______

Site/Subsite: Length: 200' Width: 10' Approximate Area ($m^2$): ______

**HABITAT FEATURES**

% Margin Vegetation: 0 Type: forbs ☐ grass ☐ sedge ☐ rush ☐ blackberry ☐ other: ☐ ______
% Emergent Vegetation: 0 Type: grass ☐ sedge ☐ rush ☐ pondweed ☐ other: ☐ ______
% Submerged Vegetation: 10 Type: algae ☐ rooted aquatic veg ☑ other: ☐ ______
% Cover Aquatic: 30 Type: rootwad ☑ aquatic veg. ☐ woody debris ☑ gaps between substrate ☐ other: ☐ ______
% Cover Terrestrial: 100 Type: duff/leaf litter ☑ burrows ☐ woody debris ☑ undercut bank ☐ other: ☐ ______
% Overhanging Vegetation: 90 Type: willow ☑ blackberry ☐ alder ☐ dogwood ☐ other: ☐ ______
% Riparian Canopy: 90 Type: willow ☑ ash ☐ alder ☐ maple ☐ oak ☐ conifer ☐ other: ☐ ______

Aquatic Substrate (%): silt/clay 100 sand ______ gravel/pebble ______ cobble ______ boulder ______ bedrock ______
Substrate Embeddedness: low (< 25%) moderate (25-50%) high (> 50%) N/A
Dominant Substrate Shape: angular sub-angular rounded N/A
Creek Habitat: riffle: ______ run: ✓ glide: ______ pool: ✓ cascade/pool: ______ step-pool: ______ pocket water: ______
Creek Gradient: [✓ low] (0-2%) moderate (2-4%) high (4-10+%)
Creek Gradient Change: [✓ No] Yes higher lower Change in Creek Habitat: ______
Rosgen Channel Type: A B C D DA [✓ E] F G
Wetted Channel Width: 4 m Bankfull Width: 10 m +
Water Turbidity: low moderate [✓ high] Water Color: clear [✓ discolored] (tannins, etc.)
Bank Gradient: low (<15°) R / L [✓ mod] (15-40°) R / L high (>40°) R / L Active Bank Erosion: Yes No
Tributary Nearby: [✓ Yes] No Location: [✓ U/S] D/S LB RB Distance: ______ [✓ Perennial] Ephemeral

Upland Habitat Type: mixed conifer foothill hardwood/conifer foothill hardwood [✓ scrub/shrub] other: ______
Fish Present: [✓ Yes] No Type: salmonid [✓ centrarchid] [✓ cyprinid] other: minnows & bass.
Herpetofauna & Life Stage (A [✓ J] T E) tree frog ______ bullfrog 2 w. pond turtle ______ garter snake ______ other: ______
Other Species Observed: ______
Impacts to Amphibian Habitat: grazing recreation industrial other: ______ low mod high
Comments: Upstream of I-680, Ala Ck. is full of large rootwads, stumps, & trees that form deep, complex pools. Site is fully shaded, hence not optimal for CRLF; however, two juvenile bullfrog noted, indicating Ranid breeding habitat. Not passable by the main channel due to depth and water obstacles, plus dense riparian vegetation.

QA/QC (initials): ______ Date: ______

Source: ESA

**Figure G-9**

Alameda Creek above I-680 supports perennial water from the Pit F2 discharge (top);
Flows maintain an extensive riparian overstory (bottom) and fine silt substrate
Photo date: October 23, 2015

# APPENDIX BIO2

# Alameda Creek Fisheries Habitat Assessment Report

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Final

# SAN FRANCISCO PUBLIC UTILITIES COMMISSION ALAMEDA CREEK RECAPTURE PROJECT

## Alameda Creek Fisheries Habitat Assessment Report

Prepared for
San Francisco Public Utilities Commission
and
San Francisco Planning Department

November 2016

ESA

Final

# SAN FRANCISCO PUBLIC UTILITIES COMMISSION ALAMEDA CREEK RECAPTURE PROJECT

## Alameda Creek Fisheries Habitat Assessment Report

Prepared for
San Francisco Public Utilities Commission
and
San Francisco Planning Department

November 2016

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# CHAPTER 1
# Introduction

## 1.1 Background and Purpose for the Fisheries Habitat Assessment Report

The purpose of the Fisheries Habitat Assessment Report is to identify and describe fisheries and aquatic resources in Alameda Creek adjacent to and downstream of the San Francisco Public Utilities Commission (SFPUC) Alameda Creek Recapture Project (ACRP or proposed project) area, develop sufficient information on these resources in order to provide baseline information to support California Environmental Quality Act (CEQA) environmental review of the ACRP, and to inform the development of potential avoidance and minimization measures as appropriate. This fisheries habitat assessment provides a functional assessment of aquatic habitat in Alameda Creek from its confluence with San Antonio Creek (adjacent to the project area), downstream to the Arroyo de la Laguna confluence, and farther downstream through Niles Canyon and the lower Alameda Creek Flood Control Channel. This technical report has been prepared in conjunction with the *Surface Water Hydrology Report for Proposed Alameda Creek Recapture Project*,[1] *Groundwater-Surface Water Interactions ACRP Biological Resources Study Area Technical Report*,[2] and the *ACRP Terrestrial Biological Resources Technical Report*.[3]

## 1.2 Project Location

The proposed ACRP is located in unincorporated Alameda County, south of the Interstate 680 (I-680)/State Route 84 (SR 84) interchange and west of Calaveras Road (**Figure 1-1**[4]). The proposed facilities would be in the Sunol Valley[5] on the east side of Alameda Creek, approximately six miles north of Calaveras Reservoir and one mile west of San Antonio Reservoir. The ACRP is located within SFPUC Alameda watershed lands[6] owned by the City and County of San Francisco (CCSF).

---

[1] Orion. 2016. *Surface Water Hydrology Report for Proposed Alameda Creek Recapture Project*. Prepared for San Francisco Planning Department by Orion Environmental Associates, November 2016. (See Appendix HYD1)

[2] LSCE. 2016. *Groundwater-Surface Water Interactions, ACRP Biological Resources Study Area*. Prepared for ESA and San Francisco Public Utilities Commission. November 2016 2016. Prepared by Luhdorff & Scalmanini Consulting Engineers. (See Appendix HYD2)

[3] ESA. 2016. *ACRP Terrestrial Biological Resources Technical Report*. Prepared for San Francisco Public Utilities Commission. November 2016. Prepared by Environmental Science Associates. (See Appendix BIO1)

[4] Figure 1-1 depicts the "Quarry Reach" of Alameda Creek, which is defined as the segment of Alameda Creek from the Alameda Siphons north to I-680.

[5] The Sunol Valley is a north-south trending valley that extends approximately five miles from the confluence of Alameda and Welch Creeks in the south to Niles Canyon in the north. The Sunol Valley is drained by Alameda Creek.

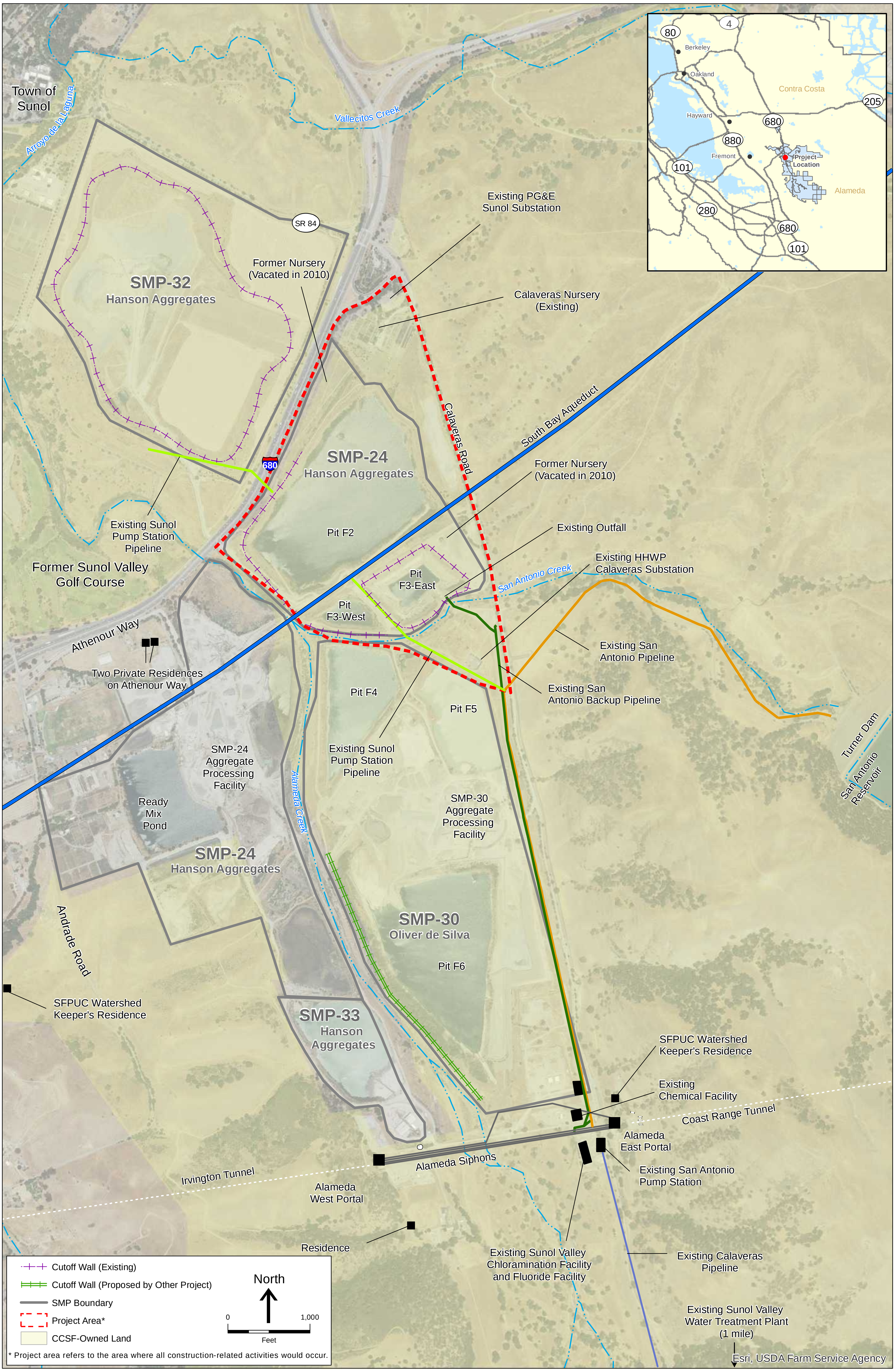
[6] The Alameda watershed refers to lands owned by the CCSF and managed by the SFPUC as part of the SFPUC regional water system; the Alameda watershed lands are located within the much larger hydrologic boundary of the Alameda Creek watershed.

## 1.3 Project Summary

The SFPUC is proposing the ACRP to recapture an annual average of up to 7,178 acre-feet per year (ac-ft/yr) (or 2,339 million gallons per year [mgal/yr]) of water that will be released from Calaveras Reservoir and/or bypassed around the Alameda Creek Diversion Dam (ACDD) during future operation of the Calaveras Reservoir following completion of the Calaveras Dam Replacement Project (CDRP). Under the ACRP, water would be recaptured from a quarry pit, Pit F2, in the Sunol Valley located approximately six miles downstream of Calaveras Reservoir and 0.5-mile south of the I-680)/SR 84 interchange. The ACRP would recapture an amount of water equivalent to that which will be released from Calaveras Reservoir and bypassed around the ACDD in accordance with CDRP permit requirements and would have otherwise been stored in Calaveras Reservoir. The recaptured water would be transferred from Pit F2 to either the Sunol Valley Water Treatment Plant or San Antonio Reservoir for water supply uses to the SFPUC service area in the Bay Area. Proposed project components for recapture of the water from Pit F2 include construction and installation of pumps mounted on barges, pipelines extending from the pumps to shore; a new pipeline connecting to the existing Sunol Pump Station Pipeline; and ancillary facilities such as throttle valves, a flow meter, and electrical facilities. No construction would occur in the bed, bank, or channel of Alameda Creek.

The CDRP is currently under construction, with completion anticipated in 2018. Through the permitting process for the CDRP, the SFPUC, in coordination with the California Department of Fish and Wildlife (CDFW) and National Marine Fisheries Service (NMFS), agreed to two instream flow schedules that satisfy the requirements of the Federal Endangered Species Act (FESA) and the provisions of the California Fish and Game Code. These instream flow schedules will be implemented as part of the future operations plan for Calaveras Reservoir to be protective of Central California Coast (CCC) steelhead (*Oncorhynchus mykiss*) distinct population segment (DPS), a species listed as threatened under the FESA, in Alameda and Calaveras Creeks below the ACDD and Calaveras Dam, respectively. The instream flow schedule at the ACDD will increase bypass flows in Alameda Creek below the diversion dam, with a corresponding reduction in the amount of water that the SFPUC historically diverted from Alameda Creek into Calaveras Reservoir; the instream flow schedule for Calaveras Creek below Calaveras Dam will provide year-round releases from Calaveras Reservoir. Summaries of the proposed flow schedules below Calaveras Dam and the ACDD are presented in Section 2.2.2 below.

The proposed ACRP is one of the facility improvement projects of the SFPUC's Water System Improvement Program (WSIP), which established level of service goals and objectives related to ensuring the SFPUC has an adequate supply of water to deliver to customers during both non-drought and drought periods. By recapturing the water and returning it to the regional water supply system, the SFPUC would be able to maintain historical water diversions from the SFPUC Alameda watershed system, avoid the loss of yield to the regional water system, and improve the SFPUC's ability to meet customer water supply needs in nondrought and drought periods.



SOURCE: ESA, 2015; Date of aerial photo is 2014.

SFPUC Alameda Creek Recapture Project

**Figure 1-1**

Project Vicinity Map

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# CHAPTER 2
# Fisheries Habitat Assessment Approach

## 2.1 Study Area

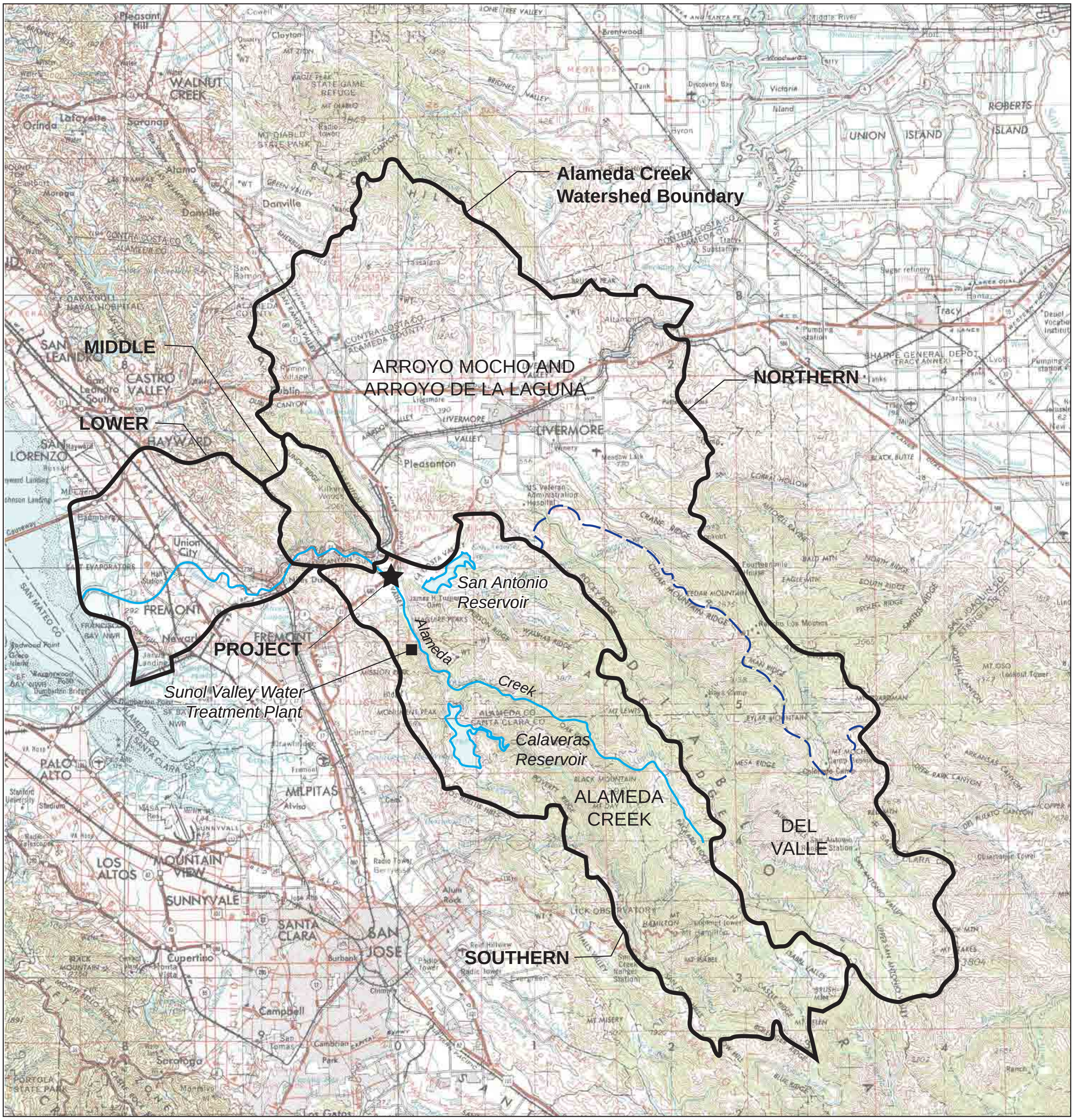
Alameda Creek originates on the northwestern slopes of the Diablo Range and drains towards San Francisco Bay. The watershed is an interior Coast Range drainage with three sub-watersheds (the lower, middle and upper sub-watersheds), and two main branches in the upper sub-watershed, Arroyo de la Laguna (northern) and Alameda Creek (southern), joining at the western end of the Sunol Valley (**Figure 2-1**). For purposes of assessing fisheries habitat in Alameda Creek, two discrete study areas have been identified; a primary area and an extended study area (see **Figure 2-2**). They consist of all fisheries habitats that could be directly or indirectly affected by the construction and operation of the ACRP.

### 2.1.1 Primary Study Area

Stream reaches immediately adjacent to and downstream of Pit F2 (the quarry pit from which the SFPUC proposes to recapture the water) comprise the primary study area for the fisheries habitat assessment. This area includes Alameda Creek from the confluence with San Antonio Creek downstream to the confluence with Arroyo de la Laguna. The primary study area has been further divided into Subreaches A, B, and C based on physical habitat characteristics (**Figure 2-3**).

### 2.1.2 Extended Study Area

The extended study area includes the Alameda Creek channel from its confluence with Arroyo de la Laguna to San Francisco Bay. Streamflows and the related fisheries habitat conditions in the extended study area are strongly influenced by operation of Del Valle Reservoir and water deliveries to the Alameda County Water District (ACWD) from the South Bay Aqueduct via Vallecitos Creek, which enters Arroyo de la Laguna just upstream of the Alameda Creek confluence. While SFPUC operations in the Alameda watershed influence flow conditions in Alameda Creek in the extended study area, the effects of SFPUC operations on streamflow are greatly diminished in the extended study area due to the effects of other water supply projects in the Arroyo de la Laguna watershed.



SOURCE: EDAW & Turnstone JV

SFPUC Alameda Creek Recapture Project

**Figure 2-1**

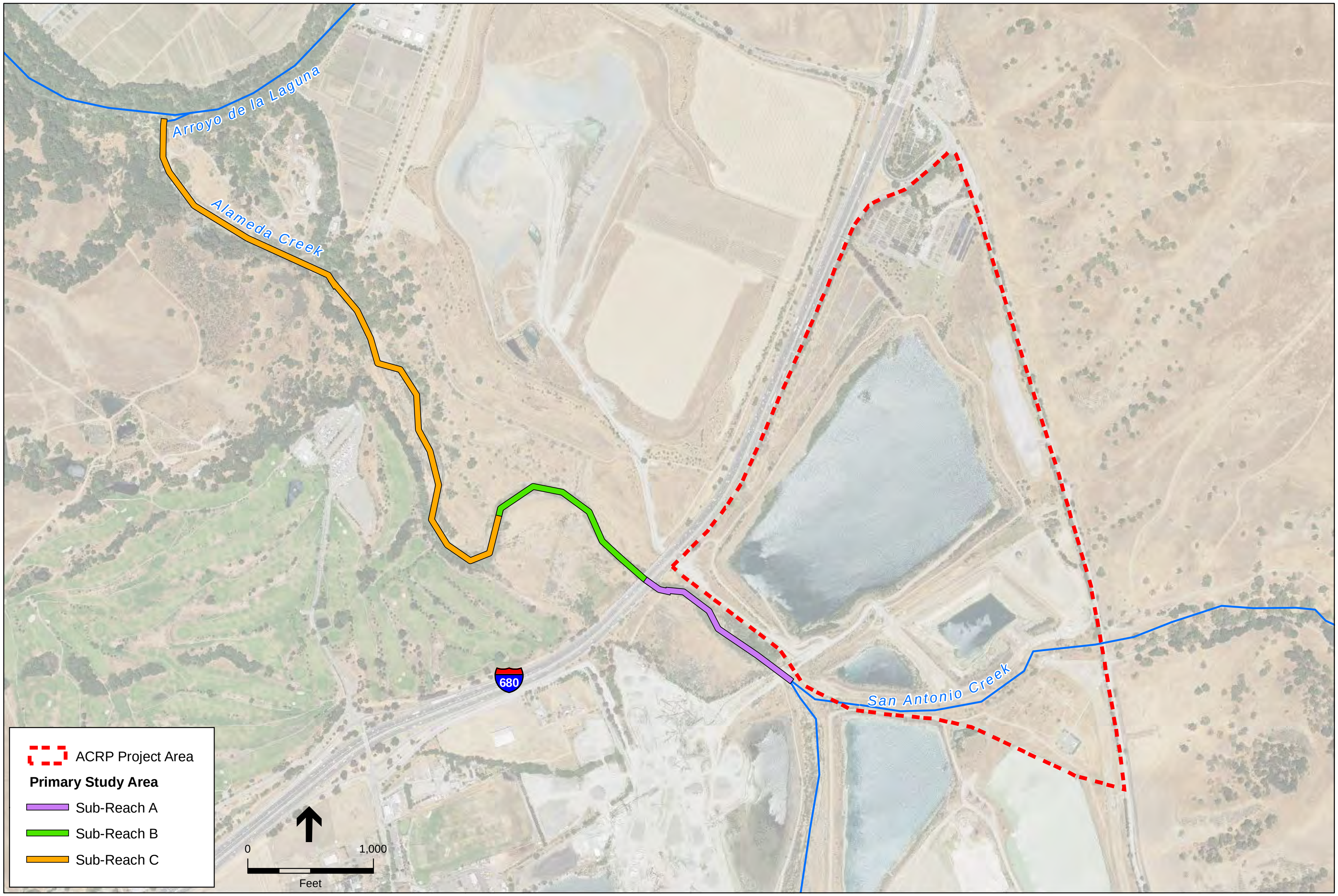
Alameda Creek Watershed and Sub-watershed Areas

SOURCE: ESA, 2016; Date of aerial photo is 2014.

SFPUC Alameda Creek Recapture Project

**Figure 2-2**

Fisheries and Aquatic Habitat Study Area



SOURCE: ESA, 2015; Date of aerial photo is 2014.

SFPUC Alameda Creek Recapture Project

**Figure 2-3**

Primary Study Area Sub-Reaches

## 2.2 Existing and with-CDRP Conditions

As described above, operation of the ACRP would be dependent on the instream flow schedules that are required to be implemented as part of future operations of Calaveras Reservoir. ACRP operations would not commence until construction of the CDRP has been completed and the instream flow schedules are implemented. Consequently, the aquatic habitat conditions that are expected to exist in Alameda Creek when the proposed ACRP would be operated are anticipated to be different from the conditions that exist in 2015. To account for this, Chapter 3 of this habitat assessment report includes separate descriptions of conditions in 2015 and conditions that are expected to prevail at the time the proposed project would be operated. The 2015 conditions are referred to as the “existing conditions” and the conditions that are expected to prevail at the time the proposed project would be implemented are referred to as the “with-CDRP conditions.” The CEQA analysis for the ACRP will use the existing and with-CDRP conditions to evaluate construction-related impacts of the ACRP as appropriate, depending on whether or not any flow-dependent resources could be affected. For the operational impacts of the ACRP on fisheries, the CEQA analysis will use the with-CDRP conditions as the baseline conditions in order to distinguish the effects of the ACRP from those of the CDRP. Each of these conditions is described in further detail Chapter 3 and defined in **Table 2-1**.

### 2.2.1 Existing Conditions

Existing conditions are those conditions in the Alameda Creek watershed at the time the San Francisco Planning Department published the Notice of Preparation of an Environmental Impact Report for the Alameda Creek Recapture Project (July 2015). Under the existing conditions, SFPUC operates Calaveras Dam and Calaveras Reservoir in accordance with the DSOD-imposed restrictions that have been in place since 2002, and as needed to allow for construction of the CDRP. The new Calaveras Dam has been under construction since 2011, and the CDRP instream flow schedules have not yet been implemented. Furthermore, numerous instream barriers currently present along Alameda Creek are preventing the upstream migration of steelhead from the San Francisco Bay remain in place.

### 2.2.2 With-CDRP Conditions

For purposes of the CEQA analysis for the operational effects of the ACRP on fisheries, the with-CDRP conditions in Alameda Creek assume completion of the CDRP and implementation of the instream flow schedules required by the CDRP permit conditions (see **Table 2-2** and **Table 2-3**, below). In addition, to be conservative, this CEQA analysis also assumes that existing human-made barriers to anadromous steelhead migration would be removed or other measures would be taken to allow fish migration; these conditions were determined to represent the worst-case scenario for fisheries resources in terms of identifying potential impacts of ACRP operations on fisheries. No attempt is made here to describe specifically what those barrier removal/bypass projects might entail, as specific adopted designs/plans are not available for certain barriers/obstacles and schedules for the removal/bypass projects are uncertain.

## TABLE 2-1
## ATTRIBUTES OF EXISTING AND WITH-CDRP CONDITIONS

| **Parameter** | **Existing Condition** | **with-CDRP Conditions** |
|---|---|---|
| Representative year | 2015 | 2019 to 2020 (following completion of the CDRP and the reservoir refill period) |
| Hydrologic period used in analysis | WY 1996 to WY 2013 | |
| Calaveras Reservoir and Dam | New dam under construction downstream of existing dam<br>Storage in Calaveras Reservoir restricted to one-third capacity with usable storage at 13% or 12,400 acre-feet by DSOD<br>Maximum pool elevation = 705 feet<br>Minimum pool elevation = 690 feet | New dam completed<br>Historical capacity of Calaveras Reservoir restored to nominal capacity = 96,850 acre-feet<br>Maximum pool elevation = 756 feet |
| Instream flow releases/spills from Calaveras Reservoir below Calaveras Dam | Frequent releases from low-flow valve or cone valve to manage water levels in the reservoir and from low flow valve for experimental purposes. Represented in ASDHM by observed flow at the USGS gage located downstream of Calaveras Reservoir | Implementation of instream flow schedule:<br>Dry year releases: May - Oct: 7 cfs; Nov – Dec: 5 cfs; Jan – April: 10 cfs, annual average<br>Wet/normal year releases: May – Sept: 12 cfs, Oct: 7 cfs; Nov – Dec: 5 cfs, Jan – April: 12 cfs |
| Alameda Creek Diversion Dam (ACDD) | No fish ladder or bypass tunnel<br>Maximum diversion of Alameda Creek water to Calaveras Reservoir = 650 cfs | Fish ladder and bypass structure operational<br>Minimum and Maximum diversion rates of Alameda Creek water to Calaveras Reservoir = 30 cfs to 370 cfs |
| ACDD bypass flows | When the gates on the diversion tunnel are open, only stream discharge greater than 650 cfs passes over the ACDD. (Note: Operations at the ACDD between WY 2002 and WY 2010 were influenced by limitations on storage at Calaveras Reservoir. As a result, the gates on the diversion tunnel were closed more frequently than they had been previously.)<br>Under Existing Condition, the ACDD tunnel has been closed since 5/23/2012. Prior to 2012 during DSOD period SFPUC operated ACDD very infrequently. For example, they were not operated at all between 10/24/2004 to 3/7/2007.<br>When the gates on the diversion tunnel are closed, all flow in Alameda Creek passes over the ACDD | Gate on diversion tunnel closed from April 1 to Nov 30, and all flow in Alameda Creek passes over ACDD.<br>Diversion of up to 370 cfs from December 1 to March 31.<br>Minimum bypass flow of 30 cfs whenever there is 30 cfs or more; if less than 30 cfs is present, entire flow passes over the ACDD |
| Quarry pit operations<br>Hanson Aggregates:<br>- SMP-24 (Pits F2, F3-East, F3-West)<br>- SMP-32SMP-33<br>Oliver de Silvia:<br>- SMP-30 (Pits F4, F5, F6) | - SMP-24 pits used only to store and manage water to support active mining on SMP-32 and aggregate processing, with excess water discharged under NPDES permit to Alameda Creek at an average annual rate of 3,436 acre-feet per year.[7] In 2015, this volume of regulated discharge was 1,206 acre-feet.<br>- SMP-30 Pit F6 in active use for aggregate extraction, with infrequent discharges from SMP-30 to Alameda Creek. | The same as the existing condition except that as a result of the releases and bypasses it is assumed more water infiltrates to the quarries and more water is available to quarry operators for water management and subsequent NPDES discharges. It is assumed the average amount of water available for quarry NPDES discharges is an annual average of 6,620 acre-feet per year. |

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[7] Hanson reports its regulated discharges to the RWQCB. The volumes of water reported are based on the pump rate of the pumps and not a meter at the discharge point. Because some of the water that is calculated by the pump rate is used for consumptive purposes, the amount of water discharge to Alameda Creek is likely an overestimation.

## TABLE 2-1 (Continued)
## ATTRIBUTES OF EXISTING AND WITH-CDRP CONDITIONS

| Parameter | Existing Condition | with-CDRP Conditions |
|---|---|---|
| Loss of surface flow in Alameda Creek to subsurface flow downstream of Welch Creek | 0 to 17 cfs (maximum) between Welch Creek and San Antonio Creek confluences and 0 to 7.5 cfs (maximum) between San Antonio Creek and Arroyo de la Laguna confluences, depending on streamflow. | |

NOTE: The attributes of pre-2001 conditions are the same as those of existing conditions, except that Calaveras Reservoir was operated with its full storage of 96,850 acre-feet and SMP-24 was in active use for aggregate extraction until 2006, SMP-32 was not yet in operation, and excess water discharged under NPDES permit to Alameda Creek was at an average annual rate of 2,796 acre-feet per year. The attributes of with-project conditions are the same as those of with-CDRP conditions, except for the addition of the proposed ACRP which would include pumping an annual average of 7,178 acre-feet of water from Pit F2 and conveying it to the regional water system, and which in turn, would reduce the amount of water assumed to be available to the quarry operators and therefore less water for NPDES discharge. The average amount of water available to the quarry operators for NPDES discharge decreases to an annual average of 2,532 acre-feet per year.

## TABLE 2-2
## CDRP INSTREAM FLOW SCHEDULES BELOW CALAVERAS DAM

| | | Dry (Schedule B) | | Normal/Wet (Schedule A) | |
|---|---|---|---|---|---|
| Flow Schedule Decision Date | Flow Schedule Application Period | Cumulative Arroyo Hondo flows for water year classification (MG) | Flow Release (cfs) | Cumulative Arroyo Hondo flows for water year classification (MG) | Flow Release (cfs) |
| N/A | October | N/A | 7 | N/A | 7[a] |
| N/A | Nov 1 thru Dec 31 | N/A | 5 | N/A | 5 |
| Dec 29 | Jan 1 thru Apr 30 | ≤ 360 | 10[a] | > 360 | 12[a] |
| Apr 30 | May 1 thru Sept 30 | ≤ 7,246 | 7 | > 7,246 | 12 |

NOTE:

[a] Flows would be ramped in accordance with Table 3 of the NMFS BO.

SOURCE: National Marine Fisheries Service (NMFS), 2011. Southwest Region. Biological Opinion for Calaveras Dam Replacement Project in Alameda and Santa Clara Counties. Tracking No. 2005/07436. March 5, 2011.

## TABLE 2-3
## CDRP INSTREAM FLOW SCHEDULE IN ALAMEDA CREEK BELOW THE ACDD

| Flow Schedule Application Period | Flow Requirements | Comment |
|---|---|---|
| Apr 1 – Nov 30 | All unimpaired flow upstream of the ACDD | No diversions from Alameda Creek to Calaveras Reservoir (ACDD gates closed) |
| Dec 1 – Mar 31 | Up to 30 cfs, dependent upon unimpaired flows in Alameda Creek above the ACDD.<br>Downstream flow requirements can be met through a combination of flows released through the fish ladder, ACDD bypass tunnel, and/or over the dam crest. | Diversion of up to 370 cfs from Alameda Creek to Calaveras Reservoir (ACDD gates open). |

SOURCE: National Marine Fisheries Service (NMFS), 2011. Southwest Region. Biological Opinion for Calaveras Dam Replacement Project in Alameda and Santa Clara Counties. Tracking No. 2005/07436. March 5, 2011.

Future operation of Calaveras Reservoir and Calaveras Dam will influence streamflow and the aquatic habitat and fish community in Calaveras Creek and Alameda Creek downstream of the reservoir. Under the CDRP, future operations of Calaveras Reservoir and Dam and the ACDD include the following provisions designed to improve habitat conditions for steelhead and other native fishes in the watershed:

- Bypass flows at the ACDD and releases from Calaveras Dam pursuant to the flow schedules identified in the CDRP's NMFS Biological Opinion[8] and CDFW Streambed Alteration Agreement;[9]
- Operational procedures for Calaveras Dam releases to avoid cone valve testing during spawning and egg incubation periods and implement flow release ramping criteria.

The regulatory permits for CDRP require that SFPUC implement the following flow release schedules (operation of Calaveras Dam) and flow bypasses (operation of ACDD) for steelhead as part of the proposed future operations of Calaveras Reservoir and Dam. Additional discussion on future operation of Calaveras Dam and the ACDD is provided in Section 3.3.1.

## 2.3 Methods

The assessment of aquatic habitat conditions in Alameda Creek relied upon: extensive literature review; analysis of 2008 survey data from the Calaveras Reservoir Experimental Water Release Habitat Characterization Study performed by the SFPUC Natural Resources and Lands Management Division, Fisheries and Wildlife Section, between May 1 and July 3, 2008; May 2015 reconnaissance-level fisheries habitat survey data collected by Environmental Science Associates; review of historical hydrologic records; and the use of the Alameda System Daily Hydrologic Model to project creek flows under the existing and with-CDRP conditions (i.e., future hydrologic conditions with implementation of CDRP instream flow schedules). Each of these data sources is discussed in further detail below.

### 2.3.1 Literature Review

The Alameda Creek watershed has been studied in detail. The Alameda Creek Fisheries Restoration Workgroup (ACFRW) is a multi-agency stakeholder group formed in 1999 to develop and implement a strategy to restore steelhead trout to Alameda Creek. The ACFRW is composed of numerous community and citizens' groups, local water management and flood control agencies, state and federal resource agencies, and others. Multiple studies have been prepared detailing the potential for restoration of anadromous fish within Alameda Creek, including those in support of the CDRP Environmental Impact Report (EIR). The following documents were reviewed to gather information on the existing and with-CDRP conditions as they relate to the ACRP and provide the basis for the fisheries habitat assessment presented in this document:

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[8] National Marine Fisheries Service (NMFS), 2011. *Biological Opinion for the Calaveras Dam Replacement Project*. Santa Rosa, CA.

[9] California Department of Fish and Game (CDFG), 2011. *Streambed Alteration Agreement for Calaveras Dam Replacement Project.* Notification No. 1600-2010-0322-R3. June 28, 2011.

- *An Assessment of the Potential for Restoring a Viable Steelhead Trout Population in the Alameda Creek Watershed.* (Gunther et al., 2000);
- *Ecology, Assemblage Structure, Distribution, and Status of Fishes in Streams Tributary to the San Francisco Estuary, California. (*Leidy, 2007);
- *Calaveras Dam Replacement Project Fisheries Technical Report 2008 (ETJV 2008);*
- *Biological Assessment and Essential Fish Habitat Assessment for the Calaveras Dam Replacement Project* (ETJV, 2009);
- *Assessment of Fish Migration at Riffles in Sunol Valley Quarry Reach of Alameda Creek* (URS and HDR, 2010);
- *Technical Memorandum: Calaveras Dam Replacement Project: Cumulative Impact Analysis – Central California Coast Steelhead. Appendix J Calaveras Dam Replacement Project FEIR* (San Francisco Planning Department 2011);
- *Final Environmental Impact Report for the Calaveras Dam Replacement Project* (San Francisco Planning Department, 2011);
- *Biological Opinion for the Calaveras Dam Replacement Project* (NMFS, 2011);
- *Streambed Alteration Agreement for the Calaveras Dam Replacement Project (Notification No. 1600-2010-0322-R3)* (CDFW, 2011);
- *Evaluating Priority Life History Tactics for Reintroduced Alameda Creek Steelhead. Prepared for: Alameda Creek Fisheries Restoration Workgroup* (McBain & Trush, 2012); and
- *Joint Lower Alameda Creek Fish Passage Improvements, Draft Initial Study with Mitigated Negative Declaration/Environmental Assessment with Finding of No Significant Impacts* (Hanson Environmental, 2016).

### 2.3.2 Analysis of 2008 Habitat Characterization Study Survey Data

In 2008, the SFPUC conducted a detailed habitat characterization of Alameda Creek from the confluence of Alameda Creek and Arroyo de La Laguna upstream to Calaveras Dam. The habitat characterization was conducted during four successive experimental water releases from Calaveras Reservoir. The data from these surveys are summarized in this document for the reach of Alameda Creek in the primary study area, and provides insight into habitat conditions during various flow conditions that may occur under the with-CDRP conditions. Crews of five or more SFPUC biologists surveyed from the confluence of Alameda Creek and Arroyo de la Laguna, upstream in Alameda and Calaveras Creeks to Calaveras Dam. The methods were repeated during four successive experimental water releases from Calaveras Reservoir between May 1 and July 3, 2008. Continuous longitudinal measurements of habitat types were recorded, and at every tenth habitat unit, the first occurrence of a given habitat unit, and around potential migration barriers a full habitat characterization was conducted including measurements of: width and depth, substrate and shelter, band and riparian characteristics, spawning and pool tailout characteristics, barrier assessment, and streamflow measurements.

## 2.3.3 2015 Fisheries Habitat Surveys

Focused surveys of the primary study area and reconnaissance surveys of the extended study area were conducted on May 27, 2015 (see Figures 2-2 and 2-3) in support of the ACRP environmental review process. ESA fisheries biologists Chris Fitzer and Andy Hatch walked the entire portion of Alameda Creek from the San Antonio Creek confluence to the Arroyo de la Laguna confluence. Aquatic habitat types, riparian vegetation cover, and instream characteristics were noted and mapped. Potential habitat and barriers to movement for steelhead were also noted during the surveys. The extended study area was surveyed via spot-checks at accessible locations along Niles Canyon and the Alameda Creek Flood Control Channel.

## 2.3.4 Alameda Creek Hydrology

### Historical Hydrological Records Review

The existing conditions have been characterized based on observation of conditions on the ground and review of recent historical records of stream discharge, water discharges and water levels in surface and groundwater bodies. These sources include stream gages, monitoring wells, and quarry discharge records and are described in more detail in the *Surface Water Hydrology Report for Proposed Alameda Creek Recapture Project* (see Appendix HYD1).[10]

### Alameda System Daily Hydrologic Model

Future hydrologic conditions in the Alameda Creek watershed were projected using the ASDHM. The methods used to make the projections are based are described in the *Surface Water Hydrology Report for the SFPUC Alameda Creek Recapture Project* (see Appendix HYD1). The ASDHM is a spreadsheet model that enables estimation of mean daily discharge values at various locations on Alameda Creek and one of its tributaries. The model was developed for the Alameda Creek Fisheries Restoration Workgroup, and the agencies and stakeholders that comprise the workgroup. The workgroup is attempting to restore steelhead populations in the Alameda Creek watershed. The workgroup developed a plan that called for several technical analyses including Ecosystem Diagnosis and Treatment, Numbers of Good Days and Spawning Risk. These analyses require information on hydrology, channel geometry, and water temperature. The ASDHM was developed to provide the hydrology information.

The ASDHM was first developed by the SFPUC in 2009 and has subsequently been expanded, refined, and updated to include the ACRP. The current version enables estimation of mean daily discharge values at one location (or node) in Calaveras Creek below Calaveras Dam, and 11 locations (nodes) in Alameda Creek between the Alameda Creek Diversion Dam and Coyote Hills Regional Park, close to the point at which the flood control channel discharges into San Francisco Bay (**Figure 2-4**). The model is described fully in a draft technical memorandum entitled *Overview of Methods, Models and Results to Develop Unimpaired, Impaired and Future Flow and Temperature Estimates along Lower Alameda Creek for Hydrologic Years 1996-2019* (Dhakal, Buckland and McBain, 2012).

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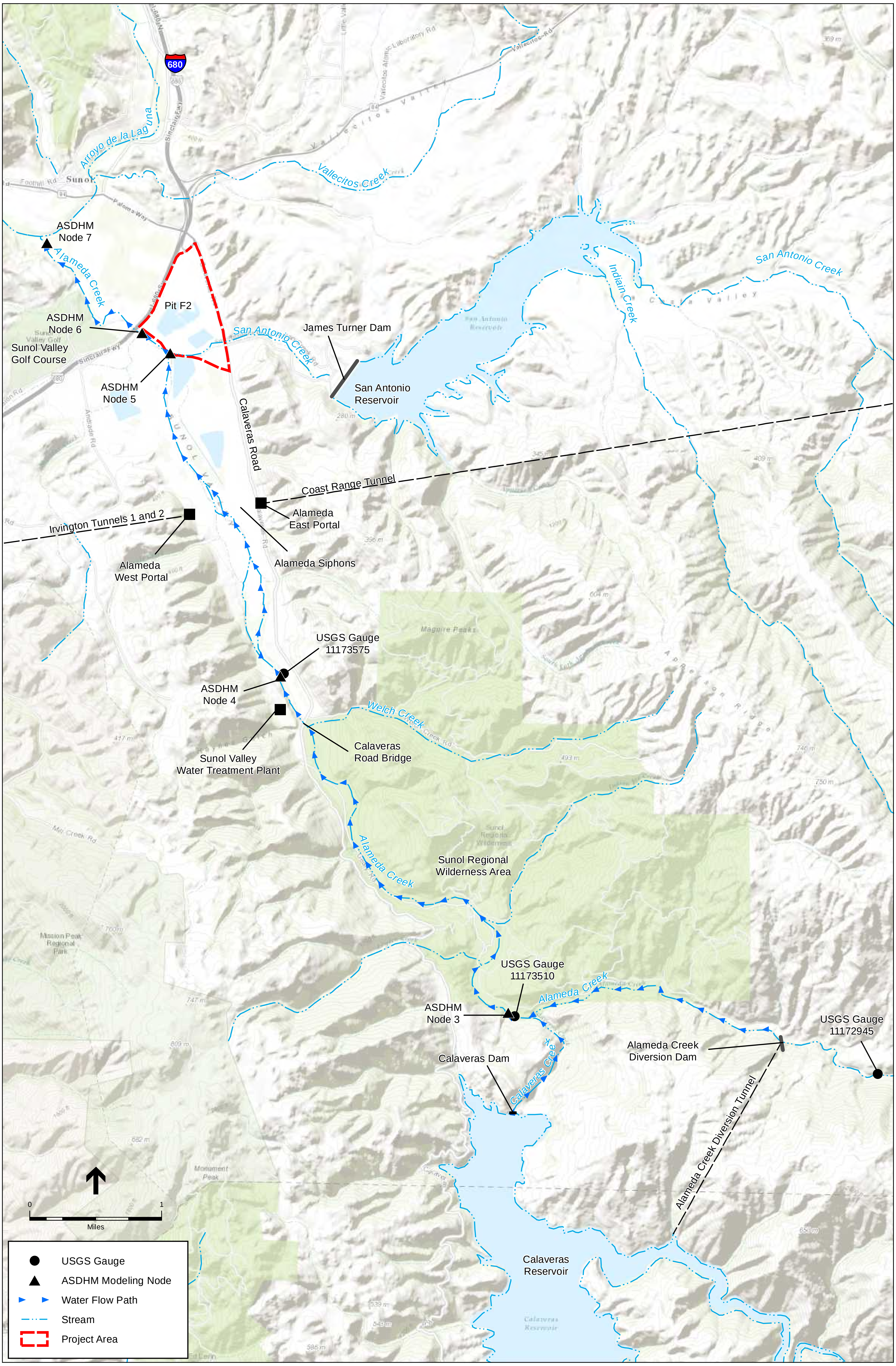
[10] Orion. 2016. *Surface Water Hydrology Report for the SFPUC Alameda Creek Recapture Project*. Prepared for San Francisco Planning Department by Orion Environmental Associates, November, 2016. (See Appendix HYD1)



SOURCES: SFPUC, 2015. Modeling node and monitoring well locations. KMZ files provided by Amod Dhakal on August 6, 2015; USGS, 2015. USGS Water Watch Google Earth Streamgages KMZ File for California. Available online at http://waterwatch.usgs.gov/index.php?m=stategage&w=kml, Accessed June 24, 2015.

SFPUC Alameda Creek Recapture Project

**Figure 2-4**

ASDHM Modeling Nodes Along Alameda Creek

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The SFPUC used the ASDHM to simulate the following scenarios in support of this habitat assessment. The hydrology used in the analysis was for the 18-year period from Water Year 1996 to Water Year 2013.

- Conditions that exist in 2015 with restricted storage in Calaveras Reservoir by order of the California Department of Water Resources, Division of Safety of Dams (DSOD) (existing conditions). (*Note: This model scenario was used to augment historical hydrological records where appropriate.*)
- Conditions that will exist when construction of the CDRP is completed and in operation and the instream flow schedules are implemented (with-CDRP conditions).

Additional description of the ASDHM application to the ACRP is provided in the *Surface Water Hydrology Report for the SFPUC Alameda Creek Recapture Project* (see Appendix HYD1).

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# CHAPTER 3
# Habitat Assessment Results

## 3.1 Alameda Creek Fisheries

Alameda Creek and its tributaries provide habitat for a diverse assemblage of native and non-native fishes. A total of 14 native and at least 13 non-native fish species have been observed in nontidal portions of the Alameda Creek watershed during the past century.[11,12,13] Several other species may have also occurred in the watershed based on collections in tidal portions, evidence from archaeological investigations, and other accounts.

Collections from the watershed include widely distributed native species typical of streams in the region, such as California roach (*Lavinia symmetricus*), Sacramento sucker (*Catostomus occidentalis*), pikeminnow (*Ptychocheilus grandis*), steelhead/rainbow trout (*Oncorhynchus mykiss*), Pacific lamprey (*Lampetra tridentata*), and prickly sculpin (*Cottus asper*). Non-native resident species present in the watershed include goldfish (*Carassius auratus*), carp (*Cyprinus carpio*), largemouth bass (*Micropterus salmoides*), smallmouth bass (*Micropterus dolomieu*), white catfish (*Ameiurus catus*), brown bullhead (*Ictalurus nebulosus*), black bullhead (*Ameiurus melas*), bluegill (*Lepomis macrochirus*), green sunfish (*Lepomois cyanellus*), western mosquitofish (*Gambusia affinis*), inland silverside (*Menidia beryllina*), and golden shiner (*Notemigonus crysaleucas*).[14,15,16]

Special-status fish species are legally protected or are otherwise considered sensitive by federal, state, or local resource conservation agencies and organizations. Special-status fish species include:

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[11] Gunther, A.J., J.M. Hagar, and P. Salop, 2000. An Assessment of the Potential for Restoring a Viable Steelhead Trout Population in the Alameda Creek Watershed. Prepared for the Alameda Creek Fisheries Restoration Workgroup. February 7, 2000.

[12] EDAW & Turnstone Joint Venture (ETJV), 2008. Calaveras Dam Replacement Project Fisheries Technical Report 2008. Prepared by Hagar Environmental Science and Thomas R. Payne and Associates for EDAW & Turnstone Joint Venture and SFPUC.

[13] Leidy, R.A., 2007. Ecology, Assemblage Structure, Distribution, and Status of Fishes in Streams Tributary to the San Francisco Estuary, California. San Francisco Estuary Institute, April 2007. Contribution No. 530.

[14] Gunther, A.J., J.M. Hagar, and P. Salop, 2000. An Assessment of the Potential for Restoring a Viable Steelhead Trout Population in the Alameda Creek Watershed. Prepared for the Alameda Creek Fisheries Restoration Workgroup. February 7, 2000.

[15] EDAW & Turnstone Joint Venture (ETJV), 2008. Calaveras Dam Replacement Project Fisheries Technical Report 2008. Prepared by Hagar Environmental Science and Thomas R. Payne and Associates for EDAW & Turnstone Joint Venture and SFPUC.

[16] Leidy, R.A., 2007. Ecology, Assemblage Structure, Distribution, and Status of Fishes in Streams Tributary to the San Francisco Estuary, California. San Francisco Estuary Institute, April 2007. Contribution No. 530.

- Species listed as threatened or endangered under the Federal Endangered Species Act (FESA) or California Endangered Species Act (CESA);
- Species identified by NMFS or CDFW as species of special concern; and
- Species fully protected in California under the California Fish and Game Code

Three special-status fish species have been identified for review as having the potential to occur in the Alameda Creek watershed, as described in **Table 3-1** below.

**TABLE 3-1**
**SPECIAL-STATUS FISH SPECIES WITH POTENTIAL TO OCCUR IN THE ACRP FISHERIES STUDY AREAS**

| Species | Status1 | | Habitat Requirements | Potential to Occur in the ACRP Fisheries Study Areas Under Existing Conditions |
|---|---|---|---|---|
| | NMFS | CDFW | | |
| California Central Coast steelhead DPS *Oncorhynchus mykiss* | T | -- | Requires cold, freshwater streams with suitable gravel for spawning. Rears in rivers and tributaries and in the San Francisco Bay. | Potential for occurrence in the primary study area is currently restricted by downstream barriers. Individuals periodically occur downstream of BART weir (downstream-most fish barrier) in the extended study area. |
| River lamprey *Lampetra ayresi* | -- | SSC | Requires cool, freshwater streams with suitable gravel for spawning. | Not expected to occur in the study areas. A river lamprey was reported in the watershed in 1966, but there are no recent occurrences. Potential for occurrence in the study areas is limited by downstream barriers. |
| Sacramento perch *Archoplites interruptus* | -- | SSC | Spawning has been reported to extend from spring to late summer, depending on location and water temperature. Occurs among aquatic plants or congregating in shallow waters in schools among or near inshore vegetation. | Not expected to occur in the study areas. Records indicate that Sacramento perch historically occurred in Alameda Creek (ETJV 2008); no recent known occurrences in the study areas. |

ACRONYMS:
CDFW = California Department of Fish and Wildlife; DPS = Distinct Population Segment; NMFS = National Marine Fisheries Service.

[1] Legal Status Definitions:

| *Federal Listing Categories (NMFS)*: | *State Listing Categories (CDFW)*: |
|---|---|
| T Threatened (legally protected) | SSC Species of Special Concern (no formal protection) |

SOURCE: ESA, 2015; SF Planning Department, 2011

## 3.1.1 Central California Coast Steelhead

### Regulatory Status

Central California Coast (CCC) steelhead distinct population segment (DPS) is listed as threatened under FESA only, and at present occurs downstream of the BART weir in the ACRP extended study area. Genetic testing suggests that the present self-sustaining populations of resident rainbow trout in upper Alameda Creek may be derived from migratory steelhead that were isolated in the upper part of the watershed by natural processes and by construction of dams and other passage obstacles.[17,18] This research found that these subpopulations were more similar to each other and populations of anadromous steelhead within the central California coast region than to other populations of steelhead including several widely distributed hatchery strains. In June 2005, NMFS proposed designating resident rainbow trout in the Alameda Creek watershed as threatened due to genetic similarities between resident and anadromous steelhead; however, only anadromous populations were included in the January 5, 2006 final listing determination, which reaffirmed the threatened status of CCC steelhead DPS under FESA. Specifically, the final listing determination stated "*under our final approach of delineating steelhead-only DPS of O. mykiss, the resident populations, including those in Upper Alameda Creek and the Livermore-Amador Valley, are not considered part of the listed DPSs*"[19] While the resident rainbow trout are not designated under FESA or otherwise, these fish may be considered "special status" under CEQA due to their genetic similarities to the listed species and agency interest.

## Life History

Steelhead have a highly flexible life history and may follow a variety of life-history patterns including residents (non-migratory) at one extreme and individuals that migrate to the open ocean (anadromous) at another extreme. Intermediate life-history patterns include fish that migrate within the stream (potamodromous), fish that migrate only as far as estuarine habitat, and fish that migrate to near-shore ocean areas. These life-history patterns do not appear to be genetically distinct.[20] Steelhead are unique among Pacific salmon in that ocean migrating individuals may return to the ocean after spawning and return to freshwater to spawn one or more times.

### *Migration*

Some of the best information on steelhead life history comes from a multi-year study in Waddell Creek in the Santa Cruz mountains.[21] Behavior of steelhead/rainbow trout in Waddell Creek is probably typical for most Central California populations. Steelhead along the Central California coast enter freshwater to spawn when winter rains have been sufficient to raise streamflows and breach the sandbars that form at the mouths of many streams during the summer. Increased streamflow during runoff events also appears to provide cues that stimulate migration and allows better conditions for fish to pass obstructions and shallow areas on their way upstream. The season for upstream migration of steelhead adults lasts from late October through the end of May, but typically the bulk of migration (over 95 percent in Waddell Creek) occurs between mid-December and mid-April.[22]

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[17] Nielsen, J., 2003. *Population Genetic Structure of Alameda Creek Rainbow/Steelhead Trout – 2002.* U.S.

[18] National Marine Fisheries Service (NMFS), 2004. *Proposed Listing Determinations for 27 ESUs of West Coast Salmonids:* Proposed Rule June 14, 2004 69 FR 113, pages 33102-33179.

[19] 71 Federal Register [FR] 841, January 5, 2006

[20] Shapovalov, L. and A.C. Taft. 1954. *The Life Histories of the Steelhead Rainbow Trout and Silver Salmon.* State of California, Department of Fish and Game. Fish Bulletin No. 98.

[21] Shapovalov, L. and A.C. Taft. 1954. *The Life Histories of the Steelhead Rainbow Trout and Silver Salmon.* State of California, Department of Fish and Game. Fish Bulletin No. 98.

[22] Shapovalov, L. and A.C. Taft. 1954. *The Life Histories of the Steelhead Rainbow Trout and Silver Salmon.* State of California, Department of Fish and Game. Fish Bulletin No. 98.

Steelhead have strong swimming and leaping abilities that allow them to ascend streams into small tributary and headwater reaches. Steelhead can swim at rates of up to 4.5 feet per second (fps) for extended periods of time and can achieve burst speeds of 14 to 26 fps during passage through difficult areas.[23] Leaping ability is dependent on the size and condition of fish and hydraulic conditions at the jump. Given satisfactory conditions, a conservative estimate of steelhead leaping ability is a height of 6 to 9 feet,[24] though other estimates range from 11 feet[25] to as high as 15 feet.[26]

Trout of various ages migrated out of Waddell Creek in all months of the year but the majority migrated in April, May, and June. Downstream migration of young-of-year fish (less than a year old) extended from late-April through the spring; however this movement constitutes dispersal to downstream rearing areas and not a true seaward migration. Downstream migration of one-year old steelhead was from April through late June and two-year old fish from March through late May, generally the age at which steelhead undergo physiological transformation for life in seawater (smoltification). In addition to temperature and flow conditions, smolts are subject to predation, primarily by birds including cormorants, mergansers, and herons, but also predatory fish. Predation by birds can increase under conditions where smolts have to traverse shallow sections of streams without cover. With clear water, birds can be particularly effective predators. Conditions favoring predation by birds occur in channel reaches modified for flood control where the channel is maintained in a wide, shallow configuration and is largely devoid of instream large woody debris and riparian vegetation. Behavioral adaptations of smolts including nocturnal migration may moderate the effects of predation.

Steelhead that survive spawning return downstream to re-enter the ocean. As many as 20 percent of adult spawners may be repeat spawners and some fish may return to spawn up to three or four times.[27] In some streams fish return downstream immediately after spawning while in others they may remain for a period up to several months. After spawning, these fish do not typically resume feeding while in freshwater. In Waddell Creek, the bulk of adults returned downstream from April through June. Fish that remain in the stream for any period of time generally reside in deeper pools. Adequate cover and cool temperature are critical habitat variables for adults that hold over for the entire summer.

Based on information from Waddell Creek, other central California coastal steelhead streams, and SFPUC’s studies of adfluvial *O. mykiss* above Calaveras and San Antonio Reservoirs, the expected migration timing for each steelhead life stage is presented in **Table 3-2**.

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[23] Bell, M. C., 1986. *Fisheries handbook of engineering requirements and biological criteria.* U.S. Army Corps of Engineers, Office of the Chief of Engineers, Portland, OR.

[24] Bjornn, T. C. and Reiser, D. W., 1991. Habitat Requirements of Salmonids in Streams. In *Influences of Rangeland Management on Salmonid Fishes and Their Habitats* (Meehan), Ed., American Fisheries Society, Bethesda, MD.

[25] Bell, M. C., 1986. *Fisheries handbook of engineering requirements and biological criteria.* U.S. Army Corps of Engineers, Office of the Chief of Engineers, Portland, OR.

[26] Gunther, A.J., J.M. Hagar, and P. Salop, 2000. *An Assessment of the Potential for Restoring a Viable Steelhead Trout Population in the Alameda Creek Watershed.* Prepared for the Alameda Creek Fisheries Restoration Workgroup. February 7, 2000.

[27] Shapovalov, L. and A.C. Taft. 1954. *The Life Histories of the Steelhead Rainbow Trout and Silver Salmon.* State of California, Department of Fish and Game. Fish Bulletin No. 98.

**TABLE 3-2**
**EXPECTED MIGRATION TIMING FOR STEELHEAD IN ALAMEDA CREEK**

| Life Stage | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sept |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Adult Immigration | | | ■ | ■ | ■ | ■ | ■ | | | | | |
| Juvenile Emigration | | | | | | ■ | ■ | ■ | ■ | | | |
| Post-spawn Adult Emigration | | | | ■ | ■ | ■ | ■ | ■ | ■ | | | |

SOURCE*:* Gunther et al. 2000; Moyle 2002; SFPUC 2004, NMFS 2011

### *Spawning*

Steelhead select spawning sites with gravel substrate and with sufficient flow velocity to maintain circulation through the gravel and provide a clean, well-oxygenated environment for incubating eggs. Preferred flow velocity is in the range of 1 to 3 feet per second for steelhead and preferred gravel substrate is in the range of 0.25 to 4 inches in diameter.[28]

Typically, sites with preferred features for spawning occur most frequently in the pool tail/riffle head areas where flow accelerates out of the pool into the higher gradient section below. In such an area, the female will create a pit, or redd, by undulating her tail and body against the substrate.

Steelhead have relatively high fecundity with a 22-inch-long female producing around 4,800 eggs and a 30-inch fish producing an average of 9,000-10,000 eggs.[29] Even a 12-inch non-anadromous rainbow trout may produce 1,000 eggs or more. Survival of fertilized eggs through hatching and emergence from the gravel are most often limited by severe changes in flow that can dislodge eggs from the substrate, result in sedimentation, or de-water incubation sites.

### *Rearing*

After emergence from the gravel, fry inhabit low velocity areas along the stream margins. As they feed and grow they gradually move to deeper and faster water. Steelhead juveniles (parr) of 4 to 6 inches (generally in their second year of life) may be commonly found in riffle habitat, particularly in warmer streams. Parr larger than 6 inches are more often found in deeper waters where low velocity areas are in close proximity to higher velocity areas and cover is provided by boulders, undercut banks, logs, or other objects. Heads of pools generally provide classic conditions for older trout. Trout can inhabit quite small streams, particularly in coastal streams. Often habitat may be far more limiting for older juveniles than habitat for younger fish. The critical period is during base flow conditions that generally occur between May and October in central California. Streamflow can drop to very low levels with loss of depth and velocity in riffle and run habitats, or in the extreme, only isolated pools with intervening dry sections of stream.

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[28] Bjornn, T. C. and Reiser, D. W., 1991. Habitat Requirements of Salmonids in Streams. In *Influences of Rangeland Management on Salmonid Fishes and Their Habitats* (Meehan), Ed., American Fisheries Society, Bethesda, MD.

[29] Shapovalov, L. and A.C. Taft. 1954. *The Life Histories of the Steelhead Rainbow Trout and Silver Salmon.* State of California, Department of Fish and Game. Fish Bulletin No. 98.

Any diversion or other depletion of streamflow during this critical period can be potentially damaging to rearing juvenile steelhead.

Although standard definitions of good trout rearing habitat often include conditions such as baseflows of at least 25 percent to 50 percent of the average annual daily flow, 1:1 riffle-to-pool ratios, and depths of a foot or more, these conditions may not always be achieved in central California streams that still support relatively good steelhead/rainbow trout populations. Steelhead/rainbow trout populations in central California can occur in streams with relatively low baseflow and in streams varying widely in terms of standard evaluation parameters such as pool:riffle ratio and mean depth. Steelhead juveniles respond to stream conditions that limit habitat for older trout by leaving the small streams to complete the maturation process in the more accommodating ocean environment.

Food and cover are key factors for rearing steelhead.[30] Food availability, in terms of production of aquatic and terrestrial insects, is influenced by substrate composition, extent of riffles, and riparian vegetation. The highest production of aquatic invertebrates is in gravel and cobble substrate with low amounts of fine sediments, often occurring in riffle type habitats. Bjornn et al. (1977)[31] found that the density of rearing steelhead and Chinook salmon in artificial channels was reduced in nearly direct proportion to increased cobble embeddedness. Response to increased embeddedness was even greater during the winter. During the high flows, reduced food abundance, and lower temperatures occurring in winter, steelhead may move into the substrate or other cover. Backwater habitat, small tributaries, or other low velocity areas may also be important winter habitat.

Temperature is also an important factor for steelhead/rainbow trout, particularly during the over-summer rearing period.[32,33] The upper lethal temperature for Pacific salmonids is in the range 23.9 to 25°C for continuous long-term exposure.[34] Some researchers indicate an upper lethal temperature for Pacific salmonids as low as 22.9°C;[35] however, steelhead can survive for short periods at elevated temperatures, especially if abundant food and dissolved oxygen exist. Temperature data suggest that summer and early-fall temperatures in Niles Canyon are within the range considered to be highly stressful or unsuitable for juvenile steelhead.[36]

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[30] Shapovalov, L. and A.C. Taft. 1954. *The Life Histories of the Steelhead Rainbow Trout and Silver Salmon.* State of California, Department of Fish and Game. Fish Bulletin No. 98.

[31] Bjornn, T.C., M.A. Brusven, M.P. Molnau, J. H. Milligan, R.A. Klamt, E. Chacho, and C. Schaye, 1977. *Transport of granitic sediment in streams and its effects on insects and fish.* University of Idaho, Forest, Wildlife and Range Experiment Station Bulletin 17, Moscow.

[32] Gunther, A.J., J.M. Hagar, and P. Salop. 2000. *An Assessment of the Potential for Restoring a Viable Steelhead Trout Population in the Alameda Creek Watershed.* Prepared for the Alameda Creek Fisheries Restoration Workgroup. February 7, 2000.

[33] Hanson Environmental Inc. 2002. *Air and Water Temperature Monitoring Within Alameda Creek: 2001-2002.* Draft October 1, 2002.

[34] Gunther, A.J., J.M. Hagar, and P. Salop. 2000. *An Assessment of the Potential for Restoring a Viable Steelhead Trout Population in the Alameda Creek Watershed.* Prepared for the Alameda Creek Fisheries Restoration Workgroup. February 7, 2000.

[35] Hanson Environmental Inc. 2002. *Air and Water Temperature Monitoring Within Alameda Creek: 2001-2002.* Draft October 1, 2002.

[36] Hanson Environmental Inc. 2002. *Air and Water Temperature Monitoring Within Alameda Creek: 2001-2002.* Draft October 1, 2002.

## Steelhead Life History Tactics in Alameda Creek

The following discussion presents different life history tactics that steelhead could use in the Alameda Creek watershed in the future. As discussed above, steelhead are the anadromous form of *O. mykiss* and have a highly flexible and complex life history. They may follow a variety of life history patterns and strategies. Historical steelhead life history tactics within the Alameda Creek watershed likely occurred in two broad categories:[37] (1) fry born in the upper tributaries reared for 1 or 2 years, then migrated rapidly to San Francisco Bay, and (2) following emergence in the upper tributaries, fry moved downstream and reared in the main stem and/or Niles Canyon before entering the estuary and San Francisco Bay. The success of a given tactics likely varied year to year and depended upon several factors (e.g., precipitation and flow, temperatures, food availability). Historically (pre-1900s), headwater tributaries likely contributed large smolts directly to San Francisco Bay, especially during consecutive wet years, but many additional large smolts were likely produced by slower migrating juveniles that grew on their way downstream through the main stem channels, before smolting and entering the Alameda Creek estuary and then San Francisco Bay.

Assuming fish passage barriers are remedied and steelhead regain access to the upper watershed in the future, a critical period occurs during juvenile freshwater residency. Juvenile fish may remain in the watershed from less than a year to more than two years. Those residing in freshwater and/or an estuary less than a full year from the time of egg deposition are categorized as ‘0+ juveniles’. Juveniles that spend one complete winter in freshwater and/or an estuary are categorized as ‘1+ juveniles’ and those that remain for two complete winters in freshwater and/or an estuary are categorized as ‘2+ juveniles’. Prior to entering the Pacific Ocean, all juveniles physiologically transform into salt-tolerant smolts. Smolts mature into adults and may remain in the Pacific Ocean from 1 to 3 years (or more) before returning to their natal streams to spawn. In California, most adult steelhead returning to spawn have spent at least one full winter rearing as juveniles (i.e., as 1+ juveniles) in their natal watershed.[38,39]

Often each unique period of juvenile freshwater residency (i.e., staying less than a year, more than one full year, and slightly more than two full years in the watershed) is considered a separate life history tactics. While helpful, the juvenile residency categories do not sufficiently differentiate patterns of watershed use. For example, a juvenile steelhead spending one winter in Alameda Creek (a ‘1+ juvenile’) might reside high in the headwaters then migrate rapidly to San Francisco Bay, or it might move far downstream shortly following emergence to spend the entire winter in Niles Canyon (if suitable conditions exist) before migrating to San Francisco Bay in late-spring. Both would enter San Francisco Bay as 1+ smolts, but their life history tactics within the watershed would have been fundamentally different.[40,41]

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[37] McBain and Trush, 2008, *Alameda Creek Population Recovery Strategies and Instream Flow Assessment for Steelhead.* Prepared for the Alameda Creek Fisheries Restoration Workgroup.

[38] McBain and Trush, 2008, *Alameda Creek Population Recovery Strategies and Instream Flow Assessment for Steelhead.* Prepared for the Alameda Creek Fisheries Restoration Workgroup.

[39] McBain and Trush, 2012. *Evaluating Priority Life History Tactics for Reintroduced Alameda Creek Steelhead.* Prepared for: Alameda Creek Fisheries Restoration Workgroup.

[40] McBain and Trush, 2008, *Alameda Creek Population Recovery Strategies and Instream Flow Assessment for Steelhead.* Prepared for the Alameda Creek Fisheries Restoration Workgroup.

[41] McBain and Trush, 2012. *Evaluating Priority Life History Tactics for Reintroduced Alameda Creek Steelhead.* Prepared for: Alameda Creek Fisheries Restoration Workgroup.

A key factor in determining steelhead survival and recovery success is the growth of juveniles during freshwater residency and smolt transition. Fish size at smolting is important to steelhead survival, and big smolts are much more likely to return as spawning adults than small smolts.[42,43] Growth rates during the juvenile rearing period are greatly influenced by both the availability (e.g., access and quantity) and quality (e.g., favorable water temperature and forage availability) of oversummer rearing habitat in the Alameda Creek watershed.

## Status in the Primary and Expanded Study Areas

Steelhead formerly inhabited the Alameda Creek watershed prior to construction of dams and other water resource and flood control infrastructure.[44,45] The presence of migratory barriers, notably a grade control weir at the BART crossing, prevents upstream movement of steelhead to potential spawning and rearing habitat, and currently, steelhead can no longer complete their lifecycle in the watershed.

Sightings of migratory *O. mykiss* have been reported downstream of the BART weir, adjacent to the inflatable dam operated by the ACWD. In 1998, individuals were captured by citizens groups and released in the mouth of Niles Canyon upstream of the inflatable diversion dam. There are also reports of migratory *O. mykiss* spawning in Alameda Creek downstream of the middle inflatable dam, and in 1998 fertilized eggs were collected from this area immediately downstream of the BART weir. The eggs hatched successfully and the resulting fry were released into Alameda Creek in Sunol Park.[46]

Steelhead along the central California coast enter freshwater to spawn when winter rains have been sufficient to raise streamflows. Increased streamflow during runoff events also appears to provide cues that stimulate migration and allows better conditions for fish to pass obstructions and shallow areas on their way upstream. If anadromous steelhead become re-established in Alameda Creek, operation of the ACDD and Calaveras Dam would influence streamflow and water temperature in Alameda Creek, which in turn would influence steelhead during its various life history stages. Higher flows may enable upstream migrating adults and downstream migrating adult steelhead and steelhead smolts to pass critical riffles and other migration obstacles. Reduced streamflows may result in higher water temperature, while releases from a restored Calaveras Reservoir may result in lower water temperatures, and could affect steelhead migrating later in the spring.

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[42] McBain and Trush, 2008, *Alameda Creek Population Recovery Strategies and Instream Flow Assessment for Steelhead.* Prepared for the Alameda Creek Fisheries Restoration Workgroup.

[43] McBain and Trush, 2012. *Evaluating Priority Life History Tactics for Reintroduced Alameda Creek Steelhead.* Prepared for: Alameda Creek Fisheries Restoration Workgroup.

[44] Gunther, A.J., J.M. Hagar, and P. Salop, 2000. *An Assessment of the Potential for Restoring a Viable Steelhead Trout Population in the Alameda Creek Watershed.* Prepared for the Alameda Creek Fisheries Restoration Workgroup. February 7, 2000.

[45] Leidy, R.A., 2007. Ecology, *Assemblage Structure, Distribution, and Status of Fishes in Streams Tributary to the San Francisco Estuary, California.* San Francisco Estuary Institute, April 2007. Contribution No. 530.

46 Gunther, A.J., J.M. Hagar, and P. Salop, 2000. *An Assessment of the Potential for Restoring a Viable Steelhead Trout Population in the Alameda Creek Watershed.* Prepared for the Alameda Creek Fisheries Restoration Workgroup. February 7, 2000.

Both the primary and extended study areas are anticipated to function only as migratory habitat for steelhead if they are restored to the upper watershed, with adults migrating through both study areas during winter months, and the majority of repeat spawners, young-of-year, or older smolt returning downstream in late spring. The primary limiting factors for all life stages of steelhead in Alameda Creek are water temperature and both natural and man-made barriers. In both the primary and extended study areas, currently water temperatures are generally too high during summer months to support steelhead rearing, and over-summering steelhead are not expected to occur in these portions of Alameda Creek.[47] This expectation has been supported by fisheries data which shows that both the primary and extended study areas support a warm-water fish assemblage.[48]

### 3.1.2 Other Fisheries in Alameda Creek

As discussed above, collections from the watershed include widely distributed native and non-native species typical of streams in the region;[49,50,51] however, no data on fish presence are available for the reach of Alameda Creek in the primary study area because no known sampling has taken place within this reach. Largemouth bass and bluegill were observed (visually) in a few of the deeper pools in this reach during the 2015 habitat assessment survey. It is unknown whether they are transients in this reach rather than part of a self-sustaining population. Largemouth bass are predatory species that may preclude the year-round presence of native species such as Sacramento sucker or roach, which might otherwise occur in this low gradient, warm-water reach.

## 3.2 Past and Present Influences on Habitat Conditions

The hydrologic and fisheries habitat conditions in Alameda Creek adjacent to and downstream of the proposed ACRP have been and are currently influenced by a number of historical and existing facilities and operations under the jurisdiction of the SFPUC, Alameda County Water District (ACWD), Alameda County Flood Control and Water Conservation District (ACFCWCD), Department of Water Resources, and Zone 7 Water Agency, among others. The natural and unimpaired flow conditions that existed pre-20th century have been substantially altered by the construction and current operation of many of these facilities. Some of these facilities are direct barriers to fish migration, while other facilities pose various degrees of control/influence over habitat conditions. The major structures, facilities, and fish passage barriers or obstacles are listed below (see **Figure 3-1**):

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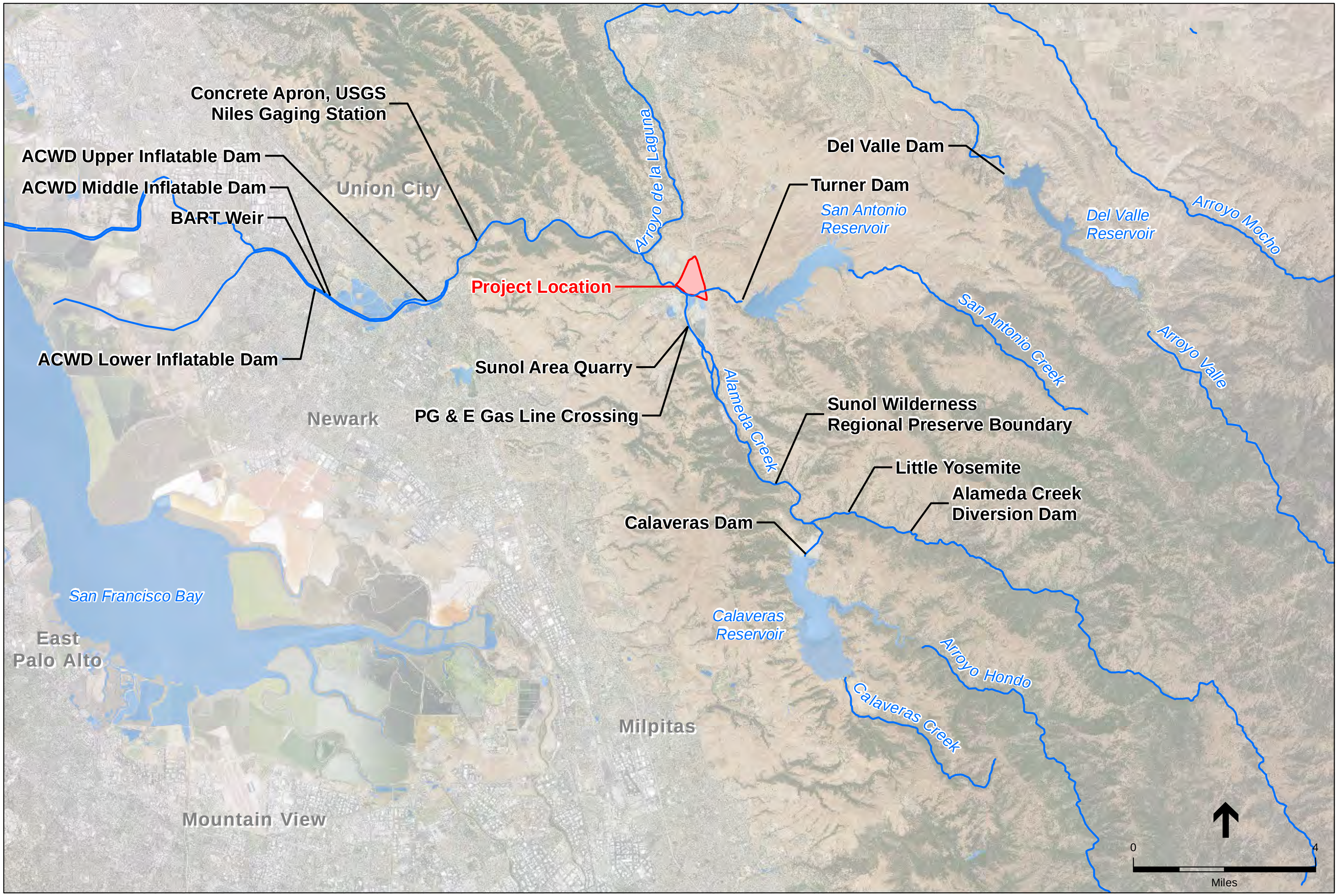
[47] EDAW & Turnstone Joint Venture (ETJV), 2008. *Calaveras Dam Replacement Project Fisheries Technical Report 2008*. Prepared by Hagar Environmental Science and Thomas R. Payne and Associates for EDAW & Turnstone Joint Venture and SFPUC.

[48] Leidy, R.A., 2007. Ecology, *Assemblage Structure, Distribution, and Status of Fishes in Streams Tributary to the San Francisco Estuary, California.* San Francisco Estuary Institute, April 2007. Contribution No. 530.

[49] Gunther, A.J., J.M. Hagar, and P. Salop, 2000. An Assessment of the Potential for Restoring a Viable Steelhead Trout Population in the Alameda Creek Watershed. Prepared for the Alameda Creek Fisheries Restoration Workgroup. February 7, 2000.

[50] EDAW & Turnstone Joint Venture (ETJV), 2008. Calaveras Dam Replacement Project Fisheries Technical Report 2008. Prepared by Hagar Environmental Science and Thomas R. Payne and Associates for EDAW & Turnstone Joint Venture and SFPUC.

[51] Leidy, R.A., 2007. Ecology, Assemblage Structure, Distribution, and Status of Fishes in Streams Tributary to the San Francisco Estuary, California. San Francisco Estuary Institute, April 2007. Contribution No. 530.



SOURCE: ESA, 2015

SFPUC Alameda Creek Recapture Project

**Figure 3-1**

Major Facilities and Fish Passage Barriers/Obstacles in the Alameda Creek Watershed

- Upstream of or adjacent to the proposed ACRP:
  - Calaveras Dam and Reservoir;
  - ACDD and diversion tunnel;
  - Sunol Valley aggregate mining operations;
  - Sunol Valley historic stream relocation and channelization;
  - Turner Dam and San Antonio Reservoir (barriers to fish passage in upper San Antonio Creek);
  - Sunol Valley infiltration galleries; and
  - PG&E gas pipeline crossing protection covering (concrete mat).
- Downstream of the proposed ACRP:
  - Del Valle Dam and Reservoir/South Bay Aqueduct, including DWR SWP releases;
  - Quarry Lakes recharge facilities;
  - Various channelized and culverted stream segments;
  - Expanding urban development of the Tri-Valley Area;
  - USGS Niles gaging station (11179000) weir/apron;
  - ACWD's inflatable dams;
  - BART Weir; and
  - ACFCWCD channelization project.

## 3.3 Alameda Creek Habitat Conditions

### 3.3.1 Hydrology

#### Existing Conditions

Over the last century, the natural hydrology of the Alameda Creek watershed has been altered by water supply system operations, gravel mining, urban development and flood reduction measures. However, almost all of the urban development and flood reduction projects are located outside of the primary study area. The primary anthropogenic factors affecting the natural hydrology of Alameda Creek in the primary study area are water supply system operations and gravel mining.

Alameda Creek flows from its headwaters near Mount Hamilton northward through Sunol-Ohlone Regional Wilderness and the Sunol Valley to its confluence with Arroyo de la Laguna. Just downstream of the confluence it turns and flows westward through Niles Canyon and across the Bay Plain to San Francisco Bay. Its total length is 46 miles.

The uppermost reach of Alameda Creek flows through rugged and underdeveloped terrain from its headwaters to the ACDD. The creek channel upstream of the diversion dam slopes steeply, descending in a narrow well-defined channel at an average rate of about 125 feet per mile. Water that passes over the diversion dam continues through a steep channel, including the gorge known as Little Yosemite, to Alameda Creek's confluence with Calaveras Creek at the southern end of the Sunol Valley. The reach of the creek between the diversion dam and the confluence with Calaveras Creek descends at an average rate of about 165 feet per mile.

Downstream (north) of the Calaveras Creek confluence, Alameda Creek's channel slope becomes much flatter, descending at a rate of about 27 feet per mile through the Sunol Valley. From the confluence, Alameda Creek flows for several miles in a well-defined channel contained within the valley bottom to the Calaveras Road bridge. The channel width ranges between 100 and 250 feet in this reach, but widens out to about 500 feet downstream of the bridge. From the Calaveras Road bridge to the San Antonio Pumping Plant bridge, the creek flows in a broad sometimes braided channel. Downstream of the San Antonio Pumping Plant bridge, levees confine the channel until the creek reaches the I-680 bridge, including Subreach A in the primary fisheries study area. About 20 years ago, this section of Alameda Creek was relocated westward to facilitate gravel quarrying in the area occupied by the creek's historical channel.

Downstream (north) of I-680, the creek flows along the west side of the Sunol Valley to its confluence with Arroyo de la Laguna (Subreaches B and C of the primary study area). Beyond the confluence (extended study area), the channel steepens as Alameda Creek flows through Niles Canyon, before flattening again as the creek flows across the Bay Plain. The most downstream reach of Alameda Creek flows through an urbanized area and is confined between levees.

From its headwaters to the ACDD, discharge in Alameda Creek has been largely unaffected by human activities; below the diversion dam it is affected by SFPUC's water supply operations. If the gates on the tunnel entrance at the diversion dam were open and the creek discharge was less than 650 cfs, all the water in the creek was historically diverted through the tunnel to Calaveras Reservoir. Stream discharge in excess of 650 cfs passed over the diversion dam and continues down Alameda Creek. Typically, discharge only exceeds 650 cfs for a few hours during storms. If the gates to the tunnel are closed the entire discharge passes over the diversion dam and continues down Alameda Creek.

Downstream of the ACDD, Alameda Creek flows to its confluence with Calaveras Creek. Calaveras Creek adds water to Alameda Creek as a result of stormwater runoff to Calaveras Creek below Calaveras Dam, and releases or spills from the dam. Releases and spills from the dam have been infrequent and irregular.

Below its confluence with Calaveras Creek, Alameda Creek flows through the Sunol Valley. The creek gains water from tributary streams and loses water to streambed gravels in this reach. The characteristics of the alluvium in this reach of the creek suggest that losses to subsurface water bodies have always occurred, but have likely been increased by the proximity of gravel pits to the creek. The creek gains water near the proposed project area when gravel quarry operators pump excess water out of gravel pits and discharge it to the creek (for more information, see subsequent section entitled "Subsurface Water").

The Arroyo de la Laguna joins Alameda Creek about two miles downstream of the proposed project area. The Arroyo de la Laguna drains a much larger area than the upper reaches of Alameda Creek. Flow in Alameda Creek below the Arroyo de la Laguna confluence increases substantially as a result of runoff from the larger drainage basin. It is further increased by releases of water from Del Valle Reservoir, south of the city of Livermore. Del Valle Reservoir is a component of the California State Water Project. Del Valle Reservoir stores local runoff and water diverted from the Sacramento-San Joaquin Delta. Water released from Del Valle Reservoir flows down Arroyo de la Laguna to Alameda Creek where it is recaptured by Alameda County Water District, a state water contractor, as it exits Niles Canyon.

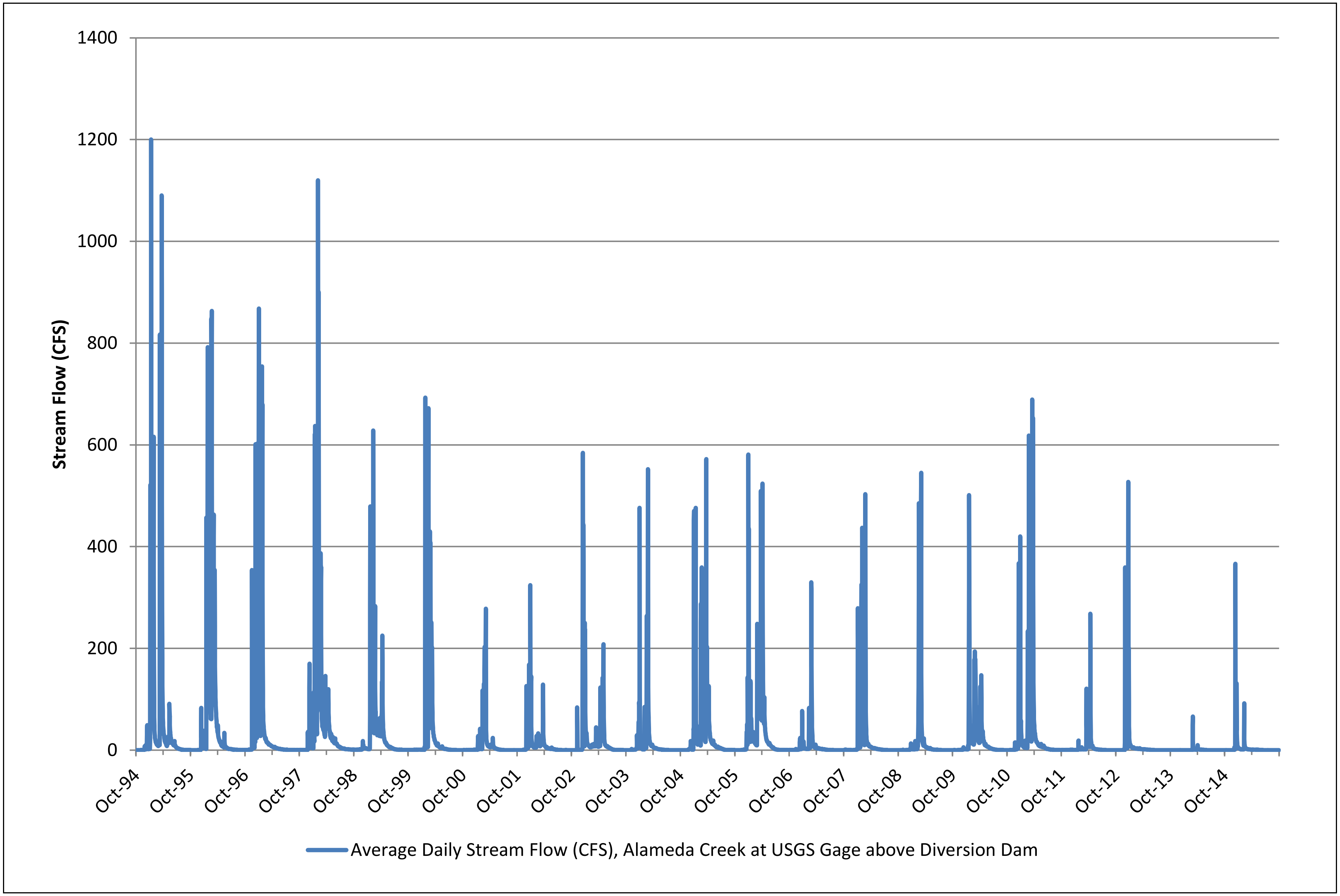
The USGS measures discharge at five stream gages located along Alameda Creek: (1) upstream of the Alameda Creek Diversion Dam; (2) below the Calaveras Creek confluence; (3) below the Welch Creek confluence; (4) at the downstream end of Niles Canyon; and (5) in the section of the creek confined between levees near the I-880 bridge.

The USGS stream gage just upstream of the Alameda Creek Diversion Dam has been in place since 1995. **Figure 3-2** is a plot of gauging data from 1995 until 2013. The gage records unimpaired flow from the upper Alameda Creek watershed; that is, flow largely unaffected by the SFPUC’s water supply system operations or other human activities. The plot shows that Alameda Creek is a naturally flashy stream. A flashy stream is one where discharge can vary greatly from day-to-day and even hour-to-hour in response to rainfall over the watershed.

Measured discharge (i.e., creek flow) at the other four USGS gages on Alameda Creek is affected by the SFPUC’s municipal water system operations. The effects of the SFPUC’s water system operations on flow in Alameda Creek are different for the three periods: (1) Before 2001, the SFPUC operated Calaveras Reservoir in a manner that took advantage of its full storage, except for a limitation that the reservoir could not normally be drawn down below elevation 690 feet to prevent entrainment of fish in the outlet works; (2) In 2001, the DSOD imposed restrictions on storage in Calaveras Reservoir. From 2001 until 2011, the SFPUC operated Calaveras Reservoir in accordance with the storage restrictions; and (3) In 2010, construction of the new Calaveras Dam began and in 2011 the SFPUC began making releases from the reservoir to accommodate construction activities.

Since 2001, when the DSOD imposed storage restrictions, the SFPUC has captured less water from the watershed upstream of Calaveras Reservoir and has diverted less water from Alameda Creek to the reservoir than it would have in the absence of the storage restrictions.

**Figure 3-3** shows flow in Alameda Creek at the USGS gage just downstream of the Calaveras Creek confluence for the period from Water Year 2002 to Water Year 2010. The gage could not record discharges above 200 cfs until September 2006. Flow in Alameda Creek at the USGS gage just downstream of the Welch Creek confluence for the period from 2000 until 2013 and at Niles for the period 1996 to 2015 is shown in **Figure 3-4**. The USGS gage on Alameda Creek at Niles is strongly influenced by flows from the large Arroyo de la Laguna watershed, including water released from the State Water Project’s Del Valle Reservoir to the Arroyo de la Laguna watershed above its confluence with Alameda Creek.

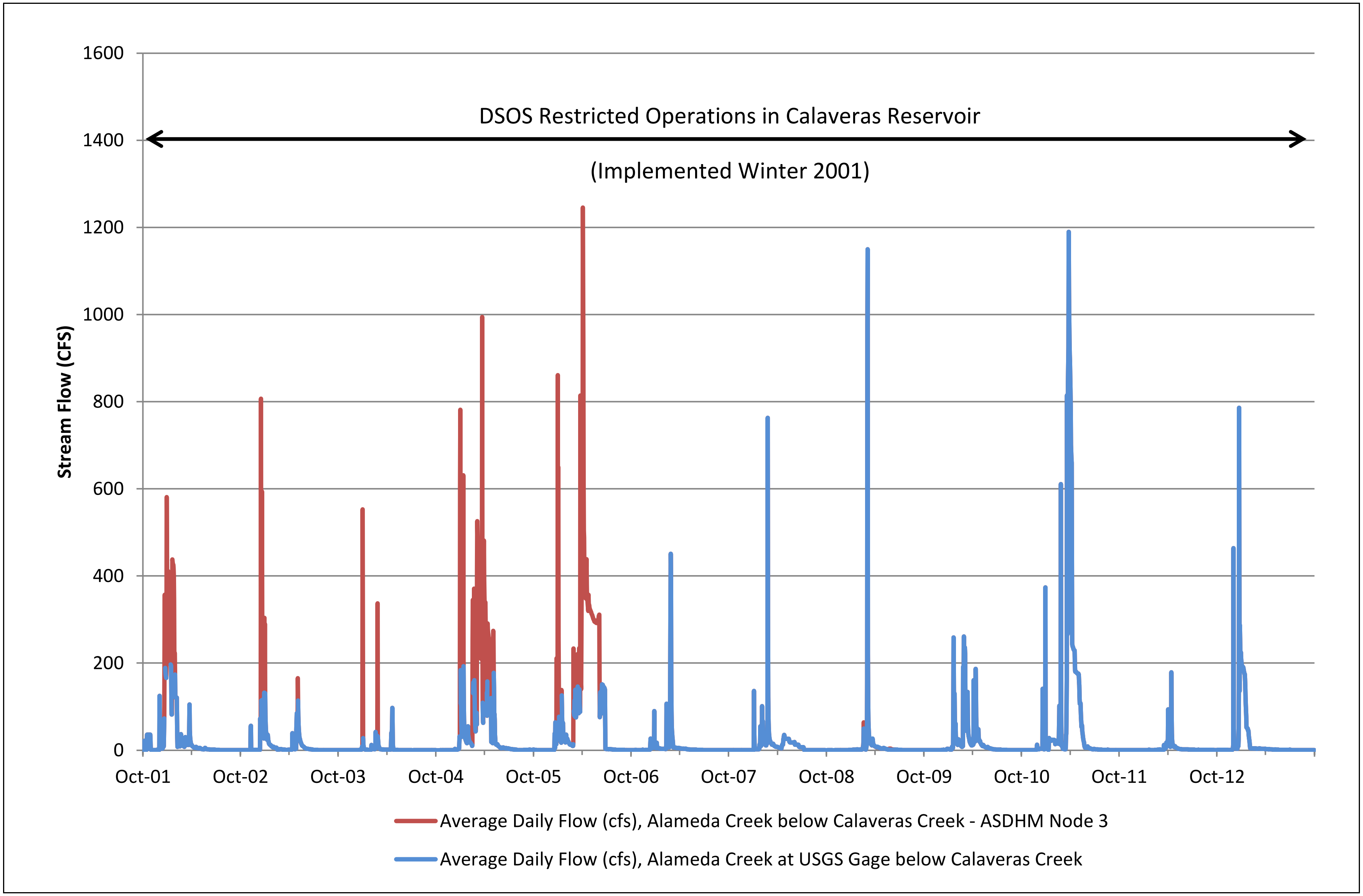


SOURCE: USGS, 2015. Mean daily discharge values for USGS Gage 11172945, Alameda Creek Above Diversion Dam Near Sunol, CA. Text file retrieved from USGS website October 08, 2015.

SFPUC Alameda Creek Recapture Project

**Figure 3-2**

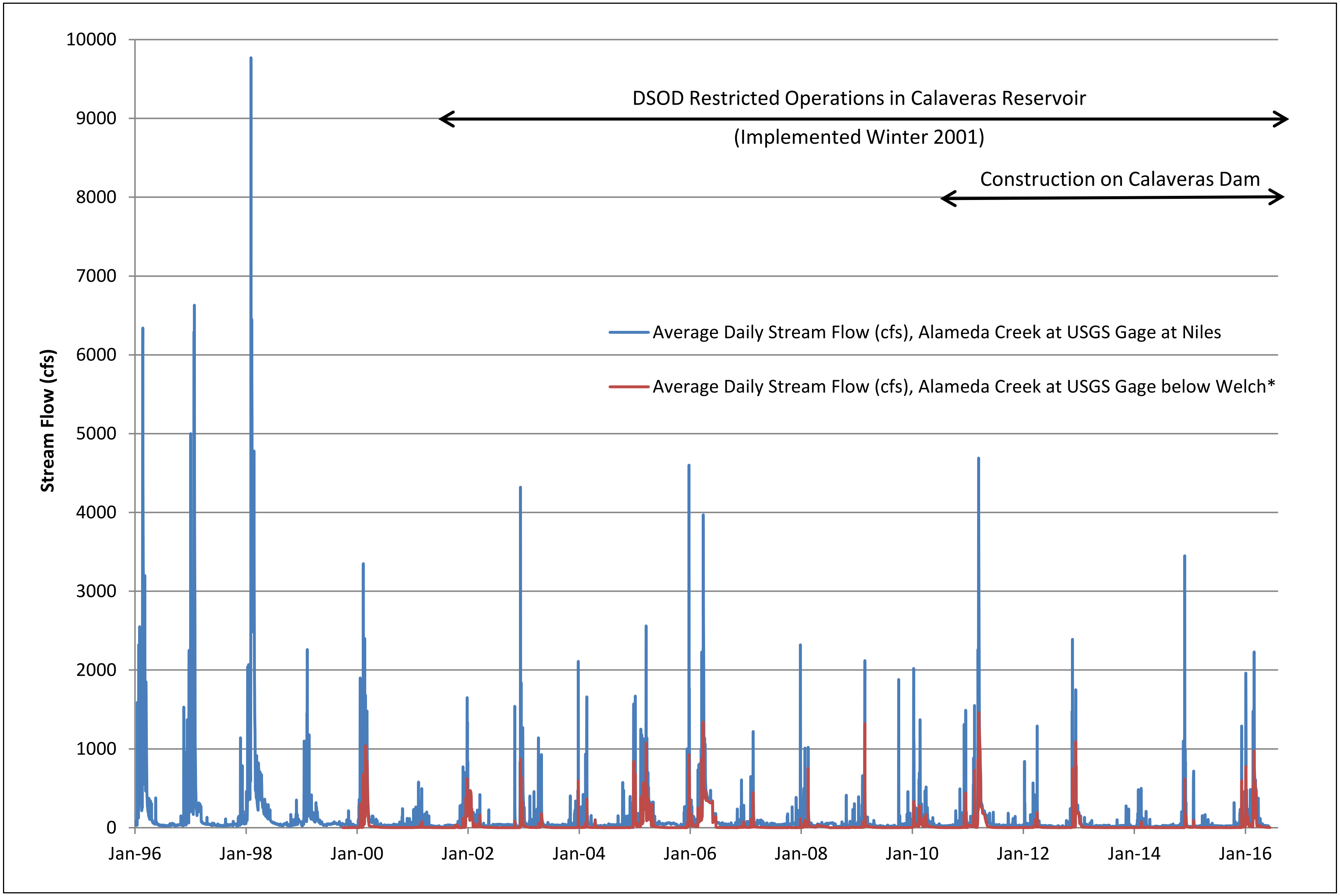
Alameda Creek Discharge at the USGS Gage Upstream of the Alameda Creek Diversion Dam



SOURCE: SFPUC, 2016. Simulated stream flows for different scenarios at 5 nodes and pond elevation for ACRP. Excel spreadsheet file provided by Amod Dhakal on July 7, 2016. Mean daily discharge values for USGS Gage 11173510. Alameda Creek Below Calaveras Creek Near Sunol, CA. Text file retrieved from the USGS website on July 7, 2016.

NOTE: USGS records were restricted to <200 cfs from October 2001 to September 2006. Discharge estimates for the Existing Condition scenario from the ASDHM have been included for reference

**Figure 3-3**
Alameda Creek Discharge at the USGS Gage
Below the Confluence with Calaveras Creek



SOURCE: USGS, 2016. Mean daily discharge values for USGS Gage 11173575, Alameda Creek Below Welch Creek Near Sunol, CA. Text file retrieved from USGS website on June 26, 2016.

USGS, 2016. Mean daily discharge values for USGS Gage 11179000, Alameda Creek Near Niles, CA. Text file retrieved from USGS website on June 26, 2016.

*Records only available for WY 2000 - 2016

SFPUC Alameda Creek Recapture Project

**Figure 3-4**

Historical Alameda Creek flow measured at the USGS Gage below Welch Creek and at Niles

**Table 3-3** is a summary of monthly discharge at the USGS gage above the Alameda Creek Diversion Dam from Water Year 1996 through Water Year 2013 expressed in cubic feet per second (cfs). The period Water Year 1996 through Water Year 2013 was chosen as the best period for comparisons of measured flows with simulated future flows. **Tables 3-4**, **3-5** and **3-6** show similar information for the USGS gages on Alameda Creek downstream of the Calaveras Creek confluence, downstream of Welch Creek confluence, and at Niles. The maximum flow at the gage above the ACDD typically occurs in February. The maximum flow at the three downstream gages typically occurs in March.

### TABLE 3-3
### ALAMEDA CREEK ABOVE ACDD – USGS AVERAGE DAILY VALUES WATER YEARS 1996-2013 (cfs)

| Month | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Average Daily | 0.2 | 2.3 | 26.4 | 60.1 | 82.1 | 50.4 | 25.2 | 7.4 | 2.6 | 0.8 | 0.3 | 0.2 |
| Max Daily Average | 1.5 | 354 | 602 | 868 | 1120 | 689 | 524 | 208 | 14 | 5.8 | 2.6 | 1.5 |
| Min Daily Average | 0.0 | 0.0 | 0.0 | 0.4 | 1.2 | 1.5 | 2.4 | 0.5 | 0.0 | 0.0 | 0.0 | 0.0 |
| % of Av. Annual Flow | 0.1 | 0.9 | 10.2 | 23.3 | 31.8 | 19.5 | 9.8 | 2.9 | 1.0 | 0.3 | 0.1 | 0.1 |

SOURCE: USGS, 2016. Mean daily discharge values for USGS Gage 11172945, Alameda Creek Above the Alameda Creek Diversion Dam Near Sunol, CA. Accessed on July 6, 2016.

### TABLE 3-4
### ALAMEDA CREEK BELOW CALAVERAS CREEK – USGS AVERAGE DAILY VALUES WATER YEARS 1996-2010 (cfs)

| Month | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Average Daily | 1.5 | 1.4 | 18.7 | 26.0 | 28.7 | 50.8 | 34.2 | 11.8 | 8.2 | 1.1 | 0.5 | 0.3 |
| Max Daily Average | 36.0 | 57.0 | 786 | 259 | 763 | 1190 | 858 | 178 | 151 | 7.1 | 4.4 | 2.9 |
| Min Daily Average | 0.0 | 0.0 | 0.1 | 0.3 | 0.5 | 0.7 | 0.8 | 0.2 | 0.1 | 0.0 | 0.1 | 0.0 |
| % of Av. Annual Flow | 0.8 | 0.8 | 10.2 | 14.2 | 15.7 | 27.7 | 18.7 | 6.4 | 4.5 | 0.6 | 0.3 | 0.2 |

SOURCE: United States Geologic Survey (USGS), 2016. Annual mean discharge values for USGS Gage 11173510, Alameda Creek Below Calaveras Creek Near Sunol, CA. Accessed on July 6, 2015.

### TABLE 3-5
### ALAMEDA CREEK BELOW WELCH CREEK – USGS AVERAGE DAILY VALUES WATER YEARS 2000-2013 (cfs)

| Month | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Average Daily | 1.7 | 1.3 | 37.8 | 53.3 | 45.2 | 103.2 | 85.4 | 38.3 | 12.7 | 1.1 | 0.5 | 0.3 |
| Max Daily Average | 34.0 | 83.0 | 1090 | 699 | 1040 | 1460 | 1340 | 345 | 335 | 7.3 | 2.3 | 1.9 |
| Min Daily Average | 0.0 | 0.0 | 0.1 | 0.7 | 0.8 | 2.0 | 1.4 | 0.6 | 0.2 | 0.1 | 0.0 | 0.0 |
| % of Av. Annual Flow | 0.5 | 0.3 | 9.9 | 14.0 | 11.9 | 27.1 | 22.4 | 10.1 | 3.3 | 0.3 | 0.1 | 0.1 |

SOURCE: United States Geologic Survey (USGS), 2016. Mean daily discharge values for USGS Gage 11173575, Alameda Creek Below Welch Creek Near Sunol, CA. Accessed on July 6, 2016.

### TABLE 3-6
### ALAMEDA CREEK NEAR NILES - USGS AVERAGE DAILY VALUES WATER YEARS 1996-2013 (cfs)

| Statistic | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Average Daily | 42.5 | 56.6 | 166.8 | 307.7 | 491.7 | 287.8 | 172.8 | 74.2 | 42.7 | 33.0 | 32.0 | 31.1 |
| Max Daily Average | 1880 | 1540 | 4600 | 6630 | 9770 | 4690 | 3970 | 928 | 340 | 68.0 | 112 | 152 |
| Min Daily Average | 7.1 | 7.6 | 12.0 | 12.0 | 14.0 | 18.0 | 12.0 | 10.0 | 8.0 | 7.7 | 5.9 | 3.8 |
| % of Av. Annual Flow | 2.4 | 3.3 | 9.6 | 17.7 | 28.3 | 16.5 | 9.9 | 4.3 | 2.5 | 1.9 | 1.8 | 1.8 |

SOURCE: USGS, 2016. Mean daily discharge values for USGS Gage 11179000, Alameda Creek Near Niles, CA. Accessed on July 6, 2016.

**Table 3-7** presents the average annual flow and the average annual volume at the four gages. Flow generally increases in a downstream direction. The total volume of flow in Alameda Creek below the Calaveras Creek confluence is lower than it is above the ACDD because the SFPUC diverts some of the water in the creek to Calaveras Reservoir at the diversion dam. **Figure 3-5** shows annual hydrographs for Water Years 2006 and 2007, respectively representative normal/wet year and dry years at the gage located above the ACDD.

### TABLE 3-7
### COMPARISON OF ANNUAL ALAMEDA CREEK GAGE DATA, WATER YEARS 1996-2013

| Gauge Location | Average Annual Flow (cfs) | Average Annual Volume (acre-feet) |
|---|---|---|
| Alameda Creek above ACDD | 20.7 | 15,026 |
| Alameda Creek below Calaveras Creek | 14.5 | 10,494 |
| Alameda Creek below Welch Creek* | 31.7 | 22,972 |
| Alameda Creek near Niles Canyon | 143.1 | 103,660 |

* records only available for WY 2000 to WY 2013

SOURCE: USGS, 2016. Mean daily discharge values for USGS Gages. Accessed on July 6, 2016.

## Surface and Subsurface Water Interactions

Below Welch Creek, Alameda Creek streamflow splits into surface and subsurface components as surface water percolates through unsaturated alluvial materials.[52] Water in the saturated zone then flows under the prevailing down-valley gradient and is governed by the hydraulic properties of the alluvium and other underlying aquifer materials. For the ACRP study area setting, subsurface flow is constrained within the shallow stream channel gravels as the fines content in the deeper, older alluvium and Livermore gravels impedes deeper groundwater recharge and movement.

The component of streamflow that enters the subsurface in Alameda Creek above the quarry reach follows two pathways. First, a fraction seeps (documented at a maximum rate of 17 cfs)[53] into quarry pits connected through the shallow, transmissive stream channel gravels. This pathway is evident through seepage faces on the walls of the quarry excavations and it is measurable through the rise in

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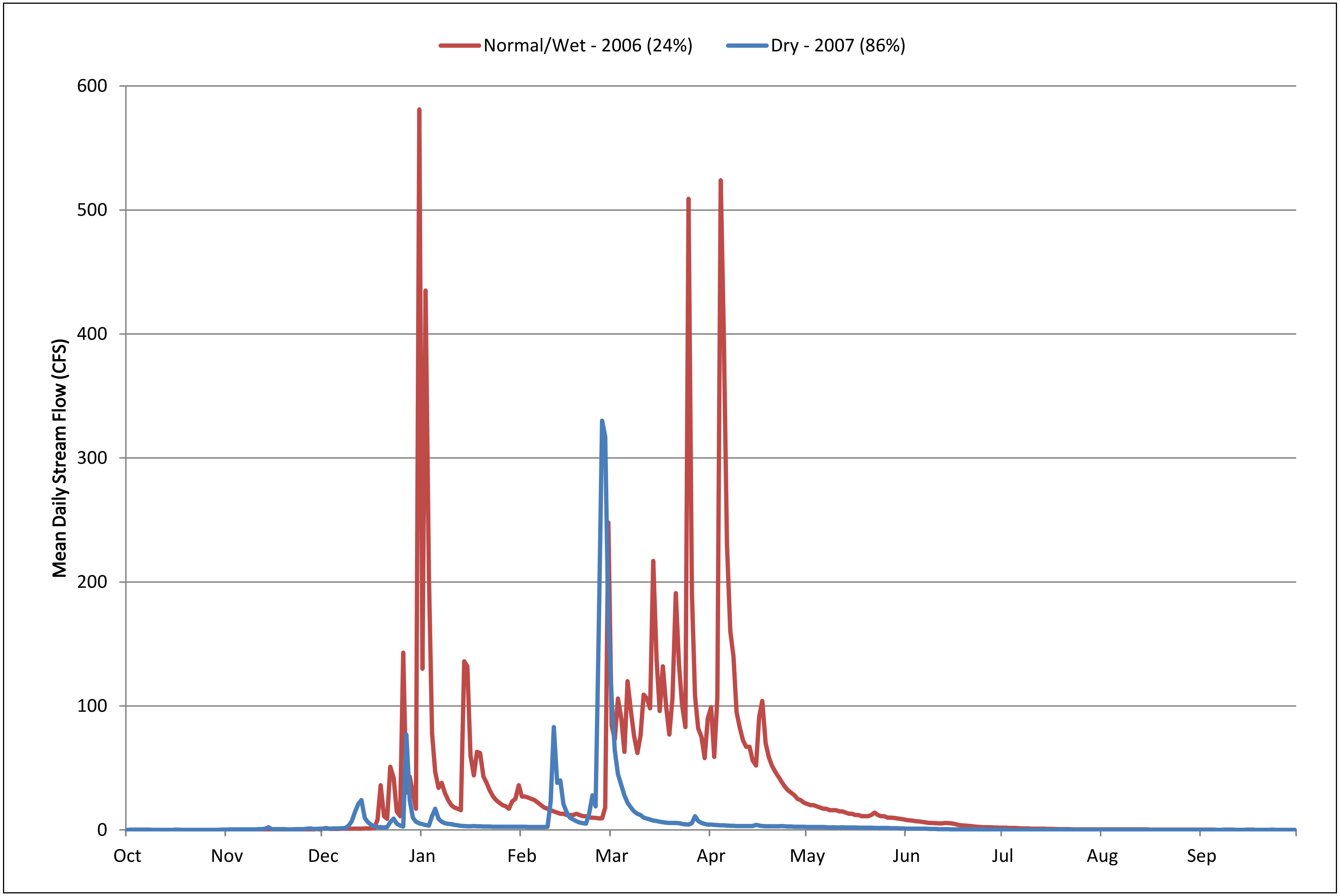
[52] Alluvial materials are loose, unconsolidated (not cemented together into a solid rock) soil or sediments, which have been eroded, reshaped by water in some form, and redeposited.

[53] Dhakal, Buckland and McBain. 2012. *Overview of Methods, Models and Results to Develop Unimpaired, Impaired and Future Flow and Temperature Estimates along Lower Alameda Creek for Hydrologic Years 1996-2019.*



SOURCE: 7. USGS, 2015a. Mean daily discharge values for USGS Gauge 11172945, Alameda Creek Above Diversion Dam Near Sunol, CA. Text file retrieved from USGS website October 08, 2015; USGS, 2015b. Annual mean discharge values for USGS Gauge 11173200, Arroyo Hondo Near San Jose, CA. Text file retrieved from USGS website on August 21, 2015.

NOTE: Exceedance probabilities (in parentheses) were calculated using data from the Arroyo Hondo gauge for Water Years 1969-2015 (longest gauge record for upper watershed).

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**Figure 3-5**

Normal/Wet (2006) and Dry (2007) Water Year Hydrographs for Alameda Creek Above ACDD water levels in pits. Water that seeps into the pits generally has no outlet unless the pit levels rise above the boundary between the shallow stream channel gravels and the underlying older alluvium/Livermore gravels units. Therefore, water that seeps into a pit is stored (bound by the less transmissive older alluvium/Livermore gravels) unless it is removed by pumping (i.e., operator discharges to the creek or consumptive use through processing), lost through evaporation, or it seeps out of pits if levels rise above the base of the stream channel gravels and shallow subsurface water elevation. A second pathway for the subsurface component of flow follows the stream channel past the quarry reaches and ultimately to the confluence of Alameda Creek and Arroyo de la Laguna. Along this pathway, multiple studies have observed an additional loss of flow to the subsurface between the San Antonio Creek and Arroyo de la Laguna confluences (documented at a maximum rate of 7.5 cfs) depending on streamflow.[54,55]

In the lower subreaches (B and C) of the primary study area, some water would be consumed through evapotranspiration where groundwater was exposed or near the ground surface and another fraction intercepted in the Sunol Filter Gallery. Moving down gradient, the remaining subsurface water would eventually drain from the valley as outflow down Alameda Creek past the confluence with Arroyo de la Laguna where it will continue as underflow until the shallow stream channel gravels become confined. At that point, which is generally the upper extent of Niles Canyon, groundwater and surface water components are nearly completely rejoined as surface flow.

During winter and spring months, precipitation-generated streamflows in Alameda Creek fill shallow aquifer space within the stream channel gravels and groundwater seeps into mining pits and, above a maximum loss rate threshold (17 cfs) between Welch and San Antonio Creeks,[56] would move past the pits to the lower reaches. As the shallow aquifer space fills and reaches saturation, the loss rate of surface water into the subsurface decreases, resulting in a larger portion of the flow remaining as surface water and flowing downstream through the Sunol Valley. This saturation flux and associated changing loss rate varies year-to-year with different streamflows (i.e., magnitude, timing, and duration of bypasses at ACDD and releases from Calaveras Dam), carryover alluvium capacity, pit water surface conditions, and quarry discharges to Alameda Creek.

Additional discussion of surface and subsurface water interactions is provided in *Groundwater-Surface Water Interactions, ACRP Biological Resources Study Area Technical Report*.[57]

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[54] Trihey and Associates, Inc., 2003. *Sunol Valley Surface Flow Study, Fall 2001*. Prepared for the Office of the City Attorney, City and County of San Francisco.

[55] Entrix, Inc., 2006. *Alameda Creek Streamflow Study*. Prepared for Kennedy/Jenks Consultants.

[56] Dhakal, Buckland and McBain. 2012. *Overview of Methods, Models and Results to Develop Unimpaired, Impaired and Future Flow and Temperature Estimates along Lower Alameda Creek for Hydrologic Years 1996-2019.*

[57] LSCE. 2016. *Groundwater-Surface Water Interactions, ACRP Biological Resources Study Area*. Prepared for ESA and San Francisco Public Utilities Commission. November 2016. Prepared by Luhdorff & Scalmanini Consulting Engineers. (See Appendix HYD2)

### *Water Quality*

Data on water quality in Alameda Creek upstream of its confluence with the Arroyo de la Laguna are limited, but the available data are sufficient to conclude that water quality is generally good and as much as would be expected from a watershed that consists of undeveloped rangeland, parkland and land set aside as a water supply catchment. Upstream of the quarry reach, there are no point sources of wastewater discharge to Alameda Creek and water primarily enters the creek as surface runoff during storms.

The SFPUC gathered water quality data at several locations along Alameda Creek between 1998 and 2007, as part of a multi-year monitoring program to characterize conditions in the creek. The monitoring program was a provision of a Memorandum of Understanding (MOU) between the SFPUC and CDFW, formerly California Department of Fish and Game.

Water quality data were obtained in the course of electro-fishing surveys that were a part of the monitoring program. The surveys were conducted in October of each year. **Table 3-8** shows average data from a sampling station in Alameda Creek located about 500 feet downstream of the Calaveras Creek confluence and about six miles upstream of the proposed project area. Data were taken in two habitat types, a pool flowing into a glide and a low-gradient riffle. **Table 3-9** shows average data from a sampling station located just downstream of the Calaveras Road Bridge and about three miles upstream of the proposed project area. Data were taken from three habitat types: a glide flowing into a deep pool that flowed back into a glide, a low gradient riffle flowing into a run, and a continuous run. Data from the two sites provide some insight into water quality in the fall when average daily streamflow is low, typically only 1 or 2 cubic feet per second. However, the data are the result of instantaneous measurements and offer no information on temporal variation of water quality characteristics.

**TABLE 3-8**
**WATER QUALITY CHARACTERISTICS:**
**ALAMEDA CREEK BELOW CALAVERAS CREEK CONFLUENCE**

| Year | Temperature, Degrees C | Turbidity, NTU | pH | Dissolved Oxygen Content, mg/l | Conductivity, mmhos/cm |
|---|---|---|---|---|---|
| 1998 | NR | 1.0 | 7.9 | 9.5 | 664 |
| 1999 | 15.0 | 2.0 | 7.3 | NR | 619 |
| 2000 | 10.2 | 0.6 | 8.1 | 8.1 | NR |
| 2001 | NR | NR | NR | NR | NR |
| 2002 | 16.1 | 1.3 | 8.1 | 8.1 | NR |
| 2003 | 14.9 | 0.4 | 7.9 | 8.4 | 580 |
| 2004 | 13.9 | 0.7 | 7.4 | 6.1 | 1,030 |
| 2005 | 13.6 | 0.5 | 8.0 | 9.0 | 793 |
| 2006 | 14.2 | 0.4 | 8.2 | 8.2 | 599 |
| 2007 | 13.9 | 0.8 | 8.1 | NR | 828 |

SOURCE: SFPUC.

### TABLE 3-9
### WATER QUALITY CHARACTERISTICS: ALAMEDA CREEK BELOW CALAVERAS ROAD BRIDGE

| Year | Temperature, Degrees C | Turbidity, NTU | pH | Dissolved Oxygen Content, mg/l | Conductivity, mmhos/cm |
|---|---|---|---|---|---|
| 1998 | NR | NR | 7.1 | 9.4 | NR |
| 1999 | 16.6 | 1.0 | 7.0 | NR | 515 |
| 2000 | 14.8 | 0.6 | 7.9 | 8.5 | NR |
| 2001 | 15.7 | 1.1 | 7.4 | 4.3 | NR |
| 2002 | 13.4 | 2.0 | 7.7 | 6.3 | NR |
| 2003 | 17.5 | 0.4 | 7.3 | 6.4 | 978 |
| 2004 | 16.0 | 0.4 | 7.4 | 6.8 | 596 |
| 2005 | 17.5 | 1.2 | 7.4 | 6.4 | 538 |
| 2006 | 16.3 | 0.7 | 7.7 | 5.5 | 566 |
| 2007 | 13.7 | 0.9 | 7.7 | NR | 522 |

SOURCE: SFPUC.

Alameda Creek water was fairly free of turbidity or suspended material at both sampling stations and its pH was in the normal range for natural waters. Dissolved oxygen content was higher at the upstream station and usually in compliance the state's objective for cold-water fish. At the downstream station, dissolved oxygen content was usually in compliance with the state's objective for warm-water fish but was rarely in compliance with the cold-water fish objective. Electric conductivity of surface water at the upper station averaged 752 mmhos/cm; at the downstream station it averaged 629 mmhos/cm. These values correspond roughly with total dissolved solids contents of 500 mg/l and 420 mg/l, respectively, and are considerably above the state's objective of 250 mg/l. Creek water was warmer at the downstream sampling station than it was at the upstream one.

As part of the monitoring program, the SFPUC installed continuously-recording water temperature measuring devices at several locations along Alameda Creek. The highest water temperatures at all locations on Alameda Creek were recorded in the months of July, August, and September. **Table 3-10** summarizes water temperature data obtained from a device located in Alameda Creek about 500 feet downstream of the Calaveras Creek confluence. Temperatures were measured every 15 minutes and exhibited considerable fluctuation during the day. The greatest fluctuations occurred in the warmest months.

In March 2008, SFPUC biologists measured turbidity in Alameda Creek at three locations close to the proposed project area: just above the San Antonio Creek confluence, at the confluence, and just below the confluence. The measurements all range between 0.84 and 2.7 NTU indicating that creek water at these locations was fairly free of suspended material.[58]

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[58] SFPUC, 2008. San Francisco Public Utilities Commission, *San Antonio Creek Pre-discharge Monitoring Technical Memorandum*. March 2008.

### TABLE 3-10
### WATER TEMPERATURE AND DIURNAL TEMPERATURE FLUCTUATION IN ALAMEDA CREEK BELOW CALAVERAS CREEK CONFLUENCE (degrees C)

| Year | Water Temperature | | | Diurnal Water Temperature Fluctuation | | |
|---|---|---|---|---|---|---|
| | Average | Maximum | Minimum | Average | Maximum | Minimum |
| 2000 | 17.9 | 24.0 | 7.3 | 8.0 | 12.7 | 1.7 |
| 2001 | 19.6 | 24.2 | 10.6 | 8.6 | 13.5 | 0.7 |
| 2002 | 15.4 | 21.3 | 6.6 | 7.1 | 13.4 | 1.1 |
| 2003 | 18.0 | 23.0 | 9.2 | 7.0 | 10.2 | 2.0 |
| 2004 | 19.2 | 23.7 | 9.6 | 8.4 | 12.0 | 2.0 |
| 2005 | 18.4 | 26.1 | 10.2 | 6.0 | 8.2 | 1.7 |
| 2006 | 18.0 | 24.1 | 18.0 | 5.4 | 9.9 | 1.8 |
| 2007 | 16.8 | 29.3 | 4.2 | 4.7 | 7.8 | 1.0 |

SOURCE: SFPUC.

## With-CDRP Conditions

When compared to the 2015 existing conditions, future operation of new Calaveras Dam and Reservoir following completion of the CDRP will alter the water levels in some surface water bodies, streamflow in Alameda Creek, and subsurface flow in the stream channel gravels and alluvium underlying the creek.

### *Surface Water Bodies*

#### Calaveras Reservoir

Construction of the CDRP is expected to be completed in 2019 and the reservoir’s nominal capacity of 98,650 acre-feet will be restored. If a wet winter follows project completion the reservoir could fill in a single season; if drier conditions prevail then it may take several seasons to fill the reservoir. Once construction is complete, the SFPUC will operate it much as it did before the DSOD’s restrictions were imposed, except that releases will be made from the reservoir to support aquatic life in Calaveras and Alameda Creeks and less water will be diverted to the reservoir from Alameda Creek. The release schedule for Calaveras Reservoir is shown in Table 2-1. Release schedules are different for dry and normal/wet years, with the classification of the year based on cumulative inflow from Arroyo Hondo into Calaveras Reservoir. Years are expected to be classified as dry 40 percent of the time. Based on the release schedule, the total annual release in dry years would be approximately 5,540 acre-feet; in normal or wet years it would be7,545 acre-feet.

When the CDRP is completed and the reservoir’s capacity is restored, the SFPUC will fill and draw down the reservoir much as it did before the imposition of storage restrictions in 2001, but the magnitude of the dry season drawdown will be greater than formerly. In addition to SFPUC transferring water stored in the reservoir to the SVWTP to meet water demand, water will be released to Calaveras Creek and water will be bypassed at the ACDD in accordance with the instream flow schedules set forth by the CDRP permit requirements. As a result of the releases, without recapture, water surface elevations in Calaveras Reservoir will be lower than they were prior to 2001 (although they will be much higher than they have been since the DSOD imposed storage restrictions in 2001).

### Alameda Creek

Physical modifications at the ACDD and at Calaveras Dam that are a part of the CDRP will enable bypass of water at the former structure and release of water from the latter structure to benefit aquatic life. The physical and operational changes will alter the flow regime in Alameda Creek compared to the existing condition.

**Physical and Operational Changes at the Alameda Creek Diversion Dam.** Before the DSOD imposed restrictions on Calaveras Reservoir storage, the gates on the tunnel that conveys water from the ACDD to Calaveras Reservoir were typically open for most of the winter, high flow season. During such times, there was no flow other than seepage in the reach of Alameda Creek below the diversion dam, except for brief periods when stream discharge in the upper creek exceeded 650 cfs (the capacity of the Alameda Creek Diversion Tunnel). When the gates on the diversion tunnel were closed, typically in the dry season, whatever flow reached the diversion dam from the upper watershed passed over the dam crest to the creek below. However, in the dry season, little water arrives at the diversion dam from the upper watershed and so little continues down the creek.

Under the existing condition, with storage in Calaveras Reservoir limited by DSOD restrictions, the SFPUC does not divert as much water from Alameda Creek at the ACDD as it did prior to 2001. Consequently, the gates on the tunnel are open for a briefer period and more water spills over the diversion dam and continues down Alameda Creek than it did before the storage restrictions were imposed. However, flow in the reach of Alameda Creek between the diversion dam and the Calaveras Creek confluence is still limited to dam seepage whenever the gates on the tunnel are open and stream discharge from the upper creek is less than 650 cfs.

As part of the CDRP, a fish screen is being installed at the ACDD. The fish screen will prevent fish entering the tunnel that conveys water to Calaveras Reservoir, but it will also reduce the capacity of the tunnel from 650 to 370 cfs. In addition, a bypass system and a fish ladder will be installed at the diversion dam that will enable fish passage and controlled by-pass of water to benefit aquatic life in Alameda Creek below the diversion dam. In accordance with the CDRP permit requirements, a minimum of 30 cfs will be bypassed at the ACDD whenever there is 30 cfs or more arriving at the diversion dam from the upper watershed. When there is less than 30 cfs arriving from the upper watershed the entire flow will be bypassed at the diversion dam and continue downstream in the creek. Average daily discharge flows at the USGS gage on Alameda Creek above the diversion dam typically exceeds or is close to 30 cfs from December through April, so it can be expected that after completion of the CDRP there will be substantial flow in the reach of Alameda Creek between the diversion dam and the Calaveras Creek confluence for much of the winter.

To summarize, after completion of the modifications at the ACDD, the SFPUC will be able to divert no more than 370 cfs from Alameda Creek to Calaveras Reservoir and diversion will only be permitted in the months of December, January, February, and March. In addition, the SFPUC will bypass a minimum of 30 cfs at the ACDD whenever there is 30 cfs or more of natural flow in the creek upstream of the dam. The bypass schedule for ACDD is shown in Table 2-2.

**Physical and Operational Changes at Calaveras Dam and Reservoir.** Prior to the imposition of storage restrictions, the SFPUC filled Calaveras Reservoir close to its spillway crest elevation whenever runoff from the watershed was sufficient. Almost all the water withdrawn from the reservoir was conveyed to the SVWTP via the Calaveras Pipeline. Although the SFPUC sought to avoid any loss of stored water, unseasonable storms over the watershed would occasionally cause water to spill over the spillway crest or necessitate a release of water from the reservoir to Calaveras Creek through the large cone valve.

Currently, with storage in Calaveras Reservoir limited, the water level is maintained far below the spillway crest elevation and no spills have occurred since 2001. Releases through a cone valve are occasionally made to manage water levels in the reservoir. Releases are also made occasionally through a temporary low-flow valve installed in 2006. The releases through the low-flow valve are made for experimental purposes, including the experiments designed to measure losses of water to the subsurface in the reach of Alameda Creek below the Welch Creek gage.

When the CDRP is completed, the SFPUC will operate the reservoir in a similar way to it did before imposition of storage restrictions, except that it will release water from the reservoir to benefit aquatic life in accordance with the fish release schedule shown in Table 2-1. The releases will be made to Calaveras Creek below Calaveras Dam using permanent low-flow valves that will be installed at the new dam. They will be made year-round and will be in the range of 5 cfs to 12 cfs, depending on the time of the year and whether the year is classified as dry or normal/ wet. As noted previously, the releases from Calaveras Reservoir will total 5,540 acre-feet per year in dry years and 7,545 acre-feet per year in normal and wet years. The total annual combined releases and bypasses from the SFPUC’s facilities to benefit aquatic life will average about 7,178 acre-feet. This includes the releases from Calaveras Reservoir, together with the bypasses at the ACDD.

Under the with-CDRP condition, downstream of the Calaveras Creek confluence, streamflow in Alameda Creek will be affected by the CDRP's physical and operational changes at the ACDD and Calaveras Reservoir.

### Use of ASDHM to Predict Streamflows

The ASDHM was used to estimate flow in Alameda Creek under the existing conditions (2015) and the with-CDRP conditions at several locations along the creek. Information on streamflows was compiled and is described below.

### Alameda Creek Streamflow Simulations

Estimates of daily flows in Alameda Creek under the with-CDRP conditions were made by using the ASDHM output as described in the *Surface Water Hydrology Report for the SFPUC Alameda Creek Recapture Project*.[59] **Figures 3-6** and **3-7** are hydrographs of estimated flows below the San Antonio Creek confluence (Node 6) and above the Arroyo de la Laguna confluence (Node 7), respectively, for Water Year1996 to Water Year 2013. **Figures 3-8** and **3-9** are flow duration curves for Alameda Creek below the San Antonio Creek confluence (Node 6), and above the Arroyo de la Laguna confluence (Node 7), respectively, for Water Year 1996 to Water Year2013. The figures show data for the existing conditions and the with-CDRP conditions.

Additional hydrographs were also developed for a range of Water Year Types[60] (WY 2006 – Very Wet [24% flow exceedance], WY 2003 – Wet [53% flow exceedance], WY 2008 – Dry [65% flow exceedance] WY 2007 – Very Dry [82% flow exceedance]) focusing on the specific period for steelhead migration in Alameda Creek (December through June) based on life stage timing described above (see Table 3-2 above). **Figures 3-10** and **3-11** are December through June hydrographs for Very Wet (2006), Wet (2003), Dry (2008), and Very Dry (2007) Water Year Types for Nodes 6 and 7, respectively. Theses plots show predicted hydrologic conditions that migrating steelhead would be anticipated to experience in Alameda Creek in the primary study area.

### Surface and Subsurface Water Interactions

Under the with-CDRP conditions, Calaveras Dam will operate at full capacity and instream flow requirements and bypassed flow at the ACDD will be implemented. During winter and spring months when rainfall is high, Alameda Creek streamflows will exceed seepage rates (maximum of 17 cfs between Welch Creek and San Antonio Creek confluences and a maximum of 7.5 cfs between San Antonio Creek and Arroyo de la Laguna confluences)[61,62,63] into the alluvium and mining pits and eventually exceed available storage space in the shallow stream channel gravels. An active stream is expected to occur through all the subreaches with the bypass flows, with flows exceeding the capacity of the diversion at the ACDD serving as the primary flow source. Alluvium saturation and associated increases in surface flows during the winter and spring is expected to occur more regularly under the with-CDRP conditions because of implementation of the instream flows schedules.

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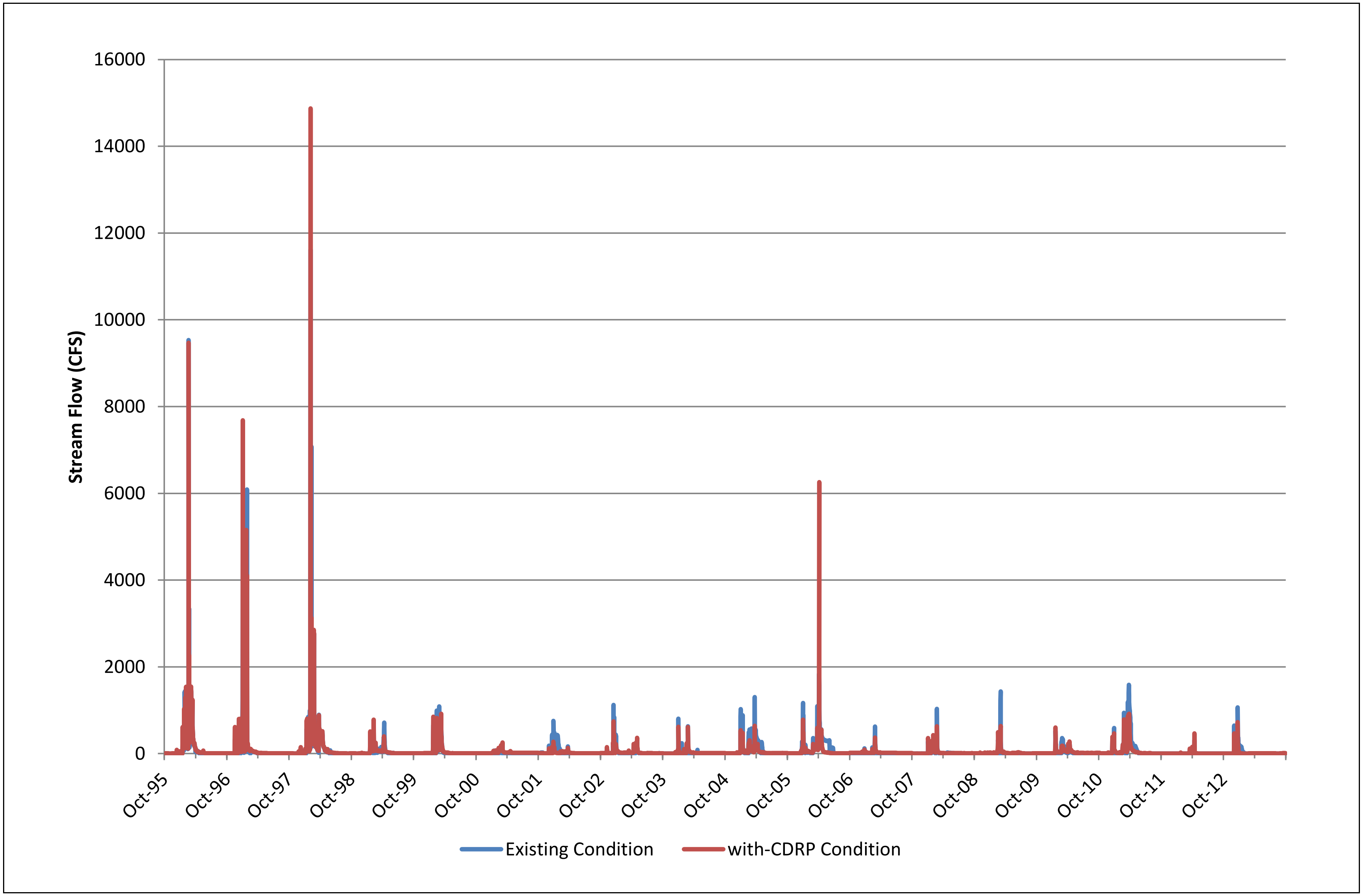
[59] Orion. 2016. *Surface Water Hydrology Report for the SFPUC Alameda Creek Recapture Project*. Prepared for San Francisco Planning Department by Orion Environmental Associates, November 2016. (See Appendix HYD1)

[60] Water Year types were defined based on flow exceedance probabilities.

[61] Dhakal, Buckland and McBain. 2012. *Overview of Methods, Models and Results to Develop Unimpaired, Impaired and Future Flow and Temperature Estimates along Lower Alameda Creek for Hydrologic Years 1996-2019.*

[62] Trihey and Associates, Inc., 2003. *Sunol Valley Surface Flow Study, Fall 2001*. Prepared for the Office of the City Attorney, City and County of San Francisco.

[63] Entrix, Inc., 2006. *Alameda Creek Streamflow Study*. Prepared for Kennedy/Jenks Consultants.



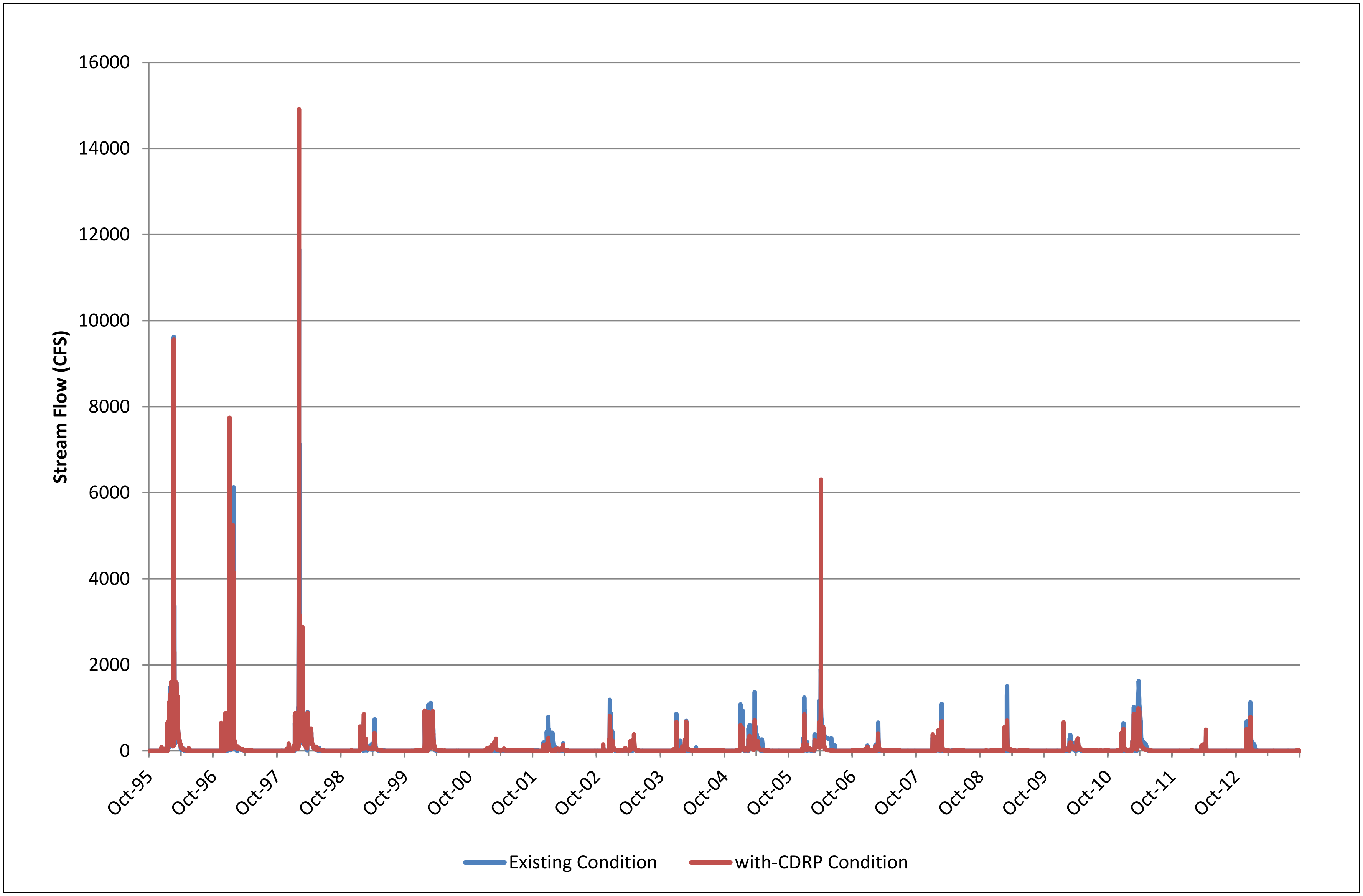
SOURCE: SFPUC, 2016. Simulated stream flows for different scenarios at 5 nodes and pond elevation for ACRP. Excel spreadsheet file provided by Amod Dhakal on July 7, 2016.

NOTE: Data presented are derived from the Alameda System Daily Hydrologic Model (ASDHM) using from Water Years (1996 – 2013)

SFPUC Alameda Creek Recapture Project

**Figure 3-6**

Modeled Hydrographs of Alameda Creek Below San Antonio Creek (ASDHM Node 6)



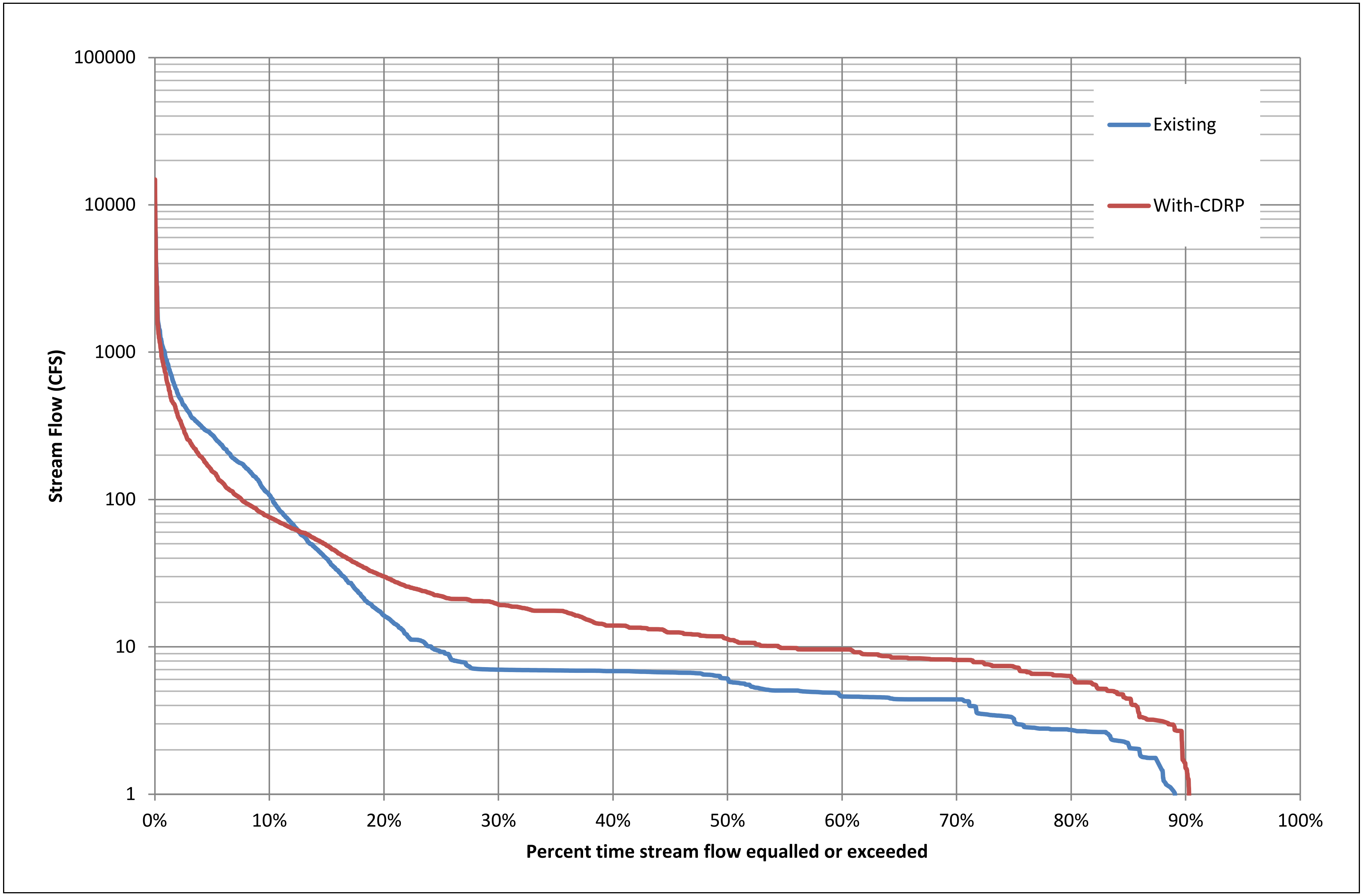
SOURCE: SFPUC, 2016. Simulated stream flows for different scenarios at 5 nodes and pond elevation for ACRP. Excel spreadsheet file provided by Amod Dhakal on July 7, 2016.

NOTE: Data presented are derived from the Alameda System Daily Hydrologic Model (ASDHM) using from Water Years (1996 – 2013)

SFPUC Alameda Creek Recapture Project

**Figure 3-7**

Modeled Hydrographs of Alameda Creek
Above Arroyo de la Laguna (ASDHM Node 7)



SOURCE: SFPUC, 2016. Simulated stream flows for different scenarios at 5 nodes and pond elevation for ACRP. Excel spreadsheet file provided by Amod Dhakal on July 7, 2016.

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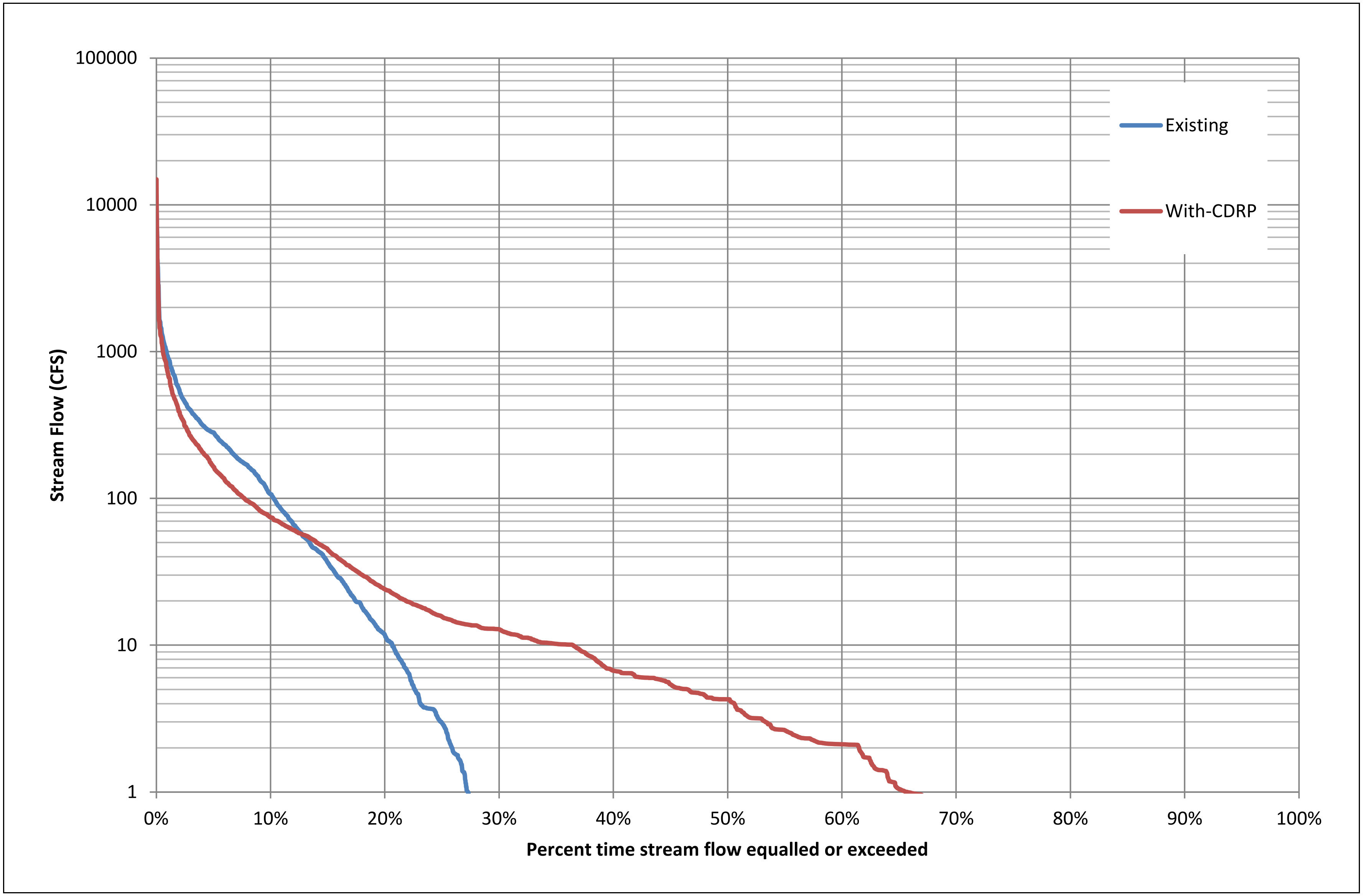
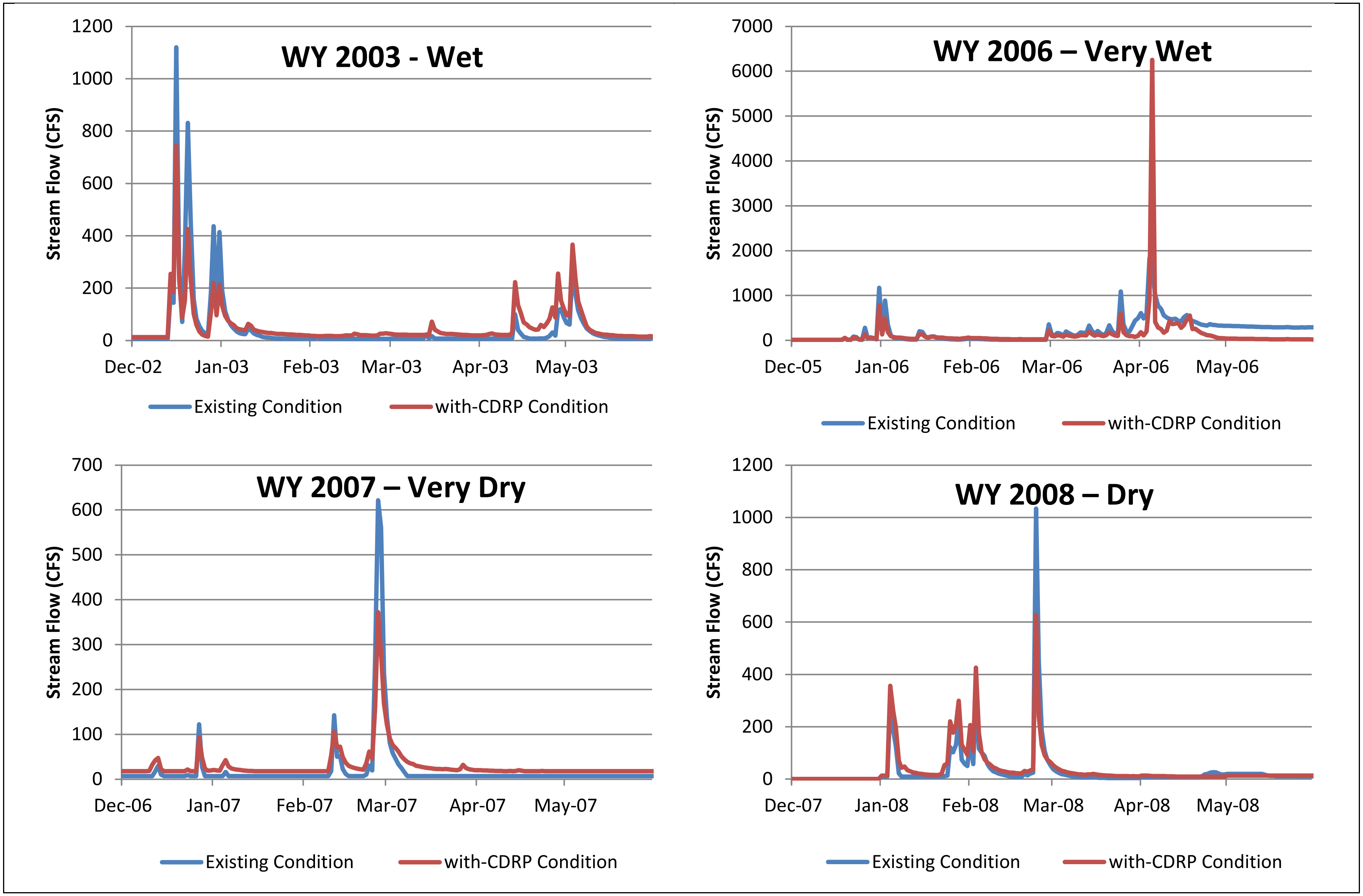
**Figure 3-8**

Modeled Flow Duration Curves of Alameda Creek
Below San Antonio Creek (ASDHM Node 6)



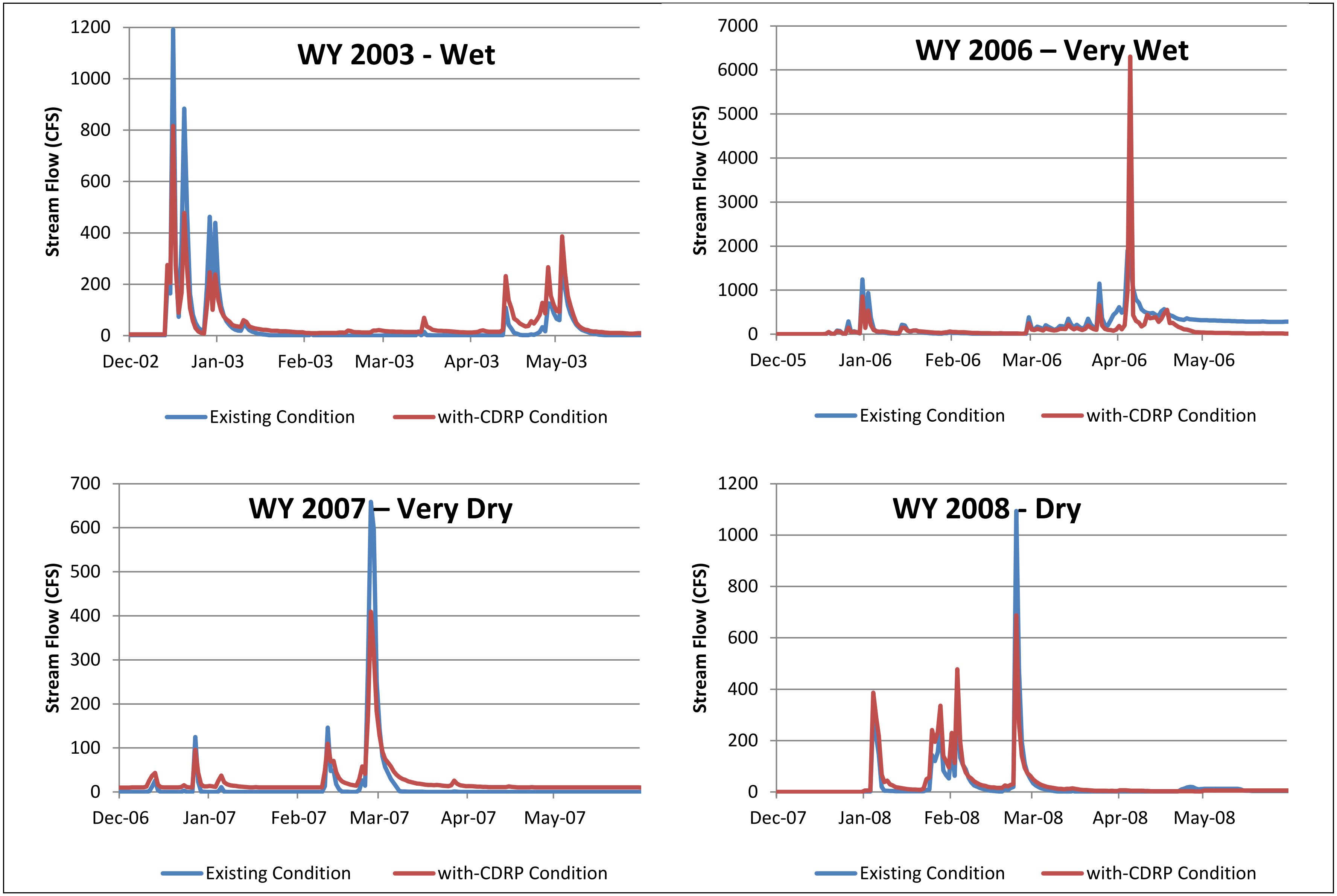
SOURCE: SFPUC, 2016. Simulated stream flows for different scenarios at 5 nodes and pond elevation for ACRP. Excel spreadsheet file provided by Amod Dhakal on July 7, 2016.

**Figure 3-9**
Modeled Flow Duration Curves of Alameda Creek Above Arroyo de la Laguna (ASDHM Node 7)



SOURCE: SFPUC, 2016. Simulated stream flows for different scenarios at 5 nodes and pond elevation for ACRP. Excel spreadsheet file provided by Amod Dhakal on July 7, 2016.

**Figure 3-10**
Modeled Stream Flow During the Typical Migration Period
Alameda Creek Below San Antonio Creek (ASDHM Node 6)



SOURCE: SFPUC, 2016. Simulated stream flows for different scenarios at 5 nodes and pond elevation for ACRP. Excel spreadsheet file provided by Amod Dhakal on July 7, 2016.

SFPUC Alameda Creek Recapture Project

**Figure 3-11**

Modeled Stream Flow During the Typical Migration Period
Alameda Creek Below Above Arroyo de la Laguna (ASDHM Node 7)

In dry months from April to October, after peak streamflow and subsurface levels recede, instream releases from Calaveras Dam will range from 7 to 12 cfs for dry and normal/wet schedules, respectively. At these rates, all the instream releases may seep into the alluvium and mining pits as the release are less than the maximum documented loss rate for this area. As a result, little to no surface flow would pass through the primary study area, similar to under existing conditions. Quarry operators seeking to minimize or avoid direct discharges to Alameda Creek may maintain increased storage in some pits. If this occurs, there could be elevated subsurface water levels and underflow through Subreach A, as seen in the existing condition, when Pit F4 was maintained at a higher storage capacity. The potentially higher subsurface flow would not result in a significant buildup in storage at or through Subreach C because the aquifer has a spill point (where the alluvium becomes confined near the Arroyo de la Laguna confluence) which does not allow the water elevation to rise except under very high streamflow conditions in the winter (see Appendix HYD2).

Quarry discharges near the San Antonio Creek confluence at the upper end of Subreach A have historically provided a source of water in dry months, from April to November. While these flows are highly variable and depend on quarry operations, they appear to support downstream riparian habitat conditions. However, as discussed in *Groundwater-Surface Water Interactions, ACRP Biological Resources Study Area Technical Report*,[64] subsurface water levels are as deep as 15 feet below the thalweg of the channel in this area and the lack of influences on the water table indicate that the zone of influence is the unsaturated zone beneath the streambed.

### *Water Quality*

It is expected that water quality in Alameda Creek in the future will be very similar to current water quality. The only water quality characteristic that is expected to change from the existing condition is water temperature. Water temperature depends on a number of factors including the temperature of water released from reservoirs, solar radiation, shading, and stream discharge, velocity, and depth. Completion of the CDRP will reduce the temperature of water available for release from the reservoir. Under the existing condition the SFPUC can only store water between elevations 690 and 705 feet; under the with-CDRP condition it will store water between elevations 690 and 756 feet. Water stored at depth will remain cool during the summer and will provide a source of cool water for release from the reservoir.

Completion of the CDRP and implementation of the instream flow schedules will also alter streamflow in Alameda Creek as described above. Assuming no change in shading, solar radiation or channel geometry, an increase in discharge can be expected to reduce water temperature during warm weather and a decrease in discharge can be expected to increase it.

Because of the water releases, there will be more water in Alameda Creek between the Calaveras Creek confluence and the Welch Creek confluence under the with-CDRP condition than under the existing condition in July through November. This increase in stream discharge combined

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[64] LSCE. 2016. *Groundwater-Surface Water Interactions, ACRP Biological Resources Study Area*. Prepared for ESA and San Francisco Public Utilities Commission. November 2016. Prepared by Luhdorff & Scalmanini Consulting Engineers. (See Appendix HYD2)

with the availability of cool water from Calaveras Reservoir will likely result in a substantial reduction of water temperature in this reach of the creek compared to the existing condition. A greater proportion of the reach will likely be in compliance with the state's water quality objectives for cold-water fish.

## 3.3.2 Reach-by-Reach Habitat Characterization

This section presents the results of the 2015 field surveys and analysis of the 2008 SFPUC habitat characterization data in the primary study area. In general, the entire primary fisheries study area is a low-gradient alluvial valley in which Alameda Creek and its tributaries can have intermittent flows due to the hydrologic regime described above. In addition, this portion of the Sunol Valley has been heavily influenced by sand and aggregate mining activities, including relocation of the channel in some locations, pumping to dewater quarry areas, and the Sunol Infiltration Gallery (formerly used for golf course irrigation water supply through a lease with the SFPUC). As described above, no rainbow trout or steelhead have been found in this area during surveys, and are only expected to use this portion of the study area as a migration corridor, once they are restored into the upper watershed.

### Primary Study Area

#### *Existing Conditions – Subreach A*

Subreach A extends from the confluence of San Antonio Creek and Alameda Creek to the I-680 culvert. During the May 2015 survey, both San Antonio Creek and Alameda Creek were dry at the confluence. Water was present in Alameda Creek approximately 50 feet below the confluence and a quarry access road that crosses Alameda Creek just below the confluence. This inflow of water was a result of pumping discharges associated with the aggregate mining operations, and generally, the quarry discharges do not follow a specific pattern, nor are they regulated to provide certain flows at any given time (although all discharges are authorized under permits issued by the RWQCB and there is a maximum discharge rate). In this area, the water was static to slow moving with abundant emergent vegetation, algae, and thick riparian vegetation surrounding isolated pools within the channel. Bullfrogs were observed in these pools. Additional flowing water was encountered downstream of these isolated pools and flows appeared to increase throughout the reach. The increases in flow are likely a result of aggregate mining operations, possibly combined with subsurface flows surfacing as Alameda Creek descends the Sunol Valley and approaches the more confined Niles Canyon.

Alameda Creek in this reach varied in wetted width, with some riffles only 6 to 8 feet wide, while some pools created by small woody debris jams were up to approximately 50 feet wide in places. In general, substrate was dominated by silt and fine sediment in pools and glide areas, which had emergent vegetation, with some gravels and more complex channel structure in the isolated riffles interspersed throughout the subreach. This observation is supported by the 2008 SFPUC data that found less than 15 percent substrate greater than 2.5 inches throughout the reach, and hundreds of linear feet of small woody debris cover. Heavy riparian vegetation and wood debris flows and debris dams in the channel combined to create pools, glides, and occasional riffles.

Steelhead migrating through Subreach A would encounter some productive riffles for macroinvertebrates, and pools with ample cover for holding, although maximum depths of these pools within this reach are not likely deep enough to provide much thermal refuge if water temperatures were a limiting factor (the maximum depth recorded during the 2008 surveys was 3.2 feet in this reach). During the 2008 SFPUC studies, temperatures were near or above thermal limits for steelhead (approximately 23 to 25°C) [65] during all experimental flow releases during May and June. Depending on flows, some of the wood debris jams or riffles could also act as potential barriers to movement through this reach. During winter migratory periods, steelhead could potentially migrate through this reach or hold in pool habitat, but conditions are less than optimal and passage through this reach would not be certain under current conditions. Habitat units in Subreach A for the different experimental flows surveyed in 2008 are spatially depicted in **Figure 3-12a** and **3-12b**.

### *Existing Conditions – Subreach B*

Subreach B extends from the I-680 culvert downstream approximately 1,500 feet. During the 2015 survey, this reach of Alameda Creek was dominated by slow moving water (glide or pool habitat), had high levels of algal cover, dense riparian vegetation on banks, and was both lower gradient and wider than Subreach A. The 2008 surveys of this reach found no riffle habitat, less than10 percent substrate greater than 2.5 inches, and a maximum recorded depth of 4.6 feet. Temperatures during the May–June 2008 surveys conducted by SFPUC in Subreach B were also sub-optimal for steelhead, and at lower flows were above thermal limits.

The lack of habitat diversity in Subreach B probably limits the productivity of this reach and the suitability of this habitat for steelhead, although the lack of obstacles and/or barriers would make migration through this reach possible, particularly during the winter migration period when water temperature is not likely to be a limiting factor. Habitat units in Subreach B for the different experimental flows surveyed in 2008 are spatially depicted in **Figure 3-12a** and **3-12b**.

### *Existing Conditions – Subreach C*

Subreach C begins where the primary channel of Alameda Creek becomes braided and intermittent surfacing of subsurface water joins the creek. This reach is characterized by riffle, run, pool complexes with less dense riparian vegetation on the margins, slightly greater gradient, and increased habitat complexity when compared with Subreach A or B. The 2008 surveys conducted by SFPUC showed that riffles in this reach were a more dominant habitat feature than in either Subreach A or B, and that there was more habitat complexity in this reach with sections of braided channel, and up to 15 percent boulders in some riffles along with an overall greater abundance of cobbles. Flows in this reach were unpredictable, but in general were found to increase below Subreach B where subsurface water resurfaces into the channel, then decrease throughout the remainder of the reach to the confluence of Arroyo de la Laguna. This pattern was observed during the 2015 survey, with flows midway through the reach and a completely dry

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[65] Gunther, A.J., J.M. Hagar, and P. Salop. 2000. An Assessment of the Potential for Restoring a Viable Steelhead Trout Population in the Alameda Creek Watershed. Prepared for the Alameda Creek Fisheries Restoration Workgroup. February 7, 2000.

channel at the Arroyo de la Laguna confluence. During the June 24, 2008 survey of this reach, SFPUC biologists measured 10.35 cfs in the upstream portion of the reach, and less than 7 cfs near the confluence with Arroyo de la Laguna. The spatial variation in flows are potentially due to inputs from the aggregate mining operations, as upstream flows in Alameda Creek as measured by the USGS gage below Welch Creek were only 7 cfs. During the June 9, 2008 survey, flows in Subreach C were measured at a maximum of 4.1 cfs mid-reach, and 2.8 cfs near the confluence, while flows in Alameda Creek, as measured by the USGS gage below Welch Creek were 14 cfs. This variation in flows shows that the flows in Subreach C are the result of complex surface – subsurface interactions. Temperatures varied widely in this reach, but tended to be lower than in Subreach A or B, likely the result of thermally buffered water inputs from the subsurface.

Due to the complexity of the habitat in Subreach C, this area appears more suitable than either Subreach A or B for migrating steelhead. Pools could provide holding habitat and riffles would make macroinvertebrate food sources more abundant. The variable flows may also be less of a factor during the migratory period because greater flows would be predicted during winter months or following major precipitation events when steelhead would be likely to move through the reach.

One complicating factor for steelhead migrating up Alameda Creek at the confluence of Arroyo de la Laguna is the potential lack of connectivity within Alameda Creek at the confluence. While Alameda Creek is the mainstem and Arroyo de la Laguna is a tributary under the unimpaired condition, the creeks currently appear to function as though Arroyo de la Laguna is the mainstem, with more dominant flows and defined channel than Alameda Creek, which acts as a tributary with more intermittent flows and much less defined channel. Based on the 2015 field survey and a review of historical aerial photography, it appears that physical connectivity with clear passage into Alameda Creek (upstream of the confluence with Arroyo de la Laguna) has become increasingly limited due to sediment deposits and vegetation growth.

Habitat units in Subreach C for the different experimental flows surveyed in 2008 are spatially depicted in **Figure 3-12a** and **3-12b**.

### *With-CDRP Conditions – Primary Study Area (Subreaches A, B, and C)*

As described above, the fisheries impact analysis assumes that in addition to completion of the CDRP and implementation of the CDRP instream flow schedules, existing human-made barriers to anadromous steelhead migration would be removed or other measures would be taken to allow steelhead passage into the watershed. Due to limiting factors, specifically temperature, steelhead are not expected to spawn or rear within the primary or extended study areas, but would be expected to migrate through both study areas during winter spawning migrations and late spring outmigrations. Implementation of the instream flow schedules required by NMFS permit requirements upon completion of the CDRP are anticipated to increase the suitability of migratory habitat throughout the primary study area.[66]

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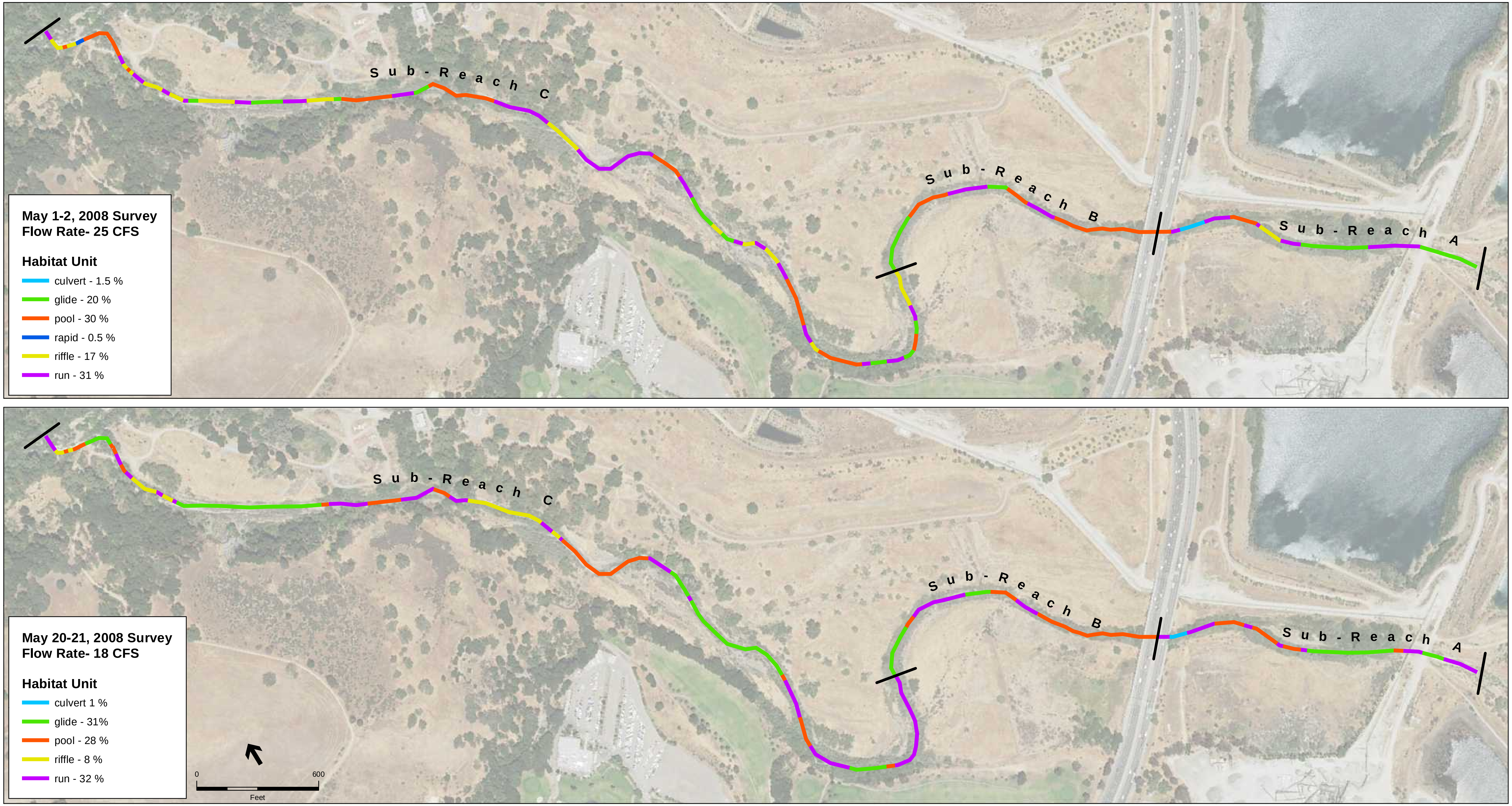
[66] National Marine Fisheries Service (NMFS), 2011. *Biological Opinion for the Calaveras Dam Replacement Project*. Santa Rosa, CA.

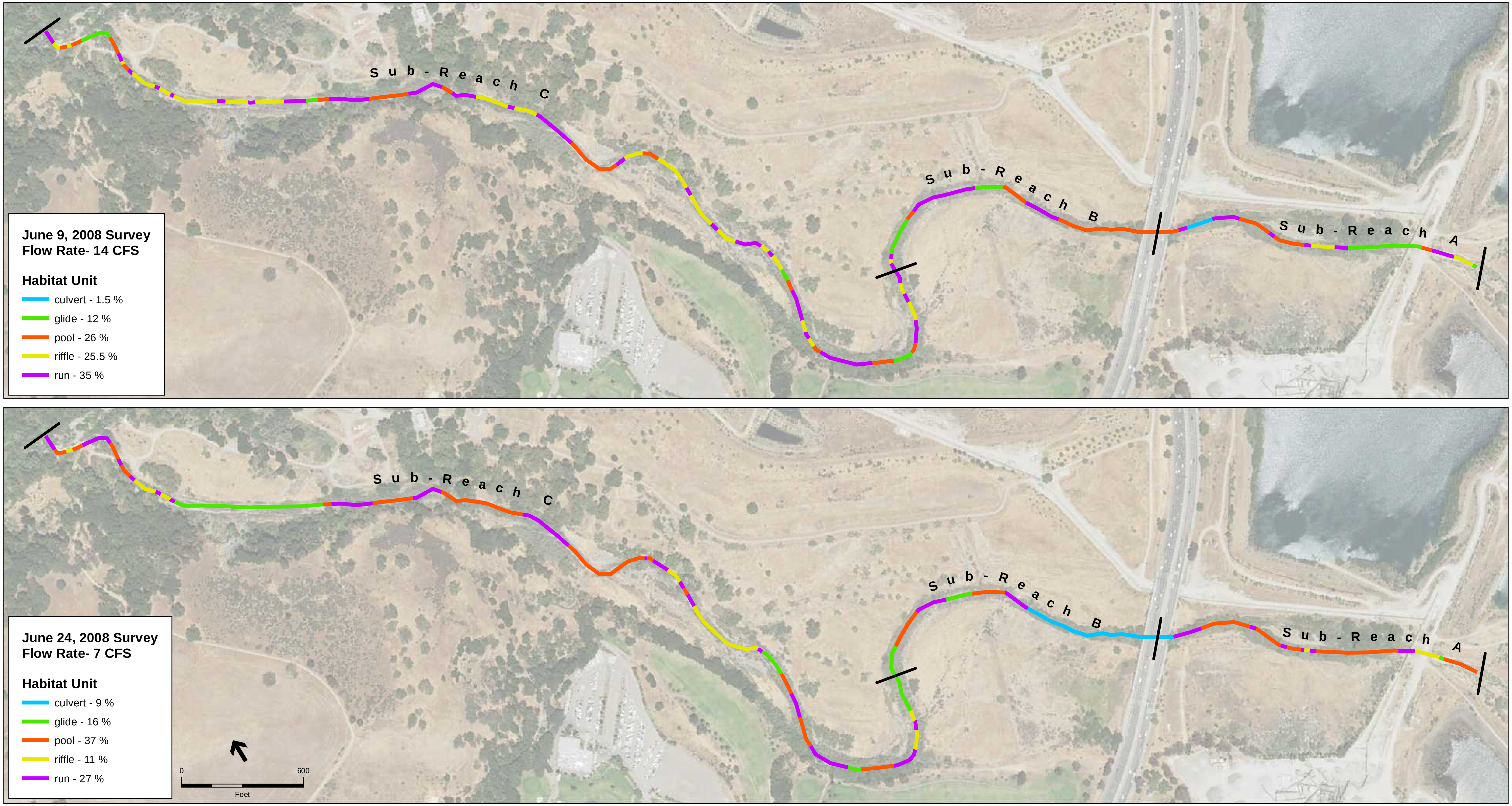


SOURCE: SFPUC, unpublished data; ESA, 2015

SFPUC Alameda Creek Recapture Project

**Figure 3-12a**

Habitat Units in Primary Study Area for the Different Experimental Flows Surveyed in 2008



SOURCE: SFPUC unpublished data; ESA, 2015

SFPUC Alameda Creek Recapture Project

**Figure 3-12b**

Habitat Units in Primary Study Area for the Different Experimental Flows Surveyed in 2008

The main migration impediments for steelhead in the Sunol Valley are located upstream of the primary study area where wide channel areas create shallow riffles under low flow conditions. Passage assessments conducted as part of the NMFS Biological Opinion for the CDRP indicate the most problematic riffles, given the current channel shape, could be passable and meet NMFS passage guidelines at 44 cfs for adult steelhead and 13 cfs for juvenile steelhead. Implementation of the NMFS instream flow schedules will increase the annual percentage of time (dry and normal/wet years) that adult steelhead (immigrating and emigrating) can pass these shallow riffle locations.[67]

To address these passage impediments in the Sunol Valley and the reduced migration opportunities caused by the historical operation of the SFPUC water system facilities in the Alameda Watershed, the SFPUC has committed, as part of the CDRP, to physically modifying locations within the Sunol Valley reach that require flows substantially greater than 40 cfs for adult steelhead passage. Physical modifications of these shallow areas are proposed to create conditions that would allow for adult upstream passage at flows of approximately 20 cfs. Because adult steelhead will not have access to upper Alameda Creek until the BART Weir fish ladder is completed, the schedule for remediating these other barriers to passage is dependent on the completion of the BART Weir fish ladder. With these future modifications, steelhead will have access to the upper watershed, and it is expected that passage opportunities for immigrating and emigrating adults through the Sunol Valley will fall within the range of the unimpaired condition. Therefore, NMFS has concluded that the combination of ACDD bypasses to Alameda Creek, releases from Calaveras Reservoir to Calaveras Creek, and the proposed modifications to passage impediments in the Sunol Valley, the number of days available for steelhead adult and juvenile passage in Alameda Creek each year is expected to fall within the range of natural hydrological variability.[68]

## Extended Study Area

As described above, the extended study area includes Alameda Creek from the confluence of Alameda Creek and Arroyo de la Laguna downstream to the San Francisco Bay. This portion of Alameda Creek is driven by flows from Arroyo de la Laguna as described in Section 3.3.1, above. This section describes existing conditions and with-CDRP conditions in Niles Canyon and Lower Alameda Creek.

### *Existing Conditions – Niles Canyon*

Beginning downstream of the Arroyo de la Laguna confluence, Alameda Creek flows approximately 6.5 miles through Niles Canyon to Niles Junction (near the crossing of Highway 238). The stream channel is relatively confined within the steep walled canyon and, with the exception of Highway 84 and a rail line, there is little development on the narrow floodplain and surrounding hills. There is a relatively well developed riparian zone throughout Niles Canyon. There are two major tributaries in this reach, Sinbad Creek and Stonybrook Creek.

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[67] National Marine Fisheries Service (NMFS), 2011. *Biological Opinion for the Calaveras Dam Replacement Project*. Santa Rosa, CA.

[68] National Marine Fisheries Service (NMFS), 2011. *Biological Opinion for the Calaveras Dam Replacement Project*. Santa Rosa, CA.

The reach is a perennial stream characterized by large, moderately deep pools, and runs separated by short, shallow riffles. The substrate is highly variable, ranging from sand, gravel, and cobble-dominated riffles and glides to cobble-boulder and silt and sand pools.

Historically, Alameda Creek in Niles Canyon was likely an intermittent to perennial stream characterized by low flows during late summer and fall. Low dry season flows were derived primarily from upstream subsurface flows (shallow groundwater that enters the canyon below Sunol) that may have been relatively cool due the limited exposure to warm atmospheric conditions in the shady canyon. Additionally, cool groundwater may have existed historically in the lower segments of Arroyo de la Laguna due to artesian flow from the Livermore Valley. During this low flow condition, some pools may have thermally stratified and provided critical thermal refuge (cool water layer on the bottom of pools) during summer months, but overall this reach likely would not have provided desirable habitat for 1+ year-old or 2+ year-old juvenile steelhead to reside over the last half of summer and early fall.[69]

As described above, Alameda Creek through Niles Canyon now serves as a conveyance for imported water supply from the South Bay Aqueduct turnout in Vallecitos Creek, which is tributary to Arroyo de la Laguna just upstream of the Alameda Creek confluence. As a result, summer base flows in Niles Canyon have increased and become less variable, thereby increasing overall water (and pool) temperatures, reducing thermal buffering that historically occurred with subsurface flows, reducing potential pool stratification, and subsequently reducing potential rearing habitat for steelhead. However, although the stream temperatures within the reach are probably higher than predevelopment historical flows, augmented flows potentially provide atypical fast water habitat with increased forage production that may allow steelhead to obtain sufficient food to withstand warmer temperatures and associated increased metabolic rates.[70]

Because of the augmented summer flows, rearing conditions in wet hydrologic years could be improved (over natural conditions) despite higher water temperatures, assuming steelhead tolerate these higher temperatures. In some instances, with sufficient food present steelhead may tolerate warmer water temperatures. Local anglers continue to catch rainbow trout in the Niles Canyon reach, despite the cessation of trout stocking several years ago, suggesting possible successful rearing.[71] However, while rainbow trout from farther upstream could move in the Niles Canyon reach during wet years, it is likely that the conditions are generally not conducive to oversummering in this reach. Results of water temperature monitoring within the Niles Canyon reach of Alameda Creek during 2001-2002 showed summer temperatures in excess of 75 degrees Fahrenheit (°F), which would affect the ability of juvenile and adult steelhead to oversummer

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[69] McBain and Trush, 2008, *Alameda Creek Population Recovery Strategies and Instream Flow Assessment for Steelhead.* Prepared for the Alameda Creek Fisheries Restoration Workgroup.

[70] Gunther, A.J., J.M. Hagar, and P. Salop, 2000. *An Assessment of the Potential for Restoring a Viable Steelhead Trout Population in the Alameda Creek Watershed.* Prepared for the Alameda Creek Fisheries Restoration Workgroup. February 7, 2000.

[71] San Francisco Planning Department, 2011. *Final Environmental Impact Report for the Calaveras Dam Replacement Project.* San Francisco Planning Department File No. 2005.0161E, State Clearinghouse No. 2005102102. Certified January 27, 2011.

within the canyon reach.[72] Monitoring conducted by Hanson Environmental in 2001 and 2002 also showed that water in Alameda Creek is in thermal equilibrium by the time it flows into Niles Canyon, likely due to the prolonged solar warming occurring in Alameda Creek from the Sunol Regional Wilderness to the Niles Canyon reach and through the discharge of warm stormwater from the Livermore Valley (after warming in the open flood control channels in that area). Furthermore, operation of upstream storage facilities including Del Valle, San Antonio, and Calaveras Reservoirs has reduced winter and spring peak flows from historical conditions in this reach of Alameda Creek.

### *Existing Conditions – Lower Alameda Creek*

Beginning downstream from the mouth of Niles Canyon, Alameda Creek flows approximately 10 miles across a broad low-gradient alluvial plain to San Francisco Bay. Historically, before extensive urbanization of the floodplain, the stream channel was relatively unconfined and the creek would migrate and form different courses and distributary channels.[73,74] These channels were tidally influenced in their lower sections and likely provided valuable estuarine habitat function for rearing juveniles or for smolts during their transition to the higher salinity of bay water.[75]

The lower Alameda Creek channel was extensively modified beginning in the 1950s as a result of floods that inundated the surrounding urbanizing area and instream aggregate extraction, and the channel served increasingly as a flood control and water conveyance facility. Following disastrous floods in Fremont in the 1950s, the lower reaches of Alameda Creek (i.e., downstream of Niles Canyon) were rerouted in the 1960s into a trapezoidal flood control channel confined between artificial levees. To maintain flood control capacity, sediment and vegetation has been periodically removed from the channel. The historical floodplain has been largely converted to residential, commercial, and industrial urban uses. Commercial salt production was carried out in an extensive system of evaporation ponds that removed historic wetlands and natural tidal channels – the ponds currently are being planned for restoration to those former conditions (South Bay Salt Ponds Restoration Project). Restoration activities have been ongoing at Coyote Hills Regional Park on the southern side of the channel for many years and flood gates connect wetlands in the park to the channel in its lower reach. Water supply and flood control structures were incorporated into the channel, including a bank-to-bank grade control structure at the BART and Southern Pacific Railway rail crossings (i.e., the BART weir) and a series of inflatable dams for water supply impoundment (including flows imported from the Sacramento – San Joaquin Delta via the South Bay Aqueduct). These features prevent fish migration and impair other habitat functions.

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[72] Hanson Environmental Inc., 2002. *Air and Water Temperature Monitoring Within Alameda Creek: 2001-2002.* Draft October 1, 2002.

[73] Gunther, A.J., J.M. Hagar, and P. Salop, 2000. *An Assessment of the Potential for Restoring a Viable Steelhead Trout Population in the Alameda Creek Watershed.* Prepared for the Alameda Creek Fisheries Restoration Workgroup. February 7, 2000.

[74] Leidy, R.A., 2007. Ecology, *Assemblage Structure, Distribution, and Status of Fishes in Streams Tributary to the San Francisco Estuary, California.* San Francisco Estuary Institute, April 2007. Contribution No. 530.

[75] Gunther, A.J., J.M. Hagar, and P. Salop, 2000. *An Assessment of the Potential for Restoring a Viable Steelhead Trout Population in the Alameda Creek Watershed.* Prepared for the Alameda Creek Fisheries Restoration Workgroup. February 7, 2000.

The BART weir is a complete barrier to all migrating anadromous fish species with the possible exception of Pacific lamprey (*Lampetra tridentata*).[76] An aerial photo of the BART weir is included in Appendix A of this report. The middle and upper ACWD inflatable dams are also major migration obstacles/barriers in lower Alameda Creek. The ACWD permanently removed the lower rubber dam from the Alameda Creek flood control channel in 2009. The concrete foundation was left in place for grade control stabilization and a low-flow fish ladder was installed in a notch through the foundation to allow continuous fish passage.

Aquatic habitat conditions in lower Alameda Creek are characterized by low summer flows, high summer water temperature, substrate with a large silt component, extensive stands of emergent vegetation, and tidal mixing with increased salinity in the lower sections near the Bay and freshwater flows in the higher lying reaches above the BART weir. Some sections may be dry during the summer.[77]

### *With-CDRP Conditions – Niles Canyon and Lower Alameda Creek*

In addition to completion of the CDRP and the implementation of the CDRP instream flow schedules, it is also assumed that all fish passage barriers would be removed and steelhead would have access to upper portions of the watershed. However, as discussed above, the reaches of Alameda Creek within the extended study area would not be expected to provide necessary spawning or rearing habitat functions for steelhead; the tidally influenced habitats toward the mouth of the creek may provide only limited transition habitat for steelhead smolts that are emigrating to the Bay.[78,79,80]

With implementation of the CDRP instream flow schedules, minimum flows necessary to meet upstream and downstream passage objectives in Niles Canyon are likely to be achieved during the winter and spring, because it is assumed that no significant barriers will remain and the augmented flows, in combination with flows from the northern (Arroyo de la Laguna) watershed, would generally not limit passage opportunities.[81] In the Alameda Creek Flood Control Channel (the lowermost 13 miles of Alameda Creek), ACWD operates two inflatable dams and several water diversions. The water diversions have a combined capacity of approximately 370 cfs. Thus, fish passage through this reach is strongly dependent on the operation of ACWD facilities. CDRP instream flows from the southern watershed when combined with flows from the northern watershed (at the confluence with the Arroyo de la Laguna) through Niles Canyon are expected to

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[76] Gunther, A.J., J.M. Hagar, and P. Salop, 2000. *An Assessment of the Potential for Restoring a Viable Steelhead Trout Population in the Alameda Creek Watershed.* Prepared for the Alameda Creek Fisheries Restoration Workgroup. February 7, 2000.

[77] Hanson Environmental Inc., 2002. *Air and Water Temperature Monitoring Within Alameda Creek: 2001-2002.* Draft October 1, 2002.

[78] Gunther, A.J., J.M. Hagar, and P. Salop, 2000. *An Assessment of the Potential for Restoring a Viable Steelhead Trout Population in the Alameda Creek Watershed.* Prepared for the Alameda Creek Fisheries Restoration Workgroup. February 7, 2000.

[79] McBain and Trush, 2008, *Alameda Creek Population Recovery Strategies and Instream Flow Assessment for Steelhead.* Prepared for the Alameda Creek Fisheries Restoration Workgroup.

[80] National Marine Fisheries Service (NMFS), 2011. *Biological Opinion for the Calaveras Dam Replacement Project*. Santa Rosa, CA.

[81] National Marine Fisheries Service (NMFS), 2011. *Biological Opinion for the Calaveras Dam Replacement Project*. Santa Rosa, CA.

provide suitable conditions for adult upstream migration and smolt downstream migration. It is assumed that these flows will arrive at the upstream end of the Alameda Creek Flood Control Channel, and furthermore, it is assumed that ACWD will provide bypass flows at their water diversion facilities for fish passage through the Flood Channel.[82]

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[82] National Marine Fisheries Service (NMFS), 2011. *Biological Opinion for the Calaveras Dam Replacement Project*. Santa Rosa, CA.

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# APPENDIX A

## Representative Photographs

Representative photograph of habitat conditions in study Subreach A (May 2015)

Representative photograph of habitat conditions in study Subreach A (May 2015)

**Representative photograph of habitat conditions in study Subreach B (May 2015)**

**Representative photograph of habitat conditions in study Subreach B (May 2015)**

Representative photograph of habitat conditions in study Subreach C (May 2015)

Representative photograph of habitat conditions in study Subreach C (May 2015)

Photograph of representative conditions in Niles Canyon (May 2015)

Aerial photograph of BART weir in Lower Alameda Creek (May 2015)

# APPENDIX HYD1

# Surface Water Hydrology Report

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# DRAFT

# Surface Water Hydrology Report

# for the

# SFPUC Alameda Creek Recapture Project

**Prepared for**
San Francisco Planning Department

**Prepared by**
Orion Environmental Associates
with Environmental Science Associates

**November 2016**

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## List of Figures (continued)

## List of Tables

**List of Tables (continued)**

# 1. Introduction

## 1.1 Purpose

The purpose of this report is to determine the environmental effects of operation of the San Francisco Public Utilities Commission's (SFPUC) proposed Alameda Creek Recapture Project (ACRP) on surface water hydrology. It describes the technical analysis undertaken to delineate the hydrologic changes that would be a consequence of operation of the proposed ACRP. It also describes the implications of ACRP-caused changes in surface water hydrology for fish and other aquatic life, terrestrial wildlife, vegetation, and other users of water from Alameda Creek. The report provides the background information needed to support impact conclusions in the Environmental Impact Report (EIR) for the proposed ACRP. The EIR is being prepared to satisfy the requirements of the California Environmental Quality Act (CEQA).

## 1.2 Alameda Creek Recapture Project

The SFPUC is currently building the Calaveras Dam Replacement Project (CDRP). When the CDRP is completed and becomes operational the SFPUC will release water from Calaveras Reservoir and bypass water at the Alameda Creek Diversion Dam in accordance with schedules established by federal and state agencies. The releases and bypasses will benefit fish and other aquatic life. The volume of the releases and bypasses would vary from year-to-year depending on hydrologic conditions but are estimated to average 14,695 acre-feet per year.

The SFPUC would operate the ACRP to recapture water that will be released from Calaveras Reservoir and bypassed at the Alameda Creek Diversion Dam. The ACRP would be operated consistent with the overall objectives and levels of service of the SFPUC's adopted Water System Improvement Program (WSIP), including maintaining the capacity of water storage in the SFPUC water supply system that is needed in drought and non-drought periods (1). The location of the proposed ACRP is shown in **Figure HYD1-1**. The volume of water that the ACRP would recapture would vary from year-to-year depending on hydrologic conditions; the SFPUC estimates that it would average 7,178 acre-feet per year.

The ACRP would enable the SFPUC to recapture water from an existing quarry pit—Pit F2—in the northern Sunol Valley. The SFPUC would use pumps mounted on floating barges to convey water from Pit F2 to either the Sunol Valley Water Treatment Plant (SVWTP) or San Antonio Reservoir. Water levels in Pit F2 would be maintained between elevations 150 feet and 240 feet, except during extreme droughts when water levels might be lowered to elevation 100 feet. A plan of the proposed ACRP is shown in **Figure HYD1-2**.

## 1.3 Scenarios Analyzed

Four scenarios were examined to characterize the effects of the ACRP on surface water hydrology: pre-2001 conditions, existing conditions, with-CDRP conditions, and with-project conditions. Because hydrologic conditions are dynamic and depend on rainfall conditions, all four scenarios are based on 18 years of site-specific hydrologic data, from water years 1996 to 2013. Pre-2001 conditions are the conditions that existed before storage in Calaveras Reservoir was restricted by order of the California Department of Water Resources, Division of Safety of Dams (DSOD). The DSOD restricted storage in Calaveras Reservoir in 2001 because of concerns about the seismic safety of the dam forming the reservoir.

Existing conditions are the conditions that existed in 2015, the year in which the Notice of Preparation for the ACRP EIR was published. Currently, the SFPUC is operating its water system in the Alameda Creek watershed with storage in Calaveras Reservoir limited to about 38,100 acre-feet or about one third of its pre-2001 storage capacity, and has been doing so since 2001. However, the usable storage capacity is 13 percent (or 12,400 acre-feet) of pre-2001 capacity due to minimum and maximum storage elevations requirements of 690 feet and 705 feet, respectively.

With-CDRP conditions are the conditions that will exist when the CDRP has been completed and in operation. CDRP operations will include the release and bypass of the water needed to meet the instream flow schedules that are a condition of the state and federal authorizations for the CDRP (2, 3). The releases of water will be made at Calaveras Dam and the bypasses of water will occur at the Alameda Creek Diversion Dam. CDRP operations will also include lifting the DSOD storage restrictions in Calaveras Reservoir and restoring its historical capacity. With-project conditions are the conditions that would exist when both the CDRP and the ACRP are completed and are in operation.

The attributes of the four scenarios analyzed are shown in **Table HYD1-1**. The attributes of pre-2001 conditions are essentially the same as those of existing conditions, except that Calaveras Reservoir was operated with its full storage of 98,850 acre-feet. The attributes of with-project conditions are the same as those of with-CDRP conditions, except for the addition of the proposed ACRP.

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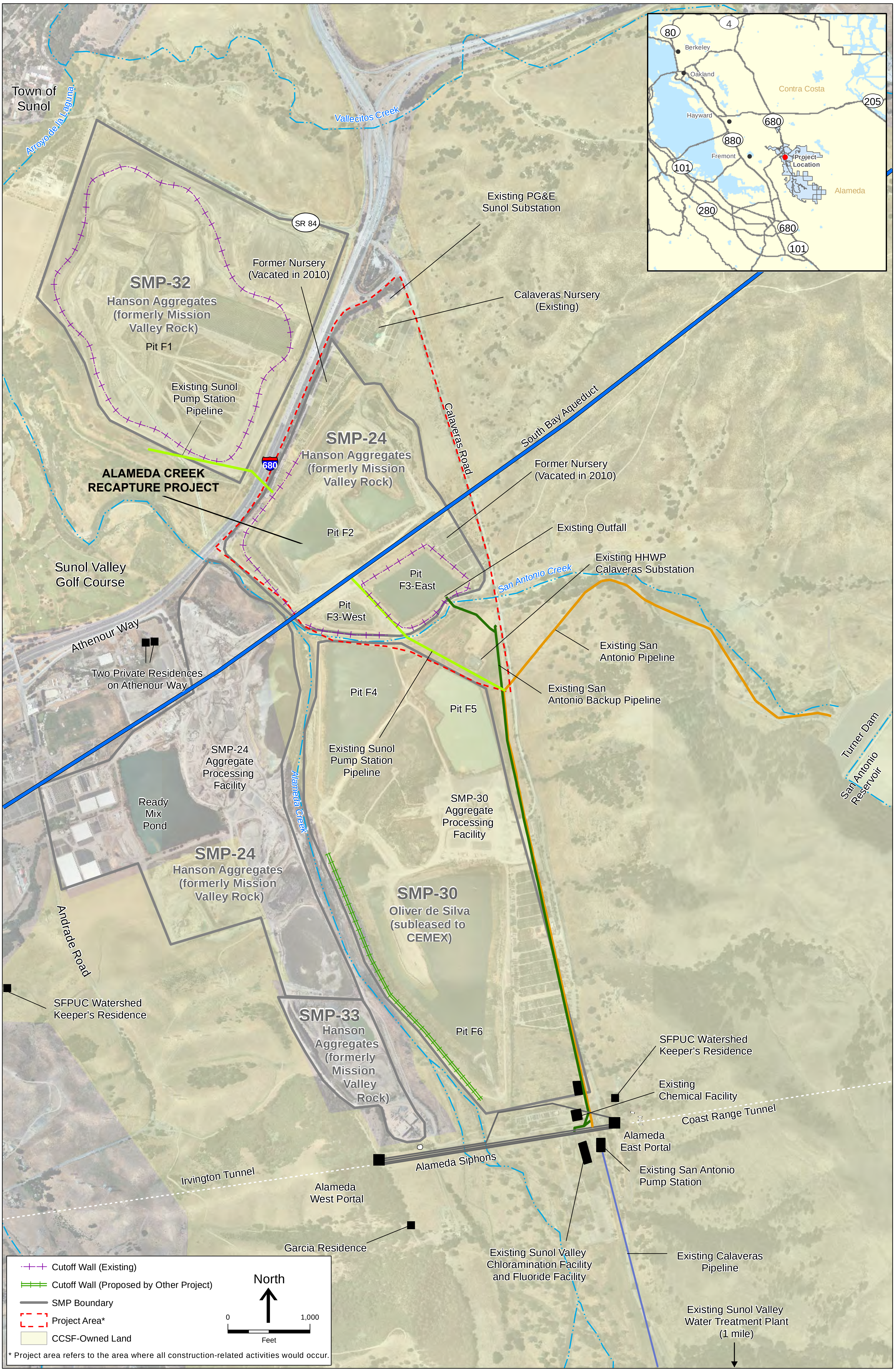
## Notes for Section 1

1. San Francisco Planning Department, 2008. F*inal Environmental Impact Report for the San Francisco Public Utilities Commission's Water System Improvement Program*. San Francisco Planning Department File No. 2005.0159E, State Clearinghouse No. 2005092026. Certified October 30, 2008.
2. National Marine Fisheries Service (NMFS), 2011. *Biological Opinion for Calaveras Dam Replacement Project in Alameda and Santa Clara Counties*. Tracking No. 2005/07436. March 5, 2011.
3. California Department of Fish and Game (CDFG), 2011. *Streambed Alteration Agreement for Calaveras Dam Replacement Project*. Notification No. 1600-2010-0322-R3. Jane 28, 2011.

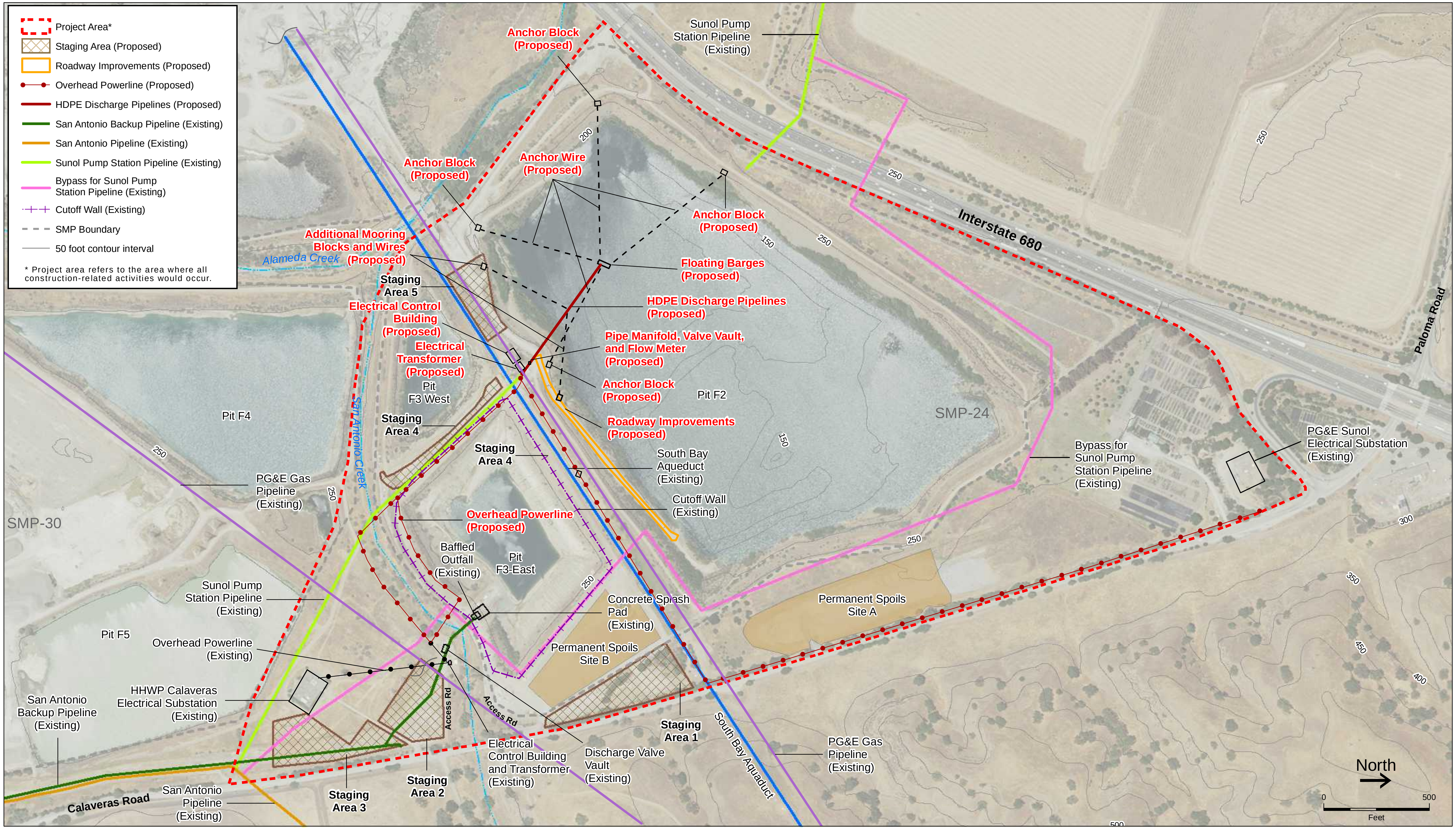


SOURCE: ESA, 2015; Date of aerial photo is 2006.

SFPUC Alameda Creek Recapture Project

**Figure HYD 1-1**

Location of ACRP



SOURCE: SFPUC, 2014a

SFPUC Alameda Creek Recapture Project

**Figure HYD 1-2**

Plot Plan of ACRP

## TABLE HYD1-1
## ATTRIBUTES OF FOUR SCENARIOS ANALYZED

| Parameter | Pre-2001 Conditions | Existing Conditions | With-CDRP Conditions | With-Project Conditions |
|---|---|---|---|---|
| Representative year | 2000 | 2015 | 2019 to 2020 (following completion of the CDRP and the reservoir refill period) | |
| Hydrologic period used in analysis | WY 1996 to WY 2013 | | | |
| Calaveras Reservoir and Dam | - Historical capacity of Calaveras Reservoir = 96,850 acre-feet<br>- Maximum pool elevation = 756 feet | - New dam under construction downstream of existing dam<br>- Storage in Calaveras Reservoir restricted to one-third capacity with usable storage at 13% or 12,400 acre-feet by DSOD<br>- Maximum pool elevation = 705 feet<br>- Minimum pool elevation = 690 feet | - New dam completed<br>- Historical capacity of Calaveras Reservoir restored to nominal capacity = 96,850 acre-feet<br>- Maximum pool elevation = 756 feet | |
| Instream flow releases/spills from Calaveras Reservoir below Calaveras Dam | None, other than spill from Calaveras Reservoir. | Frequent releases from low-flow valve or cone valve to manage water levels in the reservoir and from low flow valve for experimental purposes. Represented in ASDHM by observed flow at the USGS gage located downstream of Calaveras Reservoir | Implementation of instream flow schedule:<br>- Dry year releases: May –Oct: 7 cfs; Nov - Dec: 5 cfs; Jan –April: 10 cfs, annual average.<br>- Wet/normal year releases: May – Sept: 12 cfs, Oct: 7 cfs; Nov –Dec: 5 cfs, Jan – April: 12 cfs | |
| Alameda Creek Diversion Dam (ACDD) | - No fish ladder or bypass tunnel<br>- Maximum diversion of Alameda Creek water to Calaveras Reservoir = 650 cfs | | - Fish ladder and bypass structure operational<br>- Minimum and Maximum diversion rates of Alameda Creek water to Calaveras Reservoir = 30 cfs to 370 cfs | |
| ACDD bypass flows | - When the gates on the diversion tunnel are open, only stream discharge greater than 650 cfs passes over the ACDD (Note: Operations at the ACDD between WY 2002 and WY 2010 were influenced by limitations on storage at Calaveras Reservoir. As a result, the gates on the diversion tunnel were closed more frequently than they had been previously).<br>- Under Existing Condition, the ACDD tunnel has been closed since 5/23/2012. Prior to 2012 during the DSOD-restricted period, SFPUC operated ACDD very infrequently. For example, they were not operated at all between 10/24/2004 to 3/7/2007. When the gates on the diversion tunnel are closed, all flow in Alameda Creek passes over the ACDD | | - Gate on diversion tunnel closed from April 1 to Nov 30, and all flow in Alameda Creek passes over ACDD.<br>- Diversion of up to 370 cfs from December 1 to March 31.<br>- Minimum bypass flow of 30 cfs whenever there is 30 cfs or more; if less than 30 cfs is present, entire flow passes over the ACDD | |

## TABLE HYD1-1 (Continued)
## ATTRIBUTES OF FOUR SCENARIOS ANALYZED

| Parameter | Pre-2001 Conditions | Existing Conditions | With-CDRP Conditions | With-Project Conditions |
|---|---|---|---|---|
| Quarry pit operations<br>Hanson Aggregates:<br>- SMP-24 (Pits F2, F3-East, F3-West)<br>- SMP-32<br>- SMP-33<br>Oliver de Silvia<br>- SMP-30 (Pits F4, F5, F6) | - SMP-24 in active use for aggregate extraction until 2006<br>- SMP-32 not yet in operation<br>- SMP-30 Pit F6 in active use<br>- Excess water discharged under NPDES permit to Alameda Creek at an average annual rate of 2,796 acre-feet per year | - SMP-24 pits used only to store and manage water to support active mining on SMP-32 and aggregate processing, with excess water discharged under NPDES permit to Alameda Creek at an average annual rate of 3,436 acre-feet per year1 In 2015, this volume of regulated discharge was 1,206 acre-feet.<br>- SMP-30 Pit F6 in active use for aggregate extraction, with infrequent discharges from SMP-30 to Alameda Creek | The same as existing conditions except that as a result of the releases and bypasses it is assumed more water infiltrates to the quarries and more water is available to the quarry operators for water management and subsequent NPDES discharges. It is assumed the average amount of water available for quarry NPDES discharges is an annual average of 6,620 acre-feet per year. | The same as existing conditions except that the ACRP reduces the amount of water assumed to be available to the quarry operators and therefore less water for NPDES discharge. The average amount of water available to the quarry operators for NPDES discharge decreases to an annual average of 2,532 acre-feet per year. |
| Loss of surface flow in Alameda Creek to subsurface between Welch Creek and Arroyo de la Laguna confluences | 0 to 17 cfs (maximum) between Welch Creek and San Antonio Creek confluences, and 0 to 7.5 cfs (maximum) between San Antonio Creek and Arroyo de la Laguna confluences, depending on streamflow | | | |
| Alameda Creek Recapture Project | Not in operation | | | Pumping of water from Pit F2 by SFPUC and transfer to SVWTP or San Antonio Reservoir for municipal water supply |

# 2. Alameda Creek Watershed

## 2.1 Regional Hydrology

The proposed project area lies within the Alameda Creek watershed. The watershed is shown in **Figure HYD2-1**. The Alameda Creek watershed encompasses an area of approximately 700 square miles, extending from Mount Diablo in the north, Altamont Pass in the east, Mount Hamilton in the south, and San Francisco Bay in the west. Elevations in the watershed range from about 4,000 feet near the headwaters to sea level at the point where the creek flows to San Francisco Bay (1).

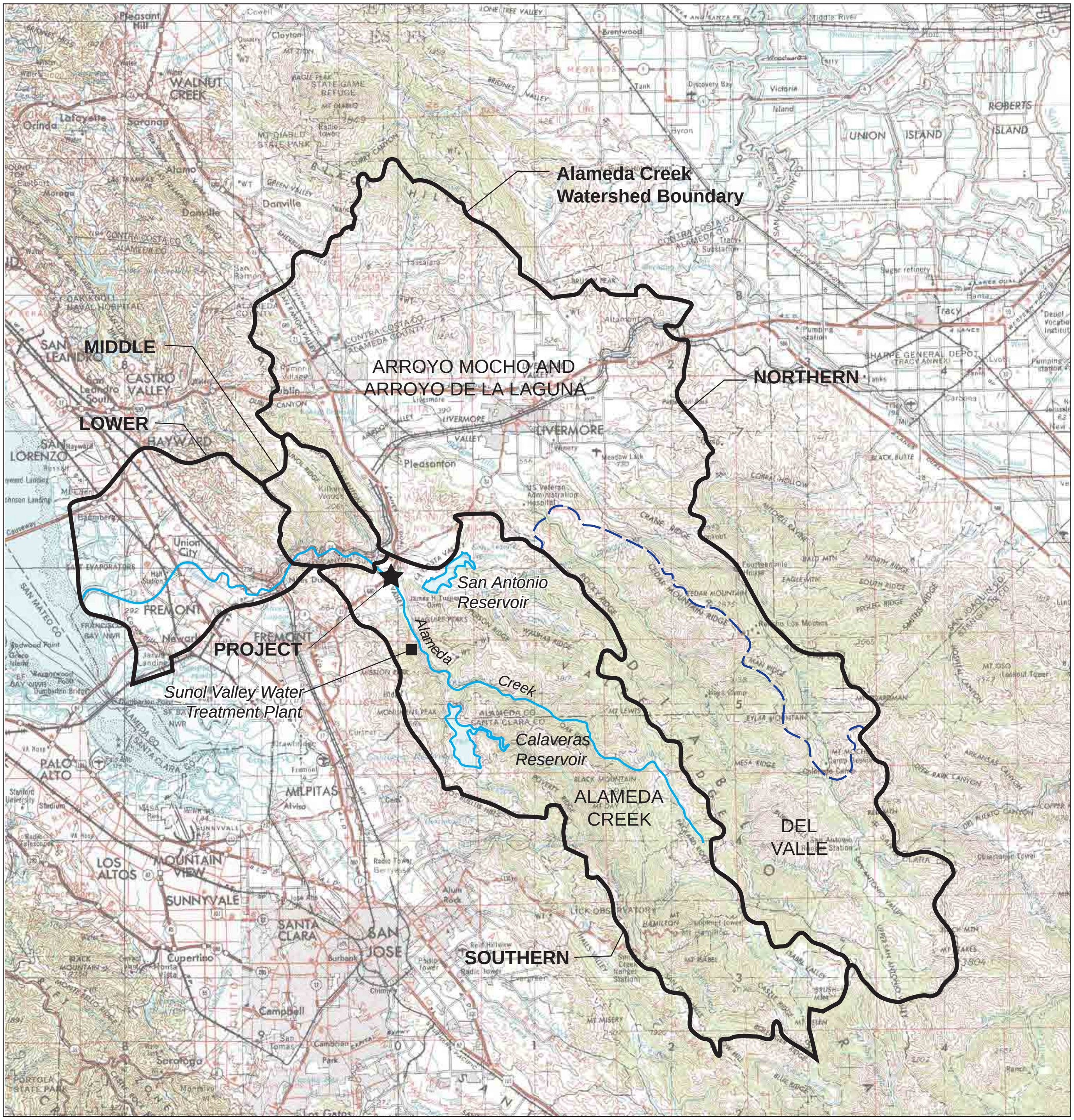
The climate of the Alameda Creek watershed is characterized by warm, dry summers and mild, rainy winters. Average temperatures range from the mid-50s in winter to the high 70s in summer (in degrees Fahrenheit [°F]). Average annual precipitation in the watershed is 20 inches, but it is higher in the headwaters (26 inches) (2).

The Alameda Creek watershed can be divided into four catchments, the larger northern and southern catchments, and the smaller middle and lower catchments. About 65 percent of the Alameda Creek watershed lies within the northern catchment. Most of the northern catchment is occupied by rangeland, cropland, and wildland, but it also contains the cities of Livermore, Pleasanton, Dublin, and San Ramon. The northern catchment drains to Arroyo de la Laguna and its tributaries, Arroyo del Valle, Arroyo las Positas, Arroyo Mocho, and San Ramon and Tassajara Creeks.

The southern catchment consists almost entirely of undeveloped wildland and rangeland. About 25 percent of the Alameda Creek watershed lies within the southern catchment. The catchment includes the Sunol-Ohlone Regional Wilderness, the SFPUC’s Alameda watershed lands, and the Sunol Valley. It drains to Arroyo Hondo, upper Alameda Creek, and Alameda Creek’s tributaries, including Calaveras Creek, Welch Creek, San Antonio Creek, La Costa Creek, and Indian Creek. The small middle and lower catchments comprise the remaining 10 percent of the Alameda Creek watershed.

The northern and southern catchments meet at the northern end of the Sunol Valley at the confluence of Arroyo de la Laguna and Alameda Creek. The middle catchment consists of the lands that drain to Alameda Creek as it flows through Niles Canyon. Sinbad and Stoneybrook Creeks are tributaries to the reach of Alameda Creek in the middle catchment. The lower catchment consists of the lands that drain to Alameda Creek as the creek flows across the San Francisco Bay Plain. In the lower catchment, much of the creek is confined between levees and receives runoff from urban storm drains.

Over the last century, the natural hydrology of the Alameda Creek watershed has been altered by water supply system operations, gravel mining, urban development, and flood reduction projects. However, almost all of the urban development and flood reduction projects are located in the



SOURCE: EDAW & Turnstone JV

SFPUC Alameda Creek Recapture Project

**Figure HYD 2-1**

Alameda Creek Watershed and Sub-watershed Areas

northern and lower catchments. The primary anthropogenic factors affecting the natural hydrology of Alameda Creek in the southern catchment are water supply system operations and gravel mining.

The proposed ACRP would lie at the northern end of the southern catchment, about 1.5 miles upstream of Alameda Creek's confluence with Arroyo de la Laguna. The following description of water resources in the vicinity of the ACRP is focused on the southern, middle, and lower catchments because that is where the potential effects of the ACRP would occur. The northern catchment would not be affected by the proposed project.

The major surface water bodies in the southern catchment are Calaveras Reservoir, San Antonio Reservoir, Alameda Creek and its tributaries, including San Antonio Creek, and several large water-filled quarry pits in the Sunol Valley. Calaveras Reservoir and San Antonio Reservoir are components of the SFPUC's water supply system. **Figure HYD2-2** shows the water bodies and the reach of Alameda Creek between the Alameda Creek Diversion Dam and the Arroyo de la Laguna.

The major surface water bodies in the middle and southern catchments are Alameda Creek and the Quarry Lakes. The Quarry Lakes are several former quarry pits that the Alameda County Water District uses for water storage and groundwater recharge. They are located on both sides of Alameda Creek, where it emerges from the Niles Canyon and begins to flow across the Bay Plain.

## 2.2 Calaveras Reservoir

Calaveras Reservoir is formed by Calaveras Dam, which was completed in 1925. The reservoir is located on Calaveras Creek about one mile upstream of the Calaveras Creek/Alameda Creek confluence. It collects water from Calaveras Creek and Arroyo Hondo as well as from local drainages along the western perimeter of the reservoir. Calaveras Reservoir also receives water from the upper reaches of Alameda Creek. Water from Alameda Creek is diverted at the Alameda Creek Diversion Dam and flows through a 1.8 mile long tunnel to Calaveras Reservoir. The SFPUC draws water from Calaveras Reservoir and conveys it by pipeline to the Sunol Valley Water Treatment Plant for treatment and distribution to customers, or to San Antonio Reservoir for storage.

When it first went into service, Calaveras Reservoir had a storage capacity of 96,850 acre-feet at a pool elevation of 756 feet, although the storage capacity has been reduced somewhat as a result of siltation. The SFPUC typically filled the reservoir to its capacity in the wet season, whenever there was sufficient runoff to do so. Storage was drawn down in the drier months to supply water to customers in the SFPUC's service area when demand was at its seasonal peak. For example, in the spring of 2000, the SFPUC filled the reservoir, raising the water surface elevation to 756 feet. In the following summer, fall and winter, the reservoir was drawn down, and the water surface elevation fell to 727 feet (3). The reservoir plays an important role in carryover storage for the SFPUC regional water system and as such the SFPUC maintains as much stored water in the reservoir as possible from year-to-year.

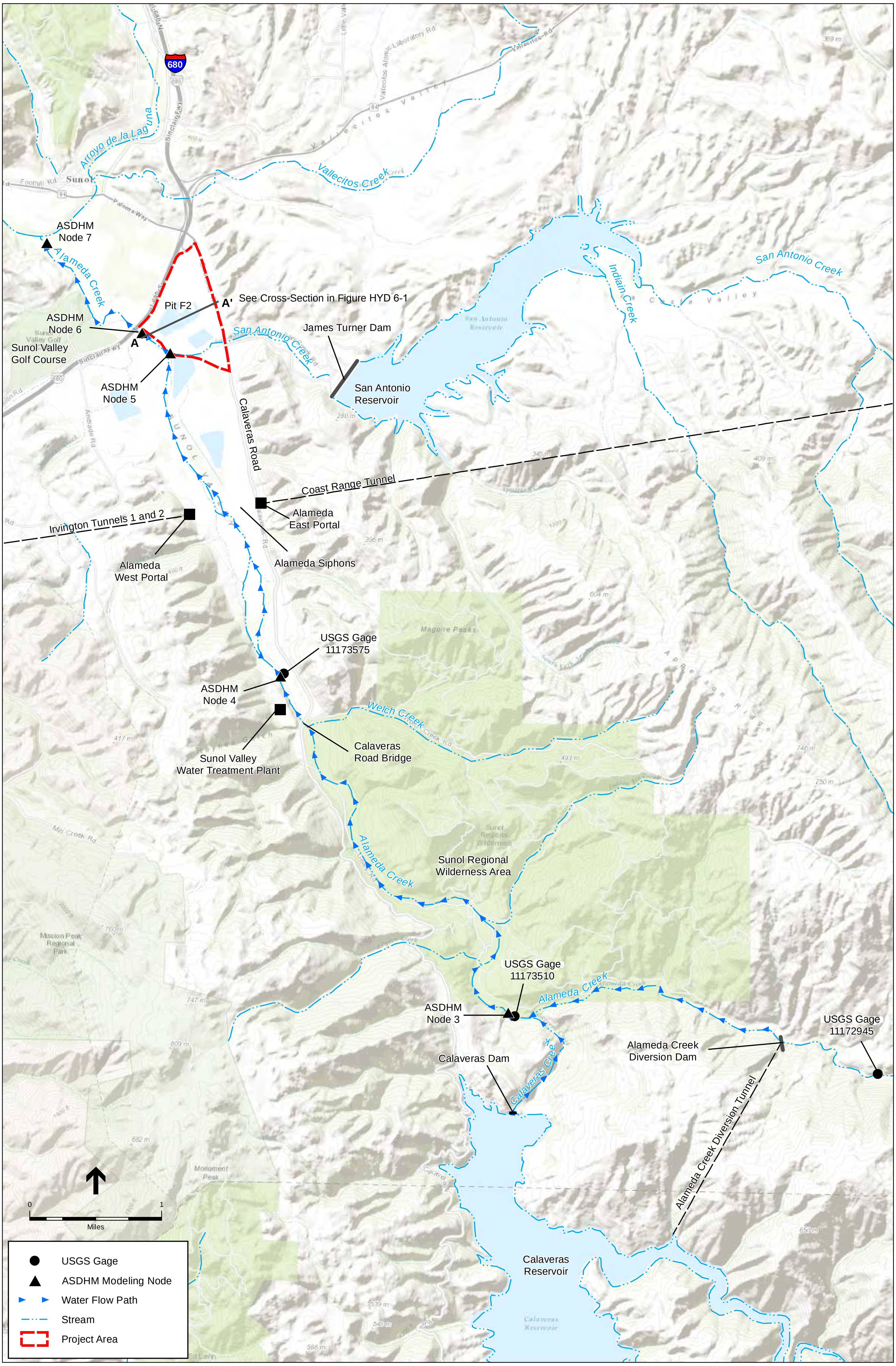
In 2001, the DSOD determined that Calaveras Dam was vulnerable to damage in an earthquake and required that the SFPUC not fill the reservoir above elevation 700, except briefly during high flow events. The elevation restriction was later raised to 705 feet. A pool elevation of 705 feet corresponds with a capacity of 38,100 acre-feet (4). With storage limited to that which can be accommodated between elevations 690 feet and 705 feet, the reservoir's usable storage became 12,400 acre-feet. The SFPUC has been operating Calaveras Reservoir with usable storage limited to 12,400 acre-feet since 2001, approximately 13 percent of the reservoir's storage capacity before the DSOD restriction was imposed.

In 2011, the SFPUC began constructing the CDRP, which consists of replacing the existing Calaveras Dam and modifying the Alameda Creek Diversion Dam. The new dam is being built immediately downstream of the existing dam, and the CDRP is scheduled for completion in 2019. During the construction period, Calaveras Reservoir is being operated with a usable capacity of 12,400 acre-feet, although this may be reduced at times to facilitate construction. The Alameda Creek Diversion Dam tunnel has also been closed since May 2012. Once the CDRP is complete, the nominal capacity of the reservoir will be restored to its original value of 96,850 acre-feet.

## 2.3 San Antonio Creek and Reservoir

San Antonio Creek is an intermittent stream with its headwaters about nine miles east of Alameda Creek. It joins Alameda Creek about one-third of a mile upstream of the Interstate 680 (I-680) bridge and in the reach of the creek adjacent to a number of quarry pits. San Antonio Reservoir is located on San Antonio Creek about 1.5 miles upstream of the creek's confluence with Alameda Creek. The reservoir has a storage capacity of 50,500 acre-feet and is formed by Turner Dam, which was constructed in 1965. The reservoir collects and stores runoff from the upper San Antonio Creek watershed. In addition to storing local runoff, San Antonio Reservoir can be used to store Calaveras Reservoir water, Hetch Hetchy water (from the Tuolumne River watershed), and subsurface water from Alameda Creek. Water from Calaveras Reservoir is transferred to San Antonio Reservoir as described above, and Hetch Hetchy water and Alameda Creek subsurface water is transferred to San Antonio Reservoir as described below.

The Hetch Hetchy Aqueduct conveys Tuolumne River water from Yosemite National Park to the Bay Area, and passes through the Sunol Valley about 1.5 miles south of the proposed ACRP. Hetch Hetchy water is conveyed beneath Alameda Creek in the Alameda Siphons to the Irvington Tunnels, which convey the water west towards the Bay Area to the water supply service area. Hetch Hetchy water can be diverted from the aqueduct to San Antonio Reservoir upstream of the Alameda Siphons (5). Subsurface water was formerly diverted to San Antonio Reservoir from the Sunol Infiltration Gallery, which in recent years has been used as the irrigation water supply for the Sunol Golf Course. The infiltration gallery is located about one-half mile downstream of the ACRP project area.



SOURCE: SFPUC, 2015. Modeling node and monitoring well locations. KMZ files provided by Amod Dhakal on August 6, 2015.

SFPUC Alameda Creek Recapture Project

**Figure HYD 2-2**

Surface water bodies in the Alameda Creek watershed between the Alameda Creek Diversion Dam and Arroyo de la Laguna

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## 2.4 Alameda Creek

Alameda Creek flows from its headwaters near Mount Hamilton northward through the Sunol-Ohlone Regional Wilderness and the Sunol Valley to its confluence with Arroyo de la Laguna. Just downstream of the confluence it turns and flows westward through Niles Canyon and across the Bay Plain to San Francisco Bay. Its total length is 46 miles.

### 2.4.1 Channel Form

The uppermost reach of Alameda Creek flows through rugged and undeveloped terrain from its headwaters to the Alameda Creek Diversion Dam. The creek channel upstream of the diversion dam slopes steeply, descending in a narrow well-defined channel at an average rate of about 125 feet per mile. Water that passes over the diversion dam continues through a steep channel, including the gorge known as Little Yosemite, to Alameda Creek's confluence with Calaveras Creek at the southern end of the Sunol Valley. The reach of the creek between the diversion dam and the confluence with Calaveras Creek descends at an average rate of about 165 feet per mile.

Downstream (north) of the Calaveras Creek confluence, Alameda Creek's channel slope becomes much flatter, descending at a rate of about 27 feet per mile through the Sunol Valley. From the confluence, Alameda Creek flows for several miles in a well-defined channel contained within the valley bottom to the Calaveras Road bridge. The channel width ranges between 100 and 250 feet in this reach, but widens out to about 500 feet downstream of the bridge. From the Calaveras Road bridge to the Alameda Siphons, the creek flows in a broad sometimes braided channel. Downstream of the Alameda Siphons, levees confine the channel until the creek reaches the I-680 bridge. About 40 years ago, this section of Alameda Creek was relocated westward to facilitate gravel quarrying in the SMP-30 area.

Downstream (north) of I-680, the creek flows along the west side of the Sunol Valley to its confluence with Arroyo de la Laguna. Beyond the confluence, the channel steepens as Alameda Creek flows through Niles Canyon, before flattening again as the creek flows across the Bay Plain. The most downstream reach of Alameda Creek flows through an urbanized area and is confined between levees.

The proposed ACRP lies adjacent to the reach of Alameda Creek between the Alameda Siphons and I-680, commonly referred to as the quarry reach. The elevation of the creek channel's lowest point, or thalweg, varies from about elevation 274 feet at the upstream end of the quarry reach to about elevation 236 feet at the downstream end. The elevation of the thalweg at the confluence of Alameda and San Antonio Creeks, near the proposed ACRP, was between 240 and 242 feet in 2003 (6).

### 2.4.2 Flow Regime

From its headwaters to the Alameda Creek Diversion Dam, streamflow in Alameda Creek is largely unaffected by human activities; below the diversion dam it is affected by SFPUC's water supply operations. Operations at the diversion dam under existing conditions are different from operations before 2001, when the DSOD imposed restrictions on storage in Calaveras Reservoir. Under pre-2001 conditions, if the gates on the tunnel entrance at the diversion dam were open and streamflow was less than 650 cubic feet per second (cfs), all the water in the creek was diverted through the tunnel to Calaveras Reservoir. Streamflow in excess of 650 cfs passed over the diversion dam and continued down Alameda Creek. If the gates to the diversion tunnel were closed the entire flow passed over the diversion dam and continued down Alameda Creek. Now, with storage in Calaveras Reservoir limited by DSOD restrictions, the SFPUC keeps the gates on the tunnel entrance closed most of the time and almost all of the flow in Alameda Creek at the Alameda Creek Diversion Dam, passes over the diversion dam and continues down the creek. Since May 2012, due to the Streambed Alteration Agreement permit requirements for the CDRP, the ACDD tunnel has been closed.

Downstream of the diversion dam, Alameda Creek flows to its confluence with Calaveras Creek. Calaveras Creek contributes to flow in Alameda Creek as a result of stormwater runoff to Calaveras Creek below Calaveras Dam, and from seepage, releases, and spills from the dam. Releases and spills from the dam to Calaveras Creek were infrequent before 2001. Releases have increased in frequency since then because of the restrictions on storage in Calaveras Reservoir. No spills have occurred since 2001 because of the lowered storage level at the reservoir.

Below its confluence with Calaveras Creek, Alameda Creek flows through the Sunol Valley. The creek gains water from tributary streams and loses water to stream channel deposits in the reach between the Welch Creek and San Antonio Creek confluences. The characteristics of the substrate in this reach of Alameda Creek suggest that the losses have always occurred, but were likely increased when quarry pits were excavated alongside the creek. Some of the time, primarily during the night, surface water flow in the creek near the proposed project area is increased when gravel quarry operators pump excess water out of gravel pits and discharge it, under NPDES permit, to the creek.

Arroyo de la Laguna joins Alameda Creek about 1.5 miles downstream of the proposed ACRP. Arroyo de la Laguna drains a much larger area than the upper reaches of Alameda Creek. Flow in Alameda Creek downstream of the Arroyo de la Laguna confluence increases substantially as a result of runoff from the larger more developed catchment. It is further increased by releases of water from the South Bay Aqueduct, a component of the State Water Project, and from Del Valle Reservoir south of the city of Livermore. Water released from the South Bay Aqueduct and Del Valle Reservoir flows down Arroyo de la Laguna to Alameda Creek and on through Niles Canyon. It is recaptured by Alameda County Water District, a state water contractor, as it exits Niles Canyon.

Flow in Alameda Creek is flashy; that is, flow increases and decreases rapidly in response to precipitation over its watershed. In the dry season, there is little or no flow in the reach of the creek adjacent to the proposed ACRP. Detailed information on flow in the creek can be found below in Section 5, Alameda Creek Surface Water Hydrology.

## 2.5 Gravel Quarries in Sunol Valley

Several gravel quarries are located at the north end of Sunol Valley, adjacent to and on both sides of Alameda Creek. There is no direct surface water flow into the quarry pits from Alameda Creek. Water enters the pits by percolation from the surrounding ground and as rainfall. Minor amounts of surface runoff and subsurface water may also enter the pits from the eastern watershed. Water levels in the pits vary and are primarily dependent on management action by the quarry operators and the rate of seepage from the surrounding ground (see Section 3, Quarry Operations, for detailed information on the quarries).

## 2.6 Quarry Lakes

Quarry Lakes are several former gravel quarries located in the city of Fremont where Alameda Creek flows out of Niles Canyon. Alameda County Water District diverts water into Quarry Lakes from Alameda Creek during the wetter months of the year using temporary inflatable dams (7). The water in Quarry Lakes percolates into the ground and recharges the Niles Cone, a groundwater basin that extends under the Bay Plain from the foot of the Diablo Range to San Francisco Bay. Its northern limit is the city of Hayward boundary, and its southern limit is the Alameda/Santa Clara County line.

## 2.7 Subsurface Water

The following main geological units lie below the Sunol Valley: stream channel deposits, Younger Alluvium, Older Alluvium, and the Livermore Gravels are not. The Older Alluvium and Livermore Gravels underlie the Sunol Valley and consist of dense clays and gravels that are non-water-bearing. From about the Welch Creek confluence to the mouth of Niles Canyon, stream channel deposits and Younger Alluvium lie above the Older Alluvium and Livermore Gravels. Water can be readily transmitted through the stream channel deposits and Younger Alluvium.

Water enters the stream channel deposits and Younger Alluvium from Alameda Creek, Welch Creek, San Antonio Creek, and as runoff from less-defined minor drainages. For more information on subsurface water, see Appendix HYD2.

## Notes for Section 2

1. San Francisco Planning Department, 2011. *Final Environmental Impact Report for the San Francisco Public Utilities Commission Calaveras Dam Replacement Project*. San Francisco Planning Department File No. 2005.0161E, State Clearinghouse No. 2005102102. Certified January 27, 2011.
2. San Francisco Planning Department, 2012. F*inal Environmental Impact Report for the San Francisco Public Utilities Commission San Antonio Backup Pipeline Project*. San Francisco Planning Department File No. 2007.0039E, State Clearinghouse No. 2007102030. Certified September 20, 2012.
3. Same as 1.
4. Same as 1.
5. San Francisco Planning Department, 2008. *Final Environmental Impact Report for the San Francisco Public Utilities Commission's Water System Improvement Program*. San Francisco Planning Department File No. 2005.0159E, State Clearinghouse No. 2005092026. Certified October 30, 2008.
6. Entrix, Inc, 2003. *Assessment of Alameda Creek in the vicinity of Mission Valley Rock Company including the proposed Ivaldi mining site, Sunol Valley reach of Alameda Creek*. Letter report to Mr. W.M. Calvert, Mission Valley Rock Company, January 8, 2003.
7. ACWD, 2014. *Reliability by Design: Integrated Resource Planning at Alameda County Water District*.

# 3. Quarry Operations

## 3.1 Overview of Quarry Operations

Commercial gravel quarries operated by Hanson Aggregates and Oliver de Silva (ODS) are located at the north end of Sunol Valley, between the Alameda Siphons to the south and the confluence with Arroyo de la Laguna to the north. Quarry pits lie adjacent to and on both sides of Alameda Creek. Some of the pits are active; that is, quarry operators are currently extracting aggregate from the pits under Surface Mining Permits (SMP). Aggregate extraction has been completed in some pits and the inactive pits are now used for water management in support of mining operations. Quarry operations are expected to continue until no additional aggregate can be extracted, which is estimated to occur within the next 20 years.

Quarry pit depths vary but several pits reportedly approach 250 feet below grade (1). **Figure HYD3-1** shows the quarry reach of Alameda Creek, the layout of the gravel quarries, and their location relative to Alameda Creek. The quarries occupy four plots of land, which are either owned by Hanson Aggregates or leased from the City and County of San Francisco. The four plots are designated SMP-24, SMP-30, SMP-32, and SMP-33. Hanson Aggregates operates quarries and aggregate processing facilities on the SMP-24, SMP-32, and SMP-33 areas. Quarries and aggregate processing facilities in the SMP-30 area are operated by ODS.

The operational schedule of the aggregate mines and processing facilities depends on market demand and weather conditions and may occur year round. Operations are usually suspended during wet weather. As mining proceeds, and after aggregate is extracted, the total size of the pits increases. This will enable an increase in the volume of water that can be stored in the pits in the future. When mining is completed, the pits will have a large capacity for water storage that could serve as an ancillary water storage facility for the regional water system, as called for in the SFPUC's Alameda Watershed Management Plan (2). The approximate storage capacities of the quarry pits based on current reclamation requirements and mining practices are shown in **Table HYD3-1**.

Water seeps into the quarry pits from Alameda Creek and the surrounding areas through a band of stream channel deposits that underlies the northern Sunol Valley (for more information, see Appendix HYD2). If needed to create a dry work area for aggregate extraction, the quarry operators remove water that seeps into the active pits by pumping it into inactive pits, inactive areas of active pits, and other storage ponds. The operators use some of the water that seeps into the pits to wash aggregate and produce concrete and asphalt. Wash water is returned to inactive pits and ponds where silt settles out. If the water level in a pit rises too high, the quarry operators pump the excess water into a pit or pond with available storage capacity or into Alameda Creek as a regulated discharge. Both Hanson Aggregates and ODS hold permits to discharge water to Alameda Creek that were issued by the San Francisco Bay Regional Water Quality Control Board (San Francisco Bay RWQCB Order No. R2-2008-0011, NPDES General Permit No. CAG982001 (Aggregate Mining, Sand

**TABLE HYD3-1**
**APPROXIMATE STORAGE CAPACITY OF MAJOR QUARRY PITS AND PONDS**

| Pit | Quarry Operator | SMP | Estimated Water Storage Capacity on Completion (acre-feet) | Mining Condition |
|---|---|---|---|---|
| **F1** | Hanson Aggregates | SMP-32 | 14,000-16,000 | Active |
| **F2** | Hanson Aggregates | SMP-24 | 8,800 | Completed and currently used for water storage |
| **F3-East** | Hanson Aggregates | SMP-24 | 1,350 | Completed and currently used for water storage |
| **F3-West** | Hanson Aggregates | SMP-24 | 280 | Completed and currently used for water storage |
| **F4** | Oliver de Silva | SMP-30 | 1,900 | Active but portions of the pit are used for water storage |
| **F5** | Oliver de Silva | SMP-30 | N/A | Active for silt management and mining |
| **F6** | Oliver de Silva | SMP-30 | 24,900 | Active |

SOURCE: SFPUC, 2015. Personal communication with Ellen Levin of SFPUC.

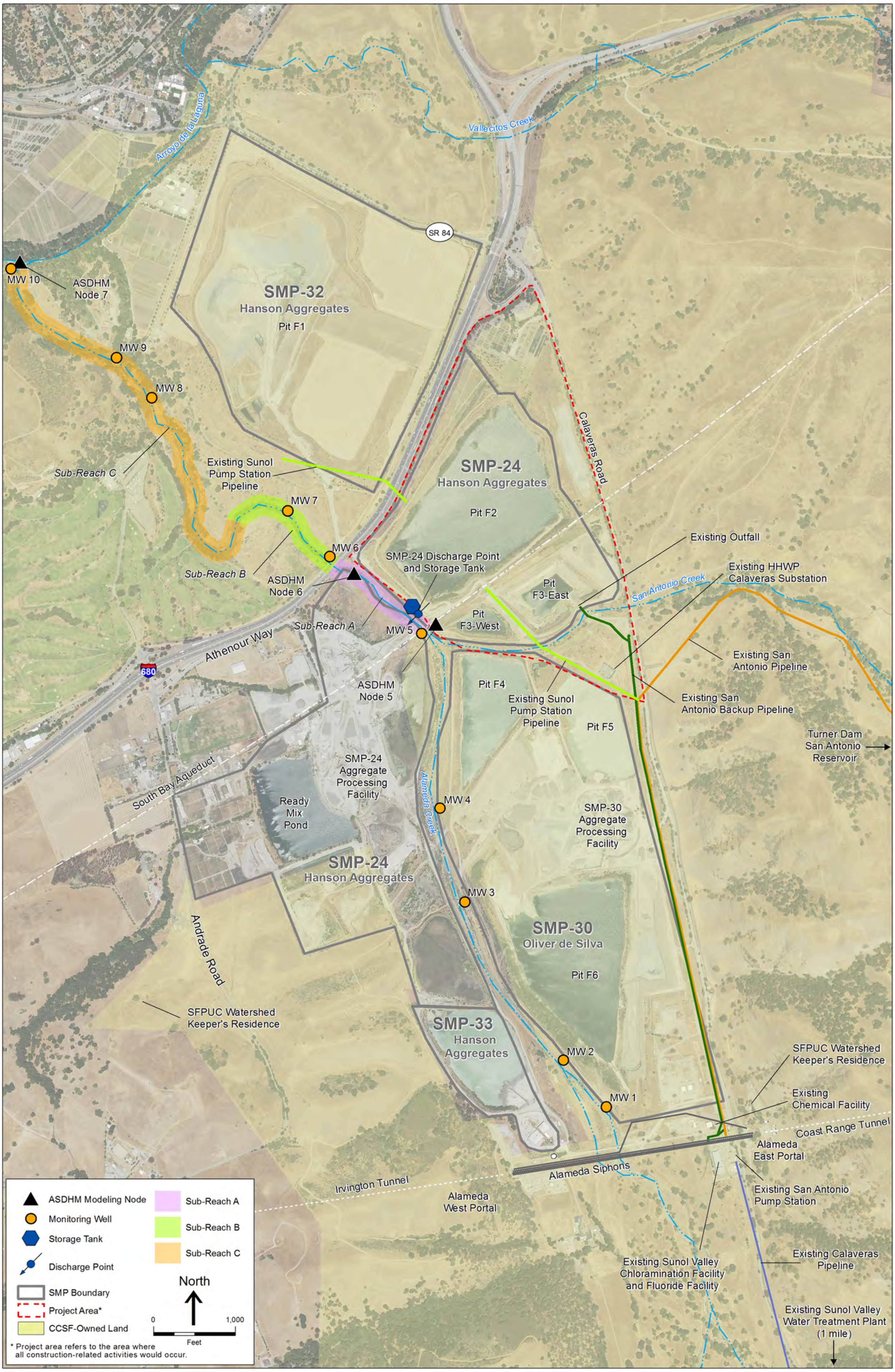
Washing, and Sand Offloading). The NPDES permits are intended to regulate the quality of the water that is discharged to Alameda Creek. The quarry operators have no requirements to discharge a minimum amount of water; however, their permits do restrict the maximum volume of water that can be discharged. The permits are updated from time to time. Future permits could include additional restrictions that may affect their ability to discharge (see EIR Chapter 5, Section 5.16.3.1 for more information on the quarry discharge permits).

The quarry operators’ general practice is to conserve water within the pits for use in aggregate processing and concrete and asphalt production and to discharge water to the creek only when absolutely necessary. When discharge is necessary, it generally occurs for about 11 hours during the night when lower cost off-peak power rates are available. However, during periods of active mining, discharges can occur at any time consistent with permit conditions.

## 3.2 Hanson Aggregates

Hanson Aggregates extracted aggregate from the SMP-24 area until 2006. The quarry operator currently extracts aggregate from the SMP-32 area, which is located north of the SMP-24 area, on the north side of Alameda Creek between I-680 and Arroyo de La Laguna. Aggregate extraction usually occurs in the dry season (generally April through November) but may occur year-round.

Water that seeps into the pit in SMP-32 must be moved to keep the active mining area dry. Water is pumped out of the active mining area and conveyed to areas within SMP-32 that are not being actively mined or to the pits and ponds within the boundary of SMP-24, including Pit F3-West on the east side of Alameda Creek, and a pond on the west side of the creek referred to as the Ready Mix Pond. Gravel from SMP-32 is conveyed to an aggregate processing facility located in SMP-24/33, on the west side of Alameda Creek. Hanson Aggregates also collects water from a small creek and



SOURCE: ESA, 2015; Date of aerial photo is 2014.

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**Figure HYD 3-1**

Quarry Reach of Alameda Creek

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several springs that emerge from the hills to the west and stores it in the Ready Mix Pond and in other ponds on SMP-24. Water from these ponds is pumped to the aggregate processing facility where it is used to wash gravel. If the amount of water in the ponds is insufficient to meet the needs of the aggregate processing facility and the concrete batch plant, supplementary water is pumped to the Ready Mix Pond from Pit F2, Pit F3-East or Pit F3-West. Hanson Aggregates uses approximately three million gallons per day of water for production purposes.

Pumping from the Ready Mix Pond to the aggregate processing facility is not continuous; it only occurs when the facility is operating. The facility does not operate in wet weather. Spent wash water from the aggregate processing facility is conveyed to pits that are no longer used for aggregate extraction (inactive pits) where silt in the wash water settles out. Currently, when Hanson uses water from Pits F2, F3-East and F3 West, or discharges water to Alameda Creek, the water is first pumped to a 2,000 gallon tank. Water from the tank is then discharged under its NPDES permit to Alameda Creek or to a piping system that distributes the water for dust control and irrigation in the SMP-24 and SMP-32 areas. The 2,000 gallon tank also has an overflow structure that results in water discharging to Alameda Creek whenever the tank is used. Hanson reports its regulated NPDES discharges to the RWQCB. The volumes of water reported are based on the pump rate of the pumps and not a meter at the discharge point.

Water in Hanson Aggregates' inactive pits and ponds must be managed to address certain risks. Water cannot be allowed to rise to levels where it poses a threat to the stability of the levees that separate the pits one from another and from Alameda Creek. Water levels are also managed to limit seepage from one pit to another or to prevent oversaturation of soils adjacent to the pits. In addition, the SFPUC uses Pit F3 East as a discharge point for Hetch Hetchy water, which is then pumped to San Antonio Reservoir. Per the lease agreement with Hanson, Hanson is required to maintain a freeboard in Pit F3 East so that there is room for a Hetch Hetchy water discharge. To maintain water levels, Hanson Aggregates pumps excess water stored in Pits F2, F3-East and F3-West and other pits it manages into other pits where water levels are lower or into Alameda Creek under its NPDES discharge permit, just downstream of its confluence with San Antonio Creek.

## 3.3 Oliver de Silva

ODS is actively mining gravel from Pit F6. In 2012, as part of the SMP-30 expansion project, ODS revised its surface mining permit and renewed its lease with SFPUC to allow for increasing the mining depth from 140 feet to a maximum of 400 feet below the ground surface. The ground surface in the vicinity of Pit F6 is at about elevation 260 feet. Also as part of the project, ODS expanded its mining area by 58 acres, and added a new asphalt batch plant. ODS has permits to build a new ready-mix concrete batch plant.

Water that enters the active mining area in Pit F6 is pumped to either an inactive area of Pit F6 or to Pit F4, which serves as a source of wash water for the SMP-30 aggregate processing facility, and for production of asphalt.[1] Water levels in Pit F6 and Pit F4 fluctuate. During seasons when the mine is inactive, water levels rise and can exceed elevation 220 feet. During the active mining season, the water level in Pit F6 may be held below elevation 220 feet, but the water surface elevation in Pit F4 may remain at a high elevation throughout the season. Water can overflow from Pit F4 to Alameda Creek over a weir with a crest elevation of about 247 feet so the water level in the pit can never exceed elevation 247 feet by more than a few inches. This overflow weir is one of two NPDES discharge points for ODS. ODS uses about five million gallons per day of water for aggregate, and asphalt production. Spent wash water from aggregate production is conveyed to Pit F5.

The SFPUC has the ability to discharge Hetch Hetchy water from the regional water system to Pit F6 under unplanned circumstances. If this water cannot be contained in the SMP-30 pits, ODS has an additional regulated discharge point at the southern end of SMP-30 and can discharge this water to Alameda Creek under its NPDES permit.

## 3.4 Water Levels in Pits

The quarry operators do not record water levels in their various pits. Because the proposed ACRP would affect water levels in Pit F2 and could affect water levels in other pits and ponds, the SFPUC has been measuring water surface elevations in four SMP-24 quarry pits—Pit F2, Pit F3-East, Pit F3-West, and the Ready Mix Pond—since early 2011 (3). Pit F2 is the site of the proposed ACRP and Pits F3-East and F3-West are adjacent to it. Pressure transducers installed in the quarry pits record water levels continuously; on occasion the transducer data are supplemented with manual measurements. Water levels in the Ready Mix Pond are not pertinent to the analysis of the ACRP and not discussed further in this report.

A plot of historical water surface elevations in Pit F2 from 2009 to the first half of 2016 is shown in **Figure HYD3-2**. Although water surface elevation monitoring in the pit did not begin until late 2012, the record of water levels was extended back to October 2009 using aerial photography and satellite imagery. In July 2009, the water surface elevation in Pit F2 was estimated to be about 95 feet. By late spring in 2010, it was at elevation 102 feet. By October 2011, the water surface elevation had risen to elevation 122 feet and a year later when measurements began, it had reached elevation 148 feet. It has risen gradually since then reaching elevation 223 feet in February 2016, before falling back to elevation 210 feet by June 2016. Hanson Aggregates stopped pumping water into Pit F2 temporarily in April, 2014, but may resume pumping water into the pit if it wishes until the time that the ACRP is commissioned. After the ACRP is commissioned, Hanson Aggregates is expected to stop pumping water into Pit F2. Hanson Aggregates continues to pump water out of Pit F2 as needed to manage water levels in the pit and for aggregate and asphalt production.

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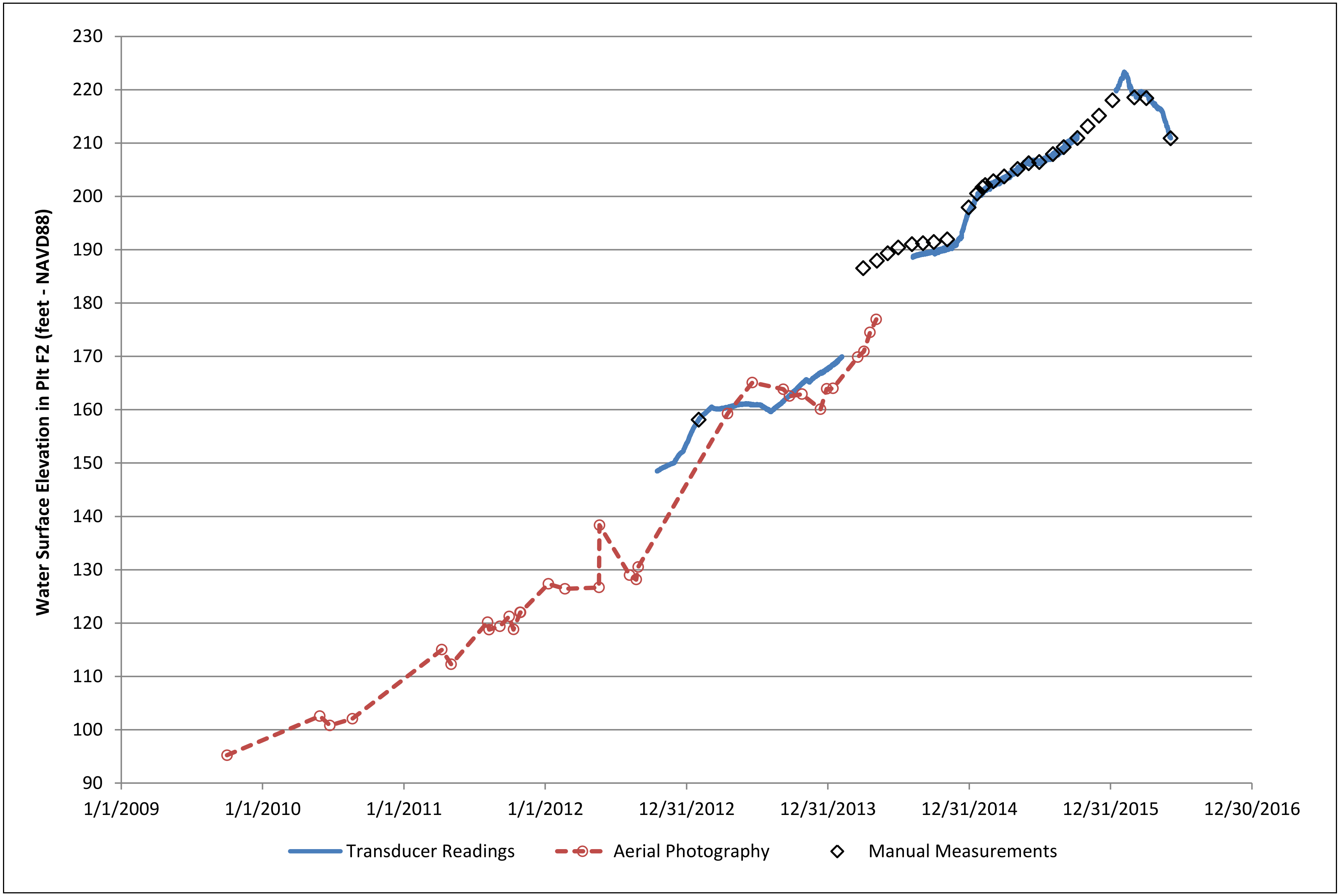
[1] ODS has approval for a concrete batch plant as well however, it has not yet been constructed.



SOURCE: Luhdorff and Scalmanini (L&S), 2016. Sunol Pit Monitoring Data Transmittal. Excel spreadsheet files and PDFs of water level figures provided by Tom Elson of L&S on September 16, 2016

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**Figure HYD 3-2**

Historical Water Surface Elevations in Pit F2

The water surface elevation in Pit F3-East varied between elevation 182 feet and elevation 227 feet during the 30-month period from March 2011 to September 2013, as shown in Figure **HYD3-3**. In the fall of 2013, the water surface elevation was lowered from elevation 225 feet to about elevation 115 feet to accommodate construction of facilities associated with the San Antonio Backup Pipeline. Since then it gradually rose to about elevation 152 feet in late 2014, before rising sharply to about elevation 237 feet in early 2015. From then until June 2016, the water surface elevation has risen and fallen between elevation 237 feet and elevation 197 feet. There is a clause in the SFPUC's lease agreement with Hanson Aggregates that calls for the latter to maintain water levels in Pit F3-East at elevation 195 feet or below so that there is always sufficient storage capacity in the pit to contain discharges of water from the Hetch Hetchy Aqueduct. The SFPUC then conveys the discharged water to San Antonio Reservoir.

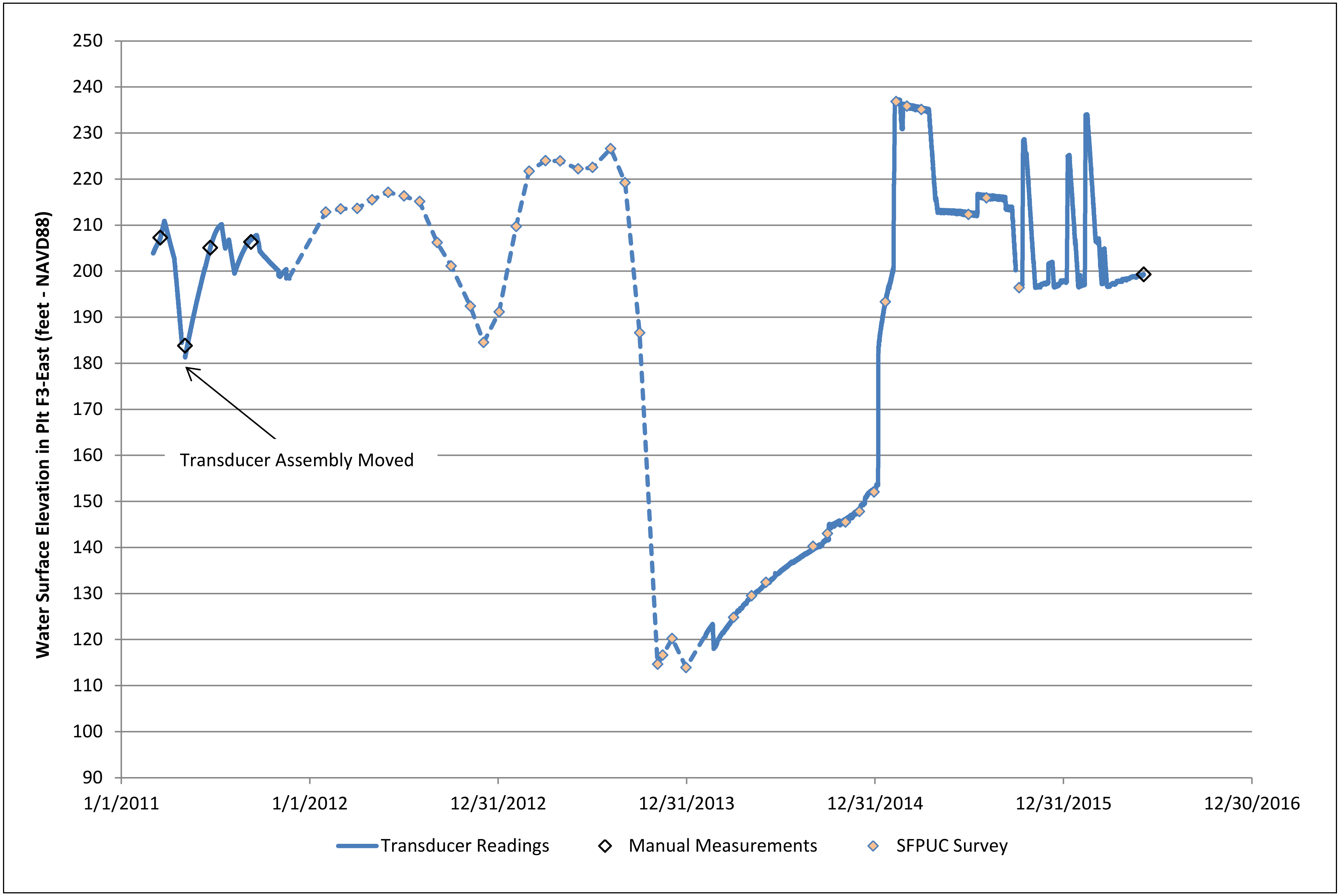
A plot of the water surface elevation in Pit F3-West is shown in **Figure HYD3-4**. It varied between elevation 242 feet and elevation 205 feet during the four-year period from March 2011 to June 2016, with multiple fluctuations, probably in response to pumping by Hanson Aggregates.

The SFPUC has been monitoring water surface elevations in two pits on ODS-leased lands, Pit F4 and Pit F6, since 2011. As shown in **Figure HYD3-5**, the water surface elevation in Pit F4 fell from elevation 247 feet in May 2011 to elevation 223 feet in December 2012, before rising sharply to elevation 233 feet in January 2013. It has remained in the range of elevation 233 feet to elevation 247 feet since then. Pit F4 is equipped with a weir with a crest elevation of 247 feet over which one of ODS' NPDES discharges occurs. Discharges are infrequent and have occurred in May 2011 and March 2016. The water surface elevation in Pit F6, which is actively mined, has fluctuated considerably in the last several years, as shown in **Figure HYD3-6**.

When monitoring began in March 2011, the water surface elevation in Pit F6 was at 146 feet. It rose sharply to elevation 166 feet in May and then fell sharply to elevation 118 feet in June, after which it ranged between elevation 118 feet and elevation 112 feet until March 2012. It then began rising, reaching a maximum elevation of 206 feet in May 2013, although it is not known whether there were water level fluctuations between March 2012 and December 2012 because the measuring equipment failed. Since May 2013, the water surface elevation has remained between elevation 210 feet and elevation 177 feet.

The data on water surface elevations in Pit F3-East, Pit F3-West, Pit F4, and Pit F6, reported above, are based on measurements made with sensors or taken manually. No analysis of aerial photography or satellite imagery was undertaken to extend the record of water levels for these pits.

Water enters and leaves the pits by percolation through the stream channel deposits that underlie the Sunol Valley. The direction of water movement depends on the hydraulic gradient between the pits and the surrounding stream channel deposits. Below the stream channel deposits are the Older Alluvium/ Livermore Gravels, which transmit water poorly, and so little water enters or leaves the pits below the base of the stream channel deposits. In the vicinity of Pit F2, the base of the stream channel deposits is estimated to be at about elevation 224 feet (for more information, see Appendix HYD2). The elevation of the bed of Alameda Creek (thalweg) in the same location is at about 242 feet.



SOURCE: Luhdorff and Scalmanini (L&S), 2016. Sunol Pit Monitoring Data Transmittal. Excel spreadsheet files and PDFs of water level figures provided by Tom Elson of L&S on September 16, 2016

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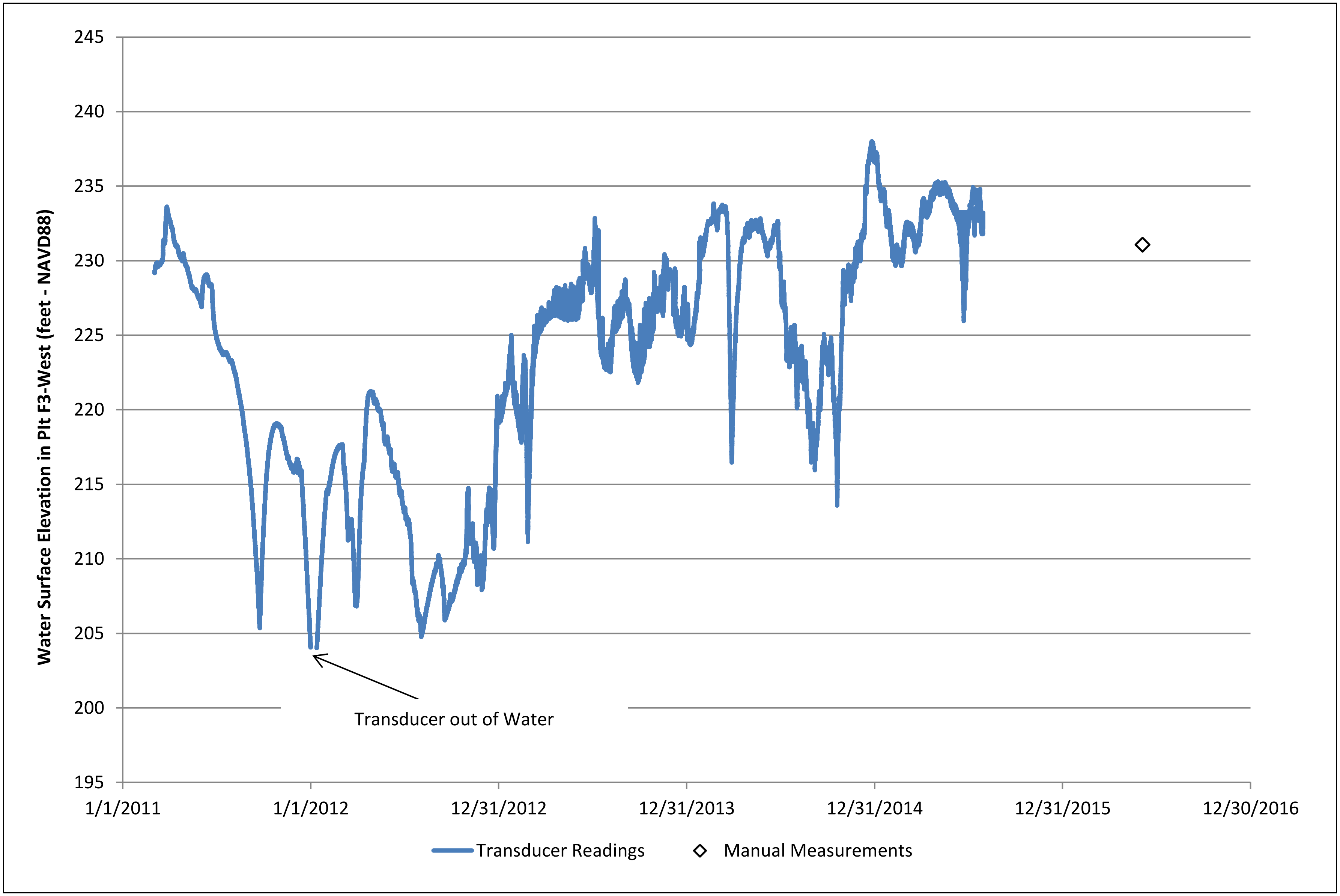
**Figure HYD 3-3**

Historical Water Surface Elevations in Pit F3-East



SOURCE: Luhdorff and Scalmanini (L&S), 2016. Sunol Pit Monitoring Data Transmittal. Excel spreadsheet files and PDFs of water level figures provided by Tom Elson of L&S on September 16, 2016

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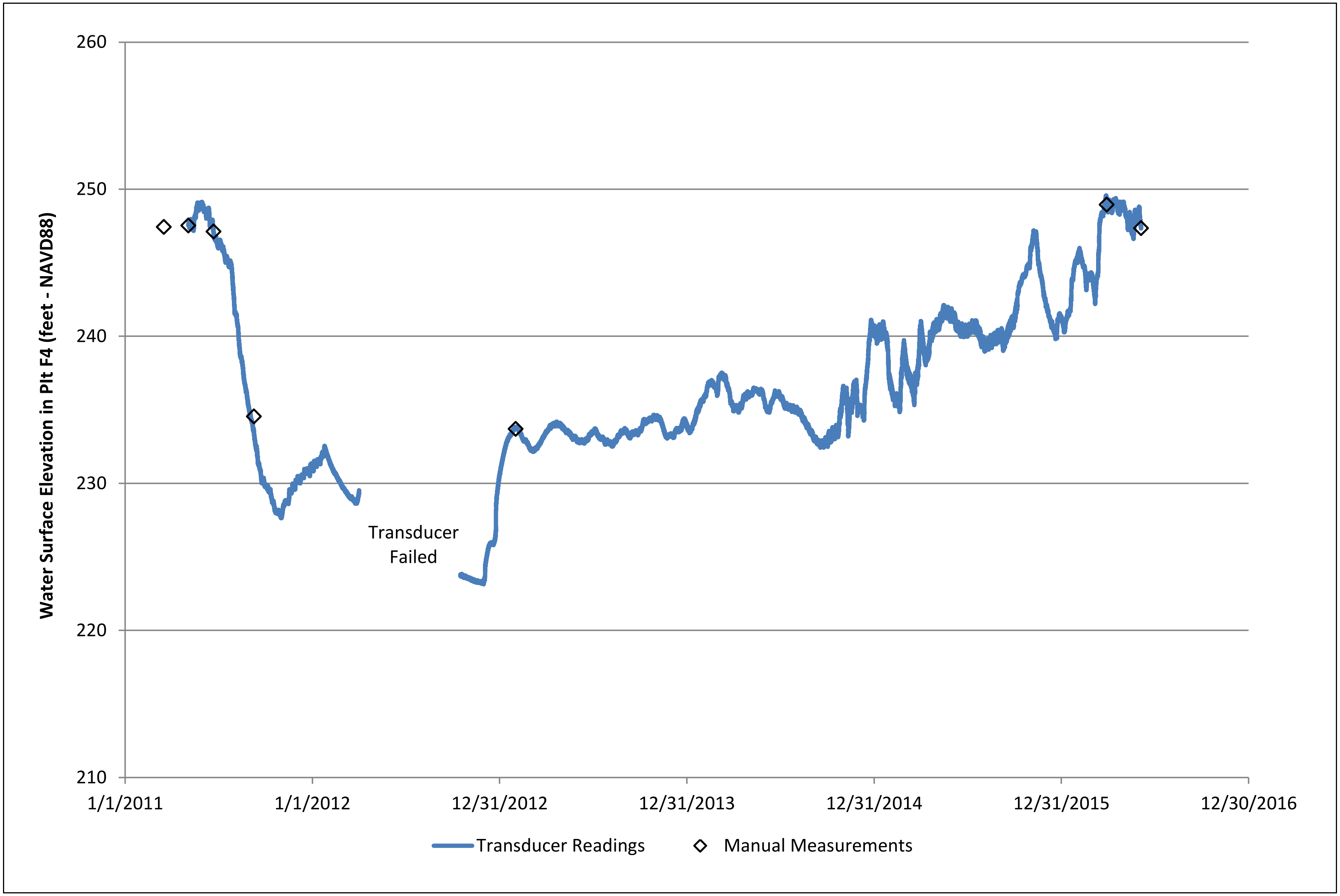
**Figure HYD 3-4**

Historical Water Surface Elevations in Pit F3-West



SOURCE: Luhdorff and Scalmanini (L&S), 2016. Sunol Pit Monitoring Data Transmittal. Excel spreadsheet files and PDFs of water level figures provided by Tom Elson of L&S on September 16, 2016

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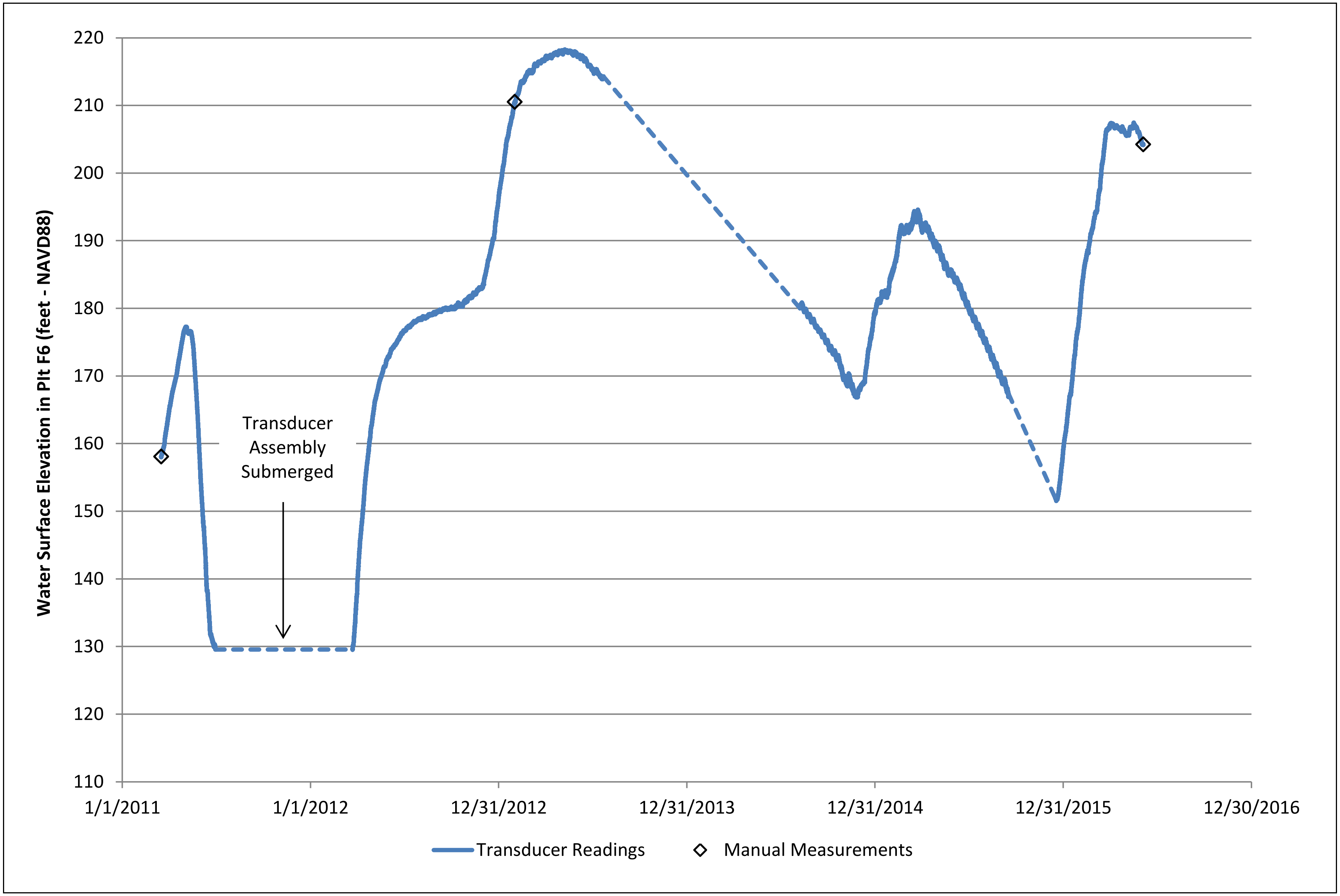
**Figure HYD 3-5**

Historical Water Surface Elevations in Pit F4



SOURCE: Luhdorff and Scalmanini (L&S), 2016. Sunol Pit Monitoring Data Transmittal. Excel spreadsheet files and PDFs of water level figures provided by Tom Elson of L&S on September 16, 2016

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**Figure HYD 3-6**

Historical Water Surface Elevations in Pit F6

Water enters Pit F2 from the stream channel deposits when the water level in the deposits is above elevation 224 feet and the water surface elevation in the pit is lower than elevation 224 feet. As shown in Figure HYD3-2, from 2009 until June 2016, the water level in Pit F2 was at or below elevation 224 feet and so water has entered the pit whenever the water level in the stream channel deposits under Alameda Creek was high enough to create a positive hydraulic gradient. Although it has not done so between 2009 and 2016, water could leave Pit F2 and percolate into the stream channel deposits if the water surface elevation in the pit rose higher than the water level in the deposits.

Hanson Aggregates reports that subsurface water migrates from Pit F2 into Pit F1 in the SMP-32 area even when the water level in Pit F2 is below elevation 224 feet. This suggests that there is a discontinuity in the stream channel deposits between Pit F2 on the south side of I-680 and Pit F1 on the north side of I-680, perhaps attributable to removal of Livermore Gravel during the I-680 construction, which may have been replaced with fill that is more permeable than the gravel.

During the five-year period in which water surface elevations in the pits have been monitored, Pit F3-East has probably gained water from the surrounding stream channel deposits almost all the time until October 2013 when cut off walls were placed around it. Pit F3-West has probably gained water from the surrounding ground from early 2011 until the present.

The base of the stream channel deposits is estimated to be at about elevation 228 feet in the vicinity of Pit F4. Except for a short period in 2012, water levels in Pit F4 have been higher than elevation 228 feet. During such times, Pit F4 has lost or gained water from the stream channel deposits under Alameda Creek, with the direction of subsurface flow determined by the subsurface water level in the stream channel deposits. The base of the stream channel deposits is estimated to be at about elevation 245 feet in the vicinity of Pit F6. Pit F6 has probably gained water from the stream channel deposits for the five-year period during which water levels in the pits have been monitored.

## 3.5 Regulated Discharges from Quarry Pits to Alameda Creek

Hanson and ODS discharge water to Alameda Creek under an NPDES discharge permit issued and managed by the RWQCB, as mentioned above. Their permits do not require a minimum discharge amount but their maximum discharge amounts are restricted. The discharge is permitted for water quality purposes only. The RWQCB can at any time discontinue the discharge permit or update the permit to restrict discharges further (see EIR Chapter 5, Section 5.16.3.1 for more information on the quarry operators discharge permits).

As noted above, Hanson Aggregates pumps excess water in the pits it manages into Alameda Creek under NPDES discharge permits. Excess water is typically discharged to the creek during the night to take advantage of lower rates for electrical power, but some water may be discharged to the creek in the day. Hanson Aggregates discharges relatively small amounts of water to Alameda Creek even when there is no need to discharge excess water from its pits because of the characteristic of its piping at SMP-24. When Hanson Aggregates pumps water from Pits F2, F3-East and F3-West into the 2,000 gallon tank that is used as a source of water for dust control and irrigation, the tank overflows and the overflow is routed to Alameda Creek. These overflows can occur at any time when the quarries run by Hanson Aggregates are operating.

The volume of water discharged to the creek varies considerably from year-to-year and from month-to-month. **Table HYD3-2** shows the amount of water discharged from Hanson Aggregates into Alameda Creek between Water Year 2002 and Water Year 2015 as reported to the Regional Water Quality Control Board (RWQCB). The annual volume of water reported as discharged to the creek under Hanson's NPDES permit during this period varied from a maximum of 5,328 acre-feet in Water Year 2010 to a minimum of 103 acre-feet in Water Year 2012 and averaged 3,245 acre-feet.

**TABLE HYD3-2**
**HANSON AGGREGATES – HISTORICAL NPDES DISCHARGES TO ALAMEDA CREEK**

| Water Year | Quarter | Mean Quarterly Discharge (cfs) | Total Quarterly Volume (acre-feet) | Total Annual Volume (acre-feet) |
|---|---|---|---|---|
| 2002 | 1 | 7.2 | 1317 | 4,970 |
| | 2 | 6.7 | 1193 | |
| | 3 | 6.7 | 1217 | |
| | 4 | 6.8 | 1244 | |
| 2003 | 1 | 6.8 | 1244 | 4,578 |
| | 2 | 6.7 | 1193 | |
| | 3 | 6.2 | 1116 | |
| | 4 | 5.6 | 1025 | |
| 2004 | 1 | 0 | 0 | 2,688 |
| | 2 | 4.9 | 884 | |
| | 3 | 4.9 | 892 | |
| | 4 | 5.0 | 912 | |
| 2005 | 1 | 5.0 | 912 | 3,928 |
| | 2 | 4.9 | 875 | |
| | 3 | 4.9 | 892 | |
| | 4 | 6.8 | 1248 | |
| 2006 | 1 | 6.8 | 1248 | 4,953 |
| | 2 | 6.8 | 1221 | |
| | 3 | 6.8 | 1235 | |
| | 4 | 6.8 | 1248 | |
| 2007 | 1 | 6.8 | 1248 | 4,542 |
| | 2 | 6.8 | 1221 | |
| | 3 | 6.8 | 1235 | |
| | 4 | 4.6 | 837 | |
| 2008 | 1 | 0.03 | 5 | 3,718 |
| | 2 | 7.3 | 1317 | |
| | 3 | 8.4 | 1518 | |
| | 4 | 4.8 | 877 | |
| 2009 | 1 | 3.8 | 698 | 2,302 |
| | 2 | 2.6 | 464 | |
| | 3 | 4.4 | 795 | |
| | 4 | 1.9 | 345 | |
| 2010 | 1 | 4.5 | 813 | 5,324 |
| | 2 | 7.3 | 1299 | |
| | 3 | 9.3 | 1683 | |
| | 4 | 8.4 | 1528 | |

### TABLE HYD3-2 (Continued)
### HANSON AGGREGATES – HISTORICAL NPDES DISCHARGES TO ALAMEDA CREEK

| Water Year | Quarter | Mean Quarterly Discharge (cfs) | Total Quarterly Volume (acre-feet) | Total Annual Volume (acre-feet) |
|---|---|---|---|---|
| 2011 | 1 | 6.0 | 1102 | 4,480 |
| | 2 | 6.9 | 1228 | |
| | 3 | 9.0 | 1619 | |
| | 4 | 2.9 | 530 | |
| 2012 | 1 | 0.2 | 30 | 103 |
| | 2 | 0.2 | 33 | |
| | 3 | 0.1 | 20 | |
| | 4 | 0.1 | 20 | |
| 2013 | 1 | 0.04 | 7 | 1,069 |
| | 2 | 0.9 | 169 | |
| | 3 | 2.7 | 483 | |
| | 4 | 2.3 | 411 | |
| 2014 | 1 | 4.0 | 724 | 1,012 |
| | 2 | 0.2 | 43 | |
| | 3 | 0.1 | 20 | |
| | 4 | 1.2 | 225 | |
| 2015 | 1 | 0.1 | 20 | 1,206 |
| | 2 | 1.8 | 327 | |
| | 3 | 2.1 | 386 | |
| | 4 | 2.6 | 473 | |

SOURCE: San Francisco Public Utilities Commission (SFPUC), 2015. SMP-24 discharge to Creek. Excel spreadsheet file provided by Amod Dhakal on April 1, 2015 for data through 2009. Data for 2010-2015 was obtained from reports provided to the RWQCB.

The average annual volume of water discharged under Hanson's NPDES permit between Water Year 1996 and Water Year 2013, the period used in the analysis of the proposed ACRP's hydrologic effects, was 3,436 acre-feet (4). The SFPUC estimates that the minimum annual discharge from Hanson Aggregates is ten percent of the long-term annual average, which for the period of Water Year 1996 to Water Year 2013 calculates to be 344 acre-feet per year. It should be noted that the reported amounts of water discharged by Hanson Aggregates to Alameda Creek under their NPDES permit are estimated based on a pump-rating curve and should not be regarded as precise (5).

Because ODS usually keeps the water level in Pit F4 above the base of the stream channel deposits at about elevation 228 feet, water percolates northward beneath San Antonio Creek towards Pit F3-West. This reduces the need to discharge water from the SMP-30 pits to maintain safe water levels and consequently, regulated discharges by ODS are infrequent. If it is necessary to remove water in the SMP-30 pits, ODS fills Pit F4 to about elevation 247 feet and the water discharges by gravity over a weir to Alameda Creek, just upstream of its confluence with San Antonio Creek. This is one of ODS's NPDES discharge points. ODS has a second regulated discharge point near the south end of Pit F6, but it is rarely used. The amount of water discharged from SMP-30 to Alameda Creek varies considerably from year-to-year and month-to-month. **Table HYD3-3**, shows the annual volumes of water discharged to Alameda Creek by ODS from Water Year 2003 until Water Year 2015. The annual volume of water discharged under ODS's NPDES permit to the creek varied from a maximum of 3,181 acre-feet in the Water Year 2011 to a minimum annual volume of zero, which occurred in several years. The average annual volume of water discharged over the period was 512 acre-feet. It should be noted that some of the reported amounts of water discharged under the NPDES permit by ODS are estimates rather than measured values. Discharges from Pit F4 are measured at the weir, but discharges from Pit F6 are estimated from pump manufacturer rating curves. In addition, the volume of water discharged by ODS in the fourth quarter of 2011 was an anomaly because it resulted from a discharge by the SFPUC into one of the pits managed by ODS.

### TABLE HYD3-3
### CEMEX (2003-2011)/OLIVER DE SILVA (2012-2015) – HISTORICAL NPDES DISCHARGES TO ALAMEDA CREEK

| Water Year | Quarter | Mean Quarterly Discharge (cfs) | Total Quarterly Volume (acre-feet) | Total Annual Volume (acre-feet) |
|---|---|---|---|---|
| 2003 | 1 | 0 | 0 | 0 |
| | 2 | 0 | 0 | |
| | 3 | 0 | 0 | |
| | 4 | 0 | 0 | |
| 2004 | 1 | 0 | 0 | 0 |
| | 2 | 0 | 0 | |
| | 3 | 0 | 0 | |
| | 4 | 0 | 0 | |
| 2005 | 1 | 0 | 0 | 236 |
| | 2 | 0 | 0 | |
| | 3 | 0.4 | 65 | |
| | 4 | 0.9 | 171 | |
| 2006 | 1 | 0.3 | 62 | 1,252 |
| | 2 | 0 | 0 | |
| | 3 | 1.1 | 198 | |
| | 4 | 5.4 | 992 | |
| 2007 | 1 | 3.8 | 691 | 740 |
| | 2 | 0.2 | 31 | |
| | 3 | 0.1 | 12 | |
| | 4 | 0.03 | 6 | |
| 2008 | 1 | 0 | 0 | 149 |
| | 2 | 0 | 0 | |
| | 3 | 0 | 0 | |
| | 4 | 0.8 | 149 | |
| 2009 | 1 | 0.5 | 90 | 208 |
| | 2 | 0 | 0 | |
| | 3 | 0 | 0 | |
| | 4 | 0.6 | 118 | |
| 2010 | 1 | 0 | 0 | 893 |
| | 2 | 0 | 0 | |
| | 3 | 4 | 713 | |
| | 4 | 1 | 180 | |
| 2011 | 1 | 0 | 0 | 3,181 |
| | 2 | 0 | 0 | |
| | 3 | 1.3 | 239 | |
| | 4 | 16.1 | 2,942[1] | |
| 2012 | 1 | 0 | 0 | 0 |
| | 2 | 0 | 0 | |
| | 3 | 0 | 0 | |
| | 4 | 0 | 0 | |
| 2013 | 1 | 0 | 0 | 0 |
| | 2 | 0 | 0 | |
| | 3 | 0 | 0 | |
| | 4 | 0 | 0 | |

### TABLE HYD3-3 (Continued)
### CEMEX (2003-2011)/OLIVER DE SILVA (2012-2015) – HISTORICAL NPDES DISCHARGES TO ALAMEDA CREEK

| Water Year | Quarter | Mean Quarterly Discharge (cfs) | Total Quarterly Volume (acre-feet) | Total Annual Volume (acre-feet) |
|---|---|---|---|---|
| 2014 | 1 | 0 | 0 | 0 |
| | 2 | 0 | 0 | |
| | 3 | 0 | 0 | |
| | 4 | 0 | 0 | |
| 2015 | 1 | 0 | 0 | 0 |
| | 2 | 0 | 0 | |
| | 3 | 0 | 0 | |
| | 4 | 0 | 0 | |

[1] The high discharge volume in the fourth quarter of 2011 resulted because of a discharge of water by the SFPUC into one of the pits managed by ODS.

SOURCE: San Francisco Public Utilities Commission (SFPUC), 2015. SMP-24 discharge to Creek. Excel spreadsheet file provided by Amod Dhakal on April 1, 2015 for data through 2009. Data for 2010-2015 was obtained from reports provided to the RWQCB.

Historical NPDES discharges from Hanson Aggregates and ODS are summarized in **Table HYD3-4**. Little water has been discharged from the SMP-30 quarry to Alameda Creek since late 2011. This is because ODS has adopted a different approach to water management from the approach used by the former operator, Cemex.

### TABLE HYD3-4
### SUMMARY OF HISTORICAL NPDES DISCHARGES FROM QUARRIES TO ALAMEDA CREEK

| Water Year | Hanson Aggregates Mean Discharge (cfs) | Hanson Aggregates Annual Volume (acre-feet) | Cemex/ODS Mean Discharge (cfs) | Cemex/ODS Annual Volume (acre-feet) | Year Type | SMP 24 Mining Status |
|---|---|---|---|---|---|---|
| 2002 | 6.9 | 4,970 | 0 | 0 | Dry | Active |
| 2003 | 6.3 | 4,578 | 0 | 0 | Dry | Active |
| 2004 | 3.7 | 2,688 | 0 | 0 | Dry | Active |
| 2005 | 5.4 | 3,928 | 0.3 | 236 | Normal/Wet | Active |
| 2006 | 6.8 | 4,953 | 1.7 | 1,252 | Normal/Wet | Active |
| 2007 | 6.3 | 4,542 | 0.2 | 140 | Dry | Active |
| 2008 | 5.1 | 3,718 | 0.2 | 149 | Dry | Inactive |
| 2009 | 3.2 | 2,302 | 0.3 | 208 | Normal/Wet | Inactive |
| 2010 | 7.4 | 5,324 | 1.2 | 893 | Normal/Wet | Inactive |
| 2011 | 6.2 | 4,480 | 4.4 | 3,181 [1] | Normal/Wet | Inactive |
| 2012 | 0.1 | 103 | 0 | 0 | Dry | Inactive |
| 2013 | 1.5 | 1,069 | 0 | 0 | Dry | Inactive |
| 2014 | 1.4 | 1,023 | 0 | 0 | Dry | Inactive |
| 2015 | 1.7 | 1,206 | 0 | 0 | Dry | Inactive |

[1] The high discharge volume in 2011 resulted because of a discharge of water by the SFPUC into one of the pits managed by ODS.

SOURCE: San Francisco Public Utilities Commission (SFPUC), 2015. SMP-24 discharge to Creek. Excel spreadsheet file provided by Amod Dhakal on April 1, 2015 for data through 2009. Data for 2010-2015 was obtained from reports provided to the RWQCB.

## Notes for Section 3

1. URS, 2009. *Final Updated Alternatives Analysis Report, Alameda Fishery Enhancement Project, SFPUC Project CUW352.01*. January 30, 2009.
2. San Francisco Public Utilities Commission (SFPUC), 2001. *Final Alameda Watershed Management Plan*. April 2001.
3. The monitoring of water levels in the pits is performed by Luhdorff & Scalmanini for the SFPUC. The water level data reported here is from a series of reports and technical memoranda prepared by that company.
4. The record of NPDES discharges of water from the quarries operated by Hanson Aggregates before 2002 is incomplete. Estimates of the missing records were made by the SFPUC to enable daily discharge estimates for the 18-year period from Water Year 1996 to Water Year 2013, the hydrologic period used in the analysis of the proposed ACRP. Data pertaining to Hanson NPDES discharges to Alameda Creek was available as daily flows disaggregated from monthly flows for the period 10/1/1999 to 6/30/2008. Daily discharge values were available from 7/1/2008 and 9/30/2009 and from 3/30/1998 to 9/30/1999. The missing data for calendar days from 10/1/1995 to 3/29/1998 were derived from the same calendar days in Water Year 1999.
5. Although pumps may have a nominal rating, 1,000 gallons per minute for example, their actual performance depends on the circumstances of their application. Pump manufacturers provide rating curves for their pumps. The curves relate flow to the hydraulic head that the pump must overcome. The higher the hydraulic head the lower the flow rate. The quarry operators estimate the hydraulic head that one of their pumps is working against by estimating the vertical height between the pump intake and its outlet, with an adjustment made for friction loss in the pipes. They then use the pump rating curve to estimate flow. If used carefully the procedure provides a reasonable but imprecise estimate of flow.

# 4. Analytical Methods

## 4.1 General Approach

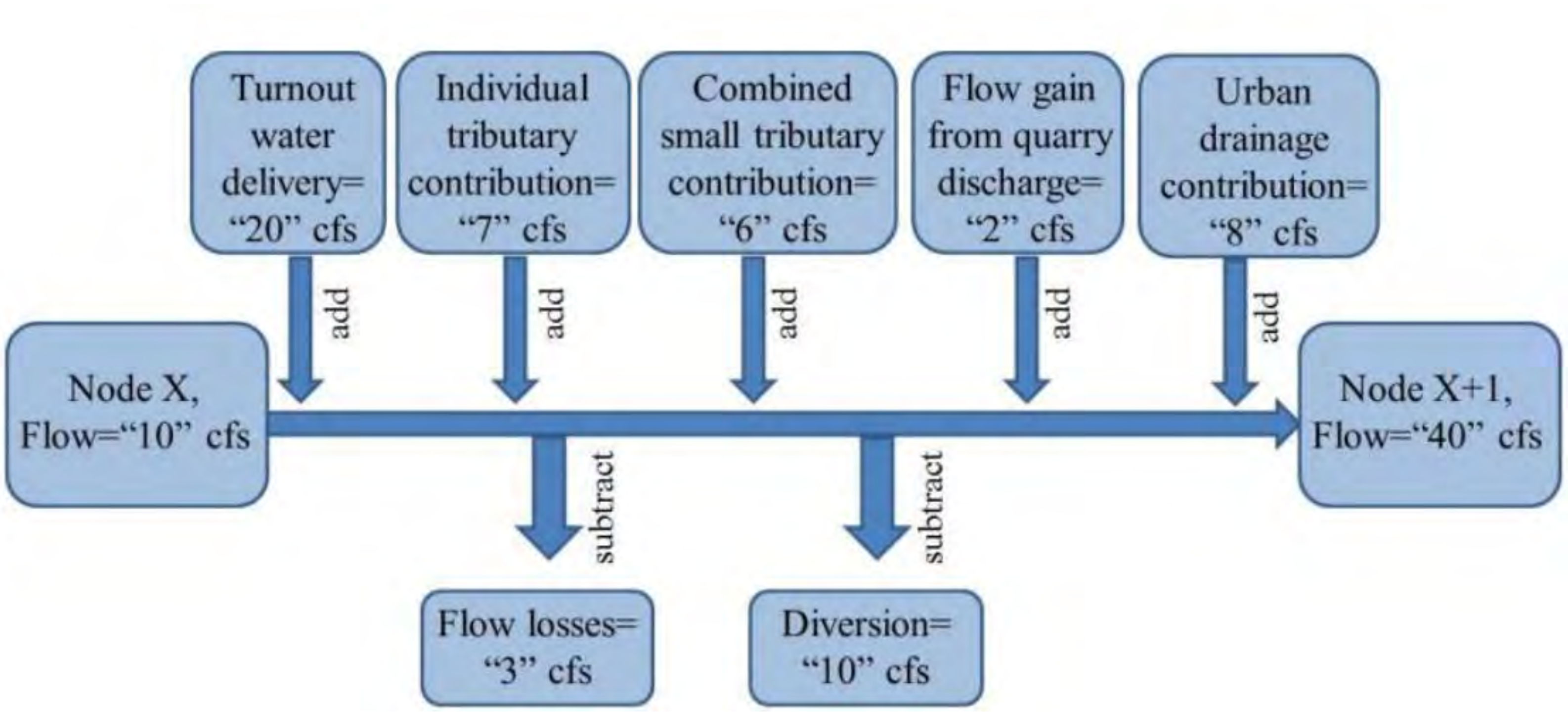
The SFPUC's Alameda System Daily Hydrologic Model (ASDHM) was used to simulate surface water flows in Alameda Creek under the four scenarios analyzed in this report. The ASDHM is a spreadsheet model based on the law of conservation of mass. The ASDHM simulates losses of water to the subsurface but does not simulate subsurface water movements in the ground. Information on subsurface water movements is provided in Appendix HYD2.

## 4.2 Alameda System Daily Hydrologic Model

The SFPUC uses the Hetch Hetchy/Local Simulation Model to simulate operation of its overall water system operations. The model operates on a monthly time-step and estimates monthly releases from the SFPUC's reservoirs and consequently monthly streamflows. Recognizing that a model that can estimate daily streamflows would be needed to analyze the effects of its water system operations on fisheries in Alameda Creek, the SFPUC developed the ASDHM. The ASDHM enables estimation of daily flows at various locations on Alameda Creek and its tributaries. The model was developed in 2009 by the SFPUC to aid discussion of potential releases and bypasses associated with the CDRP with regulatory agencies. It was expanded in 2012 for use by the Alameda Creek Fisheries Workgroup, and the agencies and stakeholders that comprise the workgroup. The workgroup is attempting to recover steelhead rainbow trout (*Oncorhyncus mykiss*) populations in the Alameda Creek watershed. The workgroup developed a plan that called for several technical analyses, including Ecosystem Diagnosis and Treatment, Numbers of Good Days and Spawning Risk. These analyses require information on hydrology, channel geometry, and water temperature. The ASDHM was developed to provide the hydrology information. Development of the model and its use in support of the Alameda Creek Fisheries Workgroup are described fully in a draft technical memorandum. (1)

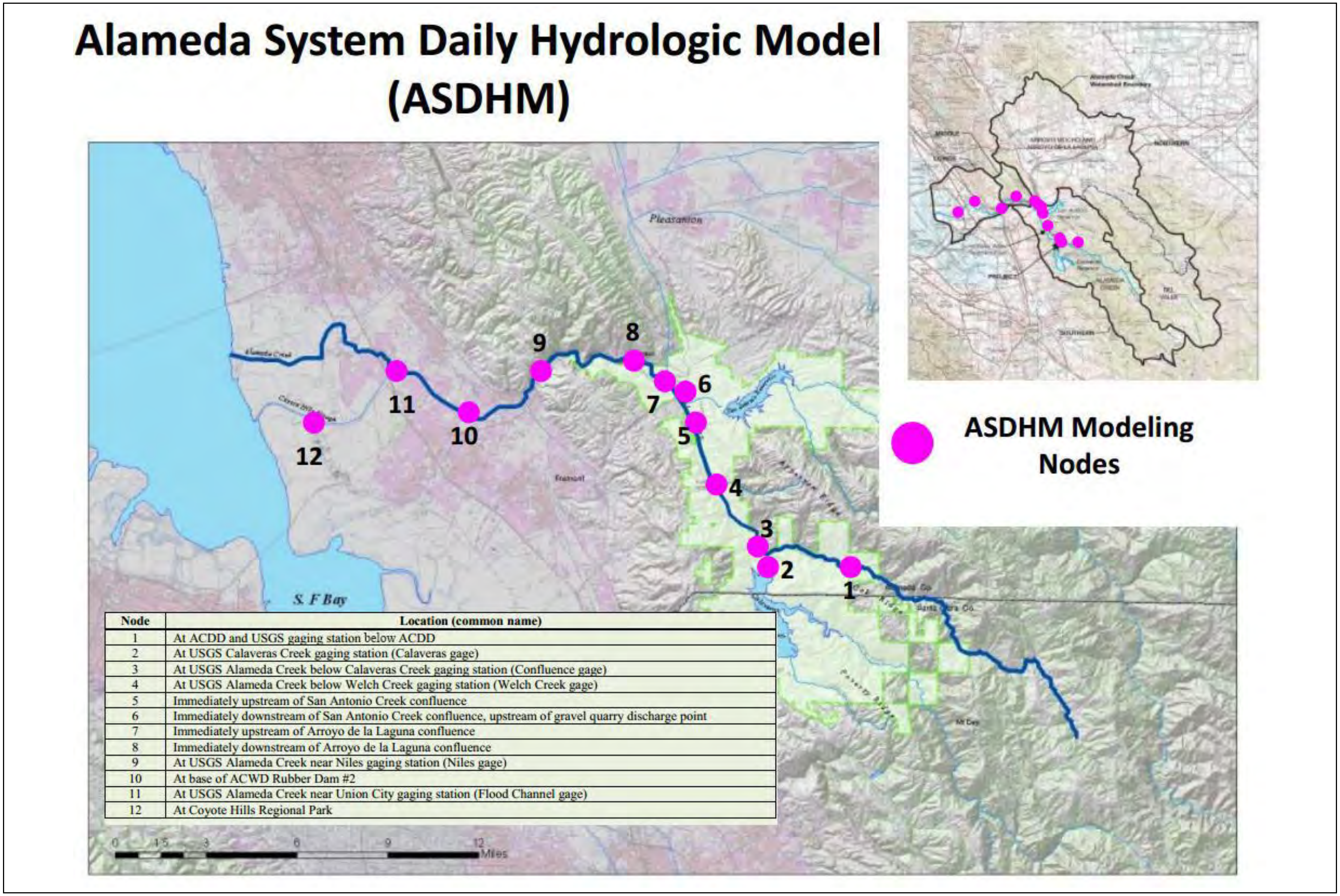
The SFPUC has extended the simulation period of the ASDHM to Water Year 2013 since its use by the Alameda Creek Fisheries Workgroup and has recently updated it to include the ACRP (2). The model's underlying computational concept is shown in **Figure HYD4-1**. The current version of the model enables estimation of daily flow values at 12 locations (or nodes) on Alameda Creek and its tributaries. The locations of the nodes, together with a description, are shown in **Figure HYD4-2**. The most upstream node is on Alameda Creek below the Alameda Creek Diversion Dam. The most downstream node is close to the point at which the creek discharges into San Francisco Bay.

# ASDHM: Computational Concept



SOURCE: SFPUC, 2015. Alameda Creek Recapture Project (ACRP) CEQA Baseline/Hydro Approach Meeting. PowerPoint presentation file provided by Amod Dhakal on February 4, 2015.

**Figure HYD 4-1**
ASDHM Computational Concept



## Alameda System Daily Hydrologic Model (ASDHM)

● ASDHM Modeling Nodes

| Node | Location (common name) |
|---|---|
| 1 | At ACDD and USGS gaging station below ACDD |
| 2 | At USGS Calaveras Creek gaging station (Calaveras gage) |
| 3 | At USGS Alameda Creek below Calaveras Creek gaging station (Confluence gage) |
| 4 | At USGS Alameda Creek below Welch Creek gaging station (Welch Creek gage) |
| 5 | Immediately upstream of San Antonio Creek confluence |
| 6 | Immediately downstream of San Antonio Creek confluence, upstream of gravel quarry discharge point |
| 7 | Immediately upstream of Arroyo de la Laguna confluence |
| 8 | Immediately downstream of Arroyo de la Laguna confluence |
| 9 | At USGS Alameda Creek near Niles gaging station (Niles gage) |
| 10 | At base of ACWD Rubber Dam #2 |
| 11 | At USGS Alameda Creek near Union City gaging station (Flood Channel gage) |
| 12 | At Coyote Hills Regional Park |

SOURCE: SFPUC, 2015. Alameda Creek Recapture Project (ACRP) CEQA Baseline/Hydro Approach Meeting. PowerPoint presentation file provided by Amod Dhakal on February 4, 2015

SFPUC Alameda Creek Recapture Project

**Figure HYD 4-2**

ASDHM Modeling Node Locations

### 4.2.1 Use of the ASDHM for the Alameda Creek Fisheries Workgroup

#### *Scenarios*

The ASDHM was run to simulate streamflow under various different scenarios for the Alameda Creek Fisheries Workgroup. Development of the model and its use in support of the Alameda Creek Fisheries Workgroup are described fully in a draft technical memorandum.

#### *Losses to the subsurface and streamflow gain from quarry NPDES discharges*

Alameda Creek loses water to the subsurface as it flows through the section of the Sunol Valley between the Welch Creek confluence and the Arroyo de la Laguna confluence. Water is lost to the stream channel gravels that lie under the creek. It is likely that losses to the subsurface have always occurred in this reach of Alameda Creek, but they have probably been increased by the excavation of deep gravel mining pits within a few hundred feet of the creek channel.

Several efforts have been made to quantify the losses to the subsurface. In each study, water was released from Calaveras Reservoir and flow measurements were made at several locations along the creek (3, 4). In one study, conducted by Trihey, 24.5 cfs was lost to the subsurface zone between the Welch Creek gage (Node 4) and the Alameda Creek/Arroyo de la Laguna confluence (Node 7), of which 17 cfs was lost between the Welch Creek gage and the San Antonio Creek confluence. Another study made by the SFPUC confirmed that loss of Alameda Creek surface water to the subsurface between the Welch Creek gage (Node 4) and the San Antonio Creek confluence (Node 5) was 17 cfs (5). The total of streamflow in Alameda Creek at the Welch Creek gage and any additional flow contributed by runoff between the Welch Creek and San Antonio Creek confluences had to be greater than 17 cfs for flowing water to be observed just upstream of the confluence with San Antonio Creek.

Based on the results of the studies, the ASDHM assumed that up to 17 cfs percolates into the ground between the Welch Creek confluence and the San Antonio Creek confluence. The ASDHM, as used for the Alameda Creek Fisheries Work Group, did not include any further loss of Alameda Creek surface water to the subsurface downstream of the San Antonio Creek confluence. (6)

Much of the time, Alameda Creek gains water downstream of its confluence with San Antonio Creek (Node 6) as a result of NPDES discharges from the quarries. As described above in Section 3, Quarry Operations, Hanson Aggregates maintain safe water levels in their pits and ponds by discharging excess water to Alameda Creek in accordance with its NPDES permit. The annual average volume of water discharged under its NPDES permit for the period Water Year 1999 to Water Year 2009 (model period used in earlier analysis) was 3,799 acre-feet. The average annual volume of water discharged under its NPDES permit for the period Water Year 1996 to Water Year 2013 was 3,436 acre-feet, or an average rate of 4.7 cfs.

The SFPUC's model runs for pre-2001, existing, with-CDRP, and with-project conditions do not include NPDES discharges from the quarries at Node 6 or losses between San Antonio Creek and Arroyo del la Laguna (Nodes 6 and 7). Although it was assumed that NPDES discharges from the quarries might continue in the future, the amount and timing of the discharge was unknown and so the SFPUC excluded NPDES discharges as well as losses in this reach in its model runs. The purpose of the model runs completed for the Alameda Creek Fisheries Workgroup was the maintenance of adequate flow for over-summering steelhead in the reach of the creek above the Welch Creek confluence and migration flows during the winter. Including the NPDES discharges was determined to be unnecessary and of little value to that analyses. The SFPUC's model run for with-CDRP conditions was used by the National Marine Fisheries Service to support their analysis when they issued their Biological Opinion for the CDRP pursuant to the federal Endangered Species Act. This run did not include NPDES quarry discharges.

## 4.2.2 Use of the ASDHM to Analyze the Effects of the ACRP

### *Scenarios*

ESA/Orion analyzed four scenarios for the ACRP EIR. They were:

- Pre-2001 Conditions: Conditions that existed before 2001, when the DSOD imposed storage restrictions on Calaveras Reservoir.
- Existing Conditions: Conditions that generally exist in 2015 (date of publication of the ACRP Notice of Preparation) with restricted storage in Calaveras Reservoir by order of the DSOD.
- With-CDRP Conditions: Conditions that will exist when the CDRP has been completed and is in operation, including implementation of the instream flow schedules and restoration of the historical capacity of Calaveras Reservoir.
- With-Project Conditions: Conditions that would exist when both the CDRP and the ACRP are completed and are in operation.

For the purposes of the ACRP EIR, ESA/Orion requested Alameda Creek streamflow data from four scenarios modeled by the SFPUC using the ASDHM. The SFPUC provided data from four modeled scenarios labeled: CDRP with ACRP, CDRP with no ACRP, measured impaired, and computed impaired, as modified to account for the current ACRP project assumptions. The simulation period and the hydrologic calculations for these scenarios are described in a memorandum (7). The CDRP with ACRP scenario is equivalent to with-project conditions; the CDRP with no ACRP scenario is equivalent to with-CDRP conditions; and the measured impaired scenario is equivalent to existing conditions. The computed impaired scenario represents conditions that existed before the DSOD imposed storage restrictions on Calaveras Reservoir (pre-2001 conditions).

### Period of Analysis

ESA/Orion compared the streamflows that would occur under each of the four scenarios analyzed in this report using the ASDHM output provided by the SFPUC. Streamflows were estimated for each scenario for a period of time that includes a broad range of hydrologic circumstances for which site-specific data are available. The hydrology used in the analysis was for the 18-year period from Water Year 1996 to Water Year 2013.

The SFPUC classifies water years based on flow measured at a stream gage on Arroyo Hondo, a tributary of Calaveras Creek. Eight of the 18 water years in the period Water Year 1996 to Water Year 2013 were classified as dry and ten years were classified as wet/normal.

### Losses to Subsurface and Gains from NPDES Discharges from Quarries

As described earlier, the ASDHM assumes a loss of up to 17 cfs of Alameda Creek surface water to the subsurface between the Welch Creek confluence and the San Antonio Creek confluence. This assumption was retained for ESA/Orion's analysis of the four scenarios. As noted earlier, the studies of losses to the groundwater from Alameda Creek showed that up to an additional 7.5 cfs of surface water is lost to the subsurface between the San Antonio Creek (Node 6) and Arroyo de la Laguna confluences (Node 7). In addition, water is added to surface flow in this reach of Alameda Creek by NPDES discharges from the quarries. Because the reach between the San Antonio Creek (Node 6) and Arroyo de la Laguna confluences (Node 7) is downstream of ACRP and is important for impact analysis, a close representation of physical processes occurring in the reach was necessary for the EIR impact analysis. The loss to the subsurface and the gain from the quarry discharges are not represented in the ASDHM, as used for the Alameda Creek Fisheries Workgroup. To better simulate physical processes in the reach, ESA/Orion adjusted the ASDHM outputs downstream of Node 6 to represent both the gains (Hanson's quarry NPDES discharge) and the losses that occur between San Antonio Creek (Node 6) and Arroyo de la Laguna (Node 7).

It is expected that a portion of the up to 7.5 cfs loss to the subsurface between the San Antonio Creek and Arroyo de la Laguna confluences may end up in SFPUC's existing infiltration gallery and a portion may emerge as a return flow around Niles. No information is available on the amount of water that may emerge from the subsurface and supplement surface water flows so no corresponding adjustment was made to ASDHM output. It was assumed that this water is lost from the Alameda Creek system. The method used to estimate the amounts of water added to Alameda Creek by the NPDES discharges from the quarries under pre-2001, with-CDRP and with-project scenarios is described in the following section.

**Table HYD4-1** shows the average annual and range of modeled losses to the subsurface for the four scenarios. The upper part of the table shows losses between the Welch Creek and San Antonio Creek confluences. The lower part of the table shows losses between the San Antonio Creek and Arroyo de la Laguna confluences.

**TABLE HYD4-1**
**LOSS OF ALAMEDA CREEK SURFACE WATER TO THE**
**SUBSURFACE AND GAIN FROM QUARRY NPDES DISCHARGES (ACRE-FEET PER YEAR)**

| | Pre-2001 Conditions | Existing Conditions | With-CDRP Conditions | With-Project Conditions |
|---|---|---|---|---|
| **Loss between Welch Creek and San Antonio Creek** | | | | |
| Average Annual | 3,610 | 4,526 | 9,033 | 9,033 |
| Maximum (water year) | 6,460 (1998) | 6,765 (2006) | 10,747 (1998) | 10,747 (1998) |
| Minimum (water year) | 1,462 (2012, 2013) | 2,249 (2001) | 7,164 (2012) | 7,164 (2012) |
| **Gain in Flow at San Antonio Creek Confluence from quarry NPDES discharge** | | | | |
| Average Annual | 3,612 | 3,436 | 6,620 | 2,532 |
| Maximum (water year) | 4,460 (2010) | 5,328 (2010) | 12,480 (2001) | 6,411 (1998) |
| Minimum (water year) | 68 (2012) | 103 (2012) | 310 (2012) | 632 (2013) |
| **Loss between San Antonio Creek and Arroyo de la Laguna** | | | | |
| Average Annual | 3,078 | 3,693 | 4,641 | 2,267 |
| Maximum (water year) | 4,511 (2006) | 5,217 (2006) | 5,433 (several) | 3,418 (1998) |
| Minimum (water year) | 215 (2012) | 430 (2012) | 916 (2012) | 1,106 (2012) |

The reason that losses of Alameda Creek surface water to the subsurface between Welch and San Antonio Creeks are different for the four scenarios is because the volume and seasonal pattern of flow differ among the scenarios. Under pre-2001 and existing conditions, for most of the summer and fall, Alameda Creek is dry or close to dry downstream of the Welch Creek confluence. Under with-CDRP and with-project conditions, there is always a small flow at the Welch Creek confluence because of the CDRP required releases at Calaveras Dam and bypasses at the Alameda Creek Diversion Dam. This small flow percolates into the streambed between the Welch Creek and San Antonio Creek confluences for many months, substantially increasing the amount of water that enters the subsurface under with-CDRP and with-project conditions. The losses between San Antonio Creek and the Arroyo de la Laguna during the non-rainy season primarily depend on quarry NPDES discharges.

### *NPDES Discharges from Quarries to Alameda Creek*

As described in Section 3 above, Quarry Operations, the quarry operators have NPDES permits to discharge water to Alameda Creek. They discharge water fairly continuously in order to conduct aggregate mining in dry conditions and to maintain safe water levels in the pits they manage. The amount of water that the quarry operators discharge to the creek affects flow in Alameda Creek from the NPDES discharge point to the mouth of the creek. Thus, to make estimates of flow in the creek downstream of the quarries (the location of the proposed ACRP), estimates of the quarry NPDES discharges under the four scenarios must be made.

The amount of water that the operators discharge to Alameda Creek depends on a number of factors, including what they are permitted to discharge under their NPDES permits, but one of the most important factors is the rate at which water percolates into the bed of Alameda Creek in the reach of the creek adjacent to the quarry pits. As noted in an earlier section, the rate at which losses to the subsurface occur varies from scenario to scenario, with larger losses occurring under with-CDRP and with-project scenarios than under pre-2001 and existing conditions. The method used to estimate the volume of the quarry NPDES discharges under the four scenarios depends on the relationship between the volume of water entering the pits from subsurface sources (water lost to the subsurface in the creek reach adjacent to the quarries and other subsurface water entering from the east) and the volume of water leaving the quarries in the form of NPDES discharges to Alameda Creek. For with-project conditions, it also depends on the volume of water recaptured by the ACRP.

### Quarry NPDES Discharge Estimation Method

Several assumptions were made in order to estimate the volume of the quarry NPDES discharges under pre-2001, with-CDRP, and with-project conditions, given the known volume of quarry discharges under the existing conditions. First, it was assumed that all of the Alameda Creek surface water that percolates into the subsurface between the Welch Creek and San Antonio Creek confluences finds its way into Pit F2. Of the pits adjacent to Alameda Creek — Pits F2, F3-East, F3 West, F4 and F6 — Pit F2 is the farthest downstream. The SFPUC made this same assumption in its estimate of the amount of water it proposes to recapture from Pit F2. Second, it was assumed that the proportional relationship between the volume of water entering Pit F2 and the volume of water leaving the pits under existing conditions remains the same for the other three scenarios.

Third, it was assumed that only NPDES discharges by Hanson Aggregates enter into the calculations. Historically, Hanson Aggregates has discharged much more water from its pits to Alameda Creek than the other operator, ODS. As a result of recent changes in its water management practices, ODS has almost eliminated NPDES discharges to the creek, so it was reasonable to conclude that in the future any quarry discharges from ODS would be negligible. Fourth, it was assumed that the quarry operators continue to discharge excess water to Alameda Creek under their NPDES permits as at present. While this assumption is reasonable in the short-term, in the next decade or two, continued aggregate mining is expected to increase the total water storage capacity of the pits. The increase in total water storage capacity will be partially offset by Hanson's loss of Pit F2 storage capacity if the ACRP is approved and becomes operational. The effects of continued mining on the water storage capacity of the pits are described in a subsequent section. Fifth, it was assumed that the Regional Water Quality Control Board will not change the conditions of the NPDES permits or put new restrictions in place regarding discharges. Currently, permit conditions limit the maximum amounts of water that the quarry operators may discharge but they do not specify minimum discharge amounts.

**Figure HYD4-3** is a schematic diagram showing the various pathways for water entering and leaving Pit F2, which are labeled A through G, and L. Water enters Pit F2 as a result of percolation from Alameda Creek between the Welch Creek and San Antonio Creek confluences (L). Water also enters Pit F2 by percolation from a watershed to the east (A) and as rainfall (B). Water leaves Pit F2 by seepage into the ground (C), by evaporation (D), and by pumping to Alameda Creek by Hanson Aggregates (E) under their NPDES discharge permit. Hanson Aggregates also pumps water out of the pit and uses it consumptively for aggregate and asphalt production (F). If the ACRP is approved and implemented the SFPUC would also pump water from the pit (G). The SFPUC would use the water for municipal water supply.

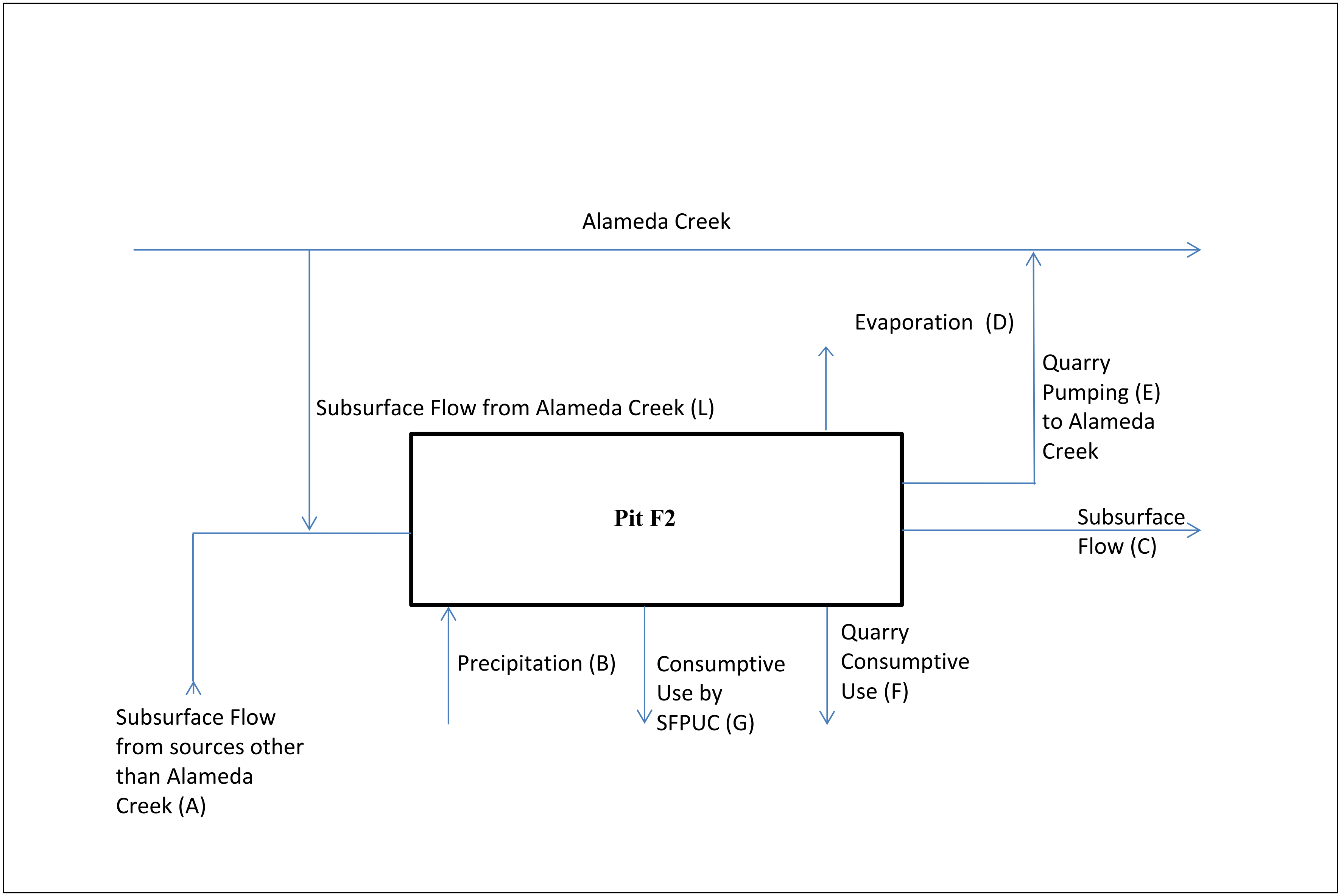
The values of A, B, C, D and F are assumed to be fairly constant over time and are the same for all four scenarios. The values of A, B, C and F are assumed to vary from year-to-year around a constant mean. The volumes of water stored in Pit F2 and in other pits available to Hanson Aggregates for water storage are also assumed to vary from year-to-year around a constant mean.

For the existing condition, the daily values of E, NPDES discharge to the creek by Hanson Aggregates, are known and are based on the historical record between Water Year 1996 and Water Year 2013, as described in the previous section. For pre-2001, with-CDRP, and with-project conditions, the daily values of E were calculated based on the proportional relationships described above, as represented by the following equations:

> For pre-2001 conditions, $E_{Pre2001} = E_{Exist}$ multiplied by [($L_{Pre2001} + A_{Pre2001}$) divided by ($L_{Exist} + A_{Exist}$)]
>
> For with-CDRP conditions, $E_{CDRP} = E_{Exist}$ multiplied by [($L_{CDRP} + A_{CDRP}$) divided by ($L_{Exist} + A_{Exist}$)]
>
> For with-project conditions, $E_{proj} = E_{Exist}$ multiplied by [($L_{Proj} + A_{Proj} - G_{Proj}$) divided by ($L_{Existing} + A_{Exist}$)]

All calculations were made as daily values for the 18-year period between Water Year 1996 and Water Year 2013.(8) Daily values of L were calculated using the ASDHM streamflow data provided by the SFPUC. Daily values of A and G were obtained from the SFPUC's daily recapture calculations. Average annual and average monthly values were calculated from the daily values.

The calculation method described above assumes that the daily pattern of discharges under with-CDRP and with-project conditions will mirror the historical pattern of NPDES discharges. The quarry NPDES discharges under existing conditions are represented by historical daily discharges between Water Year 1996 and Water Year 2013. Under with-CDRP, and with-project conditions, they are represented by the historical daily discharges between Water Year 1996 and Water Year 2013 multiplied by a factor. It is unlikely that future daily NPDES discharge patterns will precisely mirror past patterns but it was the most reasonable assumption to make considering how unpredictable the past quarry NPDES discharges have been.



SFPUC Alameda Creek Recapture Project

**Figure HYD 4-3**

Schematic of Water Entering and Leaving Pit F2

### Quarry NPDES Discharge Estimates

The estimated average annual quarry NPDES discharges for the pre-2001, existing, with-CDRP, and with-projects conditions are shown in **Table HYD4-2**. The estimates were made as described above.

**TABLE HYD4-2**
**ESTIMATED ANNUAL VOLUME OF QUARRY NPDES DISCHARGES TO ALAMEDA CREEK**
**(acre-feet per year)**

| | Pre-2001 Conditions | Existing Conditions | With-CDRP Conditions | With-Project Conditions |
|---|---|---|---|---|
| Average Annual | 2,796 | 3,436 | 6,620 | 2,532 |
| Maximum (water year) | 4,460 (2010) | 5,328 (2010) | 12,480 (2001) | 6,411 (1998) |
| Minimum (water year) | 68 (2012) | 103 (2010) | 310 (2012) | 632 (2013) |

### Uncertainty and Quarry NPDES Discharge Estimates

As noted above, several assumptions were made to estimate the volume of quarry NPDES discharges under pre-2001, with-CDRP, and with-project conditions. While ESA/Orion believe that the assumptions are reasonable, several factors make it difficult to estimate precisely the amount of water that the quarry operators might have to pump out of the pits to Alameda Creek in the future under their NPDES discharge permits. The factors are:

- accuracy of loss estimates
- changes in storage in the pits
- changes in consumptive use by quarry operators
- changes in NPDES discharge permits
- changes in water management practices by quarry operators

Each of these factors is discussed in the following paragraphs:

As noted earlier, previous studies indicate that up to 17 cfs of surface water flow in Alameda Creek is lost to the subsurface between the Welch Creek confluence and the San Antonio Creek confluence. Information on subsurface water levels shows that the 17 cfs loss to the subsurface is probably a simplification of a complex phenomenon. The estimated loss of 17 cfs of Alameda Creek surface water to the subsurface between the Welch Creek and San Antonio Creek confluences is based on measurements made during an experimental release of water from Calaveras Reservoir. The measurements were made over a few days and may not represent typical conditions over a longer period of time. At the beginning of the rainy season, subsurface water levels under Alameda Creek are at their seasonal minimum. When the first storms of the season occur, and the stream channel gravels under Alameda Creek are unsaturated, the losses to the subsurface may be greater than 17 cfs. Late in the rainy season, when the stream channel gravels are saturated, losses to the subsurface may be less than 17 cfs. While the use of 17 cfs as an average value for losses to the subsurface during the rainy season is reasonable, any inaccuracy in the loss estimates could affect the quarry discharge estimates.

One of the assumptions made in the quarry NPDES discharge estimates is that the water storage capacity available to Hanson Aggregates in the quarry pits that it manages stays fairly constant between 2015 and the time that the CDRP and ACRP become operational. In fact, mining of aggregate increases the volume of the quarry pits and thus potentially increases the amount of water storage capacity available to the quarry operators, depending on where the quarry operators dispose of their spoils. The SFPUC provided ESA/Orion with information on the amount of material removed from the quarries in 2012, 2013, and 2014. Hanson Aggregates removed 1,039,650, 1,101,200 and 1,170,230 short tons in 2012, 2013, and 2014, respectively, or an average of 1,103,693 short tons per year. Short tons are equal to 2,000 pounds. ODS removed 900,312 and 1,409,254 short tons in 2013 and 2014, respectively, or an average of 1,154,783 short tons per year. Converting the average amounts removed to volumes using an aggregate-in-place density of 156 pounds per cubic foot indicates that the volumes removed by Hanson Aggregates and ODS are 14.15 million cubic feet and 14.8 million cubic feet per year, respectively. Hanson Aggregates does not dispose of its spoils within its pits so most of the space created by excavation becomes available for water storage. It is assumed that 80 percent of the excavated space at SMP-32 is available for water storage. ODS disposes spoil within its pits and so only some of the space created is available for water storage. It is assumed here that 50 percent of the excavated space in the SMP-30 area is available for water storage. Using these assumptions, 260 and 170 acre-feet of extra water storage capacity is created each year by Hanson Aggregates and ODS, respectively.

If it is assumed that the source of the discharges, Hanson Aggregates, only has access to water storage within the properties that it manages and that the ACRP becomes operational at about the same time as the CDRP, 2018 to 2019, the water storage capacity available to Hanson Aggregates would be 780 acre-feet greater in 2018 than it is in 2015. If all of the extra water that enters the subsurface under with-CDRP and with-project conditions seeps into the quarry ponds (9,033 acre-feet per year), then by 2018 about 9 percent of it could be accommodated in the pits without the need for discharging to the Creek under its NPDES permit. If water storage capacity on property managed by ODS was also available to Hanson Aggregates then a higher percentage of the water entering the pits could be accommodated without the need for discharging to the creek. Under these circumstances, the volume of the future quarry NPDES discharges would be lower than estimated above.

On the other hand, if the ACRP is built and were to become operational, Hanson Aggregates would no longer be able to store water in Pit F2, which could increase the company's need to discharge water to Alameda Creek. Pit F2 currently provides a large proportion of Hanson Aggregates' water storage capacity. The loss of Pit F2 storage makes water management more challenging for Hanson

Aggregates and increases the likelihood that all its storage capacity could become full in most years, making discharge of water to Alameda Creek unavoidable.

The rate at which the quarry operators mine aggregate depends on economic conditions and is difficult to predict. However, it is likely that as the population of the Bay Area increases, demand for building materials including aggregate, concrete and asphalt will also increase. ODS has recently increased its ability to produce asphalt and has obtained permits for a new concrete facility. If the market for aggregate increases it is likely that quarry operators will increase their consumptive use of water for aggregate washing and concrete and asphalt production. Because the quarry operators obtain their water from the pits, higher consumptive use could reduce their need to discharge water from the pits to Alameda Creek, and the volume of the future quarry NPDES discharges would be lower than estimated above.

It appears certain that the quarry operators would need to discharge more water to Alameda Creek under with-CDRP conditions than they do under existing conditions, but by an amount subject to uncertainty. It appears likely that the quarry operators would need to discharge less water to Alameda Creek under their NPDES permits under with-project conditions than they do under existing conditions, but again, by an amount subject to uncertainty. There is also uncertainty as to whether their discharge permits would continue as is in the future or if changes would be applied to the permits over time. It is also uncertain whether they could continue with the same water management practices.

### Use of Quarry NPDES Discharge and Downstream Flow Estimates for Environmental Impact Analysis

An estimate of the volume of water that the quarry operators would discharge to Alameda Creek under their NPDES discharge permits in the future was made as described above. The estimated quarry NPDES discharges were then used to estimate surface water flow in Alameda Creek downstream of the quarry NPDES discharge point. Despite the limiting factors with respect to the quarry discharge estimates described above, surface water flows estimated based on past NPDES discharges, and a formula derived from this information, provide the best, and most reasonable basis for environmental impact assessment as they are based on the only relevant information available. Although the flow estimates described in the following sections and used in the environmental assessment are expressed in a numerically exact form they should be regarded as estimates only and not as precise amounts. The USGS reports that the accuracy of measured daily flows in Alameda Creek are in the range of 5 to 8 percent. Because the ASDHM uses USGS gage data as an input and estimates watershed contributions based on measured flows, the SFPUC expects that daily flows estimated with the ASDHM upstream of the San Antonio Creek confluence (Node 6) would be no higher than 15 percent above actual flows or 15 percent below them.

The accuracy of streamflow estimates downstream of the San Antonio Creek confluence is less than that of the upstream estimates because of the additional uncertainty associated with the quarry operators' NPDES discharges which affect streamflow estimates downstream of the confluence. Due to the extent of these uncertainties, it is reasonable to assume that the margin of error associated with streamflow estimates in this reach of the creek would be substantially greater than plus or minus 15 percent. The accuracy of the streamflow estimates downstream of the San Antonio Creek confluence is least when the NPDES discharges make up a high proportion of streamflow.

Streamflow-related environmental impacts of the project are in the reach of Alameda Creek between the San Antonio Creek and Arroyo de la Laguna confluences, downstream of ACRP project area and downstream of the quarry NPDES discharge points. During the summer and fall, the dry season, the only flow in this reach of the creek under all four scenarios is that contributed by the quarry NPDES discharges. As indicated above, the streamflow estimates are at their least accurate under these circumstances.

All or most of the flow contributed by the quarries' NPDES discharges percolates into the bed of Alameda Creek between the San Antonio and Arroyo de la Laguna confluences and so the quarry discharges have little effect on streamflow downstream of the Arroyo de la Laguna confluence. The accuracy of daily flow estimates downstream of the Arroyo de la Laguna confluence are probably about the same as the streamflow estimates above the San Antonio Creek confluence.

It should also be borne in mind that the proposed ACRP may operate for several decades and during that time, quite apart from any effect caused by the ACRP, the need for quarry NPDES discharges may cease because of much increased water storage in Hanson Aggregates' pits. Ultimately, the aggregate mines will become exhausted and retired from production at which time the quarry NPDES discharges will cease. This would be the case whether or not the ACRP is built.

Finally, as noted above, the daily and seasonal pattern of estimated future quarry NPDES discharges was assumed to mirror the historical pattern of discharges. This is an artifact of the calculation method rather than an actuality. The future pattern of daily and seasonal NPDES discharges likely will not mirror the historical pattern, so there may or may not be longer periods when discharges are minimal compared to the historical pattern.

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## Notes for Section 4

1. Dhakal A.S., Buckland E., and McBain S, 2012. *Overview of Methods, Models and Results to Develop Unimpaired, Impaired and Future Flow and Temperature Estimates along Lower Alameda Creek for Hydrologic Years 1996-2009*. Draft Technical Memorandum for the Alameda Creek Fisheries Workgroup. April 24, 2012.
2. *Dhakal, A. S. (memo to Steven Smith), 2016,* Simulation Period, Scenarios, and Hydrologic Calculations incorporated in Alameda System Daily Hydrologic Model (ASDHM) for Alameda Creek Recapture Project (ACRP) Hydrologic Requirements

3. Trihey and Associates, Inc., 2003. *Sunol Valley Surface Flow Study, Fall 2001*. Prepared for the Office of the City Attorney, City and County of San Francisco.
4. Entrix, Inc., 2004. *Alameda Creek Juvenile Steelhead Downstream Migration Flow Requirements. Phase 1: Field Survey Results.*
5. There is no formal report of the experimental releases made by the SFPUC to measure losses of surface water to the subsurface in Alameda Creek. An Excel file with analysis and information was provided by Amod Dhakal to ESA/Orion on July 14, 2016.
6. The workgroup decided not to include additional losses below the confluence with San Antonio Creek because, as the next few paragraphs describe, the workgroup chose to exclude the NPDES discharges from the modeling. It was generally assumed that these accretions and depletions cancelled each other out.
7. Same as (2)
8. Because critical gage data were not available between Water Year 1995 and Water Year 1999 the missing flow data for the existing condition for that period were developed by using simulated pre-2001 scenario flow data. Because the DSOD had not been implemented between Water Year 1995 and Water Year 1999, this was considered reasonable; however, it is noted that pre-2001 flows represent a typical operation of Calaveras Reservoir and not the actual operation during these years.

# 5. Alameda Creek Surface Water Hydrology

Two types of streamflow data are referred to in this section, measured data and estimated data. Measured streamflow data is information from U.S. Geological Survey (USGS) stream gages on Alameda Creek. Estimated streamflow data is information obtained from simulations made with the ASDHM. The comparisons of streamflow under the four scenarios rely on estimated data. The ASDHM was calibrated using measured streamflow data.

## 5.1 Measured Streamflow

### 5.1.1 Water Years and Water Year Types

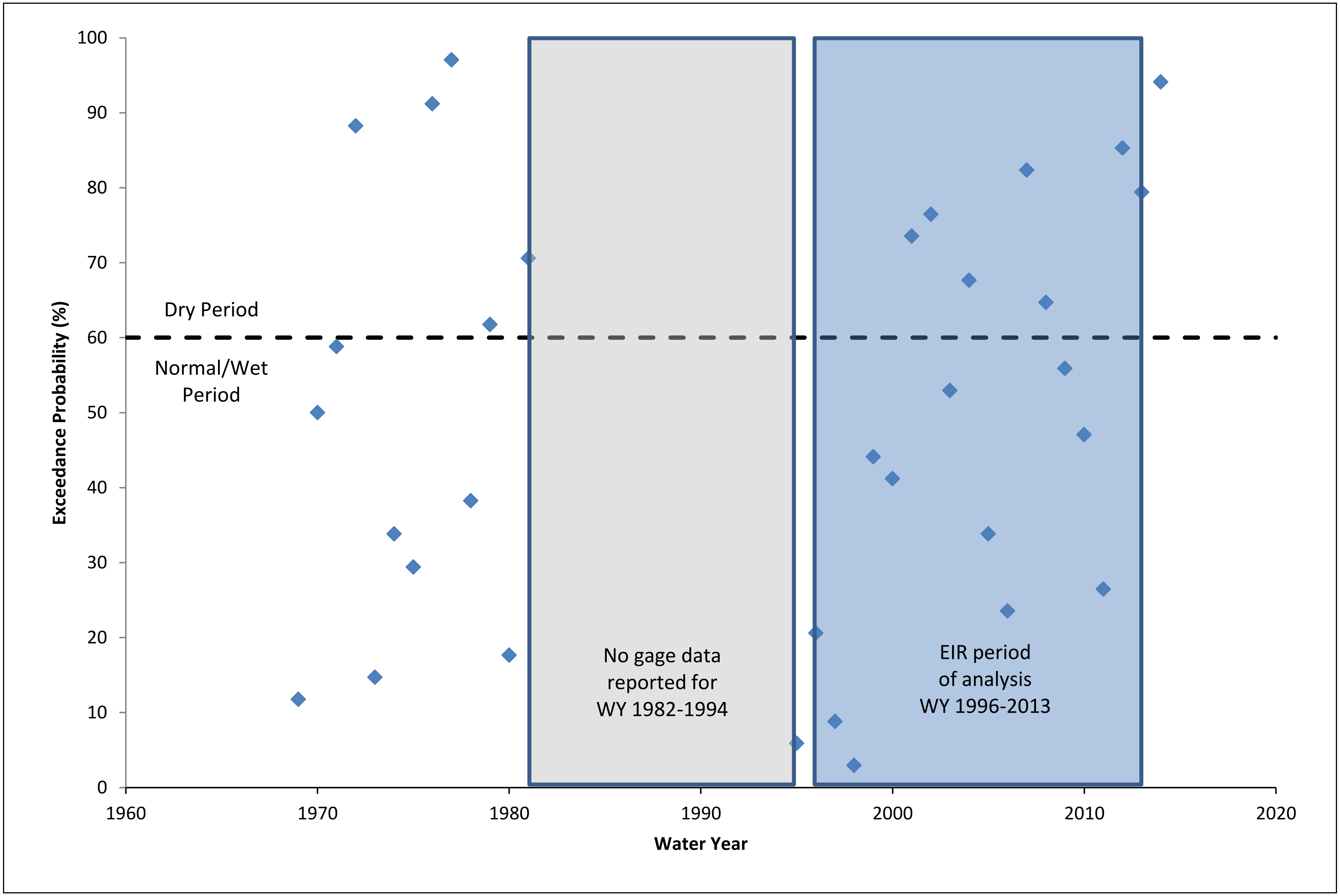
Statistical data on precipitation and streamflow are organized by water year; that is, the period from October 1st of one year to September 30th of the next year. For example, Water Year 2002 is the period from October 1, 2001 until September 30, 2002. The SFPUC classifies water year types based on flow measured at a stream gage on Arroyo Hondo, which is a major tributary of Calaveras Creek. Arroyo Hondo flows into Calaveras Reservoir. Years in which the exceedance probability is greater than 60 percent are classified as dry years. All other years are classified as normal/wet years. The classification of the water year types since 1969, when the Arroyo Hondo gage was installed, is shown in **Figure HYD5-1**.

### 5.1.2 Gaging Stations

The USGS measures streamflow at five stream gages located along the mainstem of Alameda Creek: upstream of the Alameda Creek Diversion Dam; below the Calaveras Creek confluence; below the Welch Creek confluence; at the downstream end of Niles Canyon; and in the section of the creek confined between levees near the Interstate 880 bridge. Gage numbers, catchment areas and periods of record are shown in **Table HYD5-1**. The locations of the gages are shown in Figure HYD4-2. In March 2010, the SFPUC installed two additional gages on the mainstem of Alameda Creek. They are located between the San Antonio Creek and Arroyo de la Laguna confluences.

**TABLE HYD5-1**
**USGS GAGES ON MAINSTEM OF ALAMEDA CREEK**

| Gage No. | Gage Location | Catchment Area (square miles) | Period of record |
|---|---|---|---|
| 11-172945 | Upstream of Alameda Creek Diversion Dam | 33.3 | 1995-present |
| 11-173510 | Downstream of Calaveras Creek confluence | 135 | 1996-present |
| 11-173575 | Downstream of Welch Creek confluence | 145 | 2000-present |
| 11-179000 | Near Niles | 633 | 1891-present |
| 11-180700 | Flood Control Channel at Union City | 639 | 1959-present |



SOURCE: USGS, 2015. Annual mean discharge values for USGS Gage 11173200, Arroyo Hondo Near San Jose, CA. Text file retrieved from USGS website on August 21, 2015. Normal/wet and dry periods are based on the exceedance probabilities used in Dhakal et. al. 2012.

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**Figure HYD 5-1**

Classification of water year types based on the USGS Gauge on Arroyo Hondo

## 5.1.3 Historical Flow Data

The USGS stream gage just upstream of the Alameda Creek Diversion Dam has been in place since Water Year 1995. The stream gage records unimpaired flow from the upper Alameda Creek watershed. **Figure HYD5-2** is a plot of gaging data from Water Year 1994 until Water Year 2015. It shows that Alameda Creek is a naturally flashy stream. A flashy stream is one where flow can vary greatly from day-to-day and even hour-to-hour in response to rainfall over the stream's watershed. The highest daily flow during the entire period of record was just over 1,200 cfs in Water Year 1995; the highest daily flow in the hydrologic period used in the analysis of the proposed ACRP, Water Year 1996 to Water Year 2013, was about 1,150 cfs in December 1997.

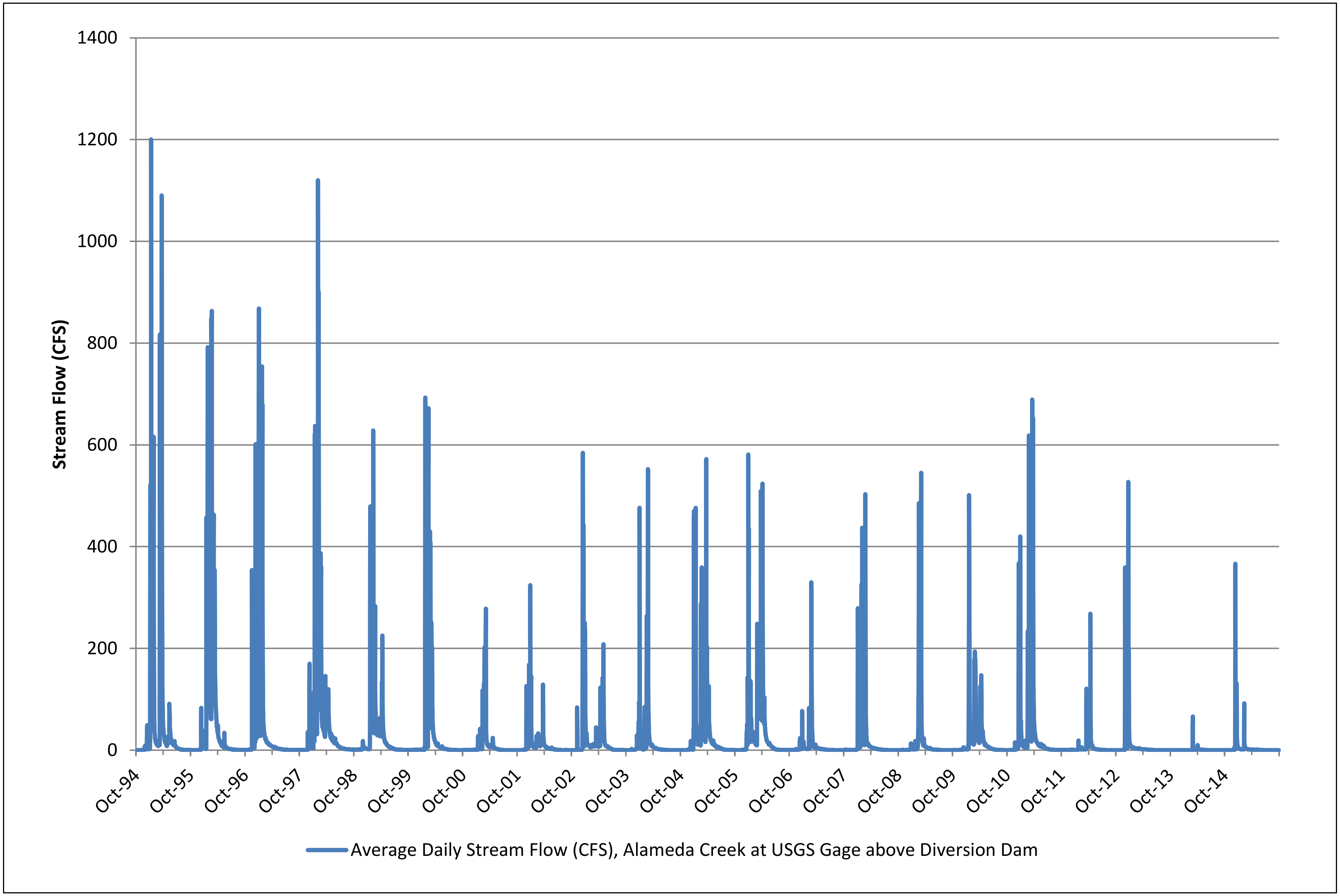
Flow volume in Alameda Creek varies widely from year-to-year. As measured above the Alameda Creek Diversion Dam, the highest annual flow volume within the period of record was 36,054 acre-feet and occurred in Water Year 1998; the lowest annual flow volume was 522 acre-feet and occurred in 2014. **Figure HYD5-3** compares the hydrographs as measured above the Alameda Creek Diversion Dam for a representative wet and dry year: 2006 with an exceedance probability of 24 percent, which was accordingly classified as normal/wet; and 2007 with an exceedance probability of 86 percent, which was classified as dry. Annual flow volumes in 2006 and 2007 were 21,502 acre-feet and 4,771 acre-feet, respectively. In 2006, daily flows exceeded 500 cfs three times; in 2007 daily flows exceeded 200 cfs only once. In 2006, daily flow exceeded 50 cfs for most of March and much of April. In 2007, there was little flow in the creek after mid-March.

**Table HYD5-2** shows average daily flows by month as measured at the USGS gage above the Alameda Creek Diversion Dam from Water Year 1996 through Water Year 2013. The highest average daily flow by month typically occurs in February (1).

**TABLE HYD5-2**
**ALAMEDA CREEK ABOVE ALAMEDA CREEK DIVERSION DAM –**
**USGS AVERAGE DAILY FLOW BY MONTH FOR WATER YEARS 1996-2013 (cfs)**

| Month | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Average Daily | 0.2 | 2.3 | 26.4 | 60.1 | 82.1 | 50.4 | 25.2 | 7.4 | 2.6 | 0.8 | 0.3 | 0.2 |
| Max Daily Average | 1.5 | 354 | 602 | 868 | 1,120 | 689 | 524 | 208 | 14.0 | 5.8 | 2.6 | 1.5 |
| Min Daily Average | 0.0 | 0.0 | 0.0 | 0.4 | 1.2 | 1.5 | 2.4 | 0.5 | 00 | 0.0 | 0.0 | 0.0 |
| % of Av. Annual Flow | 0.1 | 0.9 | 10.2 | 23.3 | 31.8 | 19.5 | 9.8 | 2.9 | 1.0 | 0.3 | 0.1 | 0.1 |

SOURCE: USGS, 2016. Mean daily discharge values for USGS Gage 11172945, Alameda Creek Above Diversion Dam Near Sunol, CA. Accessed on July 7, 2016.



SOURCE: USGS, 2015. Mean daily discharge values for USGS Gage 11172945, Alameda Creek Above Diversion Dam Near Sunol, CA. Text file retrieved from USGS website October 08, 2015.

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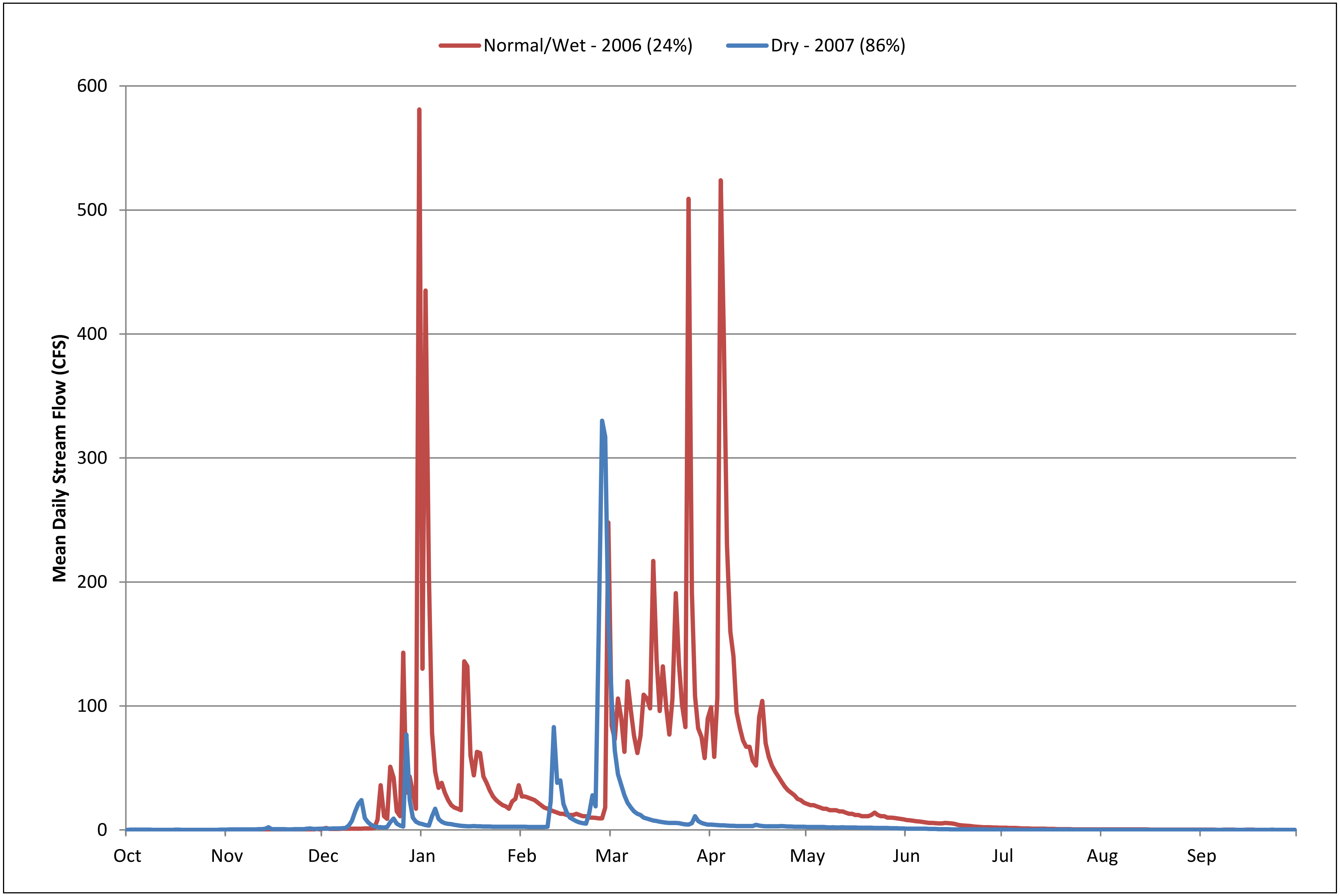
**Figure HYD 5-2**

Historical Alameda Creek flow measured at the USGS Gage above the Alameda Creek Diversion Dam



SOURCE: 7. USGS, 2015a. Mean daily discharge values for USGS Gage 11172945, Alameda Creek Above Diversion Dam Near Sunol, CA. Text file retrieved from USGS website October 08, 2015; USGS, 2015b. Annual mean discharge values for USGS Gage 11173200, Arroyo Hondo Near San Jose, CA. Text file retrieved from USGS website on August 21, 2015.

NOTE: Exceedance probabilities (in parentheses) were calculated using data from the Arroyo Hondo gauge for Water Years 1969-2015 (longest gage record for upper watershed).

**Figure HYD 5-3**

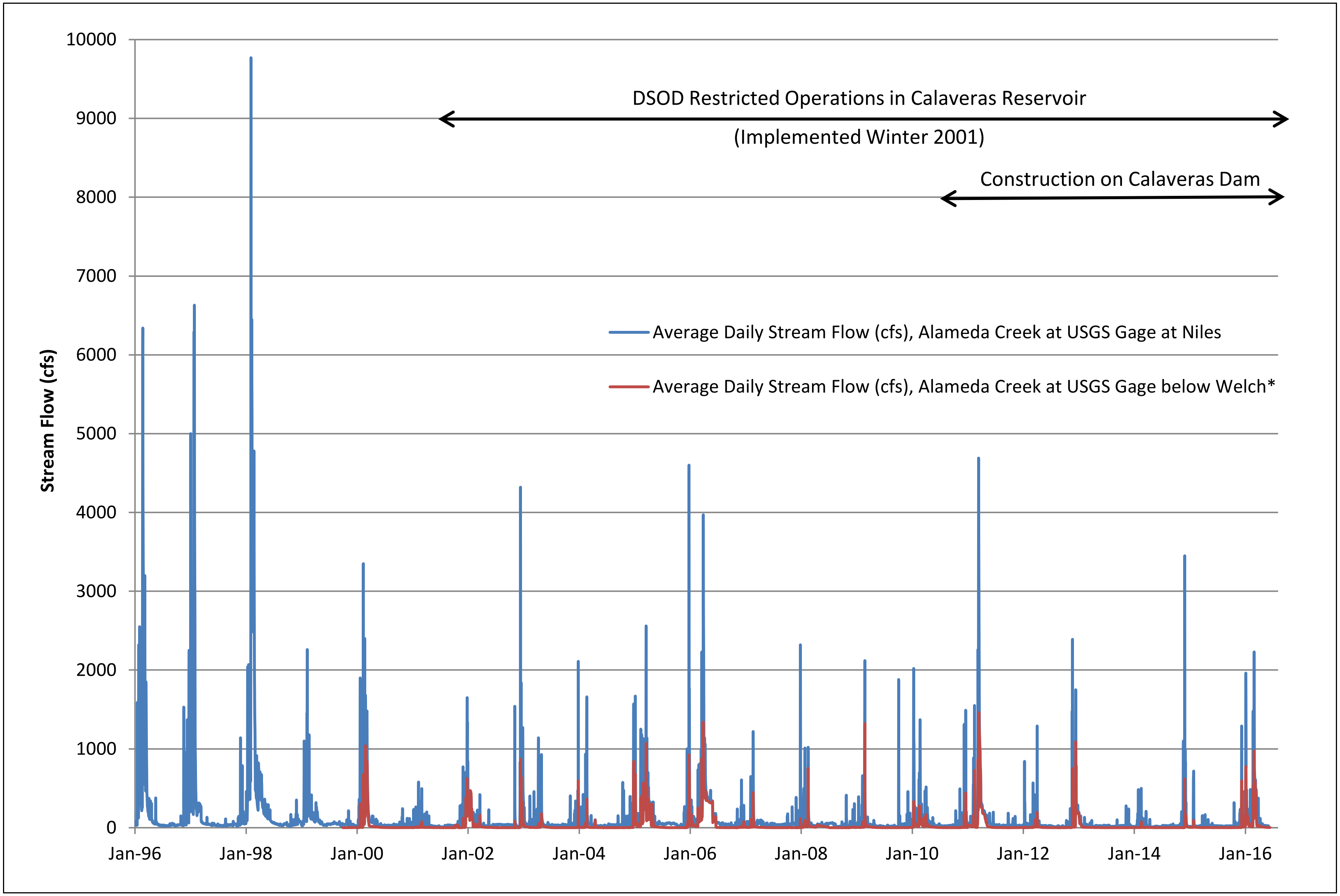
Flow in Alameda Creek measured at the USGS gage above the Alameda Creek Diversion Dam in example wet (2006) and dry years (2007)

Measured streamflow at the other four USGS gages on Alameda Creek is influenced by the SFPUC's municipal water system operations. The effects of the SFPUC's water system operations on flow in Alameda Creek are different for the periods before and after the DSOD-imposed restrictions on storage in Calaveras Reservoir, and for the period after construction of the CDRP began. Before 2001, the SFPUC operated Calaveras Reservoir in a manner that took advantage of its full storage, except for a limitation that the reservoir could not normally be drawn down below elevation 690 feet to prevent entrainment of fish in the outlet works. Since 2001, when the DSOD restrictions were imposed, the SFPUC has captured less water from the watershed upstream of Calaveras Reservoir and has diverted less water from Alameda Creek to the reservoir than it would have in the absence of the restrictions. Consequently, more water has passed over the Alameda Creek Diversion Dam than before 2001, and releases at Calaveras Dam were more frequent than they were before 2001. In 2010, construction of the CDRP began, which further limited storage in the reservoir. Beginning in Water Year 2011, releases were made from the reservoir to accommodate construction activities.

The ACRP project area lies between the USGS gage just downstream of the Welch Creek confluence and the USGS gage at Niles. The Welch Creek gage is located about three miles upstream of the ACRP project area and the Niles gage is located about four miles downstream of it. **Figure HYD5-4** shows flow in Alameda Creek at the Welch Creek gage for the period from Water Year 2000 to Water Year 2016 and flow in Alameda Creek at the USGS gage at Niles for the period from Water Year 1996 until 2016. The flow rate at the Niles gage is strongly influenced by flows from the large Arroyo de la Laguna watershed, including water released from the State Water Project into the Arroyo de la Laguna watershed, above its confluence with Alameda Creek.

**Tables HYD5-3** and **HYD5-4** show, respectively, average daily flows by month as measured at the Welch Creek gage for the period Water Year 2000 through Water Year 2013 and at the Niles gage from Water Year 1996 through Water Year 2013. The highest average daily flow at the Welch Creek gage typically occurs in March; at the Niles gage it occurs in February.

**Table HYD5-5** shows the average annual flow and the average annual flow volume at four locations. Three of the four gages are for the period Water Year 1996 to Water Year 2013. Data for the Welch Creek gage is for Water Year 2000 to Water Year 2013 because the gage was only installed in 1999. Flow generally increases in a downstream direction, but the total volume of flow in Alameda Creek below the Calaveras Creek confluence is lower than it is above the Alameda Creek Diversion Dam because the SFPUC diverts some of the water in the creek at the diversion dam to Calaveras Reservoir for municipal use.



SOURCE: USGS, 2016. Mean daily discharge values for USGS Gage 11173575, Alameda Creek Below Welch Creek Near Sunol, CA. Text file retrieved from USGS website on June 26, 2016.

USGS, 2016. Mean daily discharge values for USGS Gage 11179000, Alameda Creek Near Niles, CA. Text file retrieved from USGS website on June 26, 2016.

*Records only available for WY 2000 - 2016

**Figure HYD 5-4**
Historical Alameda Creek flow measured
at the USGS Gage below Welch Creek and at Niles

**TABLE HYD5-3**
**ALAMEDA CREEK BELOW WELCH CREEK –**
**USGS AVERAGE DAILY FLOW BY MONTH FOR WATER YEARS 2000-2013 (cfs)**

| Month | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Average Daily | 1.7 | 1.3 | 37.8 | 53.3 | 45.2 | 103.2 | 85.4 | 38.3 | 12.7 | 1.1 | 0.5 | 0.3 |
| Max Daily Average | 34.0 | 83.0 | 1,090 | 699 | 1,040 | 1,460 | 1340 | 345 | 335 | 7.3 | 2.3 | 1.9 |
| Min Daily Average | 0.0 | 0.0 | 0.1 | 0.7 | 0.8 | 2.0 | 1.4 | 0.6 | 0.2 | 0.1 | 0.0 | 0.0 |
| % of Av. Annual Flow | 0.5 | 03 | 9.9 | 14.0 | 11.9 | 27.1 | 22.4 | 10.1 | 3.3 | 0.3 | 0.1 | 0.1 |

SOURCE: United States Geologic Survey (USGS), 2016. Mean daily discharge values for USGS Gage 11173575, Alameda Creek Below Welch Creek Near Sunol, CA. Accessed on July 7, 2016.

**TABLE HYD5-4**
**ALAMEDA CREEK AT NILES –**
**USGS AVERAGE DAILY FLOW BY MONTH FOR WATER YEARS 1996-2013 (cfs)**

| Statistic | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Average Daily | 42.5 | 56.6 | 166.8 | 307.7 | 491.7 | 287.8 | 172.8 | 74.2 | 42.7 | 33.0 | 32.0 | 31.1 |
| Max Daily Average | 1,880 | 1,540 | 4,600 | 6,630 | 9,770 | 4,690 | 3,970 | 928 | 340 | 68.0 | 112 | 152 |
| Min Daily Average | 7.1 | 7.6 | 12.0 | 12.0 | 14.0 | 18.0 | 12.0 | 10.0 | 8.0 | 7.7 | 5.9 | 3.8 |
| % of Av. Annual Flow | 2.4 | 3.3 | 9.7 | 17.7 | 28.3 | 16.5 | 9.9 | 4.3 | 2.5 | 1.9 | 1.8 | 1.8 |

SOURCE: USGS, 2016. Mean daily discharge values for USGS Gage 11179000, Alameda Creek Near Niles, CA. Accessed on July 7, 2016.

**TABLE HYD5-5**
**USGS AVERAGE ANNUAL FLOW AT FOUR LOCATIONS ON MAINSTEM OF ALAMEDA CREEK**
**FOR WATER YEARS 1996-2013**

| Gauge Location | Average Annual Flow (cfs) | Average Annual Volume (acre-feet) |
|---|---|---|
| Alameda Creek above ACDD | 21 | 15,027 |
| Alameda Creek below Calaveras Creek | 15 | 10,494 |
| Alameda Creek below Welch Creek* | 32 | 22,972 |
| Alameda Creek near Niles Canyon | 143 | 103,661 |

SOURCE: USGS, 2016. *Data for Welch Creek gage is for Water Year 2000 to Water Year 2013.

## 5.2 SFPUC's Alameda System Operations

The SFPUC has operated and will operate its Alameda System differently under the scenarios analyzed in this report. The following section describes operations under pre-2001, existing, and with-CDRP conditions.

### 5.2.1 Pre-2001 Conditions

Calaveras Reservoir has a nominal capacity of 96,850 acre-feet. Prior to the imposition of storage restrictions on Calaveras Reservoir by the DSOD in 2001, the SFPUC filled the reservoir close to its spillway crest elevation whenever runoff from the watershed was sufficient. Almost all the water withdrawn from the reservoir was conveyed to San Antonio Reservoir or the Sunol Valley Water Treatment Plant via the Calaveras Pipeline. Although the SFPUC sought to avoid any loss of stored water, unseasonable storms over the watershed would occasionally cause water to spill over Calaveras Dam's spillway crest or necessitate a release of water from the reservoir to Calaveras Creek through the large cone valve at the dam.

### 5.2.2 Existing Conditions

Under existing conditions, with DSOD-imposed restrictions in place, storage in Calaveras Reservoir is limited to approximately one third of its nominal capacity and with minimum and maximum water elevations of 690 feet and 705 feet respectively, only 13 percent of its capacity is usable. Thus, the water level in the reservoir is maintained far below the spillway crest elevation. As a result, no uncontrolled spills have occurred since 2001. Controlled releases through the cone valve at the base of the dam are occasionally made to manage water levels in the reservoir. Releases are also made occasionally through a temporary low-flow valve installed in 2006. The releases through the low-flow valve were made for experimental purposes, including the experiments designed to measure losses of Alameda Creek surface water to the subsurface in the Sunol Valley north of the Welch Creek gage. The measured losses are described in Chapter 4, above, of this report.

### 5.2.3 With-CDRP Conditions

#### *Calaveras Reservoir*

Construction of the CDRP is expected to be completed in 2018 and Calaveras Reservoir's nominal capacity of 96,850 acre-feet will be restored. If there is a wet period immediately following project completion, the reservoir could fill in two years; if drier conditions prevail, it will take longer to fill the reservoir. Once the reservoir is full, the SFPUC will operate it much as it did before the DSOD restrictions were imposed, except that releases will be made from the reservoir to improve habitat for fish and other aquatic life in Calaveras and Alameda Creeks. The releases will be made in accordance with the instream flow schedule for Calaveras Reservoir shown in **Table HYD5-6**. The releases will be made to Calaveras Creek below Calaveras Dam using permanent low-flow valves that will be installed at the new dam.

The release schedule is different for dry and normal/wet years, with the classification of the year based on cumulative inflow from Arroyo Hondo into Calaveras Reservoir. Years are expected to be classified as dry 40 percent of the time. The releases will be made year-round and will be in the range of 5 to 12 cfs, depending on the time of the year and whether the year is classified as dry or normal/wet. The total annual release volume in dry years would be approximately 5,540 acre-feet; in normal or wet years it would be approximately 7,545 acre-feet.

**TABLE HYD5-6**
**CDRP INSTREAM FLOW SCHEDULE FOR RELEASES FROM CALAVERAS DAM**

| Flow Schedule Decision Date | Flow Schedule Application Period | Dry (Schedule B) | | Normal/Wet (Schedule A) | |
|---|---|---|---|---|---|
| | | Cumulative Arroyo Hondo flows for water year classification (MG) | Flow Release (cfs) | Cumulative Arroyo Hondo flows for water year classification (MG) | Flow Release (cfs) |
| N/A | October | N/A | 7 | N/A | 7[a] |
| N/A | Nov 1 thru Dec 31 | N/A | 5 | N/A | 5 |
| Dec 29 | Jan 1 thru Apr 30 | ≤ 360 | 10[a] | > 360 | 12[a] |
| Apr 30 | May 1 thru Sept 30 | ≤ 7,246 | 7 | > 7,246 | 12 |

SOURCE: National Marine Fisheries Service (NMFS), 2011. Southwest Region. Biological Opinion for Calaveras Dam Replacement Project in Alameda and Santa Clara Counties. Tracking No. 2005/07436. March 5, 2011.

When the CDRP is completed and the reservoir's capacity is restored, the SFPUC will fill and draw down the reservoir much as it did before the imposition of storage restrictions in 2001, except that the magnitude of the dry season drawdown will be greater than formerly. Under existing conditions, the SFPUC transfers water from Calaveras Reservoir to San Antonio Reservoir for storage and supplies water to the Sunol Valley Water Treatment Plant to meet water demand in the service area. Both of these activities draw down storage and water surface elevations in Calaveras Reservoir. Under with-CDRP conditions, these activities will continue but water will also be released to Calaveras Creek to benefit aquatic life. As a result of the releases, water surface elevations in Calaveras Reservoir will be lower than they were prior to 2001 (although they will be much higher than they have been since the DSOD imposed storage restrictions in 2001).

### San Antonio Reservoir

When the DSOD imposed restrictions on storage in Calaveras Reservoir in 2001, the SFPUC adjusted the operation of its other facilities to allow for the reduction in overall water system storage. After the CDRP is completed, the SFPUC will operate San Antonio Reservoir much as it did before 2001.

### Alameda Creek Diversion Dam

Physical modifications at the Alameda Creek Diversion Dam (ACDD) that are a part of the CDRP will enable the SFPUC to bypass water at the diversion dam to benefit aquatic life. The physical and operational changes made to the diversion dam as part of CDRP will alter flow in Alameda Creek.

Before the DSOD imposed restrictions on Calaveras Reservoir storage, the gates on the tunnel that conveys water from the Alameda Creek Diversion Dam to Calaveras Reservoir were typically open for most of the winter high flow season. During such times, there was no flow other than seepage in the reach of Alameda Creek below the diversion dam, except for brief periods when streamflow in the upper creek exceeded 650 cfs (the capacity of the Alameda Creek Diversion Tunnel). When the gates on the diversion tunnel were closed, typically in the dry season but also during the wet season when

Calaveras reservoir levels were high, whatever flow reached the diversion dam from the upper watershed passed over the dam crest to the creek below. However, in the dry season, little water arrived at the diversion dam from the upper watershed and so little continued down the creek.

Under existing conditions, with storage in Calaveras Reservoir limited by DSOD restrictions, the SFPUC does not divert as much water from Alameda Creek at the Alameda Creek Diversion Dam as it did formerly. Consequently, the gates on the tunnel are open for a briefer period and more water spills over the diversion dam and continues down Alameda Creek than it did before the storage restrictions were imposed. The gates to the tunnel have been closed since May 2012 due to permit restrictions. However, flow in the reach of Alameda Creek between the diversion dam and the Calaveras Creek confluence is still limited to dam seepage whenever the gates on the tunnel are open and stream discharge from the upper creek is less than 650 cfs.

As part of the CDRP, a fish screen will be installed at the Alameda Creek Diversion Dam. The fish screen will prevent fish from entering the tunnel that conveys diverted water to Calaveras Reservoir, but it will also reduce the capacity of the tunnel from 650 cfs to 370 cfs. In addition, a bypass system and a fish ladder will be installed at the diversion dam that will enable fish passage and bypass of water to benefit aquatic life in Alameda Creek below the diversion dam. Operation of the Alameda Creek Diversion Dam under with-CDRP conditions will be in accordance with the following schedule:

- Diversion shall be restricted to the period between December 1 and March 31
- No diversion from April 1 to November 30
- Diversion rates shall not exceed 370 cfs
- Minimum bypass flow of 30 cfs will be provided immediately below the ACDD when water is present in upper Alameda Creek above the Alameda Creek Diversion Dam. Water will be bypassed using the bypass tunnel, fish ladder, and/or across the dam crest (2).

In accordance with this schedule, a minimum of 30 cfs will be bypassed at the Alameda Creek Diversion Dam whenever there is 30 cfs or more arriving at the diversion dam from the upper watershed. When there is less than 30 cfs arriving from the upper watershed, the entire flow will be bypassed at the diversion dam and will continue downstream in the creek. Average daily flow at the USGS gage on Alameda Creek above the diversion dam typically exceeds or is close to 30 cfs from December through April, so it can be expected that, after completion of the CDRP, there will be substantial flow in the reach of Alameda Creek between the diversion dam and the Calaveras Creek confluence for much of the winter.

To summarize, after completion of the modifications at the Alameda Creek Diversion Dam, the SFPUC will be able to divert no more than 370 cfs from Alameda Creek to Calaveras Reservoir and diversion will only be permitted in the months of December, January, February, and March. In addition, during the diversion period, the SFPUC will bypass a minimum of 30 cfs at the Alameda Creek Diversion Dam whenever there is 30 cfs or more of natural flow in the creek upstream of the dam. For example, if there is a flow of 500 cfs in the upper creek in January, the SFPUC could choose to divert 370 cfs through the tunnel. The remaining 130 cfs would flow through the bypass or the fish ladder, or pass over the crest of the diversion dam to the creek below. If there is a flow of 300 cfs in the upper creek in January, the SFPUC must divert no more than 270 cfs into the tunnel in order to maintain the minimum 30 cfs bypass flow. If there is a flow of 100 cfs in April, no diversion could be made and the entire 100 cfs would flow through the bypass or the fish ladder or pass over the crest of the dam to the stream below. If there is a flow of 15 cfs in the upper creek in June, no diversion can be made and the entire 15 cfs would flow through the bypass or the fish ladder to the creek below. If there is no flow in the upper creek in September, no water would bypass the Alameda Creek Diversion Dam.

### *Effects on Streamflow*

Under with-CDRP conditions, flow in Alameda Creek downstream of the Alameda Creek Diversion Dam will be affected by physical and operational changes at the diversion dam. Flow in the creek downstream of the Calaveras Creek confluence will be affected by physical and operational changes at Calaveras Reservoir and at the Alameda Creek Diversion Dam. Restoration of full capacity in the reservoir will tend to reduce total annual flow in Alameda Creek downstream of the Calaveras Creek confluence compared to existing conditions because the SFPUC will be able to store and use more water for municipal water supply than it can today. On the other hand, the release of water from Calaveras Reservoir and the bypass of water at the Alameda Creek Diversion Dam to benefit aquatic life will tend to increase total annual flow in Alameda Creek downstream of the Calaveras Creek confluence compared to existing conditions.

As noted previously, the SFPUC calculates that releases from Calaveras Reservoir will total 5,540 acre-feet per year in dry years and 7,533 acre-feet per year in normal and wet years. The releases from Calaveras Reservoir together with the bypasses at the Alameda Creek Diversion Dam are estimated to average 14,695 acre-feet per year. In dry years, the releases and bypasses are estimated to average 10,133 acre-feet per year. In wet years, the releases and bypasses are estimated to average 18,345 acre-feet per year.

## 5.3 Comparison of Pre-2001, Existing and With-CDRP Conditions

The following comparison of pre-2001, existing and with-CDRP conditions was made using hydrology for the 18-year period from Water Year 1996 to Water Year 2013.

The ASDHM was used to estimate flow in Alameda Creek, under pre-2001, existing and with-CDRP conditions, at several locations, referred to as nodes, along the creek. The locations of the nodes are shown in Figures HYD2-2 and HYD4-2. The losses of Alameda Creek surface water to the subsurface, described above in Section 4, Analytical Methods, occur between the Welch Creek confluence (Node 4) and just upstream of the San Antonio Creek confluence (Node 5) and between just downstream of the San Antonio Creek confluence (Node 6) and the Arroyo de la Laguna confluence (Node 7).

The NPDES discharge of water from the quarries is assumed to occur at Node 6, just downstream of the San Antonio Creek confluence. Consequently, flow estimates at Node 6, and all locations on Alameda Creek downstream of the Node 6, are influenced by the NPDES discharges from the quarries. In the existing conditions scenario, the NPDES discharges from the quarries are represented by Hanson Aggregates' reported historical daily discharges between 1996 and 2013. The historical daily NPDES discharges averaged 3,436 acre-feet per year. Daily discharges from Hanson Aggregates under pre-2001 and with-CDRP conditions were estimated as described in Section 4, Analytical Methods. The average annual NPDES discharges from the quarries under pre-2001 and with-CDRP conditions were estimated to be 2,796 and 6,620 acre-feet, respectively.

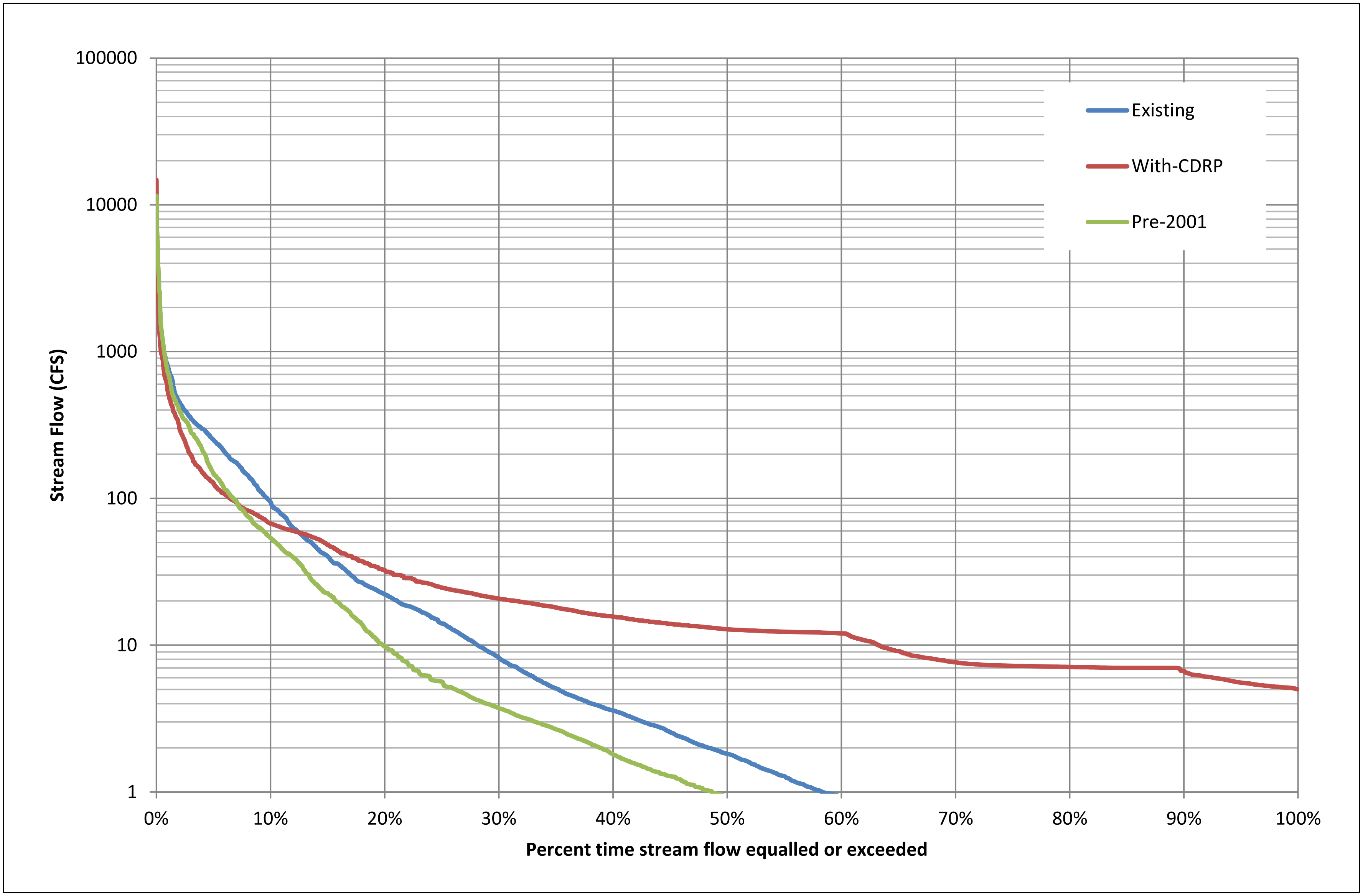
Information on daily, monthly, and annual flows was compiled and is described below. Daily flow information is needed for the comparison of conditions for fish and downstream water users under the different scenarios. Information on monthly and annual flows is needed to compare conditions for vegetation, wildlife, and downstream water users under the different scenarios.

### 5.3.1 Estimated Daily Flows

**Figures HYD5-5**, **HYD5-6** and **HYD5-7** compare flow duration curves for pre-2001, existing, and with-CDRP conditions at three locations on Alameda Creek. The three locations are just downstream of the Welch Creek confluence (Node 4), just upstream of the San Antonio Creek confluence (Node 5), and just upstream of the Arroyo de la Laguna confluence (Node 7).

**Figure HYD5-5** shows flow duration curves based on daily data for pre-2001, existing, and with-CDRP conditions just downstream of the Welch Creek confluence (Node 4). Under pre-2001 conditions, flow exceeds one cfs on about 48 percent of the days. Under existing conditions, flow exceeds one cfs on about 58 percent of the days. Under with-CDRP conditions, flow is never less than 5 cfs on any day because of the releases from Calaveras Reservoir and bypasses at the ACDD that are part of the CDRP.

**Figure HYD5-6** compares flow duration curves for pre-2001, existing, and with-CDRP conditions just upstream of San Antonio Creek confluence (Node 5). Node 5 is about 200 feet upstream of the proposed ACRP. Under pre-2001 conditions, flow exceeds one cfs on about 18 percent of the days. Under existing conditions, flow exceeds one cfs on about 24 percent of the days; under with-CDRP conditions, flow exceeds one cfs on about 37 percent of the days. The reduced frequency of days when flows exceed one cfs under all three conditions at this location is attributable to the losses to the subsurface that occur between the Welch Creek and San Antonio Creek confluences. The increased frequency of days when flows exceed one cfs under with-CDRP conditions is attributable to the releases of water from Calaveras Reservoir and bypasses of water at the Alameda Creek Diversion Dam.



SOURCE: SFPUC, 2016. Simulated stream flows for different scenarios at 5 nodes and pond elevation for ACRP. Excel spreadsheet file provided by Amod Dhakal on July 7, 2016.

NOTE: Data presented are derived from the Alameda System Daily Hydrologic Model (ASDHM) using from Water Years (1996 – 2013)

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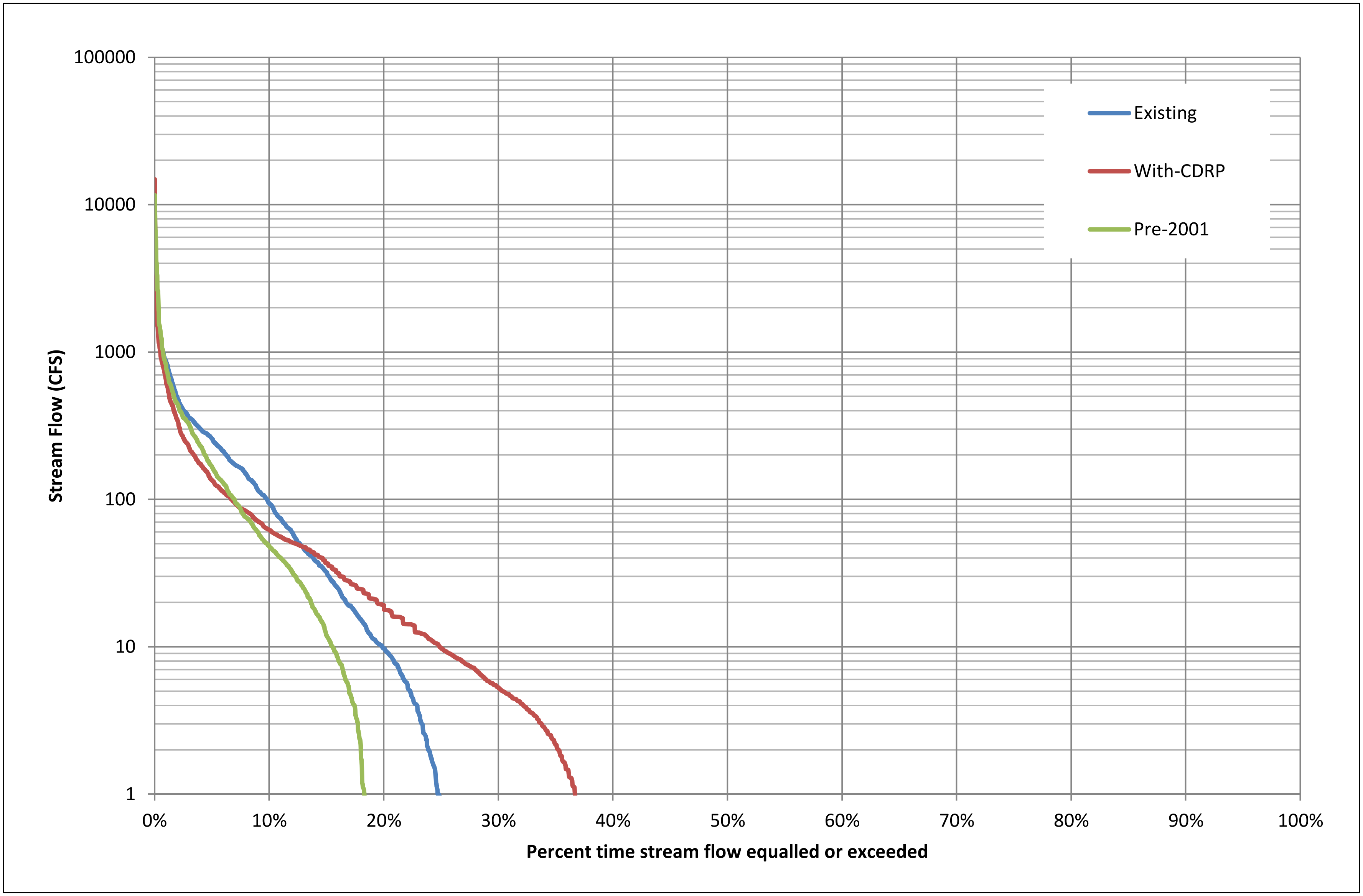
**Figure HYD 5-5**

Flow Duration Curves for Node 4 (Alameda Creek below Welch Creek) for Existing, Pre-2001, and with-CDRP Conditions



SOURCE: SFPUC, 2016. Simulated stream flows for different scenarios at 5 nodes and pond elevation for ACRP. Excel spreadsheet file provided by Amod Dhakal on July 7, 2016.

NOTE: Data presented are derived from the Alameda System Daily Hydrologic Model (ASDHM) using from Water Years (1996 – 2013)

**Figure HYD 5-6**

Flow Duration Curves for Node 5 (Alameda Creek above San Antonio Creek) for Existing, Pre-2001, and with-CDRP Conditions

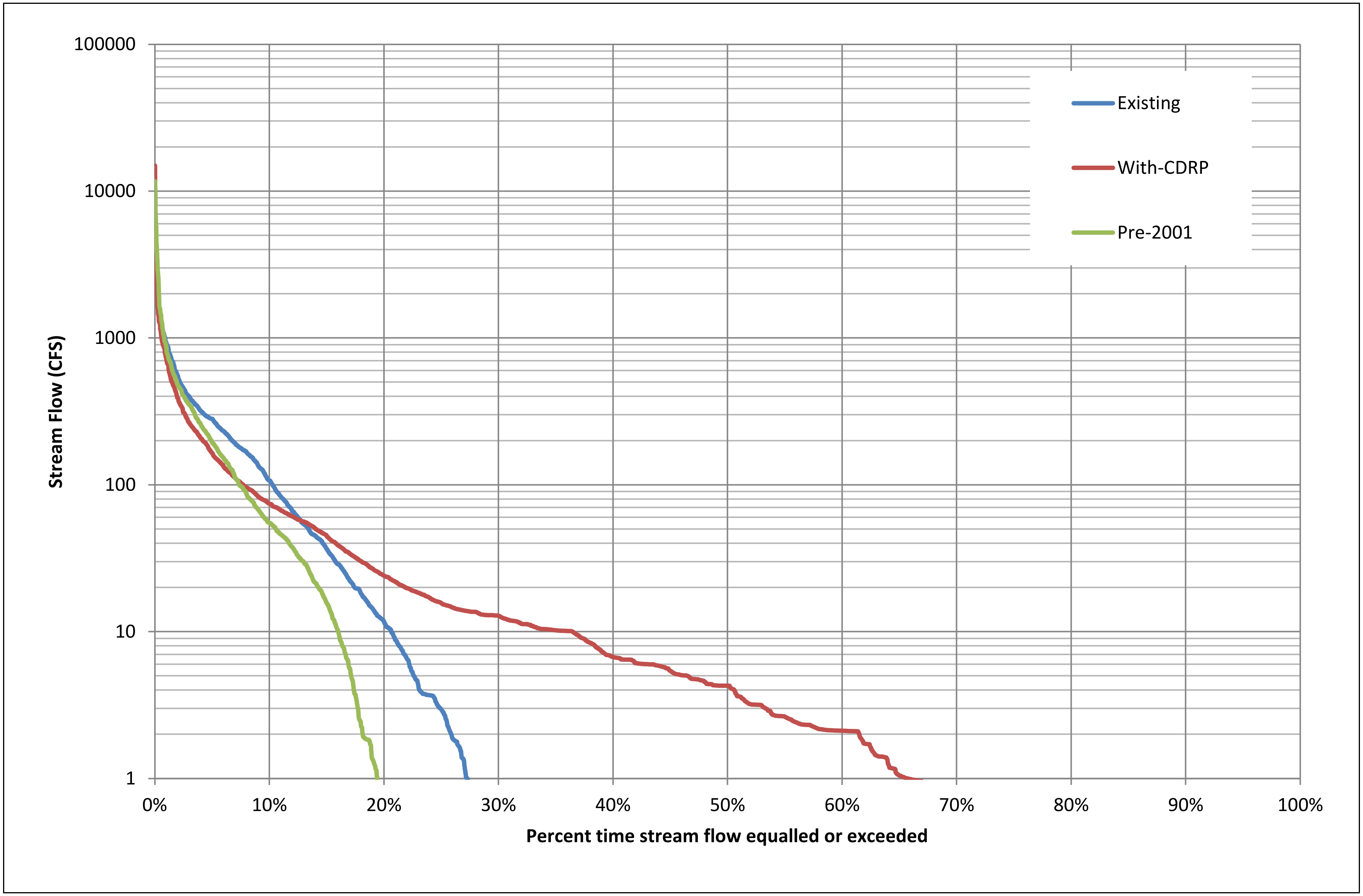
**Figure HYD5-7** compares flow duration curves for pre-2001, existing and with-CDRP conditions downstream of the proposed project area and just upstream of the Arroyo de la Laguna confluence (Node 7). Under pre-2001 conditions, flow exceeds one cfs on 19 percent of the days. Under existing conditions, flow exceeds one cfs on 27 percent of the days. Under with-CDRP conditions, flow exceeds one cfs on 65 percent of the days. Under all three conditions, surface water is added between the San Antonio Creek and Arroyo de la Laguna confluences as a result of the quarry NPDES discharges but also lost to the subsurface by percolation.

Daily hydrographs from three selected water years (Water Years 2012, 2008, and 2011) representing ranges of exceedance probabilities from 28 percent to 94 percent (wet to dry water year types) are provided to illustrate daily flows at three different nodes. For each of these water years, daily hydrographs are provided that include quarry NPDES discharges and additional losses between the confluences of Alameda Creek with San Antonio Creek and the Arroyo de la Laguna, as well as without these accretions and depletions. These hydrographs are provided to illustrate the specific effects of the accretions and depletions.

Daily hydrographs are presented at Nodes 4, 5, and 7 for three scenarios: (1) Pre-2001 Conditions, (2) Existing Conditions, and (3) With-CDRP Conditions. Node 4 is downstream of SFPUC's compliance location and is the most upstream node of Sunol Valley. The SFPUC's compliance location is the location in the watershed specified in the CDRP regulatory permit where streamflows are measured to ensure compliance with the instream flow schedule shown in Table HYD5-6. The change between Node 4 and Node 5 depicts the influence of loss in Sunol Valley. Node 7 represents flow downstream of the project before Alameda Creek meets Arroyo de la Laguna Creek (**Figures HYD 5-8A, HYD5-8B,** and **HYD5-8C**).

Due to continuous release of instream and bypass flows, in general, at Node 4, with-CDRP flows are always higher than pre-2001 flows (Figures HYD 5-8A, HYD5-8B and HYD5-8C). In drier years, during which Calaveras Reservoir does not spill, with-CDRP flows at Node 4 are always higher than pre-2001 flows. For example, in HY 2012, with-CDRP flows at Node 4 are always higher than pre-2001 flows, with the difference as high as 270 cfs. Although HY 2012 was very dry, with-CDRP peak flows exceed 100 cfs in March 2012 on two occasions due to reduced diversion capacity of ACDD. During the ACDD non-diversion period, the with-CDRP conditions peak flow at Node 4 exceeds 400 cfs in April.

However, in some years there are instances during which Calaveras Reservoir was full in pre-2001 conditions, resulting in spill, whereas the reservoir does not spill under with-CDRP conditions. Since there are no instream and bypass flow requirements in pre-2001 conditions, Calaveras Reservoir is generally at higher elevations than under with-CDRP conditions. For example, pre-2001 flows are greater than with-CDRP flows at Node 4 for five days in Water Year 2008 as Calaveras Reservoir spills for five days in pre-2001 conditions but it does not spill under with-CDRP conditions (see February 2008 storm in Figure HYD5-8B). In Water Year 2011 under the exceedance probability of 28 percent



SOURCE: SFPUC, 2016. Simulated stream flows for different scenarios at 5 nodes and pond elevation for ACRP. Excel spreadsheet file provided by Amod Dhakal on July 7, 2016.

NOTE: Data presented are derived from the Alameda System Daily Hydrologic Model (ASDHM) using from Water Years (1996 – 2013)

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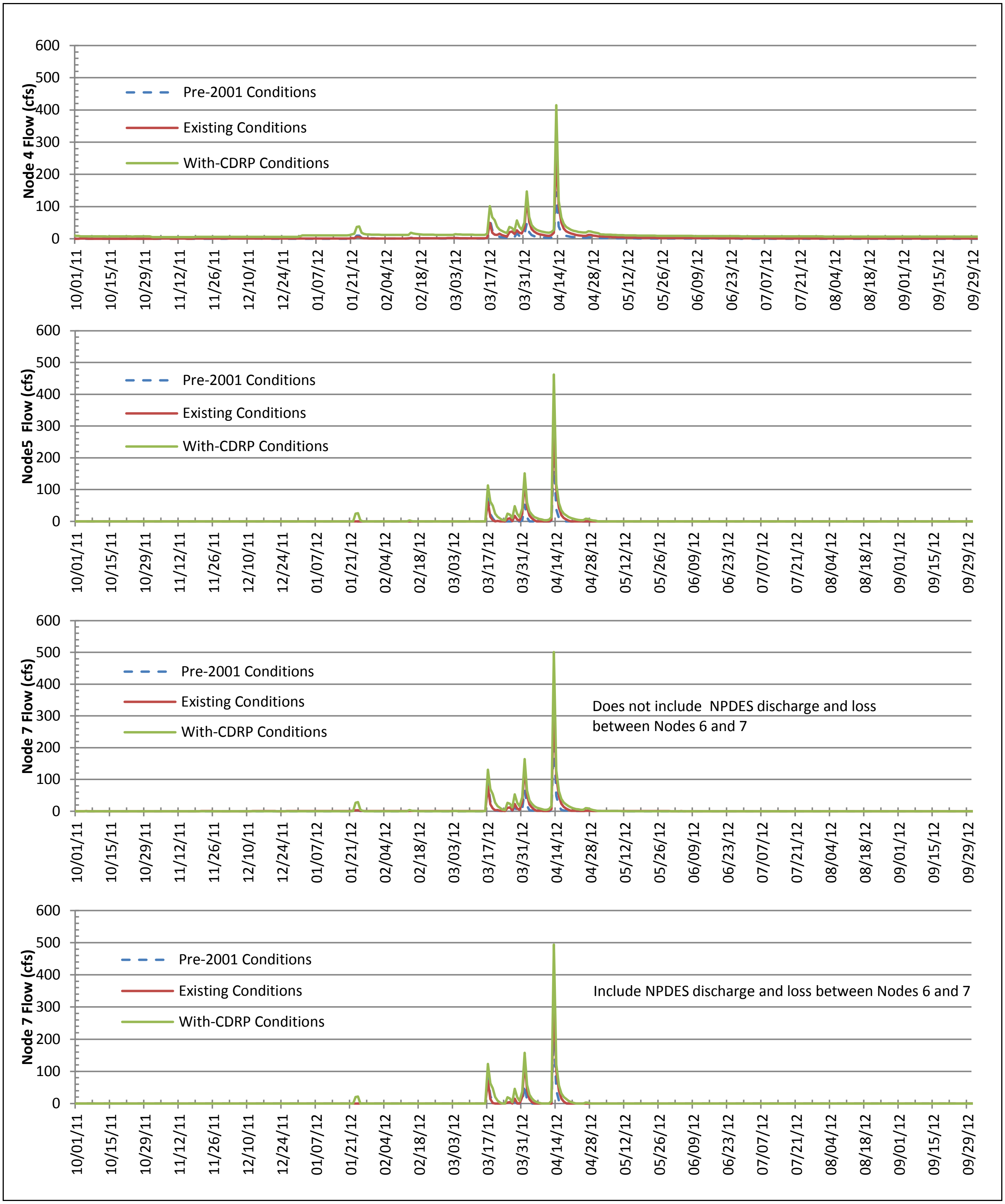
**Figure HYD 5-7**

Flow Duration Curves for Node 7 (Alameda Creek above Arroyo de la Laguna) for Existing, Pre-2001, and with-CDRP Conditions

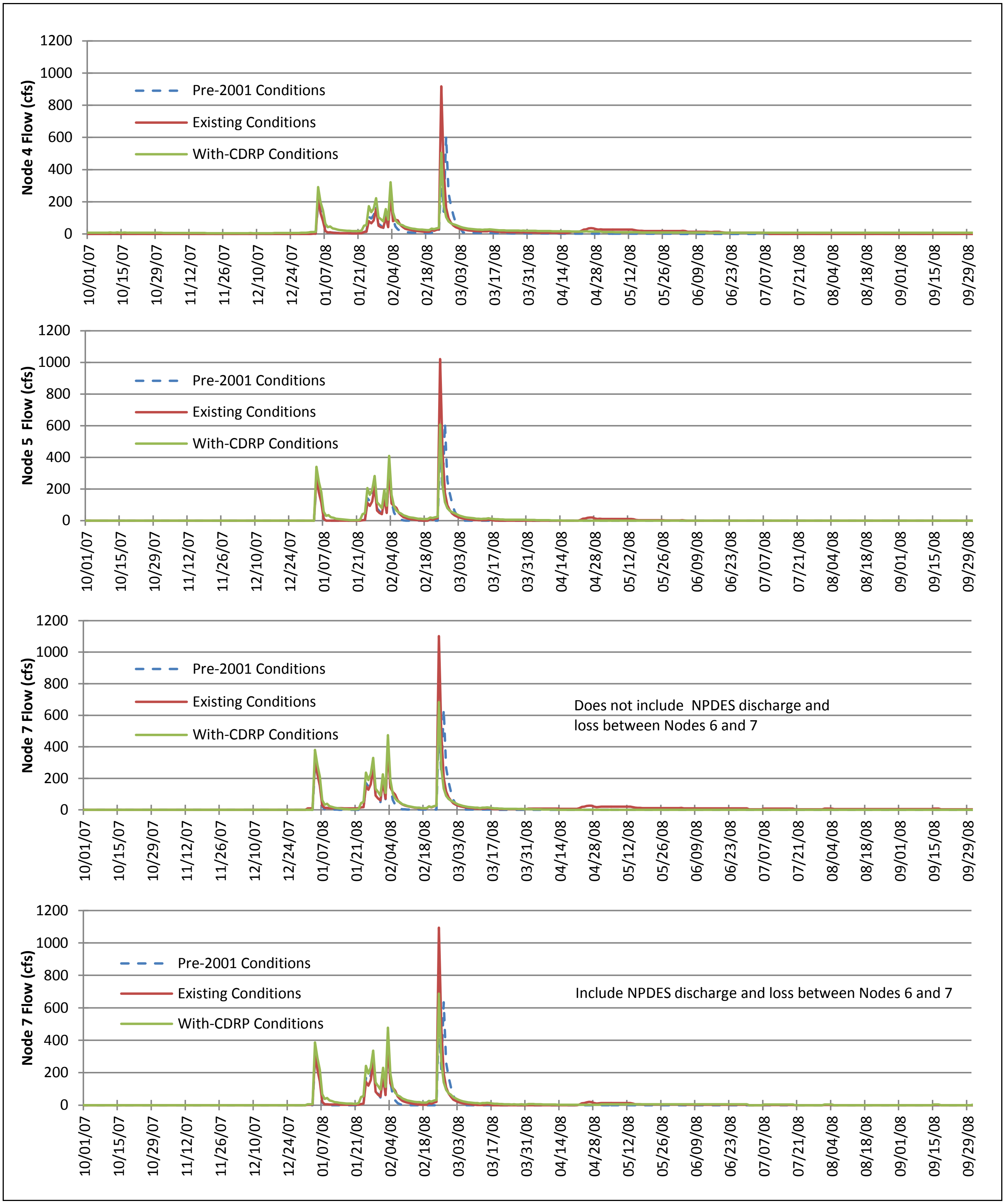


SOURCE: SFPUC, 2016. Simulated stream flows for different scenarios at 5 nodes and pond elevation for ACRP. Excel spreadsheet file provided by Amod Dhakal on July 7, 2016. Adjusted by ESA/Orion.

NOTE: The adjusted ASDHM Node 7 which included NPDES discharge and loss is depicted on bottommost graph.

**Figure HYD 5-8A**

Daily Hydrographs for WY 2012 (Ex. Prob. 91%) at Nodes 4, 5, and 7 for Pre-2001, Existing, and with-CDRP Conditions



Does not include NPDES discharge and loss between Nodes 6 and 7

Include NPDES discharge and loss between Nodes 6 and 7

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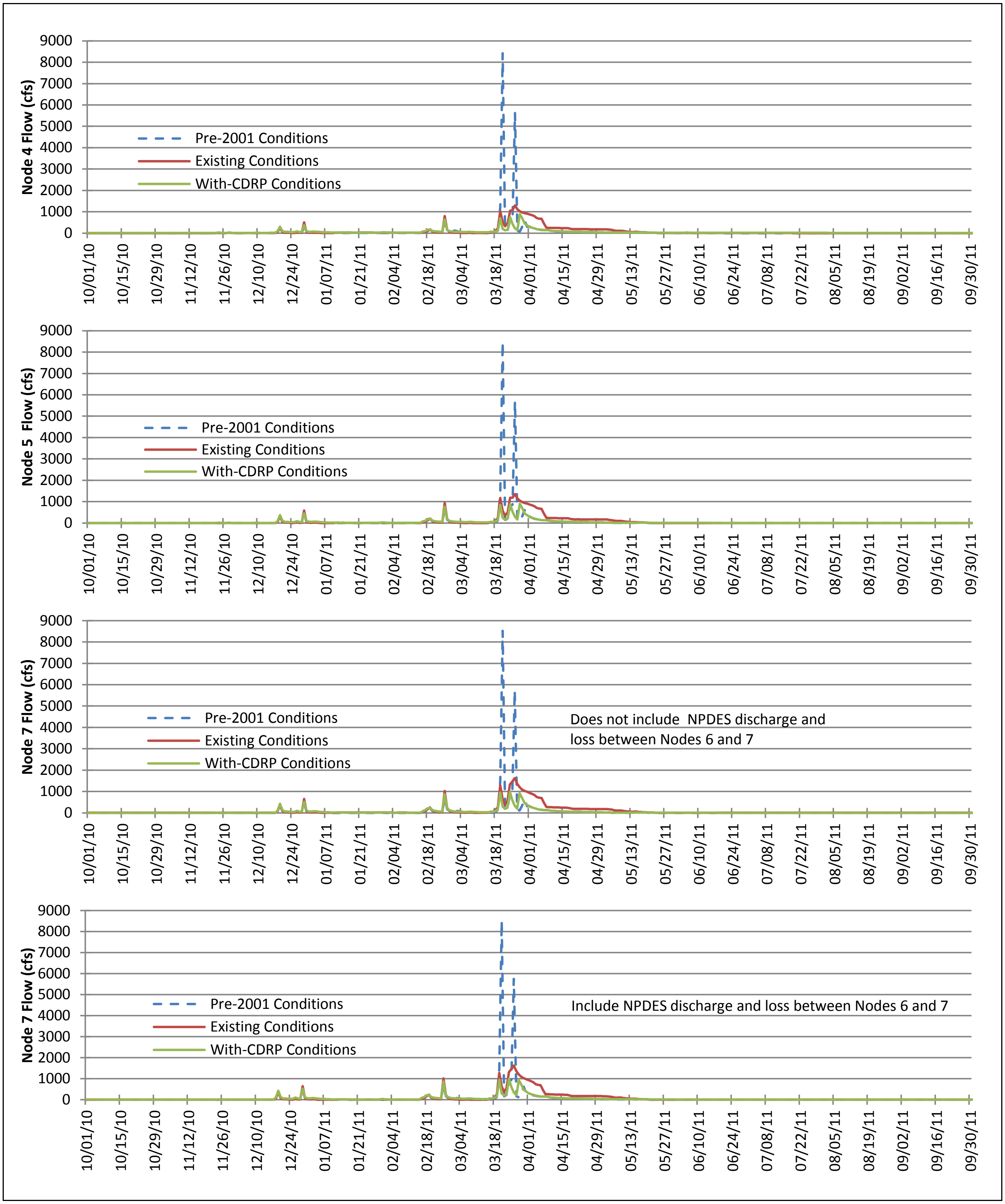
**Figure HYD 5-8B**

Daily Hydrographs for WY 2008 (Ex. Prob. 64%) at Nodes 4, 5, and 7 for Pre-2001, Existing, and with-CDRP Conditions

SOURCE: SFPUC, 2016. Simulated stream flows for different scenarios at 5 nodes and pond elevation for ACRP. Excel spreadsheet file provided by Amod Dhakal on July 7, 2016. Adjusted by ESA/Orion.

NOTE: The adjusted ASDHM Node 7 which included NPDES discharge and loss is depicted on bottommost graph.



SOURCE: SFPUC, 2016. Simulated stream flows for different scenarios at 5 nodes and pond elevation for ACRP. Excel spreadsheet file provided by Amod Dhakal on July 7, 2016. Adjusted by ESA/Orion.

NOTE: The adjusted ASDHM Node 7 which included NPDES discharge and loss is depicted on bottommost graph.

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**Figure HYD 5-8C**

Daily Hydrographs for WY 2011 (Ex. Prob. 28%) at Nodes 4, 5, and 7 for Pre-2001, Existing, and with-CDRP Conditions (wet year), Calaveras Reservoir spills in both with-CDRP and pre-2001 conditions. Since Calaveras is at much higher elevation in pre-2001 conditions compared to with-CDRP conditions the spill rate is higher under the pre-2001 conditions. However, even in Water Year 2011 (wet year), flows at Node 4 are higher under the pre-2001 conditions for only 16 days compared to with-CDRP conditions. Water Years 2011 and 2012 represent the construction period of Calaveras Reservoir under the existing conditions and Water Year 2008 represents the DSOD period. During these periods, Calaveras Reservoir and ACDD are operated as demanded by such limitations and does not represent a typical operation as represented in with-CDRP conditions. Flows are either lower or higher in existing conditions compared to with-CDRP conditions depending on how ACDD and Calaveras Reservoir are operated to accommodate the limited operational capacity of Calaveras Reservoir. Nevertheless, pattern of larger flows including peaks at Node 4 are in general similar between existing and with-CDRP conditions.

The pattern of flows at Node 5 is similar to Node 4 for larger flows. Node 5 receives additional contributions from the watershed between Node 4 and Node 5 during rainy periods. Therefore, flow peaks are slightly higher at Node 5 compared to Node 4 despite losses in Sunol Valley. Due to the Sunol Valley loss of 17 cfs, in general, Node 5 does not have flows from June to November in all conditions. Although ACDD is not operated between April and November during with-CDRP conditions, Alameda Creek around ACDD does not have significant flows during June to November. The maximum instream flow from Calaveras Reservoir during June to November is 12 cfs.

The pattern of flows at Node 7 is similar to Node 5 for all flow ranges. Node 7 receives additional contributions from the watershed between Node 5 and Node 7 during rainy periods. Therefore, in all conditions, flow peaks are higher at Node 7 compared to Node 5. In earlier applications of the model both gain from NPDES quarry discharges and losses in this reach were not included. Therefore, same as Node 5, in general, Node 7 does not have flows from June to November. In the analytical results presented in this report both the NPDES quarry discharges and losses between Node 6 and Node 7 have been incorporated. Losses of 7.5 cfs have been assumed between Node 6 and Node 7. When the NPDES quarry discharges at Node 6 are less than 7.5 cfs, Node 7 flows are the same in both methods of calculations. Therefore, the addition of the NPDES quarry discharge gain and loss incorporated between Node 6 and Node 7 does not pose hydrologic significance to affect hydrographs during rainy periods. However, Node 7 under this new calculation may receive small flows in all conditions during the period when the estimated NPDES quarry discharge at Node 6 is greater than 7.5 cfs. Therefore, at times, Node 7 has flows in this new calculation between June and November. During such hydrologic situation there are no flows between Nodes 4 and 5 and there are flows between Nodes 6 and Node 7 albeit very small. For three examples presented here, the average gain from the NPDES quarry discharge in Water Years 2012, 2008, and 2011 in pre-2001 conditions are 1.2 cfs, 2.2 cfs, and 5.2 cfs, respectively. Similarly, under the existing conditions flows are 0.1 cfs, 5.9 cfs, and 5.2 cfs, respectively, and under with-CDRP conditions, in Water Years

2012, 2008, and 2011, they are 0.4 cfs, 7.4 cfs, and 9.1 cfs, respectively. Because 7.5 cfs is lost between Nodes 6 and 7, the new calculation at Node 7 has an insignificant effect on flow rate at Node 7.

### 5.3.2 Annual Flow Volumes Calculated from Estimated Daily Flows

**Tables HYD5-7, HYD5-8** and **HYD5-9** show estimated annual flow volumes under pre-2001, existing, with-CDRP, and with-project conditions for the 18-year period from Water Year 1996 to Water Year 2013 at three locations along Alameda Creek. Table HYD5-7 shows estimated Alameda Creek flows below the Welch Creek confluence (Node 4); Table HYD5-8 shows creek flows above the San Antonio Creek confluence (Node 5); and Table HYD5-9 shows creek flows above the Arroyo de la Laguna confluence (Node 7). Between the Welch Creek confluence and the Arroyo de la Laguna confluence, water is added to Alameda Creek by accretion; that is, water from storm runoff and tributaries. It is also added by NPDES discharges from the quarries and lost to the subsurface by percolation into the streambed.

**TABLE HYD5-7**
**ESTIMATED ANNUAL FLOW VOLUME IN ALAMEDA CREEK**
**BELOW WELCH CREEK CONFLUENCE (NODE 4) FOR WY1996-WY2013 (acre-feet)**

| Water Year | Pre-2001 Conditions | Existing Conditions | With-CDRP Conditions | With-Project Conditions | Year type |
|---|---|---|---|---|---|
| 1996 | 85,478 | 85,478 | 90,569 | 91,640 | Wet |
| 1997 | 76,127 | 76,127 | 76,023 | 85,079 | Wet |
| 1998 | 126,329 | 126,329 | 124,809 | 131,491 | Wet |
| 1999 | 21,141 | 21,141 | 25,966 | 27,319 | Wet |
| 2000 | 28,238 | 32,765 | 25,524 | 34,780 | Wet |
| 2001 | 3,282 | 2,803 | 12,009 | 12,009 | Dry |
| 2002 | 3,343 | 30,187 | 13,415 | 13,415 | Dry |
| 2003 | 7,157 | 15,535 | 20,822 | 20,822 | Dry |
| 2004 | 4,719 | 6,019 | 14,622 | 14,622 | Dry |
| 2005 | 49,587 | 56,581 | 27,755 | 47,585 | Wet |
| 2006 | 67,856 | 78,200 | 48,590 | 73,844 | Wet |
| 2007 | 2,564 | 6,763 | 11,200 | 11,200 | Dry |
| 2008 | 7,944 | 11,737 | 15,351 | 15,351 | Dry |
| 2009 | 16,332 | 9,789 | 14,963 | 20,569 | Wet |
| 2010 | 17,924 | 14,870 | 20,013 | 25,419 | Wet |
| 2011 | 50,817 | 54,095 | 34,025 | 56,269 | Wet |
| 2012 | 1,605 | 3,271 | 9,710 | 9,710 | Dry |
| 2013 | 3,446 | 16,555 | 11,481 | 11,481 | Dry |
| Average | 31,878 | 36,007 | 33,157 | 39,029 | |
| Maximum | 126,329 | 126,329 | 124,809 | 131,491 | |
| Minimum | 1,605 | 2,803 | 9,710 | 9,710 | |

SOURCE:SFPUC, 2016. Simulated streamflows for different scenarios at 5 nodes. Excel spreadsheet file provided by Amod Dhakal on July 7, 2016.

## TABLE HYD5-8
## ESTIMATED ANNUAL FLOW VOLUME IN ALAMEDA CREEK ABOVE SAN ANTONIO CREEK CONFLUENCE (NODE 5) FOR WY1996-WY2013 (acre-feet)

| Water Year | Pre-2001 Conditions | Existing Conditions | With-CDRP Conditions | With-Project Conditions | Year Type |
|---|---|---|---|---|---|
| 1996 | 89,075 | 89,075 | 88,777 | 89,848 | Wet |
| 1997 | 77,523 | 77,523 | 71,921 | 80,977 | Wet |
| 1998 | 128,445 | 128,445 | 122,634 | 129,315 | Wet |
| 1999 | 19,347 | 19,347 | 19,696 | 21,048 | Wet |
| 2000 | 28,945 | 32,298 | 19,856 | 29,111 | Wet |
| 2001 | 2,588 | 2,036 | 5,994 | 5,994 | Dry |
| 2002 | 1,961 | 26,067 | 6,489 | 6,489 | Dry |
| 2003 | 6,491 | 13,981 | 14,990 | 14,990 | Dry |
| 2004 | 4,138 | 5,327 | 8,620 | 8,620 | Dry |
| 2005 | 49,841 | 55,551 | 22,839 | 42,668 | Wet |
| 2006 | 67,647 | 76,527 | 43,787 | 69,041 | Wet |
| 2007 | 1,847 | 4,918 | 4,335 | 4,335 | Dry |
| 2008 | 8,036 | 9,037 | 10,238 | 10,238 | Dry |
| 2009 | 15,695 | 8,788 | 7,901 | 13,506 | Wet |
| 2010 | 16,558 | 12,599 | 13,143 | 18,549 | Wet |
| 2011 | 50,112 | 52,199 | 28,147 | 50,391 | Wet |
| 2012 | 837 | 1,673 | 3,250 | 3,250 | Dry |
| 2013 | 3,155 | 14,688 | 4,877 | 4,877 | Dry |
| Average | 31,787 | 34,999 | 27,637 | 33,510 | -- |
| Maximum | 128,445 | 128,445 | 122,634 | 129,315 | -- |
| Minimum | 837 | 1,673 | 3,250 | 3,250 | -- |

SOURCE: SFPUC, 2016. Simulated streamflows for different scenarios at 5 nodes. Excel spreadsheet file provided by Amod Dhakal on July 7, 2016.

## TABLE HYD5-9
## ESTIMATED ANNUAL FLOW VOLUME IN ALAMEDA CREEK ABOVE ARROYO DE LA LAGUNA CONFLUENCE (NODE 7) FOR WY1996-WY2013 (acre-feet)

| Water Year | Pre-2001 Conditions | Existing Conditions | With-CDRP Conditions | With-Project Conditions | Year Type |
|---|---|---|---|---|---|
| 1996 | 97,845 | 97,845 | 98,944 | 97,882 | Wet |
| 1997 | 84,586 | 84,586 | 80,591 | 87,297 | Wet |
| 1998 | 142,718 | 142,718 | 137,869 | 146,031 | Wet |
| 1999 | 21,024 | 21,024 | 22,407 | 24,767 | Wet |
| 2000 | 30,616 | 34,078 | 23,403 | 30,934 | Wet |
| 2001 | 3,219 | 2,801 | 13,929 | 6,302 | Dry |
| 2002 | 2,307 | 26,789 | 9,292 | 5,654 | Dry |
| 2003 | 7,818 | 15,651 | 19,747 | 14,767 | Dry |
| 2004 | 4,831 | 6,726 | 12,963 | 8,586 | Dry |
| 2005 | 51,941 | 57,738 | 26,550 | 43,533 | Wet |
| 2006 | 70,068 | 84,627 | 48,399 | 71,020 | Wet |
| 2007 | 2,199 | 5,413 | 11,255 | 4,433 | Dry |
| 2008 | 9,122 | 10,737 | 13,229 | 10,646 | Dry |

**TABLE HYD5-9 (Continued)**
**ESTIMATED ANNUAL FLOW VOLUME IN ALAMEDA CREEK ABOVE ARROYO DE LA LAGUNA CONFLUENCE (NODE 7) FOR WY1996-WY2013 (acre-feet)**

| Water Year | Pre-2001 Conditions | Existing Conditions | With-CDRP Conditions | With-Project Conditions | Year Type |
|---|---|---|---|---|---|
| 2009 | 16,346 | 9,410 | 10,931 | 13,691 | Wet |
| 2010 | 18,445 | 14,999 | 19,104 | 19,314 | Wet |
| 2011 | 52,698 | 57,661 | 33,009 | 54,056 | Wet |
| 2012 | 909 | 1,634 | 2,961 | 3,167 | Dry |
| 2013 | 3,525 | 14,598 | 4,991 | 4,818 | Dry |
| Average | 34,452 | 38,274 | 32,752 | 35,934 | -- |
| Maximum | 142,718 | 142,718 | 137,869 | 146,031 | -- |
| Minimum | 909 | 1,634 | 2,961 | 3,167 | -- |

SOURCE: SFPUC, 2016. Simulated streamflows for different scenarios at 5 nodes. Excel spreadsheet file provided by Amod Dhakal on July 7, 2016. Adjusted to include NPDES quarry discharges at Node 6 and losses between Node 6 and 7 by ESA/Orion.

Tables HYD5-7, HYD5-8 and HYD5-9 show that annual flow volumes in Alameda Creek at all three locations vary greatly from year-to-year. For example, under existing conditions, the highest annual flow volume at Node 4 in the 18-year period was about 45 times greater than the lowest flow volume; the highest annual flow volume at Node 7 in the 18-year period was about 87 times greater than the lowest flow volume.

As shown in Table HYD5-7, average annual flow volume in Alameda Creek below the Welch Creek confluence (Node 4) under pre-2001 conditions between Water Year 1996 and Water Year 2013 is estimated to be 31,878 acre-feet. Estimated annual flow volume in the 18-year period ranged from 126,329 acre-feet in 1998 to 1,605 acre-feet in 2012. Average annual flow volume in Alameda Creek below the Welch Creek confluence under existing conditions between Water Year 1996 and Water Year 2013 is estimated to be 36,007 acre-feet. Estimated annual flow volume ranged from 126,329 acre-feet in 1998 to 2,803 acre-feet in 2001. Estimated average annual flow volume under existing conditions is greater than under pre-2001 conditions because, under the former, DSOD restrictions on storage in Calaveras Reservoir limited the amount of water the SFPUC could divert from Alameda Creek.

Average annual flow volume in Alameda Creek below the Welch Creek confluence under with-CDRP conditions between Water Year 1996 and Water Year 2013 is estimated to be 33,157 acre-feet. Estimated annual flow volume in the 18-year period ranged from 124,809 acre-feet in 1998 to 9,710 acre-feet in 2012. The estimated average annual flow volume at Node 4 is lower under with-CDRP conditions than under existing conditions by about 3,000 AF because the flow-reducing effects of restoration of full capacity to Calaveras Reservoir are greater than the flow-increasing effects of releases at Calaveras Reservoir and the bypasses at the Alameda Creek Diversion Dam.

As shown in Table HYD5-8, average annual flow volume in Alameda Creek above the San Antonio Creek confluence under pre-2001 conditions is estimated to be 31,787 acre-feet. Estimated annual flow volume in the 18-year period ranged from 128,445 acre-feet in 1998 to 837 acre-feet in 2012. Average annual flow volume in Alameda Creek at the same location under existing conditions, is estimated to be 34,999 acre-feet. Estimated annual flow volume in the 18-year period ranged from 128,445 acre-feet in 1998 to 1,673 acre-feet in 2012.

Average annual flow volume in Alameda Creek above the San Antonio Creek confluence under with-CDRP conditions is estimated to be 27,637 acre-feet. Estimated annual flow volume in the 18-year period ranged from 122,634 acre-feet in 1998 to 3,250 acre-feet in 2012. Between the Welch Creek confluence and the San Antonio Creek confluence, Alameda Creek gains water from accretion and loses it to the subsurface. Accretion is the same for existing and with-CDRP conditions, but losses to the subsurface are different. The average annual loss to the subsurface under existing conditions is estimated to be 4,526 acre-feet. The average annual loss to the subsurface under with-CDRP conditions is estimated to be 9,033 acre feet, or 4,507 acre-feet greater than under existing conditions (see Table HYD4-1). The reason for this is the different seasonal flow pattern of the two conditions. Implementation of the CDRP instream flow schedules under with-CDRP conditions will result in a small flow in Alameda Creek between its confluences with Calaveras Creek and Welch Creek during the summer and fall, when the creek is usually dry under the existing conditions. Consequently, there is a much greater opportunity for water to percolate into the subsurface under with-CDRP conditions than under existing conditions.

Below the San Antonio Creek confluence, Alameda Creek gains water from accretion and from NPDES discharges from the quarries and loses it to the subsurface. As shown in Table HYD5-9 average annual flow volume just upstream of the Arroyo de la Laguna confluence is estimated to be 34,452 acre-feet under pre-2001 conditions. Estimated annual flow volume in the 18-year period ranged from 142,718 acre-feet in 1998 to 909 acre-feet in 2012. Annual average flow volume at the same location under existing conditions is estimated to be 38,274 acre-feet. Estimated annual flow volume in the 18-year period ranged from 142,718 acre-feet in 1998 to 1,634 acre-feet in 2012. Annual average flow volume just upstream of the Arroyo de la Laguna under with-CDRP conditions is estimated to be 32,752 acre-feet. Estimated annual flow volume ranged from 137,869 acre-feet in 1998 to 2,961 acre-feet in 2012.

### 5.3.3 Monthly Flows Calculated from Simulated Daily Flows

Monthly flows in Alameda Creek are highly variable as shown above in Figure HYD5-3. The figure shows hydrographs for an exemplary wet/normal year (Water Year 2006) and an exemplary dry year (Water Year 2007) for the USGS gage on Alameda Creek just upstream of the Alameda Creek Diversion Dam under existing conditions. In the wet/normal year, flow exceeded 100 cfs for most of April and May. In the dry year, there was very little flow in the creek for most of these two months.

Similar variability in monthly flow patterns occurred under pre-2001 conditions and can be expected under with-CDRP conditions.

**Table HYD5-10** compares estimated monthly average flows in Alameda Creek at three locations for the period Water Year 1996 to Water Year 2013 for pre-2001, existing, and with-CDRP conditions. The locations are just downstream of Welch Creek (Node 4), just upstream of San Antonio Creek (Node 5), and just upstream of the Arroyo de la Laguna (Node 7). Values at Node 7 reflect NPDES discharges from the quarries and losses between Alameda Creek's confluence with San Antonio Creek and its confluence with the Arroyo de La Laguna. Just downstream of the Welch Creek confluence, average monthly flow in Alameda Creek under with-CDRP conditions is less than under existing conditions in December, January, March, April, and May. Average monthly flow under with-CDRP conditions is considerably greater in the summer and fall because of the releases from Calaveras Reservoir and the bypasses at the Alameda Creek Diversion Dam.

**TABLE HYD5-10**
**ESTIMATED AVERAGE MONTHLY FLOW AT THREE LOCATIONS ON ALAMEDA CREEK FOR EXISTING AND WITH-CDRP CONDITIONS FOR WY 1996 TO WY 2013 (CFS)**

| Node | Scenario | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4 | Pre-2001 Conditions | 0.2 | 1.5 | 20.5 | 103.3 | 180.2 | 147.5 | 71.8 | 8.5 | 2.4 | 0.5 | 0.3 | 0.2 |
| 4 | Existing Conditions | 1.4 | 1.8 | 40.3 | 125.4 | 182.0 | 120.5 | 86.8 | 33.5 | 11.3 | 1.2 | 0.4 | 0.3 |
| | With-CDRP Conditions | 7.3 | 8.4 | 33.0 | 99.9 | 184.4 | 87.1 | 71.9 | 21.8 | 13.7 | 11.0 | 10.2 | 10.0 |
| | Difference in flow between with-CDRP and existing conditions (With- CDRP Conditions minus Existing Conditions) | 5.9 | 6.6 | -7.3 | -25.5 | 2.4 | -33.4 | -14.9 | -11.7 | 2.4 | 9.8 | 9.8 | 9.7 |
| 5 | Pre-2001Conditions | 0 | 0.9 | 21.6 | 107.9 | 187.0 | 146.0 | 67.6 | 4.2 | 0.4 | 0 | 0 | 0 |
| 5 | Existing Conditions | 0.5 | 1.1 | 40.5 | 127.9 | 186.8 | 117.9 | 80.6 | 26.1 | 7.1 | 0 | 0 | 0 |
| | With-CDRP Conditions | 0 | 2.6 | 28.6 | 97.5 | 186.3 | 81.6 | 60.8 | 9.1 | 1.4 | 0.1 | 0 | 0 |
| | Difference in flow between with-CDRP and existing conditions (With-CDRP Conditions minus Existing Conditions) | -0.5 | 1.5 | -11.9 | -30.4 | -0.5 | -36.3 | - 19.8 | -17.0 | -5.7 | 0.1 | 0 | 0 |
| 7 | Pre-2001 Conditions | 0 | 1.1 | 24.5 | 117.7 | 201.9 | 156.4 | 73.7 | 4.8 | 0.4 | 0 | 0 | 0.1 |
| 7 | Existing Conditions | 0.6 | 1.2 | 43.6 | 138.4 | 202.1 | 130.8 | 92.2 | 27 | 7.3 | 0.1 | 0 | 0.1 |
| | With-CDRP Conditions | 1.7 | 4.2 | 33.9 | 111.2 | 206.0 | 97.5 | 72 | 14.2 | 5.1 | 2.9 | 2.3 | 2.7 |
| | Difference in flow between with-CDRP and existing conditions (With-CDRP Conditions minus Existing Conditions) | 1.1 | 3.0 | -9.7 | -27.2 | 3.9 | -33.3 | -20.2 | -12.8 | -2.2 | 2.8 | 2.3 | 2.6 |

SOURCE SFPUC, 2016. Simulated streamflows for different scenarios at 5 nodes. Excel spreadsheet file provided by Amod Dhakal on July 7, 2016. Adjusted to include NPDES quarry discharges at Node 6 and losses between Node 6 and 7 by ESA/Orion.

Just upstream of the San Antonio Creek confluence, average monthly flow under with-CDRP conditions is less than under existing conditions in December, January, March, April, May, and June. There is no flow in Alameda Creek under either with-CDRP or existing conditions in July, August, September, and October. Much of the water that arrives at the Welch Creek confluence under with-CDRP conditions as a result of releases and bypasses at Calaveras Reservoir and the Alameda Creek Diversion Dam is lost to the subsurface between the Welch Creek confluence and the San Antonio Creek confluence.

Just upstream of the Arroyo de la Laguna confluence, average monthly flow in Alameda Creek under with-CDRP conditions is less than under existing conditions in December, January, March, April, May, and June. Average monthly flow is greater under with-CDRP conditions than under existing conditions in the summer and fall. Under both conditions, Alameda Creek flow in July, August, September, and October at this location is attributable almost entirely to NPDES discharges from the quarries.

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## Notes for Section 5

1. Average daily flows by month are calculated by averaging all the daily flow records for a particular month over the period Water Year 2002 to Water Year 2010.
2. National Marine Fisheries Service (NMFS), 2011. *Biological Opinion for Calaveras Dam Replacement Project in Alameda and Santa Clara Counties*. Tracking No. 2005/07436. March 5, 2011.

# 6. Effects of ACRP Operations on Surface Water Hydrology

Operation of the proposed ACRP would affect surface water levels in Pit F2 and the SFPUC's operation of its Alameda System, particularly Calaveras Reservoir, which could affect surface water flow in Alameda Creek. The effects of the ACRP are determined by comparing surface water hydrology with the ACRP in operation to surface water hydrology under existing and with-CDRP conditions.

## 6.1 Effects of ACRP on Water Levels in Pit F2

The top of the berms that separate Pit F2 from the Alameda Creek channel are at about elevation 260 feet and the bottom of the pit is at about elevation 10 feet. The thalweg, or lowest point in the Alameda Creek channel, is at about elevation 242 feet in the vicinity of the proposed project.

Operation of the ACRP would alter water levels in Pit F2 directly by pumping water from the pit, and it could also affect water levels in the pit indirectly by altering the rate at which water seeps into the pit. The rate at which water seeps into Pit F2 depends on the relative elevations of the subsurface water level in surrounding stream channel deposits and the water level in Pit F2. Because operation of the ACRP would change the water level in Pit F2, it has the potential to alter the rate of seepage of subsurface water into the pit.

### 6.1.1 Water Level Changes in Pit F2 Caused by ACRP Pumping

When the ACRP is in operation, the SFPUC intends to maintain the water surface elevation in Pit F2 between 150 feet and 240 feet under normal hydrologic conditions, but may occasionally lower it to elevation 100 feet under very dry conditions. **Figure HYD6-1** shows the expected annual pattern of water surface elevations in Pit F2 with the ACRP in operation. During normal operations of the ACRP, the SFPUC would maintain water levels in Pit F2 between elevations 150 and 180 feet from mid-May to mid-December. Between mid-January and mid-April, the SFPUC would maintain water levels in Pit F2 between elevations 200 feet and 240 feet.

#### *Comparison to Existing Conditions*

The water surface elevation in Pit F2 was below the operating range of the proposed ACRP from mid-2009 to the spring of 2013. Since then, it has risen gradually, reaching an elevation of 223 feet in the winter of Water Year 2016 before falling back to elevation 210 feet by June of that year, as shown in Figure HYD3-2. With the proposed ACRP in operation, water surface elevations in Pit F2 would fluctuate between elevations 150 feet and 240 feet. Under existing conditions, they have been in that range since the spring of 2013. So water levels in Pit F2 with the ACRP in operation would be the same or similar to those under existing conditions.

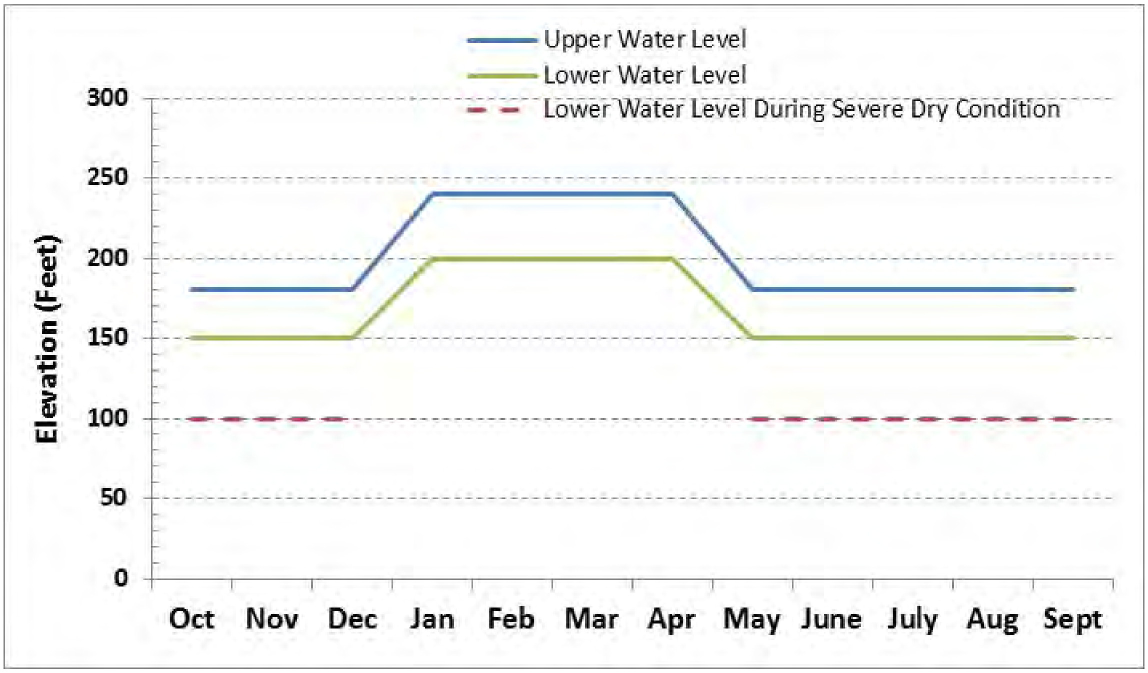


**Figure HYD6-1**
Proposed ACRP Operating Scenario

### *Comparison to With-CDRP Conditions*

As noted above, by the winter of Water Year 2016, the water surface elevation in Pit F2 had reached elevation 223 feet before dropping to elevation 210 feet a few months later. Hanson Aggregates has been pumping water out of Pit F2, as needed, to maintain a safe water level and for aggregate and asphalt production purposes. The SFPUC expects that Hanson Aggregates will maintain the water surface elevation in the pit between elevation 150 feet and 240 feet for the next several years and will continue to do so once the CDRP is commissioned. When the ACRP is commissioned, the SFPUC expects that the water level in Pit F2 would be maintained between elevation 150 feet and 240 feet most of the time. So water levels in Pit F2 with the ACRP in operation would be the same or similar to those under with-CDRP conditions.

## 6.1.2 Water Level Changes In Pit F2 Caused Indirectly by ACRP-induced Changes in Seepage Rates

Water enters and leaves Pit F2 in several ways as shown diagrammatically in Figure HYD4-3. Rain falls directly into the pit and water evaporates from its surface. Most of the water that enters the pit does so by seeping or percolating from the subsurface through the layer of permeable stream channel deposits that, in the vicinity of Pit F2, extend from about elevation 250 feet to their base at about elevation 224 feet (1). The primary source of water percolating into Pit F2 from the stream channel deposits is Alameda Creek, although much of it probably arrives after passing through one or more of the pits to the south. The pits to the south have historically had higher water levels than Pit F2. Some of the water percolating into the pit may originate in water that makes its way into the stream channel deposits from San Antonio Creek and from runoff from hills to the east. The SFPUC estimates that the quantity of water originating from the east averages 1,033 acre-feet per year.

Differences in hydraulic head, a form of potential energy, cause water to make its way through the stream channel deposits. For example, if the subsurface water level in the stream channel deposits is at elevation 245 feet and the water surface elevation in Pit F2 is at elevation 230 feet, 15 feet of hydraulic head is available to overcome friction in the stream channel deposits and push subsurface water toward, and into the pit. As the subsurface water level in the stream channel deposits under the creek falls, the amount of available hydraulic head decreases and the rate at which water moves toward the pit slows down and eventually stops when the water levels in the stream channel deposits and the pit equalize.

When the water level in the Pit F2 is above elevation 224 feet, the base of the stream channel deposits, it may cause water to move from the pit into the stream channel deposits depending on the water level in the deposits. For example, if the subsurface water level in the stream channel deposits is at elevation 225 feet and the water surface elevation in the pit is at elevation 240 feet, 15 feet of hydraulic head is available to drive water from the pit into the stream channel deposits.

If the water level in Pit F2 is below elevation 224 feet, the base of the stream channel deposits, it has no influence on the rate at which water percolates into the pit from the deposits. The rate at which water seeps into the pit from the stream channel deposits depends entirely on the water level in the deposits.

### *Comparison to Existing Conditions*

From October 2009 to October 2015, the water surface elevation in Pit F2 was below elevation 224 feet and so water has been seeping into the pit for the entire six-year period. As noted above, the SFPUC plans to keep water levels in Pit F2 in the range of elevation 150 feet to 240 feet with the proposed ACRP in operation. From mid-January to mid-April, the SFPUC expects the water level in the pit to be between 200 feet and 240 feet. During such times, if the water level is above elevation 224 feet, some water would seep out of the pit into the stream channel deposits under Alameda Creek. Under existing conditions, the water level has always been below elevation 224 feet and so water has never moved from the pit to the stream channel deposits under Alameda Creek.

From mid-April to mid-December, the SFPUC expects the water level in Pit F2 with the proposed ACRP in operation to be between elevations 150 feet and 180 feet. During that period, the rate of water movement to and from the pit to the stream channel deposits under Alameda Creek would be the same for with-project conditions as it is for existing conditions. Under both conditions, water would move from the stream channel deposits under Alameda Creek into the pit during this period. The rate of movement would depend entirely on subsurface water levels in the stream channel deposits under Alameda Creek and would be the same for existing and with-project conditions.

### *Comparison to With-CDRP Conditions*

The SFPUC expects that Hanson Aggregates will maintain water levels in Pit F2 between elevation 150 feet and 240 feet until the CDRP is commissioned and will continue to do so when the CDRP is in operation. The SFPUC would keep the water level in Pit F2 within the same range after the ACRP is commissioned. Consequently, the rates of seepage from Pit F2 to the surrounding ground and from the surrounding ground to Pit F2 would be the same for with-CDRP and with-project conditions.

## 6.2 Effects of ACRP on Streamflow in Alameda Creek

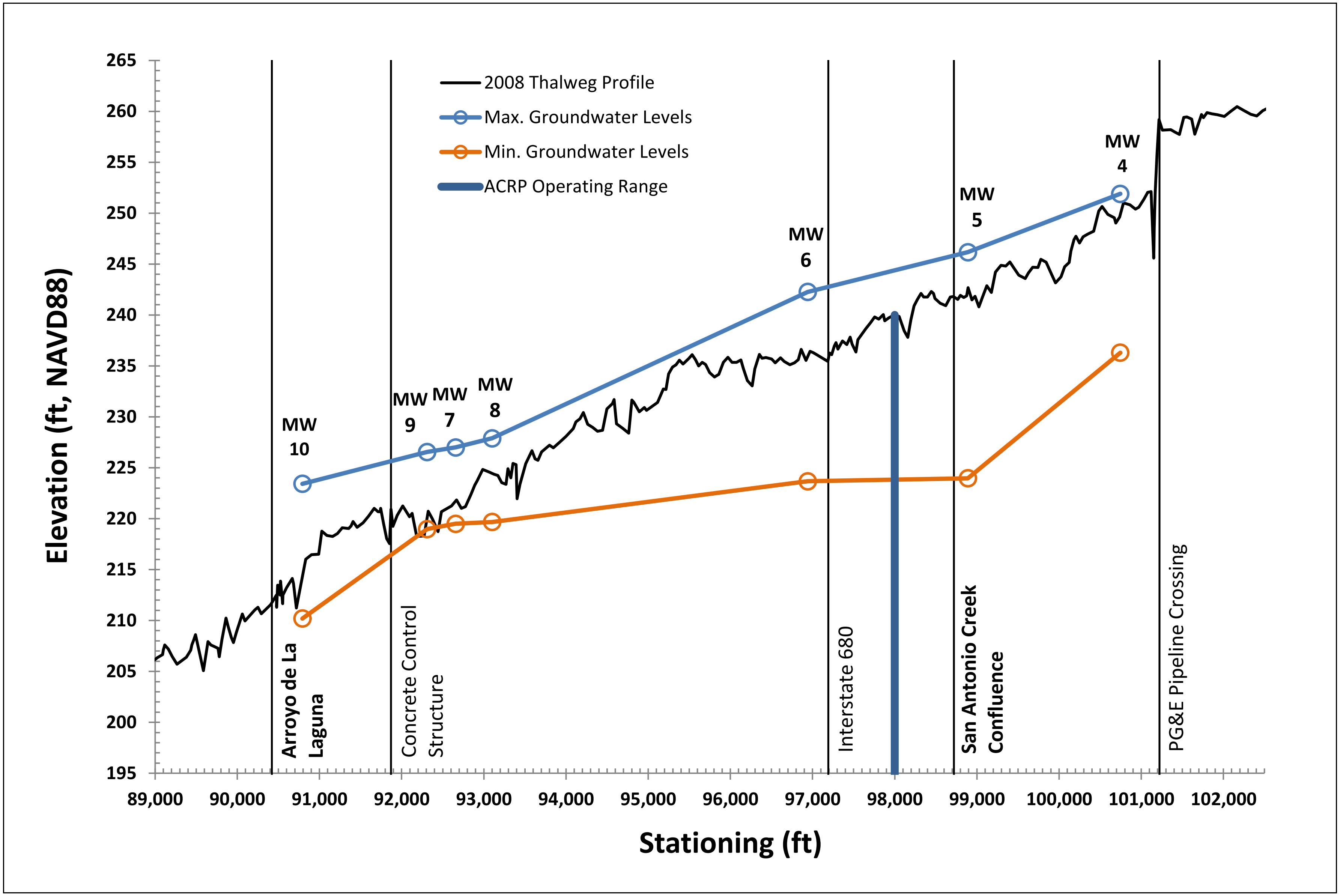
Operation of the ACRP could affect surface water flow in Alameda Creek in two ways: ACRP-caused changes in water levels in Pit F2 could accelerate the seepage of water from the creek to the pit with a consequent effect on surface water flow; and ACRP pumping of water from Pit F2 could cause changes in water management by the quarry operators that could reduce their need to discharge water into Alameda Creek under their NPDES discharge permits, thereby affecting flow in Alameda Creek downstream of the quarries.

### 6.2.1 ACRP-caused changes in water levels in Pit F2 and their relationship to flows in Alameda Creek

The proposed ACRP would change water levels in Pit F2 directly as a result of project operations and could change them indirectly as a result of ACRP-caused changes in seepage rates into the pit, as discussed in Section 6.1 above. If flow in Alameda Creek adjacent to Pit F2 was affected by the water level in the pit then ACRP-caused changes in Pit F2 water levels could affect surface water flow in the creek.

There is a relationship between the water level in Pit F2 and surface water flow in Alameda Creek, but it is not a direct one. Surface water from Alameda Creek percolates into the stream channel deposits that underlie the creek downstream of the Welch Creek confluence. During high flow periods, typically in the winter and spring, considerable volumes of water enter the stream channel deposits raising the water level in the deposits until it is close to and may even exceed the elevation of Alameda Creek’s thalweg as shown in **Figure HYD6-2**. The thalweg elevation adjacent to Pit F2 is at about elevation 242 feet. Figure HYD6-2 shows the maximum and minimum water levels in a series of monitoring wells along the alignment of Alameda Creek and the elevation of the creek’s thalweg (for more information on the monitoring wells, see Appendix HYD2).

High water levels in the stream channel deposits are sustained until the rains cease and surface water flow in Alameda Creek diminishes and eventually disappears. Subsurface water in the stream channel deposits continues to move downstream but much of it seeps into the gravel pits. With no surface water to replenish them, subsurface water levels decline to an elevation of about 224 feet in the vicinity of Pit F2 and only rise again when the next year’s storms and high stream discharges occur. The geologic units below elevation 224 feet, Older Alluvium and the Livermore Gravels, transmit water very poorly, so very little or no water enters the pits from the ground below elevation 224 feet.



SOURCE: SFPUC, 2015. Alameda Creek Recapture Project (ACRP) CEQA Baseline/Hydro Approach Meeting. PowerPoint presentation file provided by Amod Dhakal on February 4, 2015; ESA, 2008 – thalweg profile.

NOTES: The expected operating range of water surface elevations in Pit F2 is 151 to 243 ft under the with-project condition (ACRP). The historic operating range by Hanson Aggregate was 90 to 160 ft.

SFPUC Alameda Creek Recapture Project

**Figure HYD 6-2**

Maximum and Minimum Water Levels in Monitoring Wells

The relationship between water levels in Pit F2 and flow in Alameda Creek is not simple and can best be understood by consideration of a hypothetical scenario. If a large pipe connected Pit F2 to Alameda Creek then there would be a simple relationship between the water level in the pit and flow in the creek. Whenever there was sufficient flow in the creek, water would travel rapidly through the pipe and the water level in the pit would begin to rise almost immediately. At the same time, flow in the creek would be reduced by the volume of water that moved through the pipeline to the pit. But there is no such pipe connecting Pit F2 to Alameda Creek and surface water from the creek must first percolate into the subsurface and then seep through several hundred feet of gravel, sand, and clay before reaching the pit. Whereas it would take less than a minute for creek water to make its way to the pit in a pipe, it probably takes several days, perhaps weeks, for water to make its way from the creek through the stream channel deposits to the pit. Under the conditions that actually exist, the water level in the pit responds only sluggishly to transitory high flows in the creek. Furthermore, water does not move through the stream channel deposits fast enough to have a substantial reductive effect on streamflow in the creek.

The nature of the relationship between flow in Alameda Creek and water levels in Pit F2 is illustrated by data obtained during a strong storm in early December 2012. The storm occurred after a long period of dry weather. Storms that produce as much or more runoff than the December 2012 storm are fairly infrequent. Between Water Year 1999 and Water Year 2014, about 12 storms produced more runoff than the December 2012 storm, as measured at the Welch Creek gage.

Estimated flow in Alameda Creek close to Pit F2 and water surface elevations in Pit F2 before, during and after the storm are shown in **Table HYD6-1**. The estimated streamflow values were obtained by deducting 17 cfs from measured flow values at the Welch Creek gage. As discussed previously, experiments have shown that about 17 cfs is lost to the subsurface between the Welch Creek and San Antonio Creek confluences.

Water surface elevations in Pit F2 were increasing gradually through the month of November from elevation 149.2 feet on November 1 to elevation 150 feet on November 28, 2012, or a rate of 0.03 feet per day. No streamflow occurred during the period. The rise in water surface elevation accelerated in the few days before the storm, the days of the storm (December 2 and 3), and in the days after the storm. Between November 28 and December 11, the water surface elevation in Pit F2 rose from elevation 150 feet to elevation 151.5 feet, a rate of 0.1 feet per day. In the two days of the storm itself, when average daily flow in the creek peaked at 733 cfs, the water surface elevation in Pit F2 rose no faster than it did over the 14-day period from November 28 and December 11. While the two-day period of high flow in the creek influenced water surface elevations in the pit, accelerating the rate of rise over the 14-day period, there was no sharp rise during the storm itself. Clearly, substantial flow in the creek after a period of little or no flow does not result in an immediate rise in the water level in the pit.

**TABLE HYD6-1**
**ALAMEDA CREEK FLOW AND WATER LEVELS IN PIT F2, DECEMBER 2012**

| Month | Day | Streamflow (cfs) | Pit F2 Water level (feet) |
|---|---|---|---|
| Nov | 1 | 0 | 149.1 |
| Nov | 26 | 0 | 150.0 |
| | 27 | 0 | 150.0 |
| | 28 | 0 | 150.0 |
| | 29 | 0 | 150.1 |
| | 30 | 0 | 150.3 |
| Dec | 1 | 0 | 150.4 |
| | 2 | 733 | 150.6 |
| | 3 | 125 | 150.6 |
| | 4 | 8 | 150.7 |
| | 5 | 2 | 150.9 |
| | 6 | 16 | 151.0 |
| | 7 | 1 | 151.1 |
| | 8 | 0 | 151.2 |
| | 9 | 0 | 151.3 |
| | 10 | 0 | 151.4 |
| | 11 | 0 | 151.5 |

SOURCE: Streamflow data for Welch Creek gage was obtained from the USGS and adjusted by ESA/Orion to account for losses to the subsurface upstream of Pit F2. Water levels in Pit F2 were obtained from Luhdorff & Scalmanini Consulting Engineers.

During the two days of high creek flow (December 2 and 3), 1,769 acre-feet of water flowed past Pit F2 in the Alameda Creek channel. During the four-day period December 1 to December 4, the water surface elevation in Pit F2 rose by 0.3 feet. This represents an increase in volume of water in the pit of about 17 acre-feet and some of this was likely attributable to direct rainfall into the pit. Very little of the water passing by Pit F2 in the Alameda Creek channel in the December storm found its way into the pit during the storm. It is clear that the existence of Pit F2 adjacent to Alameda Creek, with a water surface elevation about 100 feet below the thalweg of the creek, had very little immediate effect on the volume of flow in the adjacent creek channel during the large December storm.

As shown in Table HYD6-1, water levels in Pit F2 have no immediate effect on surface water flow in Alameda Creek and so any water level changes in the pit caused by the proposed ACRP would have no effect on surface water flow compared to either existing or with-CDRP conditions.

### 6.2.2 ACRP-induced changes in estimated NPDES discharges by the quarry operators and their effects on flow in Alameda Creek

The ACRP would remove an annual average of 7,178 acre-feet of water from Pit F2 and transfer it to San Antonio Reservoir or the SVWTP for use as municipal water supplies. The removal of water from Pit F2 by the SFPUC would likely affect how Hanson Aggregates manages water in its other pits. If changes in the way that Hanson Aggregates manages water results in changes in the volume of water that it discharges to Alameda Creek under its NPDES permit, then flow in Alameda Creek downstream of the quarries would be affected (2).

The amount of water that the operators discharge to Alameda Creek under their NPDES permits depends on a number of factors but, as described above in Section 4.2.2 one of the most important factors is the rate at which water percolates into the bed of Alameda Creek in the reach of the creek adjacent to the quarry pits. The method used to estimate the volume of the quarry NPDES discharges under the four scenarios depends on the relationship between the volume of water entering the pits from subsurface sources (water lost to the subsurface in the creek reach adjacent to the quarries and other subsurface water entering from the east) and the volume of water leaving the quarries in the form of NPDES discharges to Alameda Creek. The method is described above in Section 4, Analytical Methods.

The reported NPDES discharges from Hanson Aggregates for the period Water Year 1996 to Water Year 2013 have averaged 3,436 acre-feet per year and varied between a maximum of 5,328 acre-feet per year to a minimum of 103 acre-feet per year. Reported daily NPDES discharge volumes from Hanson Aggregates were input to the ASDHM just downstream of the San Antonio Creek confluence to calculate flow in Alameda Creek downstream of the NPDES discharge point under existing conditions.

For with-CDRP conditions, quarry NPDES discharges were estimated to average 6,620 acre-feet per year and range from a maximum of 12,480 acre-feet in 2001 to a minimum of 310 acre-feet in 2012. For with-project conditions, NPDES discharges were estimated to average 2,532 acre-feet per year and range from a maximum of 6,411 acre-feet in 1998 to a minimum of 632 acre-feet in 2013. Estimated daily NPDES discharge volumes from Hanson Aggregates were input to the ASDHM just downstream of the San Antonio Creek confluence to calculate flow in Alameda Creek downstream of the NPDES discharge point under with-CDRP and with-project conditions.

The Hanson Aggregates NPDES discharges, which occur primarily during the night, have had an erratic effect on flow in Alameda Creek between the quarries and the confluence with the Arroyo de la Laguna, sometimes adding considerable volumes of water and sometimes not. Although the volume of Hanson Aggregates' NPDES discharges is expected to change under with-CDRP and with-project conditions compared to existing conditions, the NPDES discharges would continue to occur erratically and to have an erratic effect on streamflow between the NPDES discharge point and Alameda Creek's confluence with the Arroyo de la Laguna.

The effect of the NPDES discharges from the quarries on flow in Alameda Creek downstream of the confluence with Arroyo de la Laguna is much less than it is upstream of the confluence for two reasons. The first reason is that much of the water contributed by the NPDES discharges from the quarries percolates into the ground between the quarry discharge point and the confluence with the arroyo. The second reason is that the flow of water entering Alameda Creek from the arroyo is considerably greater than the flow of water in Alameda Creek upstream of the confluence with the arroyo and so any effects of the NPDES discharges on streamflow are proportionally less than they are upstream of the arroyo.

## *Estimated daily flows*

### Comparison to Existing Conditions

**Figures HYD6-3**, **HYD6-4** and **HYD6-5** compare flow duration curves for with-project and existing conditions at three locations on Alameda Creek. The three locations are just downstream of the Welch Creek confluence (Node 4), just upstream of the San Antonio Creek confluence (Node 5), and just upstream of the Arroyo de la Laguna confluence (Node 7).

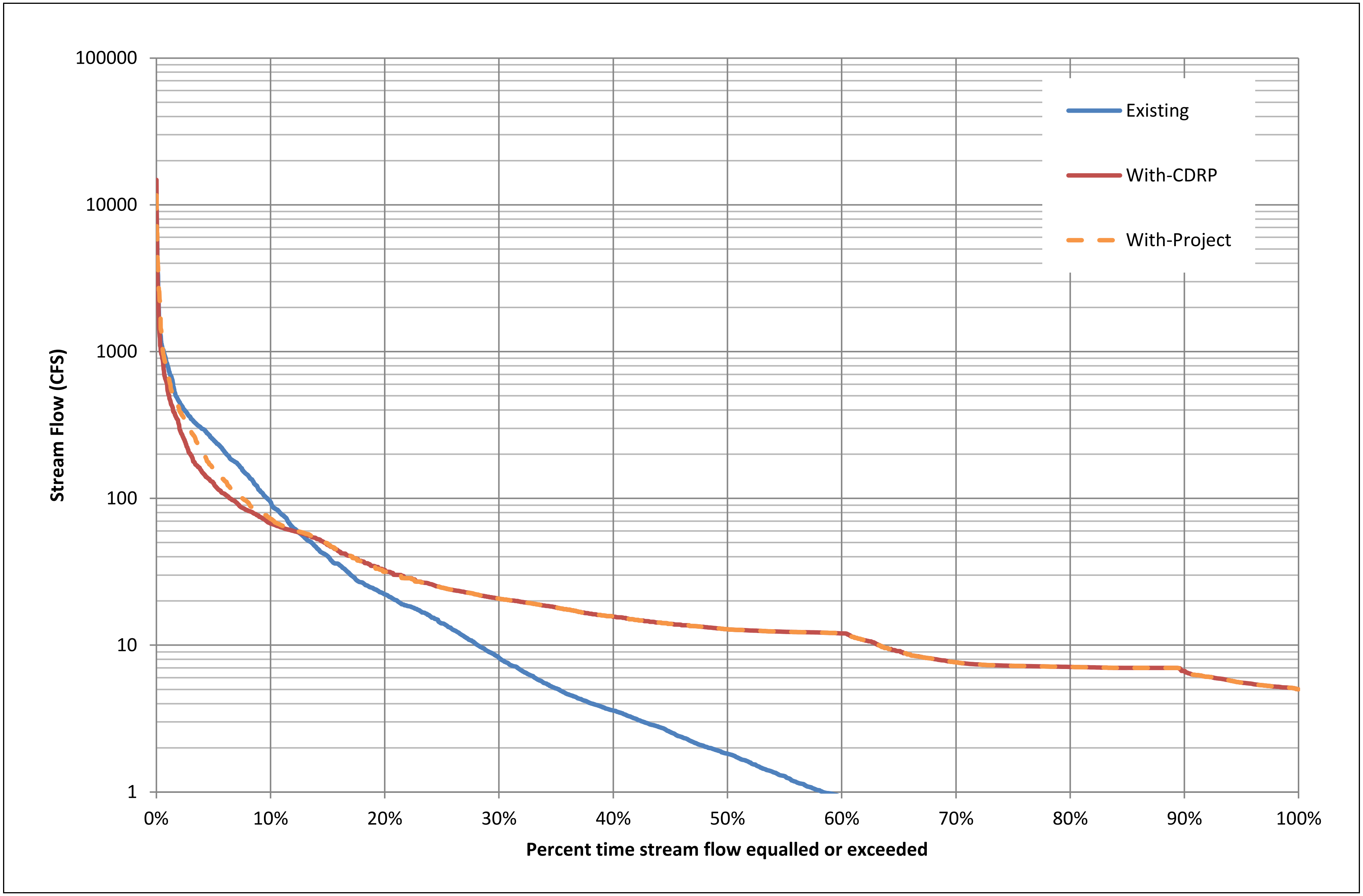
Figure HYD6-3 shows flow duration curves based on daily data for existing and with-project conditions just downstream of the Welch Creek confluence (Node 4). Under existing conditions, flow exceeds one cfs on about 58 percent of the days. Under with-project conditions, flow is never less than 5 cfs on any day because of the releases from Calaveras Reservoir and bypasses at the ACDD that are part of the CDRP.

Figure HYD6-4 compares flow duration curves for existing and with-project conditions just upstream of San Antonio Creek confluence (Node 5). Node 5 is about 200 feet upstream of the proposed ACRP. Under existing conditions, flow exceeds one cfs on about 24 percent of the days, compared to about 37 percent of the days under with-project conditions. The reduced frequency of days when flows exceed one cfs under both conditions at this location compared to Node 4 is attributable to the losses to the subsurface that occur between the Welch Creek and San Antonio Creek confluences. The increased frequency of days when flows exceed one cfs under with- project conditions is attributable to the releases of water from Calaveras Reservoir and bypasses of water at the Alameda Creek Diversion Dam.

Figure HYD6-5 compares flow duration curves for existing and with-project conditions downstream of the proposed project area and just upstream of the Arroyo de la Laguna confluence (Node 7). Under existing conditions, flow exceeds one cfs on 28 percent of the days. Under with-project conditions, flow exceeds one cfs on 34 percent of the days. Under both conditions, surface water is added between the San Antonio Creek and Arroyo de la Laguna confluences as a result of the quarry NPDES discharges but also lost to the subsurface by percolation.

### Comparison to With-CDRP Conditions

Figures HYD6-3, HYD6-4 and HYD6-5 also compare flow duration curves for with-project and with-CDRP conditions at three locations on Alameda Creek: just downstream of the Welch Creek confluence (Node 4); just upstream of the San Antonio Creek confluence (Node 5); and just upstream of the Arroyo de la Laguna confluence (Node 7).

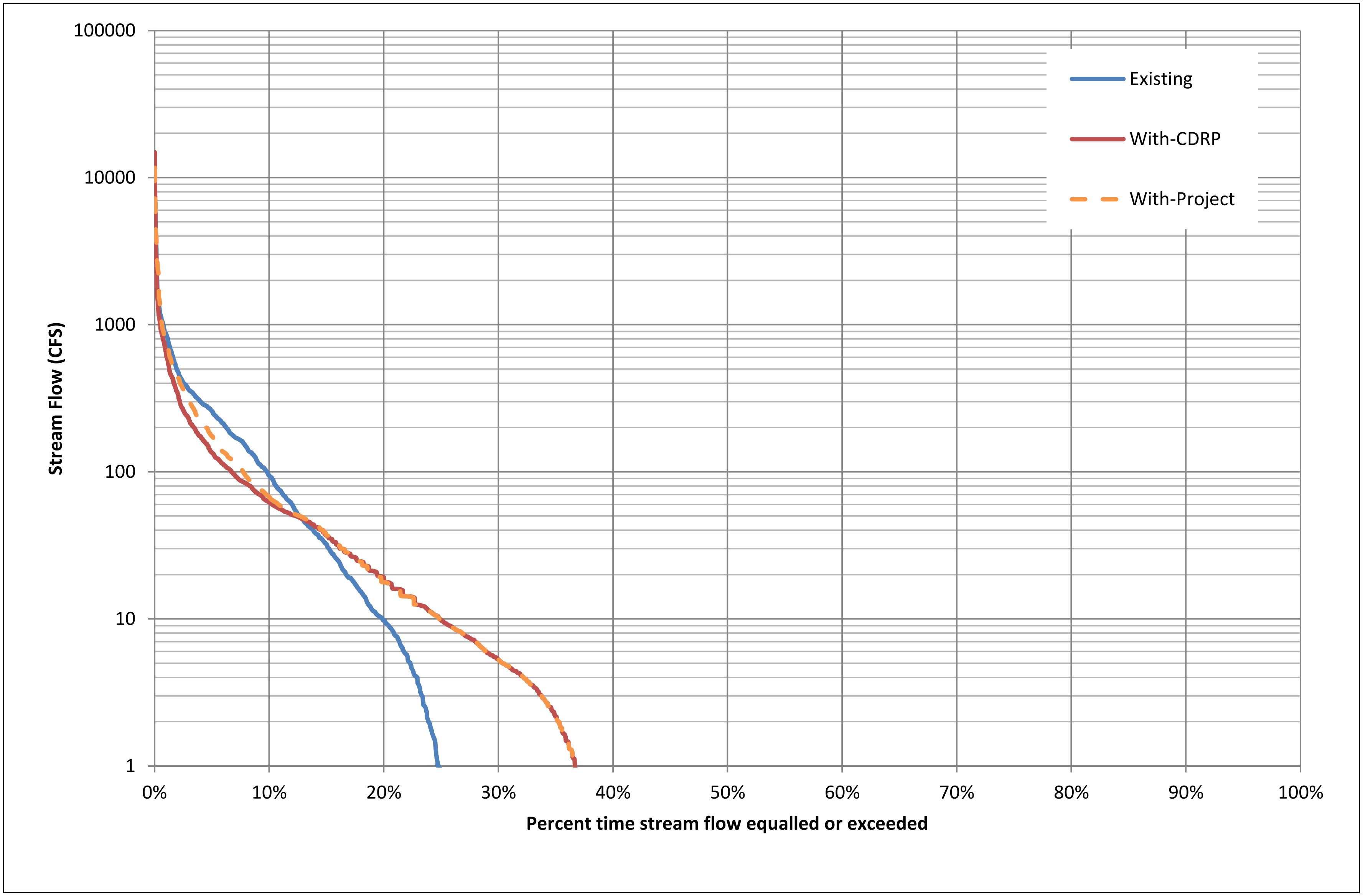


SOURCE: SFPUC, 2016. Simulated stream flows for different scenarios at 5 nodes and pond elevation for ACRP. Excel spreadsheet file provided by Amod Dhakal on July 7, 2016.

NOTE: Data presented are derived from the Alameda System Daily Hydrologic Model (ASDHM) using from Water Years (1996 – 2013)

**Figure HYD 6-3**

Flow Duration Curves for Node 4 (Alameda Creek below Welch Creek) for Existing, with-CDRP, and with-Project Conditions

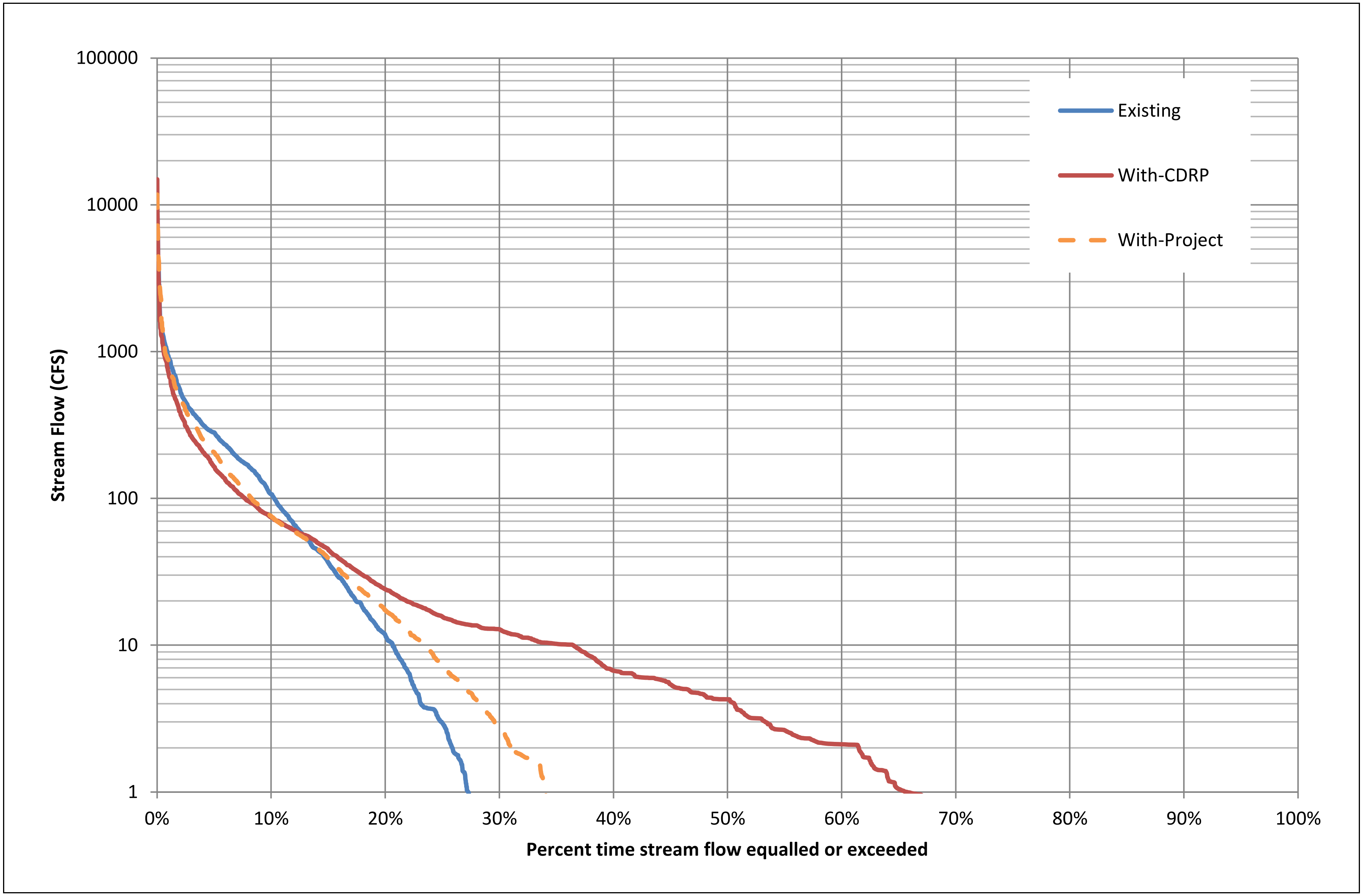


SOURCE: SFPUC, 2016. Simulated stream flows for different scenarios at 5 nodes and pond elevation for ACRP. Excel spreadsheet file provided by Amod Dhakal on July 7, 2016.

NOTE: Data presented are derived from the Alameda System Daily Hydrologic Model (ASDHM) using from Water Years (1996 – 2013)

**Figure HYD 6-4**

Flow Duration Curves for Node 5 (Alameda Creek above San Antonio Creek) for Existing, with-CDRP, and with-Project Conditions



SOURCE: SFPUC, 2016. Simulated stream flows for different scenarios at 5 nodes and pond elevation for ACRP. Excel spreadsheet file provided by Amod Dhakal on July 7, 2016.

NOTE: Data presented are derived from the Alameda System Daily Hydrologic Model (ASDHM) using from Water Years (1996 – 2013)

**Figure HYD 6-5**

Flow Duration Curves for Node 7 (Alameda Creek above Arroyo de la Laguna) for Existing, with-CDRP, and with-Project Conditions

Figure HYD6-3 shows flow duration curves based on daily data for with-CDRP and with-project conditions just downstream of the Welch Creek confluence (Node 4). Under with-CDRP and with-project conditions, flow is never less than 5 cfs on any day because of the releases from Calaveras Reservoir and bypasses at the ACDD that are part of the CDRP.

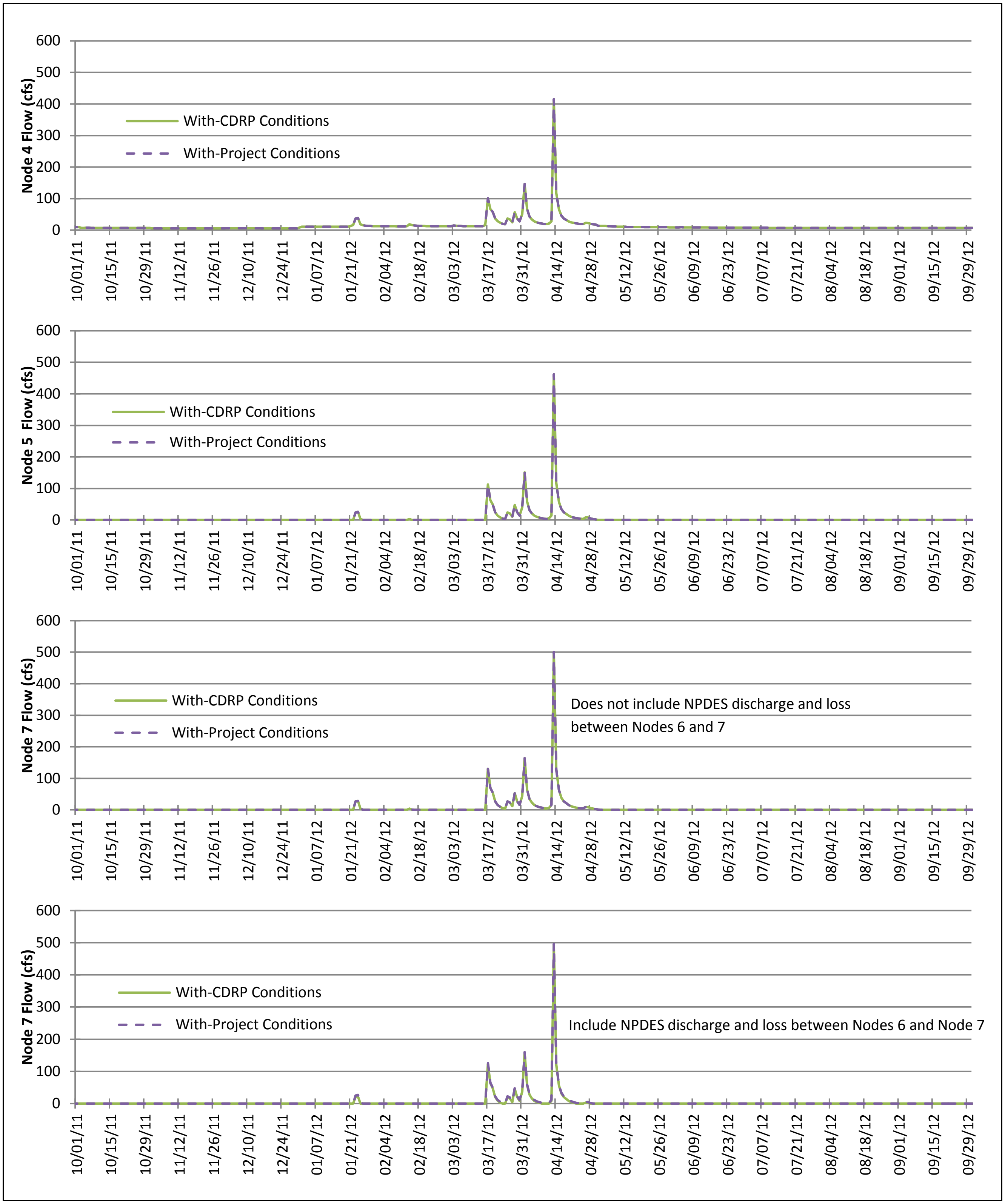
Figure HYD6-4 compares flow duration curves for with-CDRP and with-project conditions just upstream of San Antonio Creek confluence (Node 5). Under both with-CDRP and with-project conditions, flow exceeds one cfs on about 37 percent of the days. The reduced frequency of days when flows exceed one cfs under both conditions at this location compared to upstream at Node 4 is attributable to the losses to the subsurface that occur between the Welch Creek and San Antonio Creek confluences.

Figure HYD6-5 compares flow duration curves for with-CDRP and with-project conditions downstream of the proposed project area and just upstream of the Arroyo de la Laguna confluence (Node 7). Under with-CDRP conditions, flow exceeds one cfs on 65 percent of the days. Under with-project conditions, flow exceeds one cfs on 34 percent of the days. Under both conditions, surface water is added between the San Antonio Creek and Arroyo de la Laguna confluences as a result of the estimated quarry NPDES discharges but also lost to the subsurface by percolation. The estimated increase in flow due to the quarry discharges is greater under with-CDRP conditions.

Daily hydrographs from three selected water years (Water Years 2012, 2008, and 2011) representing ranges of exceedance probabilities from 28 percent to 94 percent (wet to dry water year types) are provided to illustrate daily flows at three different nodes. For each of these water years, daily hydrographs are provided that include quarry NPDES discharges and additional losses between the confluences of Alameda Creek with San Antonio Creek and the Arroyo de la Laguna, as well as without these accretions and depletions. These hydrographs are provided to illustrate the specific effects of the accretions and depletions.

Daily hydrographs are compared for two scenarios at Nodes 4, 5, and 7: (1) With-CDRP Conditions and (2) With-Project Conditions. Node 4 is downstream of SFPUC's compliance location and is the most upstream node of Sunol Valley. The change between Node 4 and Node 5 depicts the influence of loss in Sunol Valley. Node 7 represents flows downstream of the project before Alameda Creek meets Arroyo de la Laguna Creek (**Figures HYD 6-6A**, **HYD6-6B,** and **HYD6-6C**).

Because instream flows were the same in both conditions, in general, at Node 4, with-project conditions flows are the same as with-CDRP flows except in wet years when spill occur. In hydrologic years during which Calaveras Reservoir does not spill, with-project condition flows at Node 4 are always the same as with-CDRP flows. For example, Calaveras Reservoir does not spill in Water Year 2012 and Water Year 2008 and as depicted in Figures HYD6-6A and HYD6-6B under with-project and with-CDRP conditions flows at Node 4 are identical throughout hydrologic years. However, in wet years there are instances during which Calaveras Reservoir is full resulting in spill under both



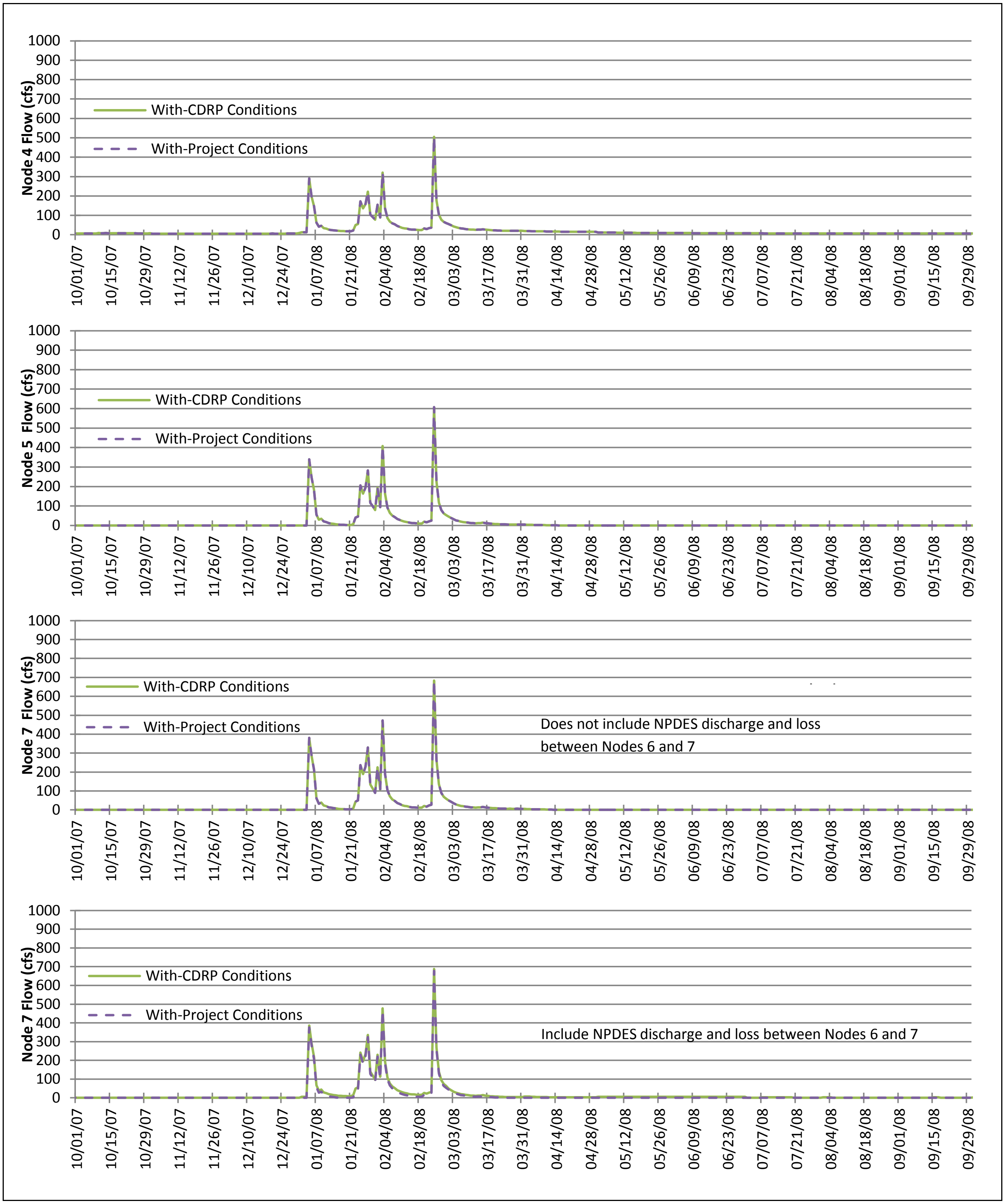
SOURCE: SFPUC, 2016. Simulated stream flows for different scenarios at 5 nodes and pond elevation for ACRP. Excel spreadsheet file provided by Amod Dhakal on July 7, 2016. Adjusted by ESA/Orion.

NOTE: The adjusted ASDHM Node 7 which included NPDES discharge and loss is depicted on bottommost graph.

SFPUC Alameda Creek Recapture Project

**Figure HYD 6-6A**

Daily Hydrographs for WY 2012 (Ex. Prob. 91%) at Nodes 4, 5, and 7 for with-CDRP and with-Project Conditions

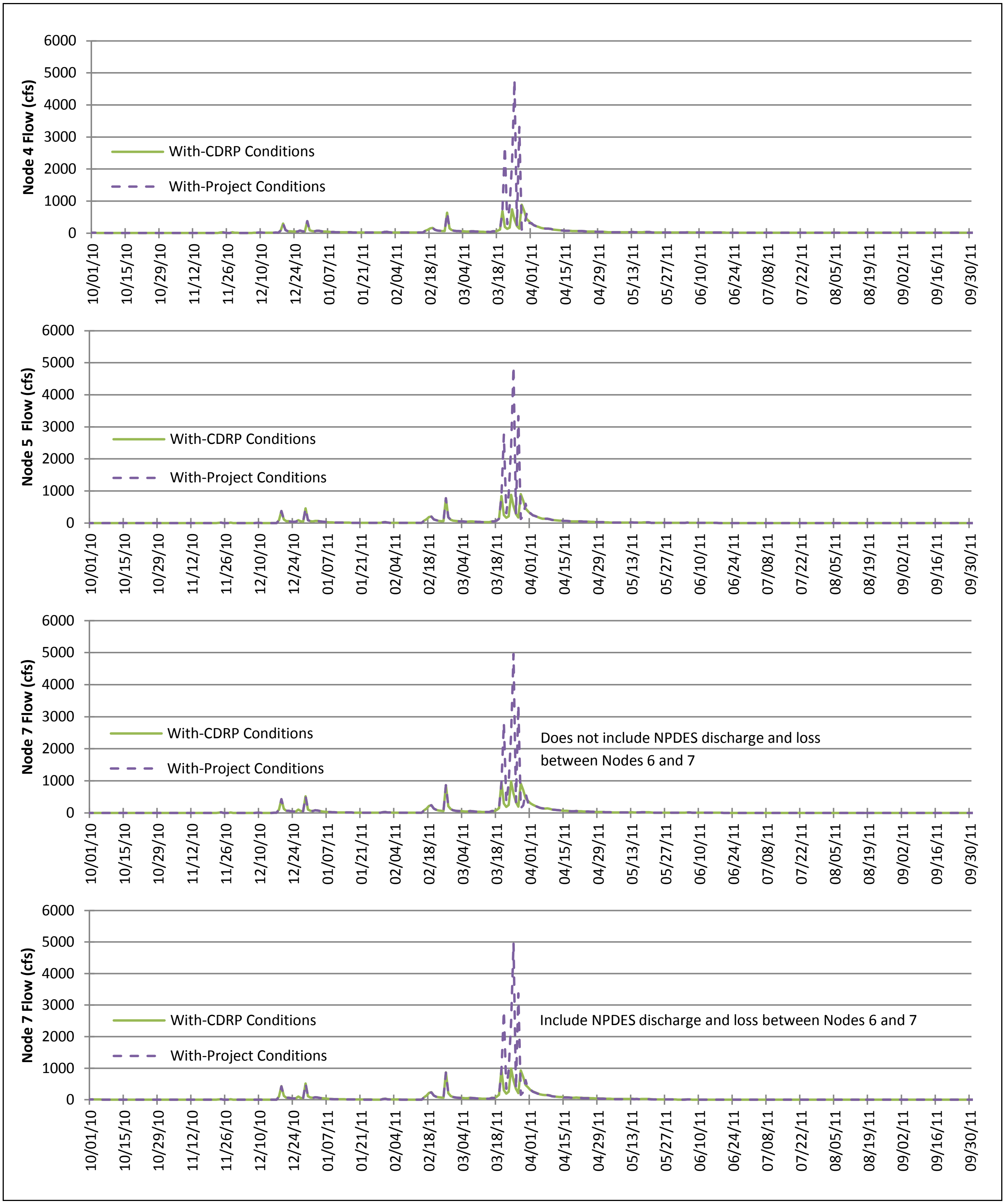


SOURCE: SFPUC, 2016. Simulated stream flows for different scenarios at 5 nodes and pond elevation for ACRP. Excel spreadsheet file provided by Amod Dhakal on July 7, 2016. Adjusted by ESA/Orion.

NOTE: The adjusted ASDHM Node 7 which included NPDES discharge and loss is depicted on bottommost graph.

**Figure HYD 6-6B**

Daily Hydrographs for WY 2008 (Ex. Prob. 64%) at Nodes 4, 5, and 7 for with-CDRP and with-Project Conditions



Does not include NPDES discharge and loss between Nodes 6 and 7

Include NPDES discharge and loss between Nodes 6 and 7

SOURCE: SFPUC, 2016. Simulated stream flows for different scenarios at 5 nodes and pond elevation for ACRP. Excel spreadsheet file provided by Amod Dhakal on July 7, 2016. Adjusted by ESA/Orion.

NOTE: The adjusted ASDHM Node 7 which included NPDES discharge and loss is depicted on bottommost graph.

SFPUC Alameda Creek Recapture Project

**Figure HYD 6-6C**

Daily Hydrographs for WY 2011 (Ex. Prob. 28%) at Nodes 4, 5, and 7 for with-CDRP and with-Project Conditions

conditions (or only in with- Project conditions like in Water Year 2005, not shown in the figure). Under the with-project conditions, because ACRP helps to meet water demand, Calaveras Reservoir is generally at higher elevations than under with-CDRP conditions. This is because under with-CDRP conditions, Calaveras Reservoir is drawn down further to meet demand. In Water Year 2011(wet year), Calaveras Reservoir spills under both with-project and with-CDRP conditions. Since Calaveras Reservoir is at a much higher elevation in with-project conditions compared to with-CDRP conditions spill rates are higher in with-project conditions (see 03/2011 peaks in Figure HYD 6-6C).

The pattern of flows at Node 5 is similar to Node 4 for all flows during both conditions. In Water Year 2012 and 2008, during which Calaveras Reservoir does not spill, flows at Node 5 are the same under both with-project and with-CDRP conditions for the entire hydrologic periods. Node 5 receives the same additional contributions from the watershed between Node 4 and Node 5 during rainy periods under both conditions. Therefore, flow peaks are slightly higher at Node 5 compared to Node 4 under both conditions despite losses in Sunol Valley. Due to the Sunol Valley loss of 17 cfs, in general, Node 5 does not have flows from June to November under both conditions. Although ACDD is not operated between April and November under both conditions, Alameda Creek around ACDD does not have significant flows during June to November. The maximum instream flow from Calaveras Reservoir during June to November is 12 cfs.

The pattern of flows at Node 7 is similar to Node 5 for all flows under both conditions. In Water Years 2012 and 2008, during which Calaveras Reservoir does not spill, flows at Node 7 are the same under both with-project and with-CDRP conditions for the entire hydrologic periods. Node 7 receives the same additional contributions from the watershed between Node 5 and Node 7 during rainy periods under both conditions. Therefore, flow peaks are higher at Node 7compared to Node 5. In earlier applications of the model both NPDES quarry discharges gain and losses in this reach were not included. Therefore, as for Node 5, in general, Node 7 does not have flows from June to November. In the analytical results presented in this report, both NPDES quarry discharges and losses between Node 6 and Node 7 have been incorporated. Losses of 7.5 cfs have been assumed between Node 6 and Node 7 and NPDES quarry discharges are estimated. When NPDES quarry discharges at Node 6 are less than 7.5 cfs, Node 7 flows are the same in both methods of calculations. Therefore, the addition of the NPDES quarry discharge gain and loss incorporated between Node 6 and Node 7 does not pose hydrologic significance to affect hydrographs during rainy periods. However, Node 7 in this new calculation may receive small flows under both conditions during the period when the estimated NPDES quarry discharge at Node 6 is greater than 7.5 cfs. Therefore, at times, Node 7 has flows in this new calculation during June and November. During such hydrologic situations there are no flows between Nodes 4 and 5 and there are flows between Node 6 and Node 7, albeit very small. For the three examples presented here, the average NPDES quarry discharge gain in Water Years 2012, 2008, and 2011 in with-CDRP conditions are 0.4 cfs, 7.4 cfs, and 9.1 cfs, respectively. They are 1.2 cfs, 3.6 cfs, and 7.7 cfs, in Water Years 2012, 2008 and 2011, respectively for with-project conditions. Because 7.5 cfs is lost between Nodes 6 and 7, this new calculation at Node 7 has an insignificant effect on flow rate at Node 7.

### *Average annual flow volumes calculated from estimated daily flows*

#### Comparison to Existing Conditions

Tables HYD5-7, HYD5-8 and HYD5-9 show estimated annual surface flow volumes under existing and with-project conditions for the 18-year period from Water Year 1996 to Water Year 2013 at three locations of Alameda Creek. Table HYD5-7 shows estimated Alameda Creek flow volumes below the Welch Creek confluence (Node 4); Table HYD5-8 shows creek flow volumes above the San Antonio Creek confluence (Node 5); and Table HYD5-9 shows creek flow volumes above the Arroyo de la Laguna confluence (Node 7). Between the Welch Creek confluence and the Arroyo de la Laguna confluence, water is added to Alameda Creek by accretion; that is, water from storm runoff and tributaries. It is also added by NPDES discharges from the quarries. It is lost to the subsurface by percolation into the streambed. About 70 percent of the losses to the streambed occur between the Welch Creek and San Antonio Creek confluences and the remainder between the San Antonio Creek and Arroyo de la Laguna confluences.

As shown in Table HYD5-7, average annual flow volume in Alameda Creek below the Welch Creek confluence (Node 4) under existing conditions between Water Year 1996 and Water Year 2013 is estimated to be 36,007 acre-feet. Estimated annual flow volume ranged from 126,329 acre-feet in 1998 to 2,803 acre-feet in 2001. Average annual flow volume in the same location between Water Year 1996 and Water Year 2013 under with-project conditions is estimated to be 39,029 acre-feet. Estimated annual flow volume would range from 131,491 acre-feet to 9,710 acre-feet.

As shown in Table HYD5-8, average annual flow volume in Alameda Creek above the San Antonio Creek confluence under existing conditions is estimated to be 34,999 acre-feet. Estimated annual flow volume in the 18-year period ranged from 128,445 acre-feet in 1998 to 1,673 acre-feet in 2012. Average annual flow volume in Alameda Creek at the same location under with-project conditions is estimated to be 33,150 acre-feet. Estimated annual flow volume in the 18-year period would range from 129,315 acre-feet to 3,250 acre-feet in 2012.

As shown in Table HYD5-9, average annual flow volume in Alameda Creek above the Arroyo de la Laguna confluence under existing conditions is estimated to be 38,274 acre-feet. Estimated annual flow volume in the 18-year period ranged from 142,178 acre-feet in 1998 to 1,634 acre-feet in 2012. Average annual flow volume in Alameda Creek at the same location under with-project conditions is estimated to be 35,934 acre-feet. Estimated annual flow volume in the 18-year period would range from 146,031 acre-feet to 3,167 acre-feet.

#### Comparison to With-CDRP Conditions

As shown in Table HYD5-7, average annual flow volume in Alameda Creek below the Welch Creek confluence (Node 4) under with-CDRP conditions between Water Year 1996 and Water Year 2013 is estimated to be 33,157 acre-feet. Estimated annual flow volume ranged from 124,809 acre-feet in 1998 to 9,710 acre-feet in 2001. Average annual flow volume in the same location between Water Year

1996 and Water Year 2013 under with-project conditions is estimated to be 39,029 acre-feet. Estimated annual flow volume would range from 131,491 acre-feet to 9,710 acre-feet.

The average annual flow volume in Alameda Creek at the Welch Creek confluence under with-project conditions is greater than under-CDRP conditions because of differences in storage in Calaveras Reservoir. Under with-CDRP conditions, the water level in Calaveras Reservoir will be drawn down in the drier months to meet water demand and as a result of the releases that will be made to meet the instream flow schedule. Under with-project conditions, a portion of the water demand is met with water from the ACRP and so the water level in Calaveras Reservoir is not drawn down as far as it is under with-CDRP conditions. Because of this, spills in wet years would be more frequent under with-project conditions than they are under with-CDRP conditions. As a result, average annual flow volumes in Alameda Creek at the Welch Creek confluence would be greater under with-project conditions than they are under with-CDRP conditions.

As shown in Table HYD5-8, average annual flow volume in Alameda Creek above the San Antonio Creek confluence under with-CDRP conditions is estimated to be 27,637 acre-feet. Estimated annual flow volume in the 18-year period ranged from 122,634 acre-feet in 1998 to 3,250 acre-feet in 2012. Average annual flow volume in Alameda Creek at the same location under with-project conditions is estimated to be 33,150 acre-feet. Estimated annual flow volume in the 18-year period would range from 129,315 acre-feet to 3,250 acre-feet in 2012.

As shown in Table HYD5-9, average annual flow volume in Alameda Creek above the Arroyo de la Laguna confluence under with-CDRP conditions is estimated to be 32,752 acre-feet. Estimated annual flow volume in the 18-year period ranged from 137,869 acre-feet in 1998 to 2,961 acre-feet in 2012. Average annual flow volume in Alameda Creek at the same location under with-project conditions is estimated to be 35,934 acre-feet. Estimated annual flow volume in the 18-year period would range from 146,031 acre-feet to 3,167 acre-feet.

### *Average monthly flows calculated from estimated daily flows*

#### Comparison to Existing Conditions

**Table HYD6-2** compares average monthly flows in Alameda Creek at a location just downstream of the San Antonio Creek confluence (Node 6) for existing and with-project conditions. The monthly flows at this location include water discharged by the quarries under their NPDES permits. Average monthly flows under with-project conditions would be less than average monthly flows under existing conditions in eight months of the year. It would be greater than average monthly flows under existing conditions in November, February, March and April. During the summer months, all of the water in this reach of the creek under both conditions would be a result of the estimated quarry NPDES discharges. Flows would be lower under with-project conditions in the summer months than under existing conditions because the estimated volume of NPDES discharge from the quarries would be less under with-project conditions than it is under existing conditions. The quarry NPDES discharges are erratic and occur primarily during the night so under both conditions summertime flow in the reach would be discontinuous.

**TABLE HYD6-2**
**AVERAGE MONTHLY FLOWS**
**IN ALAMEDA CREEK BELOW SAN ANTONIO CREEK CONFLUENCE (NODE 6)**
**FOR EXISTING CONDITIONS, WITH-CDRP CONDITIONS, AND WITH-PROJECT CONDITIONS AS ESTIMATED FOR CEQA ANALYSIS PURPOSES**
**WY 1996 TO WY 2013 (cfs)**

| Scenario | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Existing Conditions | 4.3 | 4.5 | 44.5 | 137.1 | 198.1 | 131.2 | 95.6 | 32.0 | 12.3 | 4.8 | 4.3 | 4.6 |
| With-CDRP Conditions | 7.0 | 8.9 | 35.9 | 110.4 | 202.2 | 98.3 | 76.1 | 20.2 | 11.6 | 9.4 | 8.2 | 9.0 |
| With-project Conditions | 3.0 | 5.0 | 32.6 | 118.7 | 205.7 | 152.9 | 80.3 | 13.7 | 5.1 | 3.4 | 3.0 | 3.0 |
| Difference in flow between with-project condition and existing condition (With-project conditions minus existing conditions) | -1.3 | 0.5 | -11.9 | -18.4 | 7.6 | 21.7 | -15.3 | -18.3 | -7.2 | -1.4 | -1.3 | -1.6 |
| Difference in flow between with project condition and with CDRP conditions (With-project Conditions minus with CDRP Conditions) | -4.0 | -3.9 | -3.3 | 8.3 | 3.5 | 54.6 | 4.2 | -6.5 | -6.5 | -6.0 | -5.2 | -6.0 |

SOURCE SFPUC, 2016. Simulated streamflows for different scenarios at 5 nodes. Excel spreadsheet file provided by Amod Dhakal on July 7, 2016. Adjusted to include NPDES quarry discharges at Node 6 and loses between Node 6 and 7 by ESA/Orion.

**Table HYD6-3** shows average monthly flows in Alameda Creek just downstream of the San Antonio Creek confluence for existing, with-CDRP conditions, and with-project conditions as used in the analysis for the CDRP's Biological Opinion. The estimates do not include losses to the subsurface between the San Antonio Creek and Arroyo de la Laguna confluences in any of the scenarios. Quarry NPDES discharges are included under existing conditions but not in the other scenarios.

### Comparison to With-CDRP Conditions

Table HYD6-2 compares average monthly flows in Alameda Creek at a location just downstream of the San Antonio Creek confluence for with-CDRP and with-project conditions. Average monthly flow under with-project conditions would be less than average monthly flow under with-CDRP conditions in eight months of the year. It would be greater than average monthly flow under with-CDRP conditions in November, February, March, and April. During the summer months, all of the water in this reach of the creek under both conditions would be a result of the estimated quarry NPDES discharges. Flow would be lower under with-project conditions in the summer months than under with-CDRP conditions because the volume of estimated NPDES discharge from the quarries would be less under with-project conditions than it is under with-CDRP conditions.

### TABLE HYD6-3
### ESTIMATED AVERAGE MONTHLY FLOWS IN ALAMEDA CREEK BELOW SAN ANTONIO CREEK CONFLUENCE (NODE 6) FOR EXISTING CONDITIONS, WITH-CDRP CONDITIONS, AND WITH-PROJECT CONDITIONS AS USED IN THE ANALYSIS FOR THE CDRP'S BIOLOGICAL OPINION
### WY 1996 TO WY 2013 (cfs)

| Scenario | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Existing Conditions | 4.3 | 4.5 | 44.5 | 137.1 | 198.1 | 131.2 | 95.6 | 32.0 | 12.3 | 4.8 | 4.3 | 4.6 |
| With-CDRP Conditions | 0.0 | 2.6 | 28.9 | 101.2 | 192.5 | 87.1 | 64.4 | 9.3 | 1.5 | 0.1 | 0.0 | 0.0 |
| With-project Conditions | 0.0 | 2.6 | 29.8 | 115.3 | 201.6 | 148.4 | 75.5 | 9.5 | 1.5 | 0.1 | 0.0 | 0.0 |
| Difference in flow between with-project condition and existing condition (With-project conditions minus existing conditions) | -4.3 | -1.9 | -14.7 | -21.8 | 3.4 | 17.2 | -20.1 | -22.5 | -10.9 | -4.7 | -4.3 | -4.6 |
| Difference in flow between with project condition and with CDRP conditions (With-project Conditions minus with CDRP Conditions) | 0.0 | 0.0 | 0.9 | 14.1 | 9.1 | 61.3 | 11.1 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 |

Table HYD6-3 shows estimated monthly flows in Alameda Creek at Niles for with-CDRP and with-project conditions as used in the analysis for the Biological Opinion for the CDRP. The estimates do not include losses to the subsurface between the San Antonio Creek and Arroyo de la Laguna confluences in any of the scenarios. Quarry NPDES discharges are included under existing conditions but not in the other scenarios.

### *Summary of ACRP Effects on Streamflow*

The SFPUC's operation of its Alameda System, and particularly its operation of Calaveras Reservoir, would differ under the four scenarios. The full storage capacity of the reservoir was available under pre-2001 conditions and will be again under with-CDRP and with-project conditions. Storage in the reservoir is limited under existing conditions. The need to make bypasses at the ACDD and releases from Calaveras Reservoir under with-CDRP and with-project conditions create a deficit in Calaveras Reservoir that did not exist under pre-2001 conditions. Recapture of some of the water bypassed and released under with-project conditions reduces the size of the deficit in Calaveras Reservoir and increases the frequency of spills from the reservoir. As a result, flows in Alameda Creek downstream of the Calaveras Creek confluence would be greater for with-project conditions than they are for the with-CDRP conditions.

Flow in Alameda Creek is altered downstream of the San Antonio Creek confluence by NPDES discharges from the aggregate quarries that are located near the confluence. Under with-CDRP conditions, the amount of water the quarry operators would have to manage would increase and therefore quarry NPDES discharges are estimated to increase compared to existing conditions.

Under with-project conditions, the SFPUC would pump water from Pit F2 for municipal use. The pumping by the SFPUC would substitute for part of the amount of water the quarry operators would have to manage. As a result, the average annual amount of water discharged to Alameda Creek under NPDES permits by the quarry operators under with-project conditions is estimated to be less than the average annual amount discharged under existing conditions.

Downstream of the quarries and just upstream of the Arroyo de la Laguna (Node 7), average annual flow volume in Alameda Creek would be about 6 percent less under with-project conditions than it is under existing conditions. It would be about 10 percent greater than it will be under with-CDRP conditions.

During the summer months, there is no streamflow in Alameda Creek under existing conditions at the San Antonio Creek confluence just upstream of the quarry discharge points. There will be no streamflow in the summer at this location under with-CDRP conditions nor would there be under with-project conditions. The only flow in Alameda Creek below the San Antonio Creek confluence and below the quarry discharges in the summer is that provided by the NPDES discharges from the quarries under their NPDES permits. Estimated quarry NPDES discharges under with-project conditions would be less voluminous than they are under existing conditions and are estimated to be less than they would be under with-CDRP conditions.

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## Notes for Section 6

1. It is difficult to precisely locate the base of the stream channel deposits when examining samples taken from boreholes so it was decided to rely on information from groundwater monitoring wells close to Pit F2. The water level in the monitoring wells has not fallen below elevation 224 feet during several years of monitoring so the base of the permeable stream channel deposits are assumed to be at that elevation. For more information, see Appendix HYD2.
2. The other quarry operator, ODS, also discharges water from the quarries it manages to Alameda Creek under NPDES permits. ODS's past discharge volume has been small compared to the Hanson Aggregates' discharge volume and water management changes at ODS' quarries has further reduced their NPDES discharge volume. For these reasons, ODS discharges were not included in the estimates of future discharges to Alameda Creek by the quarries.

# 7. Implications of ACRP-Caused Surface Water Hydrology Changes for Biological Resources

Hydrologic conditions under existing conditions and with-CDRP conditions are described in detail in Section 5, Alameda Creek Surface Water Hydrology. The changes in hydrologic conditions attributable to the ACRP are described above in Section 6, Effects of ACRP on Surface Water Hydrology. This section describes the implications of ACRP-caused hydrologic changes on fish, terrestrial wildlife, and riparian vegetation.

## 7.1 Fish

A number of fish species exist in Alameda Creek including migratory species. This section describes the relationship between fish habitat and surface water flow in Alameda Creek under existing, with-CDRP and with-project conditions.

### 7.1.1 Existing Conditions

Alameda Creek and its tributaries provide habitat for a diverse assemblage of native and non-native fishes. A total of 14 native and at least 13 non-native species have been observed in non-tidal reaches of the Alameda Creek watershed during the past century. Several other species may have also occurred in the watershed based on collections from tidal portions of the creek, evidence from archeological investigations, and other accounts (1) (2). Anadromous species including steelhead (*Oncorhynchus mykiss*) are excluded from most of the watershed by passage barriers in the lower catchment, most notably by the Bay Area Rapid Transit (BART) weir (3).

Fish habitat is extremely limited between the Welch Creek confluence and the Arroyo de la Laguna confluence because there is little flowing water in this reach for much of the year and the physical habitat is heavily altered and degraded. Some native and non-native warm water fish survive in isolated pools that form within the Alameda Creek channel during the dry season. The pools extend from just upstream of the I-680 bridge to just upstream of the Arroyo de la Laguna confluence. The fish populations inhabiting the pools appear to be dominated by non-native species that compete and prey on native species and are of little conservation concern. Consequently, the pools are not described in this section, but they are discussed in Section 7.2, because any changes to the pools could affect terrestrial wildlife, and in particular special status amphibians.

### 7.1.2 With-CDRP Conditions

Under with-CDRP conditions, the CDRP will be completed and placed into operation and releases and bypasses will be made at Calaveras Reservoir and the Alameda Creek Diversion Dam in accordance with instream flow schedules shown in Table HYD5-6 and described in the text in Section 5.2.3. To be conservative, the EIR impact analysis also assumes that human-made barriers to anadromous steelhead migration will be removed or other measures taken to enable fish migration.

Due to limiting factors, specifically warm water temperatures, steelhead are not expected to spawn or rear within the reaches of Alameda Creek between the Welch Creek confluence and the Arroyo de la Laguna confluence, but would be expected to migrate through this area during winter spawning migrations and late spring out-migrations.

Flow in the reaches of Alameda Creek between the Welch Creek and Arroyo de la Laguna confluences under with-project conditions will differ from flow under existing conditions. The pattern of daily flows will be altered by operation of the CDRP and implementation of the instream flow schedules as shown in Figures HYD6-3, HYD6-4, and HYD6-5. The figures are flow duration curves constructed from daily flows estimated using the ASDHM for locations just downstream of the Welch Creek confluence (Node 4), just upstream of the San Antonio Creek (Node 5), and just upstream of the Arroyo de la Laguna (Node 7). The flow duration curves for Nodes 4 and 5 are not affected by discharges of water from the quarries under their NPDES permits; the flow duration curves for Node 7 are affected by the quarry NPDES discharges and losses between San Antonio Creek and Arroyo de la Laguna.

The three figures show that under with-CDRP conditions the frequency of flows greater than about 60 cfs will decrease compared to the existing condition and the frequency of flows less than about 60 cfs will increase. As shown in Figure HYD6-3, flow at the Welch Creek confluence will always be greater than 5 cfs under with-CDRP condition; under existing conditions it is less than one cfs on about 40 percent of the days. The reasons for the increase in frequency of small flows are the releases from Calaveras Reservoir and the bypasses at the Alameda Creek Diversion Dam, in accordance with the instream flow schedules. The reason for the decrease in frequency of large flows is the increased availability of storage in Calaveras Reservoir under with-CDRP conditions, which will enable the SFPUC to divert more water from Alameda Creek than it does under existing conditions.

The fact that flow between the Calaveras Creek and Welch Creek confluences will always be greater than 5 cfs under with-CDRP conditions will benefit over-summering steelhead as a result of both the flow increase itself and reduced water temperature. Steelhead habitat in this reach of the creek under existing conditions suffers from inadequate flow and high water temperature.

Tables HYD5-7, HYD5-8 and HYD5-9 show annual flow volumes in Alameda Creek at three locations between the Welch Creek and Arroyo de la Laguna confluences for with-CDRP and existing conditions. Estimated average annual flow volume under with-CDRP conditions below the Welch Creek confluence (Node 4) is 8 percent less than it is under existing conditions. Estimated average annual flow volume under with-CDRP conditions above the San Antonio Creek confluence (Node 5) is 21 percent less than it is under existing conditions. Estimated average annual flow volume under with-CDRP conditions above the Arroyo de la Laguna confluence (Node 7) is about 13 percent less than it is under existing conditions. The reasons for the decreases in flow under with-CDRP conditions compared to existing conditions is because the flow-increasing effects of the bypasses and releases is more than offset by the flow-decreasing effects of restoration of storage in Calaveras Reservoir.

During the drier months, released and bypassed water from Calaveras Reservoir and the Alameda Creek Diversion Dam will largely percolate into the ground between the Welch Creek and San Antonio Creek confluences. Downstream of the San Antonio Creek confluence, NPDES discharges from the quarries contribute water to Alameda Creek and maintain several permanent pools in the creek channel during the drier months. The quarry NPDES discharges are very variable in volume and timing and depend on quarry operations. Under with-CDRP conditions, the volume of water that the quarry operators will need to manage will increase and therefore NPDES discharges from the quarries will increase by an average of several thousand acre-feet per year compared to existing conditions, and this increase is accounted for in the daily flow-duration curve for Node 7 in Figure HYD6-5 and the average annual flow volumes for Node 7 in Table HYD5-9.

### 7.1.3 With-project Conditions

The proposed ACRP would affect flow in Alameda Creek downstream of the Calaveras Creek confluence. Flow in the reach of the creek between the Calaveras Creek confluence and San Francisco Bay would be affected by changes in operations of the SFPUC's Alameda System, and particularly of Calaveras Reservoir. Operation of the Alameda System for with-CDRP conditions will be different from operations under with-project conditions because under with-project conditions, a portion of summertime municipal water demand would be met with water from the ACRP (i.e., water accumulated in Pit F2). As a result, average annual flows under with-project conditions would be greater than they will be under with-CDRP conditions. However, as depicted by the flow duration curves for Alameda Creek below the Welch Creek confluence (Figure HYD6-3 for Node 4) and above the San Antonio Creek confluence (Figure HYD6-4 for Node 5), most of the time flows in Alameda Creek between the Calaveras Creek and San Antonio Creek confluences would be the same for the two conditions. The frequency of flows of 60 cfs or less would be the same for with-project and with-CDRP conditions. Flows in the range 60 to 1,000 cfs would be more frequent under with-project conditions than they will be under with-CDRP conditions.

The differences in flows described above are the result of differences in operation of Calaveras Reservoir under with-project and with CDRP conditions. Downstream of the quarry NPDES discharge point, the ACRP could further affect flow in Alameda Creek. There are two ways that this might occur: if ACRP operations in Pit F2 led to a rapid increase in seepage into the pit, which would reduce peak flows in the creek; and if ACRP operations resulted in a reduction in quarry NPDES discharges, which, in combination with other flow changes caused by the ACRP, would reduce peak flows in the creek.

The first possibility was examined by monitoring water surface elevations in Pit F2 during a large storm that occurred in December 2012 after a long dry period, as described in Section 6.2.1. To summarize, flow in the creek peaked at 733 cfs and 1,769 acre-feet of water passed by the quarries during the storm. There was almost no change in the water surface elevation in Pit F2 indicating that there was almost no change in the seepage rate into the pit during the storm. At the time of the storm, the water surface elevation in Pit F2 was close to the lower end of the ACRP's planned operating range. Therefore, it is clear that operation of the ACRP will not increase seepage rates enough to have any effect on high flows in Alameda Creek that are needed to facilitate fish migration.

With respect to the second possibility, assuming no other factor causes changes in estimated NPDES discharges, the ACRP would result in a reduction in NPDES discharges from the quarries as shown in HYD4-2. The reduction in NPDES discharges from the quarries, the changes in operations at Calaveras Reservoir associated with the ACRP, and the losses to the subsurface between the San Antonio Creek and Arroyo de la Laguna confluences, are reflected in the flow duration curve for Alameda Creek above its confluence with the arroyo and shown in Figure HYD6-5. The higher flows in the figure are those needed to facilitate fish migration. Daily flows would exceed 60 cfs on about 14 percent of the days under existing, with-CDRP and with-project conditions. Daily flows under with-project conditions would exceed 100 cfs on about 8 percent of the days; corresponding values for existing and with-CDRP conditions are about 10 percent and about 7 percent of the days. Daily flows would exceed 500 cfs under with-project and with-CDRP conditions on about 2 percent of the days; the corresponding value for existing conditions is about 3 percent of the days. The frequency of flows between 60 cfs and 500 cfs would increase slightly under with-project conditions compared to with-CDRP conditions. This probably would have no effect on fish migration but if it had an effect it would be modestly beneficial.

Just as they do under existing conditions, the quarry NPDES discharges under with-project conditions would be expected to have an erratic effect on flow in Alameda Creek between the San Antonio Creek and Arroyo de la Laguna confluences. Although the average annual NPDES discharges under with-project conditions are estimated to be about two-thirds of those under existing conditions, their timing and daily volume would be variable and would depend on quarry operations. Table HYD3-2 shows historical NPDES discharges by Hanson Aggregates to Alameda Creek. There is no obvious seasonal pattern to Hanson Aggregates' NPDES discharges to the creek. Hanson Aggregates' highest volumetric NPDES discharge in the second quarter between 2002 and 2010 was 1,317 acre-feet, which is equivalent to a continuous discharge of about 7.4 cfs. Because the Hanson Aggregates discharges most of its excess water at night the actual discharge rate would be higher, perhaps in the range of 10 to 15 cfs. Although this is a sufficient amount of water to theoretically affect migration flows in the quarry reach, it probably has little actual effect on migration flows for two reasons: the discharge is discontinuous, starting and stopping in the course of a day; and it only affects the portion of the quarry reach below the NPDES discharge point downstream of the San Antonio Creek confluence as this flow is eventually lost in the reach between San Antonio Creek and Arroyo de la Laguna Creek.

## 7.2 Terrestrial Wildlife

Terrestrial wildlife species are present in a reach of Alameda Creek that could be affected by changes in surface and subsurface hydrology attributable to the proposed ACRP. The wildlife species are associated with a series of pools within the Alameda Creek channel that are shown in **Figure HYD7-1**.

**Table HYD7-1** is a summary description of hydrologic and riparian conditions in the Alameda Creek channel between Pit F2 and the Arroyo de la Laguna under existing, with-CDRP and with-project conditions for each of the subreaches identified in Figure HYD7-1. Separate descriptions are provided for surface water conditions, subsurface water conditions, instream wetlands and woody riparian vegetation. The evaluation of surface water conditions was made by ESA/Orion and the evaluation of subsurface water conditions was made by Luhdorff & Scalmanini. The probable effects of the surface and subsurface flow changes on the pools within the Alameda Creek channel were made jointly by ESA/Orion and Luhdorff & Scalmanini. The probable effects of the changes in surface and subsurface flow on biological resources were made by ESA/Orion biologists.

This section provides information on those aspects of Alameda Creek's surface water hydrology that affect terrestrial wildlife habitat under existing, with-CDRP and with-project conditions. Information on those aspects of subsurface water hydrology that affect terrestrial wildlife habitat is contained in Appendix HYD2.

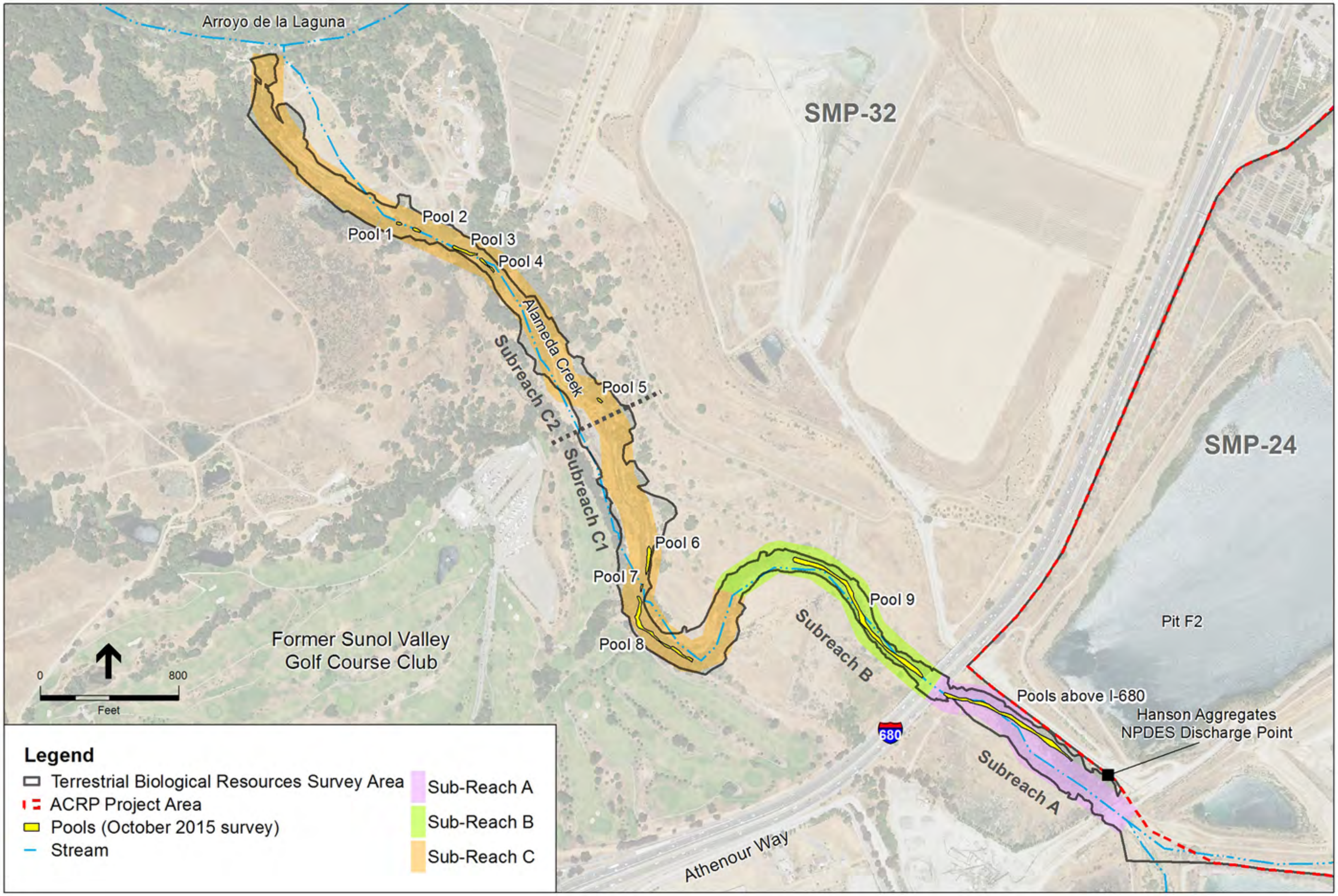
### 7.2.1 Existing Conditions

There are a number of isolated pools that form within the Alameda Creek channel during the dry season between Pit F2 and the creek's confluence with the Arroyo de la Laguna. The pools are a consequence of current hydrologic conditions in Alameda Creek including the NPDES discharges from the quarries which occur just upstream of the pools. The pools provide habitat for amphibians, including the federally-listed California red-legged frog (4).

The pools are shown in Figure HYD7-1 and were plotted based on a survey made in October 15, 2015. There was no significant streamflow in this reach of Alameda Creek for many months before the survey and so the inflow needed to maintain these ponds is presumed to be from a combination of NPDES discharges from the quarries and emerging subsurface flow. These processes are described in greater depth in Appendix HYD2.

### 7.2.2 With-CDRP Conditions

As described in Table HYD7-1, the pools within the Alameda Creek channel that support amphibians are supplied with water by a combination of NPDES discharges of surface water from the quarries and subsurface water emerging from the ground. A change in the rate of NPDES discharge of water by the quarries or a change in the rate of emergence of water from the subsurface would alter the water supply to the pools. As a result, the attributes of the pools could change, which could in turn affect habitat for amphibians. Completion and commissioning of the CDRP could affect both the volume of water discharged by the quarries and subsurface water flow in the vicinity of the quarries.



SOURCE: ESA

SFPUC Alameda Creek Recapture Project

**Figure HYD 7-1**

Pools in Alameda Creek channel observed in October 2015

## TABLE HYD7-1
## SUMMARY OF HYDROLOGICAL AND RIPARIAN CONDITIONS ALONG ALAMEDA CREEK SUBREACHES A, B, AND C UNDER EXISTING, WITH-CDRP, AND WITH-PROJECT CONDITIONS
### (See Figure HYD7-1 for Location of Subreaches)

| Location | Existing Conditions | With-CDRP Conditions | With-Project Conditions |
|---|---|---|---|
| **Subreach A** | **Surface Water**. Surface water conditions in this reach are represented by Node 6 in the ASDHM. Average annual flow volume at Node 6 = 40,100 acre-feet per year, including quarry NPDES discharges. Live stream in wet months. Average total flow volume over the 18-year study period of 834 acre-feet (min: 21 acre-feet, max: 1,534 acre-feet) in dry-season 3-month period of July, August and September, entirely attributable to quarry NPDES discharges. | **Surface Water**. Average annual flow at Node 6 = 35,422 acre-feet per year, including quarry NPDES discharges. Live stream in wet months. Average ASDHM total flow volume over the 18-year study period of 1,618 acre-feet (min: 61 acre-feet, max: 3,667 acre-feet) in dry-season 3-month period of July, August and September, entirely attributable to quarry NPDES discharges. | **Surface Water**. Average annual flow volume at Node 6 = 37,207 acre-feet per year, including quarry NPDES discharges. Live stream in wet months. Average ASDHM flow volume over the 18-year study period of 576 acre-feet (min: 112 acre-feet, max: 1,660 acre-feet) in dry-season 3-month period of July, August and September, entirely attributable to quarry NPDES discharges. |
| | **Subsurface Water**. Subsurface water conditions in this reach are represented by measurements in MW5. Subsurface water levels at MW5 have varied seasonally from at or above the projected creek thalweg[2] elevation of 242 feet elevation in the winter and spring to 223 feet at the end of the dry season in the fall. Altered water management by ODS since 2012 has raised minimum elevations in the fall from 223 feet to about 230 feet.<br>Subsurface water elevations fluctuate within the observed range as a function of hydrology and mining activities, including timing and duration of precipitation through spring, timing and magnitude of dewatering activities by mining operators, and in recent years, water management practices such as by ODS. | **Subsurface Water**. Subsurface water levels at MW5 will vary seasonally from at or above the thalweg elevation of 242 feet in the winter and spring to 230 feet at the end of the dry season in the fall.[1]<br>Fluctuations will occur within this range and will resemble existing conditions as a function of hydrology and mining activities. | **Subsurface Water**. Subsurface water levels at MW5 would vary seasonally from at or above the thalweg elevation of 242 feet in the winter and spring to 230 feet at the end of the dry season in the fall.[1]<br>Fluctuations will occur within this range and will resemble existing conditions as a function of hydrology, mining activities, and variations in ACRP operations. |
| | **Pools.** Live stream through pools in wet months. Pools persist through dry months. | **Pools.** Live stream through pools in wet months. Pools persist longer in dry months. Pools will be larger in the dry months than under existing conditions due to greater quarry NPDES discharges. | **Pools.** Live stream through pools in the wet months. Pools persist in dry months. Pools would be smaller and possibly dry out in the dry season compared to with-CDRP conditions and somewhat smaller in the dry season compared to existing conditions due to ACRP recapture and projected smaller quarry discharges. In some years, about one in three of the hydrologic base period, ACRP would have limited operations leading to a wetter condition. The range from dry to wetter conditions as a function of ACRP operations would produce pooling that is consistent with variability seen under existing conditions. |

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[2] Thalweg is the path of a line connecting the lowest points of cross-sections along a streambed.

## TABLE HYD7-1 (Continued)
## SUMMARY OF HYDROLOGICAL AND RIPARIAN CONDITIONS ALONG ALAMEDA CREEK SUBREACHES A, B, AND C UNDER EXISTING, WITH-CDRP, AND WITH-PROJECT CONDITIONS
## (See Figure HYD7-1 for Location of Subreaches)

| Location | Existing Conditions | With-CDRP Conditions | With-Project Conditions |
|---|---|---|---|
| **Subreach A (cont.)** | **Instream Wetlands.** Instream wetlands are of two types: **perennial instream wetlands** occupy margins of more or less permanent pools and other perennial reaches of the creek. Perennial instream wetlands are the result of the combination of surface and subsurface flows. In Subreach A, perennial instream wetlands exist only because of the additional contribution of quarry NPDES discharges and would not exist due to surface flows alone. **Seasonal instream wetlands** occupy the periphery of pools, isolated seasonal pools within the floodplain, and other low areas subject to seasonal saturation or inundation from surface flows or groundwater seepage, generally drying in the dry season. | **Instream Wetlands.** The extent of instream perennial wetlands around the margins of permanent pools and other perennial reaches of the creek could increase compared to existing conditions because of increased CDRP releases, potentially replacing seasonal wetlands in these areas. The extent of isolated seasonal pools and the instream seasonal wetlands they support would not change substantially from existing conditions because the seasonal pattern of groundwater elevations would not change substantially due to instream flow schedules. | **Instream Wetlands.** The extent of instream perennial wetlands around the margins of permanent pools and other perennial reaches of the creek could decrease compared to with-CDRP and existing conditions, although seasonal wetlands may replace areas supporting perennial wetlands to some extent. The extent of isolated seasonal pools and the seasonal wetlands they support would not change substantially from with-CDRP or existing conditions. No net loss of wetlands expected, although the proportion (seasonal vs. perennial) could vary slightly. |
| | **Woody Riparian Vegetation.** Tree-supporting riparian alliances (including willow thicket and riparian forest alliances) and dense mulefat thicket are found in areas along the low-flow channel. Dense vegetative growth depends on consistent access to surface or shallow groundwater supplied by quarry NPDES discharges, especially during the dry summer months. Sparse mulefat thicket alliance is found in the floodplain away from the low-flow channel. | **Woody Riparian Vegetation.** Tree-supporting riparian alliances could increase compared to existing conditions due to increased dry-season flows attributable to increased quarry NPDES discharges. Extent of mulefat thicket would not change except that some might be replaced by tree-supporting alliances. Density of mulefat could increase along the low-flow channel. | **Woody Riparian Vegetation.** Tree-supporting riparian alliances could decrease compared to existing and with-CDRP conditions due to reduction in dry-season quarry NPDES discharges. Mulefat thicket alliance could replace tree-supporting alliances and mulefat density could decrease in some areas. |
| **Subreach B** | **Surface Water.** Live flow in wet months. Average ASDHM annual flow volume lower than at Node 6 (40,100 acre-feet per year) in Subreach A due to seepage losses to groundwater. Lower total dry-season flow volume in July, August and September in Subreach B than at Node 6 for the same reason. Dry-season flow and pooling attributable to quarry NPDES discharges. | **Surface Water.** Live flow in wet months. Average ASDHM annual flow volume lower than at Node 6 ( at 35,422 acre-feet per year) in Subreach A due to seepage losses to groundwater. Lower total dry-season flow volume in July, August and September than at Node 6 for the same reason. Greater dry-season flow compared to existing conditions due to expected increased quarry NPDES discharges. | **Surface Water.** Live flow in wet months. Average ASDHM annual flow volume lower than at Node 6 (at 37,207 acre-feet per year) in Subreach A due to seepage losses to groundwater. Lower total flow volume in July, August and September than at Node 6 for the same reason. Lower dry-season flow volume compared to existing or with-CDRP conditions because of expected reduced dry season quarry NPDES discharges. |
| | **Subsurface Water.** Subsurface water conditions in this reach are represented by measurements in MW6. Subsurface water levels at MW6 have varied seasonally from at or above the projected creek thalweg elevation of 236 feet elevation in the winter and spring to 221 feet in the fall. Altered water management by ODS since 2012 has raised minimum elevations to about 227 feet. | **Subsurface Water**. Subsurface water levels at MW6 will vary seasonally from the thalweg elevation of 236 feet in the winter and spring to 227 feet in the fall.[1]<br>Fluctuations will occur within this range and will resemble existing conditions as a function of hydrology and mining activities. | **Subsurface Water**. Subsurface water levels at MW6 would vary seasonally from as high as the thalweg elevation of 236 feet in the winter and spring to 227 feet in the fall.[1]<br>Fluctuations will occur within this range and will resemble existing conditions as a function of hydrology, mining activities, and variations in ACRP operations. |

## TABLE HYD7-1 (Continued)
## SUMMARY OF HYDROLOGICAL AND RIPARIAN CONDITIONS ALONG ALAMEDA CREEK SUBREACHES A, B, AND C UNDER EXISTING, WITH-CDRP, AND WITH-PROJECT CONDITIONS
### (See Figure HYD7-1 for Location of Subreaches)

| Location | Existing Conditions | With-CDRP Conditions | With-Project Conditions |
|---|---|---|---|
| **Subreach B (cont.)** | **Pools**. Live stream through pools in wet months. Pools persist through dry months. | **Pools**. Live stream through pools in wet months. Pools persist longer in dry months. Pools will be larger than under existing conditions due to greater quarry discharges and greater subsurface flow. | **Pools**. Live stream through pools in wet months. Pools persist in dry months. Pools would be smaller and possibly dry out in the dry season compared to with-CDRP conditions and somewhat smaller in the dry season compared to existing conditions due to ACRP recapture and projected smaller quarry discharges. In some years, about one in three of the hydrologic base period, ACRP would have limited operations leading to a wetter condition. The range from dry to wetter conditions as a function of ACRP operations would produce pooling that is consistent with variability seen under existing conditions. |
| | **Instream Wetlands.** Instream perennial wetlands occupy margins of permanent pools and other perennial reaches of the creek. Instream seasonal wetlands occupy the periphery of permanent pools, isolated seasonal pools within the floodplain, and other low areas subject to seasonal saturation or inundation from surface flows or groundwater seepage, generally drying in the dry season. | **Instream Wetlands.** The extent of instream perennial wetlands around the margins of permanent pools and other perennial reaches of the creek could increase compared to existing conditions. The extent of seasonal pools and the instream seasonal wetlands they support will not change substantially from existing conditions. | **Instream Wetlands.** The extent of instream perennial wetlands could decrease compared to with-CDRP and existing conditions, although instream seasonal wetlands may replace areas supporting perennial wetlands somewhat. The extent of isolated seasonal pools and the instream seasonal wetlands they support would not change substantially from with-CDRP or existing conditions. No net loss of wetlands expected, although the proportion (seasonal vs. perennial) could vary slightly. |
| | **Woody Riparian Vegetation.** Tree-supporting willow and riparian forest alliances and dense mulefat thickets found in areas along the low-flow channel. Dense growth depends on consistent access to surface or shallow groundwater supplied by quarry NPDES discharges, especially during the dry summer months. Sparse mulefat thicket alliance found in the floodplain away from the low-flow channel. | **Woody Riparian Vegetation.** Tree-supporting willow and riparian forest alliances could increase compared to existing conditions due to increased dry-season quarry NPDES discharges. Extent of mulefat thicket alliance would not change except that a small amount might be replaced by tree-supporting riparian vegetation because of increased dry-season flows. | **Woody Riparian Vegetation.** Tree-supporting willow and riparian forest alliances could decrease compared to existing and with-CDRP conditions due to reduction in dry-season quarry NPDES discharges. Mulefat thicket could replace tree-supporting alliances. |
| **Subreach C1** | **Surface Water.** Live flow in wet months. Average annual flow volume lower than at Node 6 (40,100 acre-feet per year) and in Subreach B due to seepage losses to groundwater. Lower total flow volume in dry-season July, August and September than at Node 6 and in Subreach B for the same reason. Dry-season flow and pooling attributable to quarry NPDES discharges. | **Surface Water.** Live flow in wet months. Average annual flow volume lower than at Node 6 (35,422 acre-feet per year) and in Subreach B due to seepage losses to groundwater. Lower total flow volume in dry-season July, August and September than at Node 6 and in Subreach B for the same reason. Greater dry-season flows compared to existing conditions due to increased quarry NPDES discharges. | **Surface Water.** Live flow in wet months. Average annual flow volume lower than at Node 6 (37,207 acre-feet per year) and in Subreach B due to seepage losses to groundwater. Lower total flow volume in July, August and September than at Node 6 and in Subreach B for the same reason. Lower dry-season flow volume compared to existing or with-CDRP conditions because of reduced dry-season quarry NPDES discharges. |

## TABLE HYD7-1 (Continued)
## SUMMARY OF HYDROLOGICAL AND RIPARIAN CONDITIONS ALONG ALAMEDA CREEK SUBREACHES A, B, AND C UNDER EXISTING, WITH-CDRP, AND WITH-PROJECT CONDITIONS
## (See Figure HYD7-1 for Location of Subreaches)

| Location | Existing Conditions | With-CDRP Conditions | With-Project Conditions |
|---|---|---|---|
| **Subreach C1 (cont.)** | **Subsurface Water.** Subsurface water conditions in the downstream portion of this subreach are represented by measurements in MW8. Groundwater levels at MW8 have varied seasonally within a narrow range from at or above the projected creek thalweg elevation of 224 feet in the winter and spring to 220 feet in the fall. In the absence of a monitoring well in the upstream portion of this reach, using the aquifer profile, it can be inferred that the subsurface water in the upstream portion of this subreach would fluctuate similar to Subreach B and the downstream portion similar to Subreach C2.<br>Streambed gravels are thin and the aquifer has less storage capacity than in upstream reaches. | **Subsurface Water**. Subsurface water levels at MW8 will vary seasonally from at or above the thalweg elevation of 224 feet in the winter and spring to 220 feet in the fall. Subsurface water levels in average years could be comparable to subsurface water levels in wetter years under existing conditions.<br>Fluctuations will occur within this range and will resemble existing conditions as a function of hydrology and mining activities. | **Subsurface Water**. Subsurface water levels at MW8 would vary seasonally from at or above the thalweg elevation of 224 feet in the winter and spring to 220 feet in the fall.<br>Fluctuations will occur within this range and will resemble existing conditions as a function of hydrology, mining activities, and variations in ACRP operations. |
| | **Pools.** Live stream through pools in wet months. Pools probably persist through dry months. Water-bearing streambed gravels are thin and the pools may extend to their base. | **Pools.** Live stream through pools in wet months. Pools persist in dry months. Pools could be larger than under existing conditions due to greater quarry discharges and greater subsurface flow. Live flow may persist longer through pools in dry months. | **Pools**. Live stream through pools in wet months. Pools persist in dry months. Pools would be smaller and possibly dry out in the dry season compared to with-CDRP conditions and somewhat smaller in the dry season compared to existing conditions due to ACRP recapture and smaller quarry discharges ACRP recapture and projected smaller quarry discharges. In some years, about one in three of the hydrologic base period, ACRP would have limited operations leading to a wetter condition. The range from dry to wetter conditions as a function of ACRP operations would produce pooling that is consistent with variability seen under existing conditions. |
| | **Instream Wetlands**. Instream perennial wetlands occupy margins of permanent pools and other perennial reaches of the creek. Instream seasonal wetlands occupy the periphery of permanent pools, isolated seasonal pools within the floodplain, and other low areas subject to seasonal saturation or inundation from surface flows or groundwater seepage, generally drying in the dry season. | **Instream Wetlands.** The extent of instream perennial wetlands around the margins of permanent pools and other perennial reaches of the creek could increase compared to existing conditions. The extent of seasonal pools and the instream seasonal wetlands they support will not change substantially from existing conditions. | **Instream Wetlands.** The extent of instream perennial wetlands around the margins of permanent pools and other perennial reaches of the creek could decrease compared to with-CDRP and existing conditions. Instream seasonal wetlands may replace areas supporting instream perennial wetlands to some extent. Other than this small effect, the extent of seasonal pools and the instream seasonal wetlands they support would not change substantially from with-CDRP or existing conditions. No net loss of wetlands expected, although the proportion (seasonal vs. perennial) could vary slightly. |

## TABLE HYD7-1 (Continued)
## SUMMARY OF HYDROLOGICAL AND RIPARIAN CONDITIONS ALONG ALAMEDA CREEK SUBREACHES A, B, AND C UNDER EXISTING, WITH-CDRP, AND WITH-PROJECT CONDITIONS
## (See Figure HYD7-1 for Location of Subreaches)

| Location | Existing Conditions | With-CDRP Conditions | With-Project Conditions |
|---|---|---|---|
| **Subreach C1 (cont.)** | **Woody Riparian Vegetation.** Tree-supporting willow and riparian forest alliances, and dense mulefat thickets found along the low-flow channel. Dense growth depends on consistent access to surface or shallow groundwater supplied by quarry NPDES discharges, especially during the dry summer months. Sparse mulefat thicket alliance found in the floodplain away from the low-flow channel. | **Woody Riparian Vegetation.** Tree-supporting willow and riparian forest alliances could increase compared to existing conditions due to increased dry-season quarry NPDES discharges. Extent of mulefat thicket would not change except that some might be replaced by dense woody riparian vegetation because of increased dry-season flows. | **Woody Riparian Vegetation.** Tree-supporting willow and riparian forest alliances could decrease compared to existing and with-CDRP conditions due to reduction in dry-season quarry NPDES discharges. Mulefat thicket alliance could replace tree-supporting alliances. |
| **Subreach C2** | **Surface Water.** Surface water conditions in this reach are represented by Node 7 in the ASDHM. Average annual flow volume at Node 7 = 38,274 acre-feet per year, about 5 percent lower than at Node 6. Average total flow volume over the 18-year study period of 16 acre-feet (min: 0 acre-feet, max: 275 acre-feet) in dry-season 3-month period of July, August and September, entirely attributable to quarry NPDES discharges. | **Surface Water.** Average ASDHM annual flow volume at Node 7 = 32,752 acre-feet per year, about 8 percent lower than at Node 6. Average ASDHM total flow volume over the 18-year study period of 476 acre-feet (min: 0 acre-feet, max: 2,301 acre-feet) in dry-season 3-month period of July, August and September, entirely attributable to quarry NPDES discharges. | **Surface Water.** Average ASDHM annual flow at Node 7 = 35,934 acre-feet per year, about 3 percent lower than at Node 6. Average ASDHM total flow volume over the 18-year study period of 39 acre-feet (min: 0 acre-feet, max: 356 acre-feet) in dry-season 3-month period of July, August and September, entirely attributable to quarry NPDES discharges. |
| | **Subsurface Water.** Subsurface water conditions in this reach are represented by measurements in MW10. Subsurface water levels at MW10 have varied seasonally within a narrow range from at or above the projected creek thalweg elevation of 215 feet in the winter and spring to 211 feet in the fall. Streambed gravels are thin and the aquifer has less storage capacity than in upstream reaches. Groundwater elevations higher than 215 feet may occasionally occur as a result of inundation from nearby Arroyo de la Laguna. | **Subsurface Water.** Subsurface water levels at MW10 will vary seasonally from 215 feet in the winter and spring to 211 feet in the fall.<br>Subsurface water levels in average years could be comparable to ground water levels in wetter years under existing conditions.<br>Fluctuations will occur within this range and will resemble existing conditions as a function of hydrology and mining activities. | **Subsurface Water.** Subsurface water levels at MW10 will vary seasonally from 215 feet in the winter and spring to 211 feet in the fall. Little change from existing conditions due to the limited aquifer thickness.<br>Fluctuations will occur within this range and will resemble existing conditions as a function of hydrology, mining activities, and variations in ACRP operations. |
| | **Pools.** Live stream through pools in wet months. Pools may persist through dry months as permeable streambed gravels are thin. | **Pools.** Live stream through pools in wet months. Pools will persist through dry months. Extent of pools in average years will be similar to extent of pools in wetter years under existing conditions. | **Pools.** Live stream through pools in wet months. Pools may persist through dry months. Little change from existing conditions. |
| | **Instream Wetlands**. Instream perennial wetlands occupy margins of permanent pools and other perennial reaches of the creek. Instream seasonal wetlands occupy isolated seasonal pools within the floodplain and other low areas subject to seasonal saturation or inundation from surface flows or groundwater seepage, generally drying in the dry season. | **Instream Wetlands**. Slight increases in groundwater water levels may more consistently support instream perennial wetlands. The extent of seasonal pools and the instream wetlands they support will not change substantially from existing conditions. | **Instream Wetlands**. Little change from with-CDRP and existing conditions. |

## TABLE HYD7-1 (Continued)
## SUMMARY OF HYDROLOGICAL AND RIPARIAN CONDITIONS ALONG ALAMEDA CREEK SUBREACHES A, B, AND C UNDER EXISTING, WITH-CDRP, AND WITH-PROJECT CONDITIONS
## (See Figure HYD7-1 for Location of Subreaches)

| Location | Existing Conditions | With-CDRP Conditions | With-Project Conditions |
|---|---|---|---|
| **Subreach C2 (cont.)** | **Woody Riparian Vegetation.** Tree-supporting willow and riparian forest alliances dominate most of this Subreach. Dense growth depends primarily on consistent access to shallow groundwater rather than from quarry NPDES discharges. Sparse mulefat thickets found in the floodplain in the upstream portion of subreach. | **Woody Riparian Vegetation.** Tree-supporting willow and riparian forest alliances expected to change little if at all because increased dry-season flows are likely to simply flow through the shallow stream channel gravels. Most of this subreach already contains tree-supporting alliances. | **Woody Riparian Vegetation.** Tree-supporting willow and riparian forest alliances expected to change little if at all compared to with-CDRP and existing. Increased dry-season flows with-CDRP are likely to simply flow through the shallow stream channel gravels. With-project dry-season flows are nearly the same as existing. Most of this subreach already contains tree-supporting alliances. |

NOTES: See Appendix HYD1 for details and further explanation of surface water conditions, and see Appendix HYD2 for details and further explanation of subsurface and ground water conditions.

[1] Future scenarios assume that water management changes made by ODS in 2012 will continue in the future.

SOURCE: ESA, LSCE, and Orion, 2016

Under with-CDRP conditions, the NPDES discharges from the quarries are estimated to average 6,620 acre-feet per year as compared to 3,436 acre-feet per year under existing conditions (see Section 4, Analytical Methods, for more information). Because the volume of water discharged by the quarries under with-CDRP conditions is estimated to be greater than under existing conditions, the pools in the creek channel could increase in size. However, the increase in size is likely to be theoretical rather than real because the proposed ACRP would be commissioned soon after the CDRP (within one year). The proposed ACRP would likely cause a reduction in NPDES discharges from the quarries compared to existing conditions, as described below.

### 7.2.3 With-Project Conditions

As described in Table HYD7-1, the pools in the Alameda Creek channel that support amphibians receive their water from the quarry NPDES discharges and water emerging from the subsurface. If the ACRP resulted in a change in the volume of the quarry NPDES discharges or a change in the amount of subsurface water moving north in the Sunol Valley, it could alter habitat for amphibians.

As noted earlier, the NPDES discharges from the quarries are expected to average 6,620 acre-feet per year under with-CDRP conditions as compared to _3,436 acre-feet per year under existing conditions. When the proposed ACRP is in operation, the SFPUC would pump an average of 7,178 acre-feet per year from Pit F2 for municipal use. Under with-project conditions, the volume of water discharged from the quarries is estimated to average 2,532 acre-feet, about 74 percent of its value under existing conditions. Thus, the surface water supply to the pools in the creek channel under with-project conditions would be reduced compared to existing conditions. The reduced surface water supply to the pools as a result of the ACRP, would be expected to result in some reduction in size of the pools during dry months as compared to existing conditions.

## 7.3 Riparian Vegetation

Riparian vegetation is present in a reach of Alameda Creek that could be affected by changes in surface and subsurface hydrology attributable to the proposed ACRP. The riparian vegetation includes woody riparian vegetation and instream wetland vegetation.

**Table HYD7-1** is a summary description of hydrologic and riparian conditions in the Alameda Creek channel between Pit F2 and the Arroyo de la Laguna under existing, with-CDRP and with-project conditions for each of the subreaches identified in Figure HYD7-1. Separate descriptions are provided for surface water conditions, subsurface water conditions, instream wetlands and woody riparian vegetation.

This section provides information on those aspects of Alameda Creek's surface water hydrology that affect riparian vegetation habitat under existing, with-CDRP, and with-project conditions. Information on those aspects of subsurface water hydrology that affect riparian vegetation is contained in Appendix HYD2.

### 7.3.1 Existing Conditions

Most of the Alameda Creek channel from the San Antonio Creek confluence to the Arroyo de la Laguna confluence is currently covered with riparian shrubs and trees. Emergent wetland vegetation exists around the pools shown in Figure HYD7-1 and elsewhere in the creek channel. During the dry season when there is no surface water flow in Alameda Creek at the San Antonio Creek confluence, the riparian vegetation is probably sustained by a combination of water discharged from the quarries under their NPDES discharge permit and groundwater. Riparian vegetation upstream of the I-680 bridge is probably primarily sustained by the quarry NPDES discharges because groundwater levels fall to 15 or 20 feet below the ground surface in this location in the dry season. Groundwater probably plays a more important role in sustaining riparian vegetation downstream of the I-680 bridge because, even in the dry season, groundwater levels there only fall to 5 or 10 feet below the ground surface (5).

The riparian vegetation that exists in the Alameda Creek channel between the San Antonio Creek and Arroyo de la Laguna confluences in 2016 is a product of the conditions that have existed in the channel over the last several decades, including the amount, depth and seasonal pattern of surface and subsurface water flow, the soil conditions, exposure to sunlight, among other factors. The CDRP will not, and the ACRP would not, alter any of the factors important to the abundance and health of riparian vegetation other than to the extent that it would indirectly affect the amount, depth and seasonal pattern of surface and subsurface water flow.

Daily streamflow is probably too transient to have much effect on the abundance and health of riparian vegetation except the rare very high daily flows that may uproot vegetation. Of more importance for riparian vegetation, is the season in which surface flow exists in the Alameda Creek channel. Surface water in the channel and associated elevated levels of subsurface water in the spring and summer supplies water to growing riparian vegetation; the vegetation is dormant in the fall and winter. Average annual streamflow is also important to riparian vegetation because if there was a long-term trend toward drier conditions, then the abundance and perhaps health of riparian vegetation would be expected to decline.

The rate of subsurface water flow is only important to riparian vegetation in the sense that it affects the groundwater level under the channel which, depending how far it is below the surface, may sustain riparian vegetation during periods when there is no surface water flow. Groundwater levels change less rapidly than surface water levels in the creek channel and their location on any particular day is not of much importance for riparian vegetation. Much more important is the seasonal pattern of groundwater levels and their relationship to the root zone for vegetation. Information on subsurface water conditions in the reach of Alameda Creek between Pit F2 and the creek’s confluence with the Arroyo de la Laguna is contained in Appendix HYD2 and summarized in Table HYD7-1, together with information on surface water conditions. The following paragraphs focus on those aspects of surface water flow that most influence the abundance and health of riparian vegetation; that is low flows and flows during the growing season.

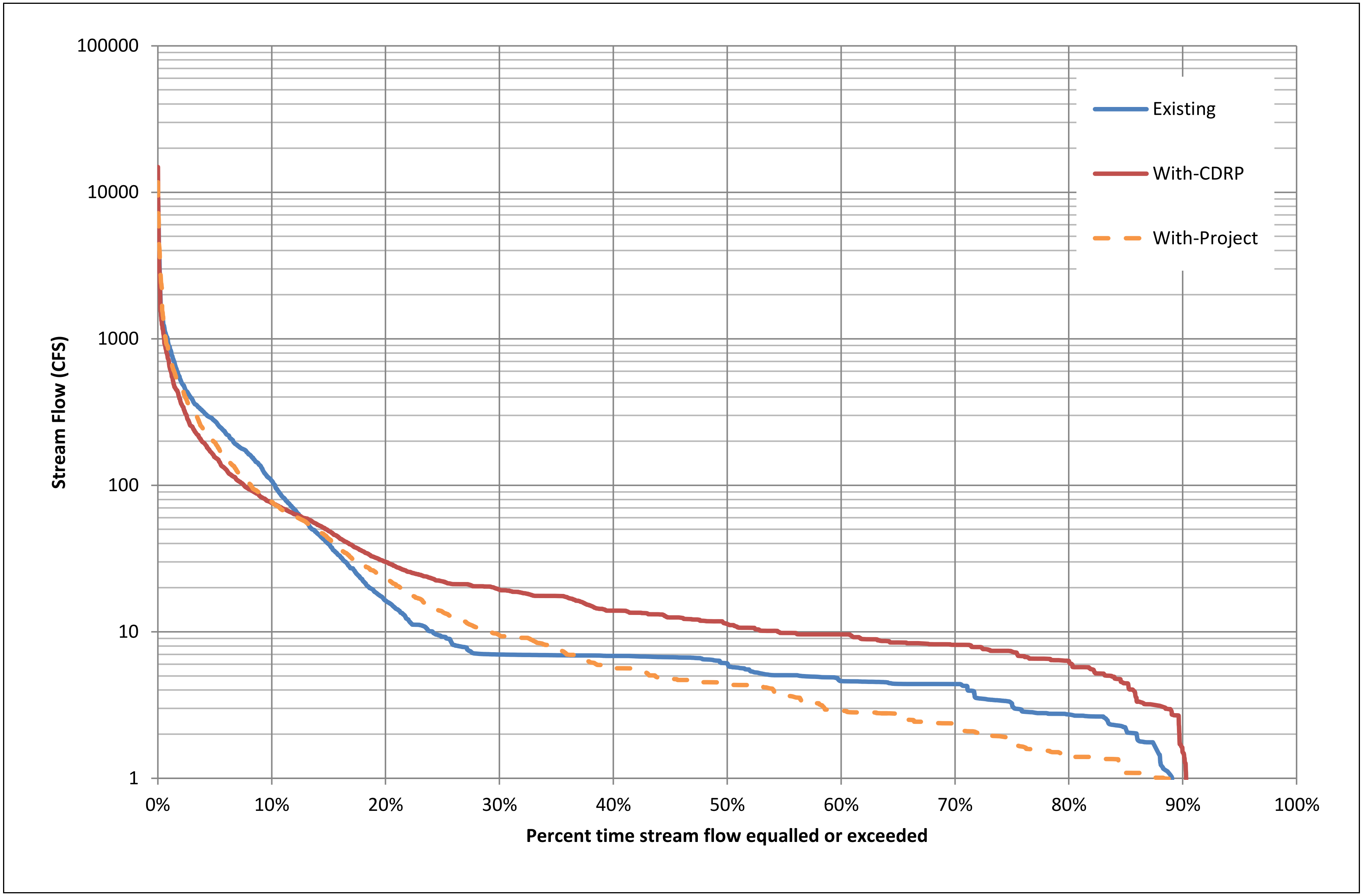
### 7.3.2 Surface Flow Effects Under With-CDRP Conditions

The ASDHM was used to estimate surface water flow in Alameda Creek immediately above and below the San Antonio Creek confluence. Flow immediately above San Antonio Creek depends solely on runoff from upper Alameda Creek. Figure HYD6-4 shows flow duration curves at that location (Node 5) for existing, with-CDRP conditions and with-project conditions. It is estimated that flow exceeds one cfs on 24 percent of the days under existing conditions. There is little or no flow in the creek at this location most of the time under existing conditions. Under with-CDRP conditions, it is estimated that flow will exceed one cfs on 37 percent of the days. The increase is attributable to the bypasses at the ACDD and releases at Calaveras Reservoir that are part of the CDRP.

Node 6, immediately below the San Antonio Creek confluence is at the upstream end of the reach where the proposed project could affect riparian vegetation. This reach is affected by flow from upper Alameda Creek, flow from San Antonio Creek, and the NPDES discharges of water from the quarries. **Figure HYD7-2** shows flow duration curves for Alameda Creek below the San Antonio Creek confluence (Node 6) for the existing condition, with-CDRP condition, and with-project condition.

Flow exceeds one cfs on about 90 percent of the days under both existing and with-CDRP conditions. A comparison between Figures HYD6-4 and HYD 7-2 is instructive. As shown in Figure HYD6-4, Alameda Creek upstream of the quarry NPDES discharges is dry or close to dry most of the time under existing and with-CDRP conditions. As shown in Figure HYD7-2, the creek downstream of the quarry NPDES discharges is wet almost all the time. The difference between the two is attributable to the quarry NPDES discharges.

Flow downstream of the quarry NPDES discharge point exceeds 10 cfs for about 60 percent of the days under with-CDRP conditions but only for about 25 percent of the days under existing conditions. The difference is a result of greater estimated quarry NPDES discharges under with-CDRP conditions. As noted above, the average annual quarry NPDES discharge under existing conditions is 3,436 acre-feet per year; under with-CDRP conditions it is estimated to be 6,620 acre-feet per year. Table HYD6-2 shows average monthly flows in Alameda Creek below the San Antonio Creek confluence (Node 6) for existing and with-CDRP conditions, calculated from daily flows. Daily flows were calculated by adding estimated daily NPDES discharges from the quarries to daily flows for Node 6, estimated using the ASDHM. Average annual flow volume at this location under existing conditions is estimated to be 40,100 acre-feet per year. Under with-CDRP conditions, it is estimated to be 35,422 acre-feet per year. Average annual flow is lower under with-CDRP conditions than under existing conditions, because restoration of full capacity of Calaveras Reservoir enables the SFPUC to divert more water from Alameda Creek for municipal use than it can under existing conditions. Under existing conditions, storage in Calaveras Reservoir is restricted by order of the DSOD.



SOURCE: SFPUC, 2016. Simulated stream flows for different scenarios at 5 nodes and pond elevation for ACRP. Excel spreadsheet file provided by Amod Dhakal on July 7, 2016.

NOTE: Data presented are derived from the Alameda System Daily Hydrologic Model (ASDHM) using from Water Years (1996 – 2013)

SFPUC Alameda Creek Recapture Project

**Figure HYD 7-2**

Flow Duration Curves for Node 6 (Alameda Creek below San Antonio confluence) for Existing, with-CDRP, and with-Project Conditions

Average monthly flow volume will be greater under with-CDRP conditions than under existing conditions, about half the time. Average flow volume under with-CDRP conditions will be greater than under existing conditions in October, November, July, August, and September. Because riparian vegetation is dormant through the fall and winter, the health of the vegetation depends on spring and summer flows. Average monthly flow will be greater under with-CDRP conditions in three of the six spring and summer months than it is under existing conditions.

The changes in flow in Alameda Creek under with-CDRP conditions are likely to be theoretical rather than real because the proposed ACRP would be commissioned soon after the CDRP (within one year). This period of time would be too short for riparian vegetation to be much affected by the change in flows attributable to the CDRP. The proposed ACRP would further change Alameda Creek flow as compared to existing and with-CDRP conditions as described below.

### 7.3.3 Surface Flow Effects Under With-Project Conditions

If the ACRP resulted in a change in Alameda Creek surface water flows in the quarry reach it could alter conditions for the riparian vegetation that exists downstream of the San Antonio Creek confluence. For information on ACRP-caused changes in subsurface flow that could affect riparian vegetation, see Appendix HYD2.

Figure HYD7-2 shows flow duration curves for Alameda Creek below the San Antonio Creek confluence for existing, with-CDRP, and with-project conditions. Under all three conditions, flow in the creek would be greater than one cfs in about 90 percent of the days in the 18-year hydrologic period. Under with-project conditions, flow in the creek would be greater than 10 cfs in about 30 percent of the days in the 18-year hydrologic period. Under existing conditions flow would be greater than 10 cfs on about 25 percent of the days. The differences in frequencies of relatively low flows between the scenarios is largely attributable to the differences in NPDES discharges from the quarries. Under with-project conditions, the average annual quarry NPDES discharge is estimated to be 2,532 acre-feet; under existing and with-CDRP conditions it is estimated to be 3,436 acre-feet and 6,620 acre-feet, respectively (see Table HYD4-2, above).

Table HYD6-2 shows annual average flow volumes in Alameda Creek below the San Antonio Creek confluence for existing, with-CDRP, and with-project conditions. Average annual flow volume under existing conditions is estimated to be 40,100 acre-feet. Average annual flow volume under with-CDRP conditions is estimated to be 35,422 acre-feet. Under with-project conditions, the average annual flow volume is estimated to be 37,207 acre-feet. The differences in annual average flow volumes under the different scenarios are too small to have much effect on riparian vegetation.

Table HYD6-2 also shows monthly average flows in Alameda Creek below the San Antonio Creek confluence. Monthly average flows under with-project conditions would be greater than they are under existing conditions in three months of the year, November, February and March, and less in the other months of the year. Monthly average flows under with-project conditions would be greater than they are under with-CDRP conditions in four months of the year, January, February, March and April, and less in the other months of the year. In both cases, flows under with-project conditions would be less in most drier months than they are under existing and with-CDRP conditions. Riparian vegetation is most affected by flows in the drier months when it is actively growing but water supply may be limited. The differences in drier month flows between scenarios are primarily attributable to differences in estimated quarry NPDES discharges.

**Table HYD7-**2 shows average flow volumes in Alameda Creek downstream of the San Antonio Creek confluence in the spring and summer for existing, with-CDRP, and with-project conditions. Under with-project conditions, estimated flow volumes are lower in the spring and summer than they are under either existing or with-CDRP conditions. They are lower in the spring because of changes in operations at Calaveras Reservoir and lower in summer because of differences in estimated quarry NPDES discharges. Thus, the water supply to the riparian vegetation in and around the Alameda Creek channel downstream of the San Antonio Creek confluence in the spring and summer would be lower under with-project conditions than it is under existing conditions and will be under with-CDRP conditions. The reduction in surface water in Alameda Creek could have an adverse effect on riparian vegetation particularly in the creek reach between the San Antonio Creek confluence and I-680, where the persistence of the vegetation in dry periods appears to rely primarily on NPDES discharges by the quarry operators.

**TABLE HYD7-2**
**ESTIMATED AVERAGE FLOW VOLUMES IN ALAMEDA CREEK BELOW THE SAN ANTONIO CREEK CONFLUENCE (NODE 6) IN SPRING AND SUMMER (acre-feet)**

| Scenario | Total flow volume in spring (April, May and June) | Total flow volume in summer (July, August and September) |
|---|---|---|
| Existing Conditions | 8,390 | 834 |
| With-CDRP Conditions | 6,462 | 1,618 |
| With-project Conditions | 5,920 | 576 |

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## Notes for Section 7

1. Gunther, A.J., J.M. Hagar, and P. Salop, 2000. *An Assessment of the Potential for Restoring a Viable Steelhead Trout Population in the Alameda Creek Watershed.* Prepared for the Alameda Creek Fisheries Restoration Workgroup. February 7, 2000.
2. Leidy, R.A., 2007. *Ecology, Assemblage Structure, Distribution, and Status of Fishes in Streams Tributary to the San Francisco Estuary*, California. San Francisco Estuary Institute, April 2007. Contribution No. 530.

3. Environmental Science Associates, 2016. *Alameda Creek Recapture Project, Alameda Creek Fisheries Habitat Assessment Report*. Prepared for the San Francisco Public Utilities Commission, November 2016. (See Appendix BIO2).
4. Environmental Science Associates, 2016. *San Francisco Public Utilities Commission Alameda Creek Recapture Project Terrestrial Biological Resources Report*, prepared for the San Francisco Public Utilities Commission, November 2016 (See Appendix BIO1).
5. Environmental Science Associates, 2016. *San Francisco Public Utilities Commission Alameda Creek Recapture Project Terrestrial Biological Resources Report*, prepared for the San Francisco Public Utilities Commission, November 2016 (See Appendix BIO1).

# 8. Implications of ACRP-Caused Surface Water Hydrology Changes for Alameda County Water District

Surface water hydrology under existing conditions and with-CDRP conditions are described in detail in Section 5. The changes in surface water hydrology attributable to the ACRP are described in Section 6. This section describes the implications of ACRP-induced changes in surface water hydrology for Alameda County Water District (ACWD), the only other user of Alameda Creek water besides the SFPUC that could potentially be affected by the ACRP. The question to be answered for the CEQA impact analysis is whether ACRP-induced changes in surface water hydrology could cause a change in ACWD operations that has adverse environmental effects.

## 8.1 Alameda County Water District's Water Sources

ACWD obtains its water from three sources, local supplies, the State Water Project and the San Francisco regional water system. The District obtains about 40 percent of its water from local sources, 40 percent from the State Water Project and 20 percent from the SFPUC regional water system (1).

The primary source of the local supplies is Alameda Creek. Alameda Creek water, emerging from Niles Canyon, infiltrates into the Niles Cone groundwater basin. The Niles Cone groundwater basin extends from the foothills of the Diablo Range on the east to San Francisco Bay on the west and from the city of Hayward on the north to the Alameda/Santa Clara County line on the south. ACWD pumps hard water from the Niles Cone groundwater basin, blends it with soft water purchased from San Francisco, and supplies it to its customers. San Francisco delivers Tuolumne River water to the ACWD blending facility from the Hetch Hetchy Aqueduct.

ACWD also collects and stores water from the Alameda Creek watershed in Del Valle Reservoir in the Livermore-Amador Valley. Water from the Del Valle Reservoir is conveyed to ACWD's water treatment plants by the State Water Project's South Bay Aqueduct. State Water Project water from the Sacramento-San Joaquin Delta is also conveyed to the District's treatment plants by the South Bay Aqueduct.

In addition to being delivered directly to ACWD in the South Bay Aqueduct, State Water Project water is released to Alameda Creek at a turnout on the South Bay Aqueduct on Vallecitos Creek, a tributary of the Arroyo de la Laguna. The State Water Project water together with Arroyo de la Laguna and Alameda Creek water flows downstream through Niles Canyon to the Niles Cone. ACWD enhances infiltration of the water into the Niles Cone by diverting water from Alameda Creek at several temporary dams into percolation ponds, some of which were gravel quarries.

The proposed ACRP has the potential to affect one of ACWD's water sources, Alameda Creek. It would not affect delivery of water to ACWD by the State Water Project or San Francisco. If the ACRP altered the amount of water or the seasonal pattern of water flowing through Niles Canyon to the Niles Cone, it could cause a change in ACWD operations that in turn could cause adverse environmental effects.

## 8.2 ACWD's Alameda Creek Operations

ACWD diverts water from Alameda Creek at two inflatable rubber dams near the downstream end of Niles Canyon. Diverted water is routed to the Quarry Lakes and other ponds, where it percolates into and recharges the Niles Cone. Water can be diverted from October 1 to May 31, with a maximum permissible diversion volume set by ACWD's water rights. The maximum permissible diversion volume does not constrain ACWD's operations because it is higher than the amount of water available. During the period the rubber dams are in place, ACWD is required to make releases of water to the downstream reaches of Alameda Creek to support aquatic life but there is no set minimum flow rate, rather the minimum rate is based upon targets for steelhead migration. Currently, ACWD suggests using 25 cfs as a reasonable estimate of the minimum flow rate. It is expected that a new schedule of releases from the rubber dams will replace the current schedule in the next few years. ACWD deflates the rubber dams when instantaneous flow in Alameda Creek exceeds 1,200 cfs to protect the integrity of the dams and diversion structures and they remain deflated when average daily flow exceeds 700 cfs (2).

Although many improvements have been made, ACWD basic operational mode has not changed for several decades. ACWD has been diverting water from Alameda Creek and purchasing it from San Francisco since the 1930s, and receiving water from the State Water Project since the 1960s.

## 8.3 Effects of ACRP on flow in Alameda Creek at Niles

Flow from upper Alameda Creek and Arroyo de la Laguna combine at their confluence upstream of Niles Canyon. Flow from the Arroyo de la Laguna is several times greater than flow from upper Alameda Creek. The proposed ACRP has the potential to affect flow in upper Alameda Creek but not flow from the Arroyo de la Laguna.

ACWD's locally-sourced water comes from Alameda Creek as it leaves Niles Canyon. If the proposed ACRP were to alter the rate of flow in Alameda Creek at that location, it could affect ACWD's operations.

In the following analysis of surface water hydrology three comparisons are made. With-project conditions are compared to pre-2001 conditions (the conditions that existing before the DSOD imposed limitations on storage in Calaveras Reservoir), existing conditions, and with-CDRP conditions.

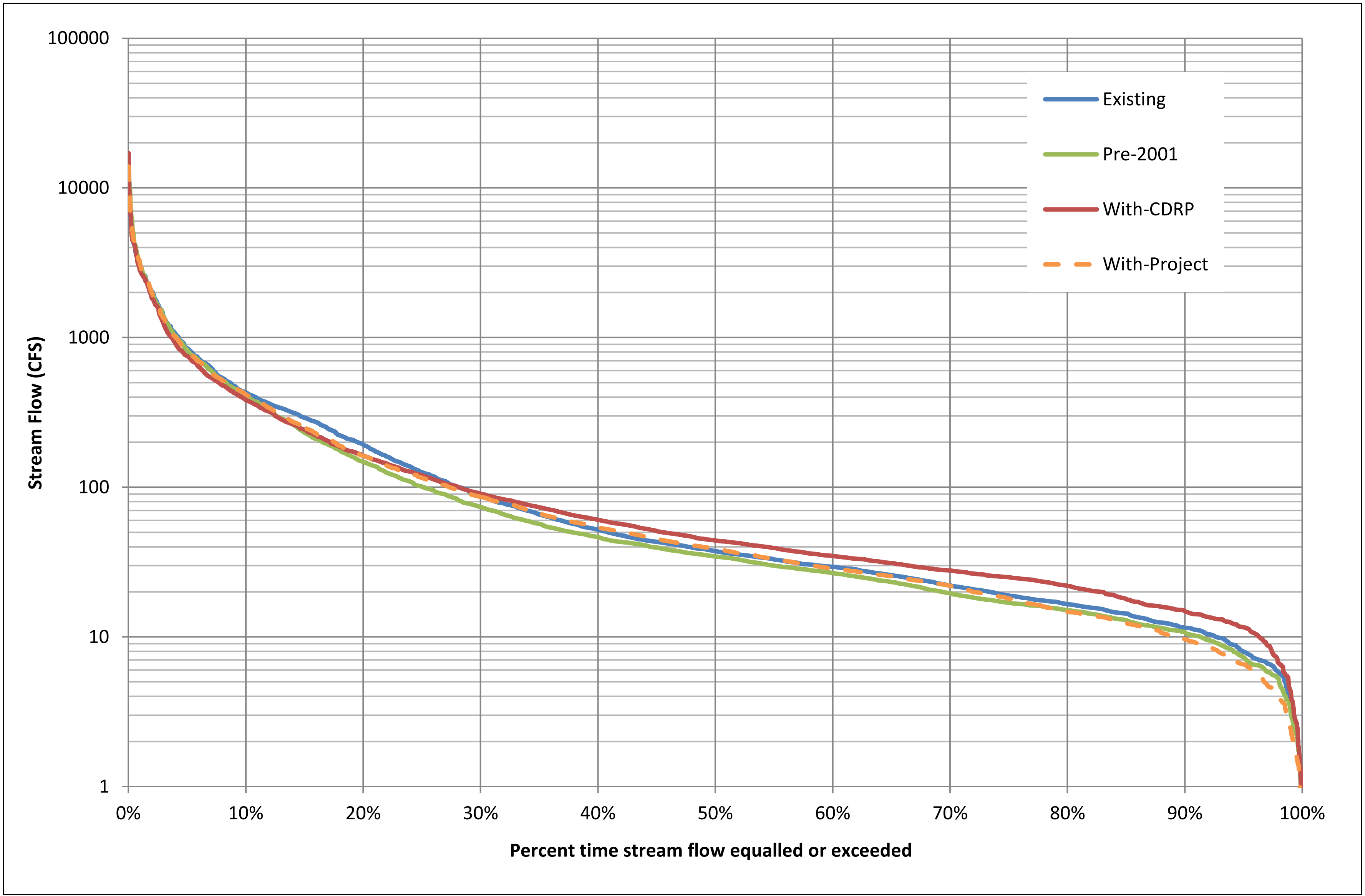
The ASDHM, with adjustments by ESA/Orion, was used to estimate daily flows in Alameda Creek at Niles (Node 9) for four scenarios: pre-2001 conditions, existing conditions, with-CDRP conditions, and with-project conditions. The comparisons between different conditions are made at the location of the USGS gage on Alameda Creek at Niles (Node 9). The gage is located close to the downstream end of Niles Canyon and upstream of ACWD's diversion point. Comparisons are made between the scenarios at flow rates of 25 cfs, 700 cfs, and 1,200 cfs.

## 8.3.1 Comparison of With-project Conditions to Pre-2001 Conditions

### *Estimated Daily Flows*

**Figure HYD8-1** shows flow duration curves for Alameda Creek at Niles (Node 9) for pre-2001 and with-project conditions. The flow duration curves were constructed using data from October 1 to May 31, the period during which ACWD is permitted to divert water from Alameda Creek. Although the flow duration curves in Figure HYD8-1 provide useful information on the potential impacts of the ACRP on flow in Alameda Creek at Niles, they should be viewed with caution. The quarry NPDES discharges in the ASDHM under existing conditions are represented by historical daily NPDES discharges between Water Year 1996 and Water Year 2013. For pre-2001, with-CDRP and with-project conditions, ASDHM output was modified by ESA/Orion to include the estimated NPDES quarry discharges and the losses of surface water to the subsurface between the San Antonio and Arroyo dela Laguna confluences. Under pre-2001, with-CDRP, and with-project conditions, the estimated NPDES quarry discharges are represented by the historical daily NPDES discharges between Water Year 1996 and Water Year 2013 multiplied by a factor (see Section 4, Analytical Methods, for more information). The methodology used to estimate quarry NPDES discharges under pre-2001, with-CDRP, and with-project conditions is based on the best available information — existing quarry NPDES discharge data. But, the methodology necessarily assumes the quarries will continue to operate in the future as they have in the past and given current daily variability, even if they continue to operate as before, they are unlikely to follow the exact same daily pattern. However, changes in the daily pattern of NPDES discharges is expected to have little effect on the flow duration curves for pre-2001, existing, and with-project conditions because under these three scenarios almost all of the water added by the NPDES discharges from the quarries percolates into the ground between the San Antonio Creek and Arroyo de la Laguna confluences and has little influence on surface water flow downstream of the arroyo confluence. A change in the daily pattern of NPDES discharges could be expected to affect the flow duration curve for with-CDRP conditions. Under with-CDRP conditions, the NPDES discharges from the quarries are more voluminous than under the other three scenarios and so some of the water added by these discharges does not percolate into the ground between the San Antonio Creek and Arroyo de la Laguna confluences but continues downstream.

It is expected that some of the water that percolates into the ground between the San Antonio Creek and Arroyo de la Laguna confluences reemerges as surface water flow in Alameda Creek between the arroyo confluence and Niles. No information is available on the quantity of water that might reenter the surface stream and so no allowance is made for it in the ASDHM results, as adjusted by ESA/Orion. As a result, it is possible that the estimates of flow in Alameda Creek at Niles shown in Figure HYD8-1, **Table HYD8-1** and **Table HYD8-3** are understated.



SOURCE: SFPUC, 2016. Simulated stream flows for different scenarios at 5 nodes and pond elevation for ACRP. Excel spreadsheet file provided by Amod Dhakal on July 7, 2016.

NOTE: Data presented are derived from the Alameda System Daily Hydrologic Model (ASDHM) using from Water Years (1996 – 2013)

**Figure HYD 8-1**

Flow Duration Curves for Node 9 (Alameda Creek at Niles)
for ACWD Diversion Period (October 1 – May 31)
for Existing, Pre-2001, with-CDRP, and with-Project Conditions

### TABLE HYD8-1
### FLOW VOLUME IN ALAMEDA CREEK AT NILES (NODE 9) FROM OCTOBER 1 THROUGH MAY 31 FOR WY1996-WY2013 AS ESTIMATED FOR CEQA ANALYSIS (acre-feet)

| Water Year | Pre-2001 Conditions | Existing Conditions | With-CDRP Conditions | With-Project Conditions |
|---|---|---|---|---|
| 1996 | 216,303 | 216,303 | 217,707 | 216,318 |
| 1997 | 190,068 | 190,068 | 186,241 | 192,639 |
| 1998 | 349,584 | 349,584 | 344,306 | 352,207 |
| 1999 | 71,672 | 71,672 | 73,351 | 75,467 |
| 2000 | 93,267 | 97,206 | 87,309 | 94,436 |
| 2001 | 29,822 | 29,477 | 38,428 | 32,568 |
| 2002 | 30,399 | 56,130 | 38,047 | 33,584 |
| 2003 | 57,573 | 65,733 | 69,310 | 64,031 |
| 2004 | 40,625 | 42,614 | 47,768 | 44,090 |
| 2005 | 121,718 | 127,878 | 96,237 | 113,082 |
| 2006 | 160,492 | 168,038 | 138,362 | 161,199 |
| 2007 | 28,277 | 32,541 | 37,115 | 30,721 |
| 2008 | 50,255 | 52,354 | 54,543 | 51,806 |
| 2009 | 44,788 | 38,026 | 40,120 | 41,707 |
| 2010 | 72,845 | 69,440 | 72,665 | 73,736 |
| 2011 | 121,868 | 127,120 | 102,364 | 123,516 |
| 2012 | 21,651 | 22,542 | 24,243 | 25,942 |
| 2013 | 31,546 | 43,358 | 34,236 | 33,306 |
| Average | 96,264 | 100,005 | 94,575 | 97,797 |
| Maximum | 349,584 | 349,584 | 344,306 | 352,207 |
| Minimum | 21,651 | 22,542 | 24,243 | 25,942 |

SOURCE SFPUC, 2016. Simulated streamflows for different scenarios at 5 nodes. Excel spreadsheet file provided by Amod Dhakal on July 7, 2016. Adjusted to include NPDES quarry discharges at Node 6 and losses between Node 6 and 7 by ESA/Orion.

Figure HYD8-1 shows that flow at Niles (Node 9), under pre-2001 conditions is estimated to exceed 25 cfs on about 63 percent of the days. Under with-project conditions, it would exceed 25 cfs on 65 percent of the days. Under both pre-2001 and with-project conditions, it would exceed 1,200 cfs on about 4 percent of the days and 700 cfs on 6 percent of the days. But it is impossible to know what flow at Niles would be on any given day in the future because the NPDES discharges from the quarries are so variable in volume and timing and are unlikely to mirror the daily pattern they exhibited between Water Year 1996 and Water Year 2013. Similarly, due to the loss between San Antonio Creek and Arroyo de la Laguna, it is not known what portion of the NPDES discharge from quarries would actually reach Alameda Creek at Niles.

### *Flow Volumes for Period October 1 through May 31 Calculated from Simulated Daily Flows*

Table HYD8-1 shows flow volumes in Alameda Creek at Niles for the period when ACWD is permitted to divert water from the creek, October 1 through May 31, for pre-2001 and with-project conditions as estimated for CEQA purposes. Under pre-2001 conditions, the average flow volume was

96,264 acre-feet. The average flow volume under with-project conditions would be 97,797 acre-feet or about 1.6 percent more than under pre-2001 conditions.

**Table HYD8-2** shows estimated flow volumes in Alameda Creek at Niles for the period when ACWD can divert water for pre-2001 and with-project conditions as used in the analysis for the Biological Opinion for the CDRP. The estimates do not include losses to the subsurface between the San Antonio Creek and Arroyo de la Laguna confluences in any of the scenarios. Quarry discharges are included under existing conditions but not in the other scenarios.

**TABLE HYD8-2**
**ESTIMATED FLOW VOLUME IN ALAMEDA CREEK AT NILES (NODE 9)**
**FROM OCTOBER 1 THROUGH MAY 31**
**FOR WY1996-WY2013 AS USED IN ANALYSIS FOR CDRP BIOLOGICAL OPINION (acre-feet)**

| Water Year | Pre-2001 Conditions | Existing Conditions | With-CDRP Conditions | With-Project Conditions |
|---|---|---|---|---|
| 1996 | 217,935 | 219,925 | 217,641 | 218,685 |
| 1997 | 191,706 | 193,690 | 186,096 | 195,165 |
| 1998 | 351,153 | 353,206 | 344,792 | 351,483 |
| 1999 | 73,310 | 75,294 | 73,362 | 74,986 |
| 2000 | 95,102 | 100,828 | 86,013 | 95,269 |
| 2001 | 31,035 | 33,099 | 34,446 | 34,446 |
| 2002 | 32,223 | 59,752 | 36,756 | 36,756 |
| 2003 | 58,483 | 69,355 | 66,989 | 66,989 |
| 2004 | 42,820 | 46,236 | 47,302 | 47,302 |
| 2005 | 123,387 | 131,500 | 96,134 | 115,991 |
| 2006 | 161,433 | 171,660 | 137,347 | 162,636 |
| 2007 | 29,760 | 36,164 | 32,252 | 32,252 |
| 2008 | 52,708 | 55,976 | 54,911 | 54,911 |
| 2009 | 47,007 | 41,649 | 39,202 | 44,815 |
| 2010 | 73,659 | 73,062 | 70,157 | 75,571 |
| 2011 | 122,420 | 130,742 | 100,272 | 122,546 |
| 2012 | 25,223 | 26,165 | 27,636 | 27,636 |
| 2013 | 34,909 | 46,980 | 36,633 | 36,633 |
| Average | 98,015 | 103,627 | 93,788 | 99,671 |
| Maximum | 351,153 | 353,206 | 344,792 | 351,483 |
| Minimum | 25,223 | 26,165 | 27,636 | 27,636 |

SOURCE SFPUC, 2016. Simulated streamflows for different scenarios at 5 nodes. Excel spreadsheet file provided by Amod Dhakal on July 7, 2016. Does not include NPDES quarry discharges at Node 6 or losses between Node 6 and 7.

### *Monthly Flows Calculated from Simulated Daily Flows*

**Table HYD8-3** compares average monthly flows in Alameda Creek at Niles for pre-2001 and with-project conditions as estimated for CEQA purposes. Average monthly flows would be greater under with-project conditions than they were under the pre-2001 condition for 8 of 12 months. Average monthly flow volumes would be lower under with-project conditions than under pre-2001 conditions in March, July, August, and September. However, three of these months, July, August and September are months when ACWD is not permitted to divert water from Alameda Creek.

**TABLE HYD8-3**
**AVERAGE MONTHLY FLOWS IN ALAMEDA CREEK AT NILES FOR WITH-CDRP CONDITIONS AND WITH-PROJECT CONDITIONS ESTIMATED FOR CEQA ANALYSIS PURPOSES**
**WY 1996 TO WY 2013 (CFS)**

| Scenario | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Pre-2001 Conditions | 35.0 | 46.8 | 151.4 | 320.5 | 527.4 | 330.1 | 165.5 | 40.3 | 26.1 | 24.5 | 24.2 | 24.7 |
| Existing Conditions | 36.3 | 47.7 | 171.1 | 342.3 | 528.1 | 305.1 | 184.8 | 63.2 | 33.9 | 25.4 | 25.0 | 25.6 |
| With-CDRP Conditions | 39.0 | 52.2 | 162.5 | 315.5 | 532.2 | 272.1 | 165.4 | 51.4 | 33.1 | 30.0 | 28.9 | 30.0 |
| With-project Conditions | 35.0 | 48.2 | 159.1 | 323.8 | 535.7 | 326.7 | 169.5 | 44.9 | 26.6 | 24.0 | 23.7 | 24.0 |
| With-project Conditions minus Pre-2001Conditions | 0 | 1.4 | 7.7 | 3.3 | 8.3 | -3.4 | 4.0 | 4.6 | 0.5 | -0.5 | -0.5 | -0.7 |
| Difference in flow between with project conditions and existing conditions (With-project conditions minus Existing Conditions) | -1.3 | 0.5 | -12.0 | -18.5 | 7.6 | 21.6 | -15.3 | -18.3 | -7.3 | -1.4 | -1.3 | -1.6 |
| Difference in flow between with project conditions and with CDRP conditions (With-project conditions minus With-CDRP) | -4.0 | -4.0 | -3.4 | 8.3 | 3.5 | 54.6 | 4.1 | -6.5 | -6.5 | -6.0 | -5.2 | -6.0 |

SOURCE SFPUC, 2016. Simulated streamflows for different scenarios at 5 nodes. Excel spreadsheet file provided by Amod Dhakal on July 7, 2016. Adjusted to include NPDES quarry discharges at Node 6 and losses between Node 6 and 7 by ESA/Orion

**Table HYD8-4** shows estimated monthly flows in Alameda Creek at Niles for pre-2001 and with-project conditions as used in the analysis for the Biological Opinion for the CDRP. The estimates do not include losses to the subsurface between the San Antonio Creek and Arroyo de la Laguna confluences in any of the scenarios. Quarry discharges are included under existing conditions but not in the other scenarios.

**TABLE HYD8-4**
**AVERAGE MONTHLY FLOWS IN ALAMEDA CREEK AT NILES FOR WITH-CDRP CONDITIONS AND WITH-PROJECT CONDITIONS AS USED IN ANALYSIS FOR CDRP BIOLOGICAL OPINION**
**WY 1996 TO WY 2013 (CFS)**

| Scenario | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Pre-2001 Conditions | 39.5 | 51.7 | 155.9 | 324.3 | 530.7 | 332.9 | 168.0 | 43.2 | 29.4 | 28.0 | 28.2 | 28.5 |
| Existing Conditions | 43.8 | 55.2 | 178.6 | 349.8 | 535.6 | 312.6 | 192.3 | 70.7 | 41.4 | 32.9 | 32.5 | 33.1 |
| With-CDRP Conditions | 39.5 | 53.3 | 163.0 | 313.9 | 530.0 | 268.4 | 161.1 | 48.1 | 30.5 | 28.1 | 28.2 | 28.5 |
| With-project Conditions | 39.5 | 53.3 | 163.9 | 327.9 | 539.1 | 329.8 | 172.2 | 48.2 | 30.5 | 28.1 | 28.2 | 28.5 |
| With-project Conditions minus Pre-2001Conditions | 0.0 | 1.7 | 8.0 | 3.6 | 8.4 | -3.1 | 4.2 | 5.0 | 1.1 | 0.1 | 0.0 | 0.0 |
| Difference in flow between with project conditions and existing conditions (With-project conditions minus Existing Conditions) | -4.3 | -1.9 | -14.7 | -21.8 | 3.4 | 17.2 | -20.1 | -22.5 | -10.9 | -4.7 | -4.3 | -4.6 |
| Difference in flow between with project conditions and with CDRP conditions (With-project conditions minus With-CDRP) | 0.0 | 0.0 | 0.9 | 14.1 | 9.1 | 61.3 | 11.1 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 |

SOURCE: SFPUC, 2016. Simulated streamflows for different scenarios at 5 nodes. Excel spreadsheet file provided by Amod Dhakal on July 7, 2016. Adjusted to include NPDES quarry discharges at Node 6 and losses between Node 6 and 7 by ESA/Orion

## 8.3.2 Comparison of With-project Conditions to Existing Conditions

### *Estimated Daily Flow*

Figure HYD8-1 shows flow duration curves for existing conditions and with-project conditions at Niles (Node 9). Flow at Niles, under existing conditions is estimated to exceed 25 cfs on about 65 percent of the days. Under with-project conditions, it would also exceed 25 cfs on 65 percent of the days. Under both with-project and existing conditions, it would exceed 1,200 cfs on about 4 percent of the days and 700 cfs on 6 percent of the days.

### *Flow Volumes from October 1 through May 31 Calculated from Simulated Daily Flows*

Table HYD8-1 shows flow volumes in Alameda Creek at Niles for the period when ACWD is permitted to divert water from the creek, October 1 through May 31, for existing and with-project conditions as estimated for CEQA purposes. Under existing conditions, the average flow volume in Alameda Creek at Niles is estimated to be 100,005 acre-feet. Under with-project conditions, it would be 97,797 acre-feet, about 2.2 percent less than under existing conditions.

Table HYD8-2 shows estimated flow volumes in Alameda Creek at Niles for the period when ACWD is permitted to divert water from the creek for existing and with-project conditions as used in the analysis for the Biological Opinion for the CDRP. The estimates do not include losses to the subsurface between the San Antonio Creek and Arroyo de la Laguna confluences in any of the scenarios. Quarry NPDES discharges are included under existing conditions but not in the other scenarios.

### *Monthly Flows Calculated from Daily Flows*

Table HYD8-3 compares average monthly flows in Alameda Creek at Niles for existing and with-project conditions as estimated for CEQA purposes. Average monthly flows would be lower under with-project conditions than under existing conditions for nine months of the year. However, four of these months are June, July, August, and September when ACWD is not permitted to divert water from Alameda Creek. Average monthly flows under with-project conditions would be higher than under existing conditions in November, February and March.

Table HYD8-4 shows estimated monthly flows in Alameda Creek at Niles for existing and with-project conditions as used in the analysis for the Biological Opinion for the CDRP. The estimates do not include losses to the subsurface between the San Antonio Creek and Arroyo de la Laguna confluences in any of the scenarios. Quarry NPDES discharges are included under existing conditions but not in the other scenarios.

## 8.3.3 Comparison of With-project Conditions to With-CDRP Conditions

### *Estimated Daily Flow*

Figure HYD8-1 shows flow duration curves for with-CDRP conditions and with-project conditions at Niles (Node 9). Flow at Niles, with-CDRP conditions is estimated to exceed 25 cfs on about 75 percent of the days. Under with-project conditions, it would exceed 25 cfs on 65 percent of the days. Under both with-CDRP and with-project conditions, flows would exceed 1,200 cfs on about 4 percent of the days and 700 cfs on 6 percent of the days.

### *Flow Volumes for October 1 through May 31 Calculated from Simulated Daily Flows*

Table HYD8-1 shows flow volumes in Alameda Creek at Niles for the period when ACWD is permitted to divert water from the creek for with-CDRP and with-project conditions as estimated for CEQA purposes. Under with-CDRP conditions, the average flow in Alameda Creek at Niles is estimated to be 94,575 acre-feet. Under with-project conditions, it would be 97,797 acre-feet, about 3.4 percent more than under with-CDRP conditions. This is because the reduction in storage in Calaveras Reservoir caused by the releases to meet the instream flow schedule is greater for with-CDRP conditions than it is for with-project conditions and, as a result spills are less frequent.

**Table HYD8-2** shows estimated flow volumes in Alameda Creek at Niles for the period when ACWD can divert water for with-CDRP and with-project conditions as used in the analysis for the Biological Opinion for the CDRP. The estimates do not include losses to the subsurface between the

San Antonio Creek and Arroyo de la Laguna confluences in any of the scenarios. Quarry NPDES discharges are included under existing conditions but not in the other scenarios.

### *Monthly Flows Calculated from Daily Flows*

Table HYD8-2 compares average monthly flows in Alameda Creek at Niles for with-CDRP and with-project conditions as estimated for CEQA purposes. Average monthly flows would be lower under with-project conditions than under with-CDRP conditions for eight months of the year. However four of these months are June, July, August, and September when ACWD is not permitted to divert water from Alameda Creek. Average monthly flows under with-project conditions would be higher than with-CDRP conditions in January, February, March, and April.

Table HYD8-4 shows estimated monthly flows in Alameda Creek at Niles for with-CDRP and with-project conditions as used in the analysis for the Biological Opinion for the CDRP. The estimates do not include losses to the subsurface between the San Antonio Creek and Arroyo de la Laguna confluences in any of the scenarios. Quarry NPDES discharges are included under existing conditions but not in the other scenarios.

## 8.4 Implications of ACRP-caused Flow Changes for ACWD Operations

For decades before 2001, the SFPUC operated its Alameda System in a manner that took full advantage of Calaveras Reservoir’s full storage capacity. Under these pre-2001 conditions, the average flow volume in Alameda Creek at ACWD’s diversion point for the eight-month period between October and May when ACWD can divert water is estimated to be 96,264 acre-feet.

In 2001, the DSOD imposed restrictions on storage in Calaveras Reservoir and from 2001 until the present the SFPUC has operated the reservoir with a fraction of its pre-2001 storage capacity. Under existing conditions, the average flow volume in Alameda Creek at ACWD’s diversion point for the eight-month period between October and May when ACWD can divert water is estimated to be 100,005 acre-feet.

In the future, when both the CDRP and the proposed ACRP (if approved) are in operation, the SFPUC will again take advantage of Calaveras Reservoir’s full capacity. Under these with-project conditions, the average flow volume in Alameda Creek at ACWD’s diversion point for the eight-month period between October and May when ACWD can divert water would be 94,575 acre-feet.

From the 2001 until the present, as a result of the SFPUC’s reduced diversion of water necessitated by the storage restrictions at Calaveras Reservoir, an annual average of about 4,000 acre-feet more water has flowed down Alameda Creek to the ACWD diversion point between October and May than did prior to 2001. These conditions will continue until the CDRP and the proposed ACRP (if approved) are commissioned in about 2019. Once the CDRP and the proposed ACRP are commissioned and Calaveras Reservoir's full storage capacity is available to the SFPUC, flow volume at ACWD's diversion point between October and May would be reduced, but it would still be an annual average of about 1,500 acre-feet, or 1.6 percent, higher than under pre-2001 conditions.

Although operation of the proposed ACRP is not expected to have an adverse effect on the overall amount of water available to ACWD from Alameda Creek, it may have an effect on the amount of water available on individual days. At 25 cfs and 1200 cfs, the amount of water available to ACWD on individual days under with-project conditions would be the same or nearly the same as under pre-2001 and existing conditions. It would be less than under with-CDRP conditions.

It is expected that any effects of the proposed ACRP on ACWD operations would be too small to cause ACWD to make substantial changes in the way it operates and uses its various sources of water. Therefore, it is not expected that the proposed ACRP would result in environmental impacts that stem from changes in ACWD operating practices.

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## Notes for Section 8

1. ACWD, 2014. *Reliability by Design: Integrated Resource Planning at Alameda County Water District*.
2. ACWD, 2016. Personal communication between Evan Buckland of ACWD and Joyce Hsiao of Orion Environmental Associates, September 21, 2016.

# APPENDIX HYD2

# Groundwater/Subsurface Water Interactions Technical Memorandum

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# TECHNICAL MEMORANDUM

## GROUNDWATER-SURFACE WATER INTERACTIONS
## ACRP BIOLOGICAL RESOURCES STUDY AREA

Prepared for: ESA

Date: November 2016

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## 1. Introduction

This technical memorandum discusses interactions between groundwater and surface water with respect to aquatic and riparian habitats in the Alameda Creek Recapture Project (ACRP) biological resources study area. It was prepared to support the ACRP environmental impact analysis. The habitat areas occur between the ACRP project location and the Arroyo de la Laguna. The focus on impacts in this analysis is during seasonally dry months between April and November. The ACRP project location and study area are shown in **Figure 1**.

The data analyzed in this study show how groundwater responds to streamflow in Alameda Creek and, in turn, can be interpreted to determine how changes in streamflow in CEQA scenarios will affect shallow groundwater within reaches containing aquatic and riparian habitats. Sources of data included groundwater levels from monitoring wells installed within the study area, surface water elevations in quarry pits, and Alameda Creek streamflow. The monitoring wells in the ACRP study area are distributed such that conditions through any reach can be inferred by interpolation. The periods of record for all data sources encompass seasonal and water-year variations. Monitoring well locations and groundwater level data are shown in **Figure 2**. Monitored quarry pits and surface level data are shown in **Figure 3**. Both figures include Alameda Creek streamflow from a USGS gauge (1173575) located below Welch Creek.

## 2. Setting

For each monitoring well location, minimum and maximum recorded water levels correspond to physical features of the groundwater-surface water system in the study area. First, the minimum level is interpreted as the base of transmissive alluvial materials through which surface water percolates and recharges shallow groundwater. The alluvial materials include Stream Channel Gravels (Qg), consisting of sand and gravel, that occurs along the lowest elevations of stream channels of Alameda Creek and San Antonino Creek, and other tributary streams (LSCE, 1993). This formation and its properties are important because it comprises the Alameda Creek stream bed and serves as a conduit between surface water and groundwater. The distribution of this formation in the study area and vicinity is shown on **Figure 4**.

Younger Alluvium (Qa) underlies the Stream Channel Gravels and occurs on surfaces of slightly higher elevation adjacent to streams and on the Sunol Valley floor. The Younger Alluvium consists of unconsolidated sand and gravel with interbedded clay and silt and represents floodplain, stream channel and alluvial fan deposits. The Stream Channel Gravels and Younger Alluvium comprise the shallow aquifer system discussed in this memorandum and are the only formations that transmit groundwater that is of concern to potential impacts to riparian and aquatic habitat in the study area. Water level data indicate that the Stream Channel Gravels and Younger Alluvium are up to 30 feet in thickness in the quarry reach just upstream of the ACRP project area, decreasing to less than 15 feet near the Arroyo de la Laguna. By their thin nature, the shallow aquifer has limited storage capacity.

Underlying the shallow aquifer system are the Older Alluvium (Qoa) and Livermore Gravels (QTl) formations. These units are difficult to distinguish from borings and neither exhibits favorable water transmitting properties due to high content of fine-grained materials and clay. The Older Alluvium and Livermore Gravels are not feasible water supply sources for agriculture, large municipal, or industrial mining in the project setting. The minimum groundwater level data from monitoring wells delineate the boundary between the shallow aquifer and older non-water bearing formations and the depth to which surface water can percolate and move as underflow[1].

Another physical feature of the study area setting inferred from groundwater data is related to maximum observed water levels, which are interpreted as the fill point for subsurface flow and delineate the upper boundary of the water table aquifer through which groundwater flows and seeps into quarry pits. The groundwater level hydrographs in **Figure 2** indicate that the maximum water levels correspond to peak streamflow in winter months, which then recede as streamflow drops off.

## 3. Groundwater Occurrence and Movement

The primary source of recharge to groundwater in the ACRP study area is percolation of streamflow from Alameda Creek. Other sources may include recharge from older geologic units of the mountain blocks to the east and west, but this source is likely diffuse and potentially intercepted in pits within the quarry reaches south of Interstate 680. Downstream of the quarry reaches, there may be an accrual of recharge from the mountain blocks into the alluvial valley, but it is not apparent from groundwater or surface water observations proximal to Alameda Creek.

Below Welch Creek, streamflow splits into subsurface and surface components as surface water percolates through the Stream Channel Gravels and into unsaturated alluvial materials. Water in the saturated zone then flows under the prevailing down-valley gradient governed by the hydraulic properties of the aquifer materials. For this component of flow, the terms groundwater, subsurface flow, and underflow are interchangeable. In addition, as the system is unconfined, the term water table aquifer also applies. For the ACRP setting, groundwater flow is assumed to occur primarily within the Stream Channel Gravels and Younger Alluvium as the fines content in the Older Alluvium and Livermore Gravels impedes deeper groundwater recharge and movement.

The component of streamflow that enters the subsurface in Alameda Creek above the quarry reaches follows two pathways through the study area. First, a fraction seeps into quarry pits

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[1] Underflow is the downstream movement of water through permeable materials underlying a streambed and which are limited by formations, or rocks, of less permeability (Langbein and Iseri, 1972).

through the Stream Channel Gravels. This pathway is evident through seepage faces on the walls of quarry excavations and is measurable through the rise in water levels in pits in wet months when groundwater and surface water flows peak (see **Figures 2** and **3**). Water that seeps into the pits generally has no outlet unless pit levels rise above the boundary between the Stream Channel Gravels/Younger Alluvium and the underlying Older Alluvium/Livermore Gravels units. Therefore, water that seeps into a pit is stored unless it is removed by pumping (e.g., operator discharges to the creek and consumptive use through processing), lost through evaporation, or it seeps out of pits when levels rise above the shallow groundwater elevation in the shallow aquifer.

A second pathway for the subsurface component of flow follows the stream channel past the quarry reaches and ultimately to the confluence of Alameda Creek and Arroyo de la Laguna. Groundwater monitoring data indicate that aquatic and riparian habitats may be supported by the shallow groundwater table and therefore some fraction of subsurface flow will be consumed by evapotranspiration. Subsurface flow is also intercepted by an infiltration gallery owned by SFPUC and used for irrigation on the adjacent Sunol Valley Golf Course, which closed at the end of 2016. Water is still diverted from the infiltration gallery to maintain the water system and will continue to be used for irrigation on the property. The flow pathways described above are shown schematically in **Figure 5**.

## 4. Groundwater Conditions

Groundwater conditions in the ACRP study area were interpreted from available monitoring data reflecting the pathways and gradients described above. Monitoring wells within the quarry reach above Interstate 680 are also discussed in relation to water levels in quarry pits. For the period of record, water level elevations in some of the quarry pits rose above the base of the shallow aquifer. Under such conditions, the gradient for seepage into quarry pits decreases and, if the pit level rises above the groundwater table, seepage would be rejected and water would seep from the pit to the groundwater.

The creek thalweg[2] elevation is also relevant to conditions observed in the study area. If projected groundwater levels from monitoring wells rise above the thalweg in the absence of a live stream, it will be observed as a pool. As a natural system, pools may be intermittent as a function of an irregular thalweg profile. In this setting, a pool is an expression of the shallow groundwater table and underflow. The Alameda Creek thalweg profile from a 2008 survey by ESA was used in this analysis to relate field observations with groundwater level data.

Using data presented in **Figures 2** and **3**, groundwater conditions and surface water interactions at each monitoring well location are summarized below and illustrated through conceptual cross sections.

### MW 4 – Immediately Upstream of ACRP Project Area

MW 4 is located next to Pit F4 immediately upstream of the ACRP project area. Interpreted conditions for MW 4 are presented in **Figure 6**, which shows the projected Alameda Creek

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[2] Thalweg is the path of a line connecting the lowest points of cross-sections along a streambed.

thalweg, the monitoring well profile, and Pit F4. The drawing is scaled vertically while the horizontal scale is generalized.

The maximum observed water level in MW 4, shown in **Figure 6(a)**, coincides with peak flow in Alameda Creek. This represents the fill point for the shallow aquifer at this location as it cannot store water at higher elevations. Pit F4 is shown at a stage in which it is filling from seepage from the shallow aquifer.

When streamflow decreases after wet months, groundwater rapidly recedes as shown on the hydrographs in **Figure 2** and conceptually in **Figure 6(b)**. Because of the aquifer geometry (i.e., its limited distribution and thin nature), groundwater levels exhibit the same flashy behavior associated with surface water in Alameda Creek. Here, the adjacent Pit F4 is shown in a partially dewatered state as quarry operators typically lowered pit levels and for mining purposes and discharged the water to the creek.

The minimum observed groundwater level at MW 4 is shown in **Figure 6(c)**. This is the interpreted base of the Stream Channel Gravels and Younger Alluvium layer (Qg/Qa) through which groundwater flows. In this figure, the entire aquifer thickness has drained down the valley toward Arroyo de la Laguna or seeped into quarry pits. This state would be typical for summer to late fall with Pit F4 at a lower stage of storage than earlier in the year. From **Figure 2**, it can be seen that such drainage occurred in dry months of each year until 2015.

In 2015, the water level in adjacent Pit F4 rose above the base of the shallow aquifer at MW 4. When this occurred, surface water in the pit seeped into the shallow aquifer in dry months and induced higher groundwater levels in MW 4 as compared to previous years (see **Figure 2**). The quarry pit and monitoring well levels are presented together in **Figure 7** showing the hydraulic connection between the pit and aquifer at this location.

The higher levels in Pit F4 occurred due to operational changes at the SMP 30 quarry where Pits F6 and F4 are located (see **Figure 1**). Since 2012, the operator made no direct discharges to Alameda Creek. This new water management practice resulted in higher storage levels in Pit F4 compared to previous years (as discussed below, the level in Pit F3 West also rose due to a hydraulic connection with Pit F4). Increased storage in Pit F4 can be seen through the gradual increase in pit level (see **Figures 3** and **7**). Direct influences on groundwater are seen in 2015 when water levels in MW 4 rose synchronously with pit levels above the base of the shallow aquifer (Qg/Qa). As discussed below, downstream monitoring wells also experienced influences from seepage from Pits F4 and F3 West, as indicated by their synchronous fluctuations.

### MWs 5 and 6 – Immediately Upstream and Downstream of ACRP Pit F2

**Figure 8** shows conditions for MW 5 in the ACRP project area where Pit F2 would serve as the storage facility and pumping location for the recapture project. The maximum observed groundwater water level is shown in **Figure 8(a)**. Also shown in **Figure 8(a)** is the maximum storage level in Pit F2 (240 feet elevation) under the ACRP project operations plan[3], which would typically be expected to occur at the end of March.

**Figure 8(b)** shows the recession of groundwater with declining stream flow. **Figure 8(c)** shows the minimum observed groundwater level corresponding to the interpreted base of the shallow aquifer. The minimum level in Pit F2 (150 feet elevation) would be observed at summer to fall prior to the onset of the next wet season. In these figures, Pit F2 is shown at progressively lower levels representing ACRP pumping between spring and fall with **Figure 8(c)** showing the maximum drawdown that would occur according to the operations plan.

Historically, the minimum groundwater level occurred in summer to early fall of each year of record until 2012 when levels in Pits F4 and F3 West rose above the base of the shallow aquifer and provided a seepage source through the dry months. **Figure 9a** compares groundwater levels in MW 5 and pit levels in F4 and F3 West showing their hydraulic connection and the gradient for flow from the pits into the shallow aquifer.

A narrative description for MW 6 would be like that for MW 5. Elevated groundwater levels observed in 2012-15 due to higher storage in Pits F4 and F3 West is less evident at MW-6 (see **Figure 9b**), but there appears to be generally higher water levels when compared with readings in 2007-08 (see **Figure 2**).

After 2012, a gradient for seepage from Pits F4 and F3 West to MW 6 was created when the pit levels exceeded the elevation of the base of the shallow aquifer (Qa/Qg) as seen in **Figures 9a** and **9b**. Seepage from Pit F2 would have only occurred briefly in January 2016 when the pit level rose above the base of the aquifer (see **Figure 9b**). However, when Pit F2 is filled to 240 feet under ACRP operations, there will also be a gradient for seepage out of the pit to groundwater until the pit is pumped below the base of the shallow aquifer. **Figure 10** shows the conceptualization of stream-aquifer relationships for MW 6.

As discussed below, pools were observed in the reach from MW 5 to below MW 6 during a terrestrial survey conducted in October 2015. The surface of the pools in the stream channel is an expression of groundwater, or underflow. Seepage from upstream sources such as quarry pits F4 and F3 West would preferentially follow the stream and contribute to underflow. Examination of historical aerial photos in fall months in Google Earth indicate that pools occurred consistently in this area in years prior to 2012, even in a dry year such as 2008[4]. The occurrence of pools into fall are attributed to quarry NPDES discharges, which ranged from 2,512 acre-feet in 2009 to 7,664 acre-feet in 2011. Since 2012, quarry NPDES discharges decreased significantly to about 1,000 acre-feet per year in part due to water management changes at SMP 30. However, pools observed in October 2015 indicate conditions similar to prior years. The occurrence of pools in reaches below MWs 5 and 6 in fall 2015 are attributed to quarry NPDES discharges plus seepage out of Pits F4 and F3 West,

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[3] Chapter 3.6 Operations and Maintenance

[4] e.g., Image August 31, 2008; Google Earth Pro 7.1.2.2041; 37° 34’ 45.45” N 121° 52’ 47.87” W; Elev. 243 ft.; Eye Alt. 2035 ft; Image U.S. Geological Survey; Accessed September 26, 2016.

most evident from higher groundwater levels in MW 5, which migrates downstream and contributes to underflow.

MWs 8 and 9 – Infiltration Gallery Reach

**Figures 11** and **12** show conditions for the MW 8 and 9 locations, respectively. The conditions depicted in these cross sections are considerably different than up-gradient locations particularly with respect to decreased aquifer thickness[5].

At MW 8, the relationship between the stream thalweg and minimum and maximum groundwater levels indicates that pools and live stream conditions are most likely to occur during peak streamflow in wet months. Due to the thinning of the aquifer, groundwater levels fluctuate in a narrower range than upstream sites (i.e., MWs 4, 5, and 6).

At MW 9, the stream thalweg is nearer the interpreted base of the shallow aquifer than at the MW 8 site. As a result, groundwater elevations exceed the projected creek thalweg on a near year-round basis and water levels fluctuate in an even narrower range than at MW 8.
During wet months, the surface water elevation would be near or higher than groundwater. However, with groundwater levels generally above the thalweg elevation throughout the year at MW 9, pools of water would be observed even in dry months when there is no live stream (see **Figure 12(b)**). Pool formation at this site is more a function of the narrow separation between the thalweg and base of the aquifer so that any appreciable underflow may be exposed in the channel. In wet months, pools would merge as Alameda Creek becomes a live stream. Like upstream reaches, groundwater levels exhibit a flashy nature during the winter, only with lower amplitudes governed by the thinner nature of the aquifer. **Figure 13** shows the thalweg profile and thinning of the shallow aquifer through decreasing separation between the creek thalweg and the base of Stream Channel Gravels/Younger Alluvium (Qg/Qa).

MW 9 is located near the SFPUC filter gallery system and Sunol Pump Station. The gallery was previously used to capture groundwater and return it to either San Antonio or Calaveras reservoirs (URS, 2007). The wet well of the pump station was used until 2016 to pump water for irrigation at the adjacent Sunol Valley Golf Course property leased from SFPUC. Water from the infiltration gallery is still diverted to maintain the water system on the property and it will continue to be the source of irrigation supply for the property. The method of capture is by gravity flow of shallow groundwater into horizontally aligned galleries. Historically, capture was augmented by diverting stream flow into basins overlying the horizontal intake sections of the system (LSCE, 2009).

The Sunol Water Temple always has a water table which is about 4 feet higher than the projected creek thalweg at MW9. These galleries may have provided fixed gradient control (i.e., a sink) and, along with possible seepage from the pump station and other piping, may have affected groundwater conditions in the vicinity of MW 9. However, because the aquifer is thinner than upstream reaches, groundwater level fluctuations would be constrained by the

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[5] Here, aquifer thickness is defined as the vertical distance between the interpreted base of the permeable aquifer materials (Qg/Qa) and the ground surface.

limited capacity of the aquifer to store or release water; i.e., it can only fill or drain within a narrow range of groundwater elevations (see **Figure 13**).

MW 10 – Immediately Upstream of Arroyo de la Laguna
**Figure 14** shows conditions for MW 10. At this site, there would be less pooling due to the height of the thalweg relative to groundwater level fluctuations. Immediately downstream of this monitoring well, the thalweg drops 4 to 5 feet so that flow from Arroyo de la Laguna would inundate the area during storm events (see **Figure 13**).

## 5. Groundwater Recharge, Storage, and Discharge

Groundwater systems are characterized through characterization of recharge, storage, and discharge. For the study area setting, these characteristics are apparent in the available monitoring data discussed above. Recharge is seen in the strong relationship between Alameda Creek flow and responses in groundwater levels in monitoring wells. The rapid recession of groundwater after peak streamflow events indicates limited available storage space with discharge ultimately at the Arroyo de la Laguna. The shallow groundwater system exhibits the same flashiness associated with runoff in the watershed and flow in Alameda Creek.

The monitoring data also indicate that the shallow aquifer materials that transmit underflow have decreasing thickness in the lower reaches of the study area from MW 8 to the Arroyo de la Laguna (see **Figure 13**). The decreased thickness is reflected in lower amplitude of groundwater fluctuations. Examination of the transition from the ACRP project reach, where Pit F2 is located, to the area of decreased aquifer thickness reveals that the aquifer system has a spill point near MW 9 (see **Figure 15**). As a result, groundwater cannot be stored in upstream reaches after being recharged by winter storm events, but rather will discharge, or drain, out of the valley as underflow. This is illustrated in **Figure 15**, which compares conditions for a wet period (February 2008) to a dry period (October 2007). For the wet period, Alameda Creek would be a live stream or nearly so with groundwater levels in the adjacent monitoring wells near or exceeding the thalweg. Here, the projection of the water surface between MW 6 and MW 8 does not account for a sloping water surface that exists under peak flow conditions (since the stream is losing). Therefore, a pool or live stream is not interpreted from a direct comparison of thalweg elevation to water levels in the monitoring wells at some locations depending on the thalweg-aquifer configuration. After the wet season, groundwater drains from the upper reaches by gravity, particularly under the initial high gradients caused by peak streamflow events. The drainage is nearly complete through dry months in the absence of other recharge sources.

The groundwater conditions in wet and dry months shown in **Figure 15** represent a typical seasonal cycle for the ACRP setting in which groundwater rapidly recedes after being recharged in winter months. Examination of groundwater levels and pit surface water elevations indicate that recession was variable as a function of when quarry operators initiated pit dewatering for mining operations. Significantly, this cycle changed after 2012 when Pit F4 was maintained at a relatively high storage level due to changes in water management at SMP 30 (due to their hydraulic connection, a similar rise in surface water elevation was observed in Pit F3 West). The result of this practice is seen in **Figure 16** in which pit levels are superimposed on the thalweg-aquifer profiles showing the hydraulic gradient for seepage to the shallow aquifer from Pit F4 and F3 West. As a result, groundwater conditions in the dry months of 2015 were like those in wet months, or other months of considerable quarry NPDES discharges. The "wetter" condition is attributed to the contribution of seepage from the pits, plus regular quarry NPDES discharges.

## 6. Classification of Subreaches and Characteristics

CEQA scenarios are discussed in terms of potential impacts to aquatic and riparian habitats between San Antonio Creek and Arroyo de la Laguna. Based on the physical features of the creek thalweg and underlying shallow aquifer, the study area was subdivided to characterize potential changes to groundwater conditions for each CEQA scenario. The subreach classifications are listed below and shown in **Figure 17**. A location map is shown in **Figure 18**.

| Subreach | Description | Approx. Stationing (ft) | Representative Monitoring Wells |
|---|---|---|---|
| A | San Antonio Creek to Interstate 680 | 98720 to 97200 | MWs 4 - 6 |
| B | Interstate 680 to Downstream MW 6 | 97200 to 95500 | MWs 5 and 6 |
| C1 | Downstream MW 6 to Upstream MW 8 | 95500 to 93500 | MW 6 and MW 8 |
| C2 | Upstream MW 8 to Upstream Arroyo de la Laguna | 93500 to 90520 | MWs 8 - 10 |

Subreaches A and B are the same as delineated in EIR Section 5.14, Biological Resources, and Subreaches C1 and C2 correspond to Subreach C in the EIR. Within the subreaches, groundwater conditions are governed by streamflow and aquifer thickness reflected in the vertical separation between the creek thalweg and base of the Stream Channel Gravels/Younger Alluvium (Qg/Qa) in **Figure 17** and the conceptual cross sections discussed in **Section 4**. Aquifer thickness is greatest in Subreach A where the ACRP facilities are located and least in Subreach C2. Within Subreach B, aquifer thickness is relatively constant, then begins to thin in Subreach C1 due to increasing thalweg slope. Subreach C1 represents a transition where the aquifer is thinnest in Subreach C2 and where intermittent pools are expected to be present year-round at MW 9.

## 7. CEQA Scenarios

This analysis considers potential impacts to groundwater conditions in the biological study area for three scenarios: Existing, With-CDRP, and With-Project scenarios as defined in Section 5.1.2 of the EIR. Each of these scenarios is discussed with respect to the subreaches delineated above.

### Existing Scenario

This scenario is represented by the range of groundwater conditions from 2006 to 2015, as reflected by groundwater levels and quarry pit levels shown on **Figures 2** and **3**, and a smaller discrete dataset from a study of local groundwater conditions in Sunol Valley (LSCE, 1993).

The relationship between groundwater and aquatic or riparian habitat can be determined by relating water levels in MWs 4 – 6 to observed field conditions. For Subreach A, represented by MWs 5 and 6, groundwater levels peak during storm events coincident with peak flows in Alameda Creek. At MW5, the highest level recorded is just greater than the projected thalweg at 242 feet; at MW6, the peak level occasionally and briefly exceeds the projected thalweg at 236 feet (see **Figure 2**). These elevations represent the upper range of groundwater level fluctuations under the Existing Scenario. Outside the wet season from April to October and up to 2012, groundwater levels exhibited seasonal low levels reflective of the base of transmissive alluvial materials at 223 feet elevation at MW 5 and 221 feet elevation at MW 6. After 2012, the seasonal declines were not as great due to seepage effects from Pits F4 and F3 West with low water levels falling to only 230 feet in MW 5 and 227 feet at MW6 (see **Figures 2** and **3**). Wet conditions observed in this reach, including damp soil visible on Google Earth imagery and from in-person site visits, would be due to direct quarry NPDES discharges to the streambed and, after 2012, contribution of seepage to underflow from elevated storage in Pits F4 and F3 West as well.

Subreach B is represented by conditions at MW 6. In this subreach, the creek thalweg and base of the shallow aquifer are relatively flat (see **Figure 17**). Like Subreach A, elevated groundwater levels in MW 6 due to routine quarry NPDES discharges and seepage from stored water in upstream quarry pits support pools in this area outside of the periods when Alameda Creek is a live stream to the Arroyo de la Laguna.

Within Subreach C1, the thalweg profile drops in elevation while the interpreted base of Stream Channel Gravels is roughly flat indicating a thinning of the shallow aquifer. As the aquifer thins, the separation between groundwater and the creek thalweg decreases. As shown in **Figure 17**, the separation is about 15 feet at the upstream end of Subreach C1 and it is nearly 0 feet at the downstream end. Due to a lack of well control in this subreach, groundwater level data are not available. From the geometry of the aquifer system, it is assumed that the transition through which upstream conditions would be represented by data from MW 6 and downstream conditions by MW 8 is linear. From the October 2015 amphibian survey and in other years, pools were present to about halfway through the subreach. From the current analysis, this would be the point where data from MW 8 are more representative of the subreach.

Within Subreach C2, groundwater was exposed in intermittent pools in the October 2015 amphibian survey as well as other years (based on historical aerial imagery). Near MW 9 (see **Figure 2**), this condition would be typical in all years and would not be greatly influenced by upstream quarry practices since the aquifer system has little storage capacity at this location. While there are no available data to evaluate the effects of the historic filter gallery, Sunol Water Temple, and Sunol Pump Station on water levels in this subreach, influences would be the same for all CEQA scenarios.

With-CDRP Scenario

Under the With-CDRP scenario, the Calaveras Dam Replacement Project (CDRP) will be completed, Calaveras Reservoir will operate at full capacity, and in-stream flow requirements and bypassed flow at the Alameda Creek Diversion Dam will be implemented (see detailed descriptions in EIR). During wet months (November to April), peak Alameda Creek flows will exceed available storage space in the shallow aquifer and will also exceed seepage rates into mining pits. A live stream will prevail through all the subreaches with bypass flows at the Alameda Creek Diversion Dam serving to attenuate groundwater recession between storm events.

In dry months (April to November), after peak streamflow and groundwater levels recede, in-stream releases from Calaveras Reservoir will range from 7 to 12 cfs for dry and normal/wet schedules, respectively. At these release rates, two potential outcomes could occur depending on how water is managed in the quarries. First, if pit storage is employed to minimize direct NPDES discharges to Alameda Creek as seen at SMP 30 since 2012, the in-stream releases would induce a wetter condition through Subreaches A, B, and part of C1 as seepage to quarry pits would be rejected by high surface water elevations in pits. The pools observed in October 2015 and in other years would persist and likely extend or connect as groundwater elevations increase due to the addition of the continuous in-stream release flow. The increase might be on the order of a foot or less based on the relationship between streamflow and groundwater level responses. The largest influence would be due to the high storage elevations in Pits F4 and F3 West that induced groundwater levels to rise 5 to 10 feet at MWs 4 and 5 since 2013. A small rise in the water table could expose more underflow and create pools as the water table meets the thalweg in places where it was just below the surface. While wetter conditions are expected, the in-stream releases are not sufficient to produce a live stream throughout the quarry reach.

The second potential outcome considers quarry operations prior to 2013 in which pit storage was not used to avoid direct quarry NPDES discharges as in recent years at SMP 30. In this case, quarry NPDES discharges would occur into about mid-summer after which dry conditions in the shallow aquifer would prevail in the summer to fall. Under this assumption, a significant fraction of in-stream releases would seep into quarry pits (as evidenced from a 2008 experimental release study discussed below). In either case, the effects of bypasses and in-stream releases on groundwater levels are expected to fall within the range of past variations in hydrology and quarry NPDES discharges.

The proportion of releases that would seep into pits and be transmitted as underflow can be evaluated from 2008 experimental releases from Calaveras Reservoir. The experimental releases were part of an in-stream flow assessment study plan by McBain and Trush (2008), which, among other purposes, sought to evaluate seepage losses through the quarry reaches. This led to quantification of a threshold flow, 17 cubic feet per second (cfs), below Welch Creek for which a live stream would be sustained below the quarry reaches (SFPUC, ACWD and McBain and Trush, 2012). Since the in-stream release schedule in dry months under the With-CDRP scenario consists of flows less than this threshold, no live stream would occur within or past Subreach A; this assumes that the quarry operators do not continuously maintain high pit levels in dry months.

Examination of groundwater levels in MW 5 during the 2008 experimental release period was made to assess how the magnitude of the releases influence groundwater levels in the quarry reach. **Figure 19** shows groundwater levels and the experimental release flows measured at the USGS gauge below Welch Creek. The experimental releases were initiated at 33 cfs and followed by 4 two-week release periods at rates of 25, 18, 13, and 7 cfs. From 18 to 7 cfs, groundwater levels declined toward a baseline with no apparent stabilizing influences. It appears, then, that residual underflow from in-stream releases may have minor effects on conditions in the lower subreaches, particularly in a dry year. Thus, underflow from in-stream releases would be a contributory factor to conditions in the quarry reach where quarry NPDES discharges and seepage from pits are most evident in historical observations and groundwater data.

For the With-CDRP scenario, dry month in-stream releases would mainly influence groundwater levels in the study area subreaches by contributing to underflow. The releases would pass through the subreaches and extend or connect pools that are often observed downstream through addition to quarry discharges and seepage from pits. If the SMP 30 quarry operator does not store water on-site to limit direct NPDES discharges to the creek, then much of the in-stream flow could seep into quarry pits. Based on the stream flow studies cited above, the in-stream releases are not sufficient on their own to create a live stream to Arroyo de la Laguna during the dry season. The combined in-stream releases, quarry NPDES discharges, and pit seepage would be expected to support pools within the same range as historical conditions.

### With-Project Scenario

Under the With-Project scenario, water that naturally seeps into Pit F2 would be stored in wet months and recaptured by pumping in dry months. The hydraulic connection between Pit F2 and groundwater would undergo changes during storage and recovery cycles that result in gradients for seepage into and out of the pit. The main difference in groundwater conditions between With-Project and Existing/With-CDRP scenarios is the systematic storage and pumping of water in Pit F2 that would occur with ACRP implementation, and it is primarily the systematic aspect that distinguishes the scenarios. Storage in Pit F2 under the ACRP would be indiscernible from natural seepage into the quarry pit that occurs each winter under any scenario. The recapture cycles in which water is pumped from Pit F2 would be analogous to quarry dewatering except that ACRP pumping does not discharge to the creek and it results in lower quarry NPDES discharges compared to the Existing scenario. While this would result in drier conditions in the creek downstream of the quarry operations discharge point compared to With-CDRP conditions, the in-stream releases and bypasses will serve to offset ACRP pumping relative to the Existing scenario. This is because the ACRP recapture volume is, on average over the historical hydrology and simulated operations, less than the bypasses and releases by an amount comparable to the estimated reduction in quarry NPDES discharges[6]. As detailed below, in one-third of the 18-year hydrology used in simulating ACRP recovery operations, the water level in Pit F2 will remain higher than the base of the shallow aquifer due to a lack of unused storage volume in Calaveras Reservoir governing recapture of bypassed or released water[7].

In years when SFPUC does not fully draw down or recapture stored water in Pit F2 stored water would seep into shallow groundwater throughout the dry months. This is analogous, but slower, than quarry NPDES discharges that occur the under Existing scenario and that will occur under the With-CDRP scenario.

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[6] Chapter 3.6 Operations and Maintenance
[7] Ibid.

When water is stored in Pit F2 under the With-Project scenario, the surface water elevation is temporarily higher than groundwater, creating a gradient for seepage out of the pit as shown conceptually in **Figure 20(a)**. Under a typical storage and recapture cycle, seepage out of the pit would occur until the pit is pumped down to the elevation of the groundwater table in the adjacent shallow aquifer as shown in **Figure 20(b)**. This occurs rapidly within the first month of pumping as groundwater elevations would typically be close to the maximum pit storage level in the Existing scenario (see **Figure 2**). When the water level in the pit is drawn below the groundwater level, there would be no seepage from Pit F2 to the groundwater. And, when the water level falls below the base of the shallow aquifer at 221 to 224 feet elevation (corresponding to the base of the shallow aquifer at MWs 6 and 5, respectively), the pit and shallow aquifer are hydraulically disconnected as shown in **Figure 20(c)**. This occurs in two-thirds of the hydrologic period used in simulating ACRP recapture pumping.

In a year with little or limited recapture pumping (i.e., one-third of hydrologic period used in simulating ACRP operations), water stored in Pit F2 would contribute to underflow from other sources including variable quarry NPDES discharges and seepage from pits influenced by SMP 30 water management practices. This storage condition has the potential to influence groundwater conditions within Subreaches A, B, and the upper half of C1 by increasing underflow and supporting more expansive pools in fall months. This may not deviate substantially from the Existing scenario in years prior to 2012 when annual quarry NPDES discharges were consistently 3,000 to 5,000 acre-feet per year.

## 8. Conclusions

Potential impacts of the ACRP project on the Alameda Creek groundwater system are governed by the extent and distribution of shallow aquifer materials and their connection to Alameda Creek. This connection permits recharge by Alameda Creek and, in turn, seepage into quarry pits to store water for recapture operations under the With-Project CEQA scenario.

Before Calaveras Reservoir operation was restricted by DSOD (pre-2001), groundwater would seep into quarry pits and, depending on streamflow, would flow past the pits to the lower reaches as surface water and/or underflow. Ultimately, surface water and groundwater not consumed or stored in pits drains from the valley as outflow through Alameda Creek downstream of Arroyo de la Laguna. Underflow would occur until the aquifer pinches out at which point groundwater and surface water merge as surface flow. These pathways were previously described and are depicted in **Figure 5**.

Peak stream flows in Alameda Creek rapidly fill the shallow aquifer consisting of Stream Channel Gravels and Younger Alluvium formations. When streamflow recedes, groundwater levels decline similar to the flashiness of Alameda Creek surface flow. In dry months, in-stream releases under With-CDRP and With-Project scenarios have less influence on groundwater conditions than direct quarry NPDES discharges and high water levels in active quarries, which can produce wetter or drier conditions throughout the biological resources study area as a function of water year and water management practices. In recent years, water management practices have produced higher groundwater elevations in MW5, just upstream of ACRP Pit F2, and possibly downstream at MW6. While the With-Project scenario will be drier than With-CDRP due to recapture pumping, there will be only minor changes in groundwater conditions compared to the Existing scenario because of variability in the hydrologic base period analyzed for ACRP pumping and the fact that, on average, ACRP pumping is less than bypass and release volumes.

The following table summarizes characteristics of each scenario according to the groundwater-surface water interactions described in this report.

| Location | Existing | With-CDRP | With-Project |
|---|---|---|---|
| Subreach A | There is sufficient streamflow in wet months to support a live stream in Subreach A. In dry months after recession of the live stream, pools in this subreach may be observed and supported primarily by quarry NPDES discharges. Since 2012, groundwater levels in nearby monitoring wells have increased to shallower depths due to water management practices at SMP-30 where the operator has maintained greater storage levels in Pit F4. This practice has in turn induced higher surface water levels in Pit F3 West and causes seepage to groundwater. This seepage source would also support pools in combination with quarry NPDES discharges. Water in this area is likely perennial or nearly perennial. | In-stream flow releases and bypasses will have minor effect on groundwater conditions compared to the Existing scenario. Pools may expand slightly due to increases in groundwater levels induced by in-stream releases. | In wet months, live streamflow will prevail through Subreach A just as in the Existing and With-CDRP scenarios.<br>In two-thirds of years in the base hydrologic period, ACRP pumping will reduce direct quarry NPDES discharges. On average, the recapture amount is less than the bypasses and releases by about the average decrease in projected quarry NPDES discharges.<br>In years that ACRP does not operate due to lack of available storage in Calaveras Reservoir, about one-third of the years, water will seep into shallow groundwater from Pit F2 as underflow in the subreach resulting in conditions similar to wet years in Existing scenario.<br>The variability in groundwater levels in Subreach A over the base hydrologic period used to model ACRP operations will be similar to the Existing scenario. |
| Subreach B | Same as Subreach A. | Same as Subreach A. | Same as Subreach A. |
| Subreach C1 | Quarry NPDES discharges and high pit levels influence groundwater in the upper half of this subreach. The lower half has characteristics similar to Subreach C2. | Effects on groundwater levels due to bypasses and in-stream releases will contribute to underflow and make this subreach wetter than Existing scenario. The wetter condition will extend and expand ponding according to the stream channel geometry. | Lower quarry NPDES discharges in two-thirds of the years will result in similar groundwater fluctuations and similar or slightly less pooling as ACRP pumping is offset by bypasses and releases in the upper part of this subreach. In one-third of years, wetter conditions will result as storage in Pit F2 seeps to the shallow groundwater and contributes to pooling as underflow. |
| Subreach C2 | Intermittent pools exist year- | No change. | No change. |

| | | | |
|---|---|---|---|
| | round due to residual underflow. Quarry operations do not cause significant changes due to limited aquifer storage capacity. | | |

## 9. References

Langbein, W.B. and Iseri, Kathleen T. 1972. *Manual of Hydrology: Part 1 General Surface Water Techniques; General Introduction and Hydrologic Definitions*. Geologic Survey Water-Supply Paper 1541-A. United States Department of the Interior Geologic Survey.

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URS Corporation. 2007. *Sunol, California Task 1.3 – Condition Assessment Report Alameda County, California for SFPUC Alameda Creek Fishery Enhancement*. Prepared for San Francisco Public Utilities Commission. September 26.

# Figures

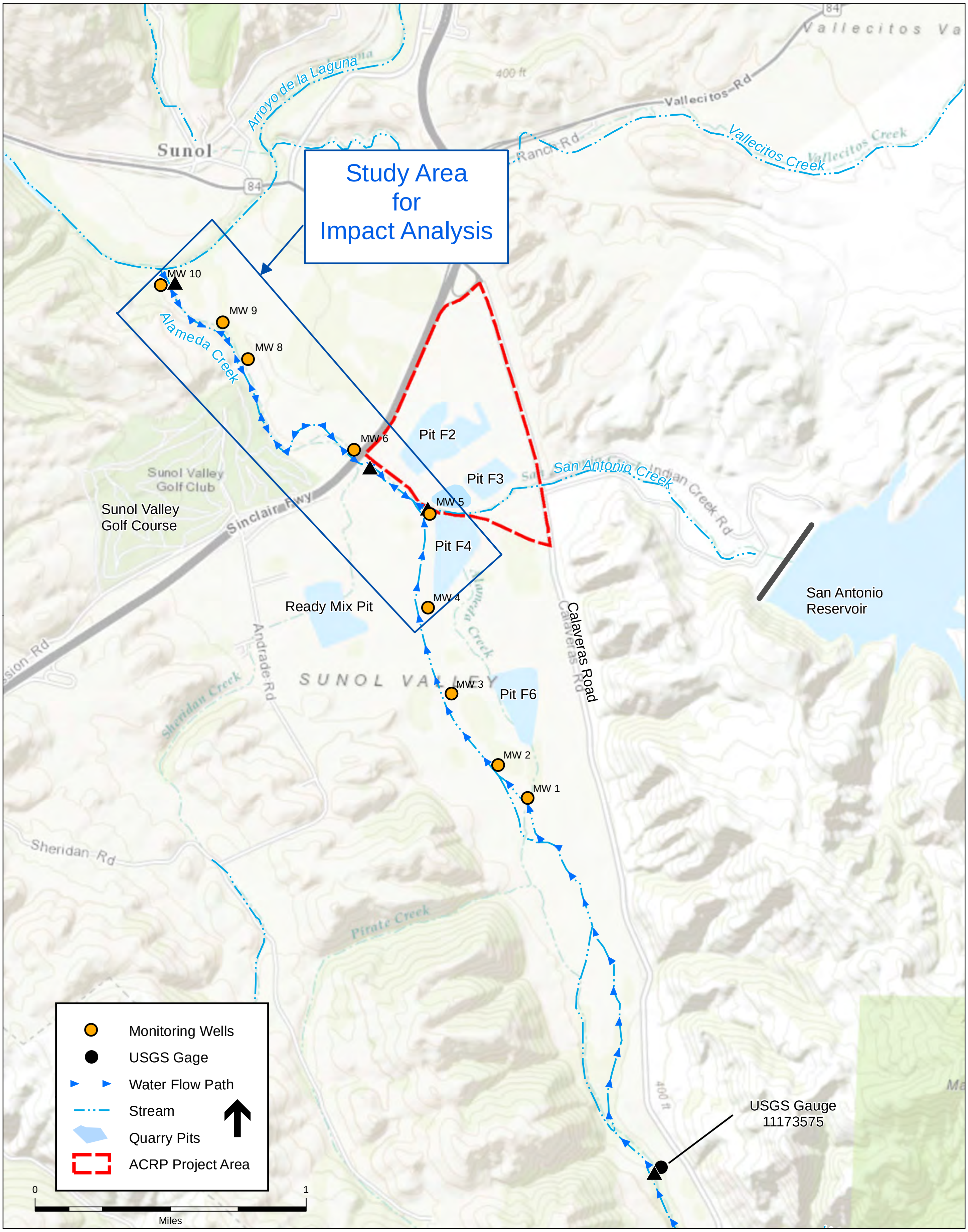

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Figure 1
ACRP Study Area Location Map

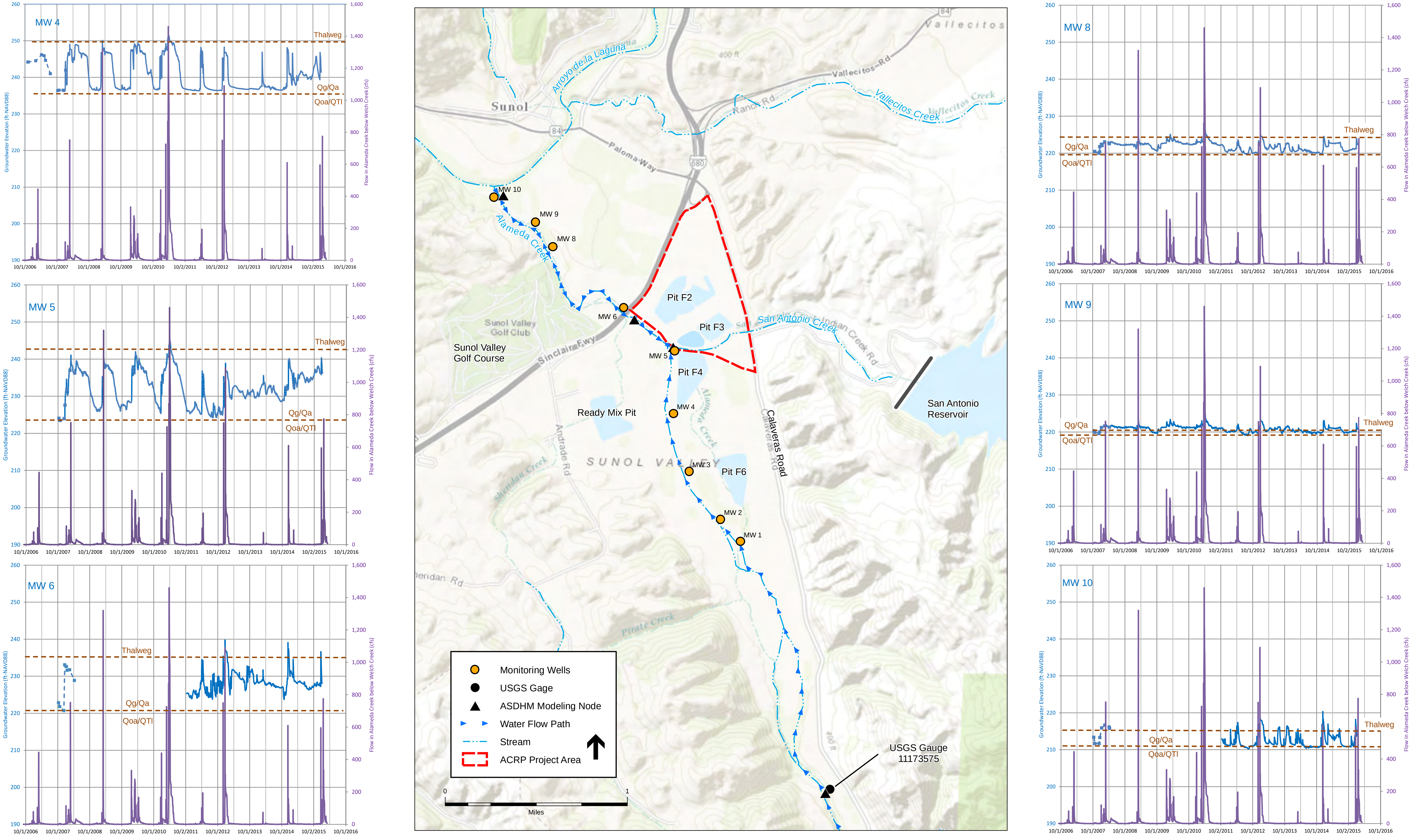

Figure 2
Groundwater Level Data for WY 2006 to Present

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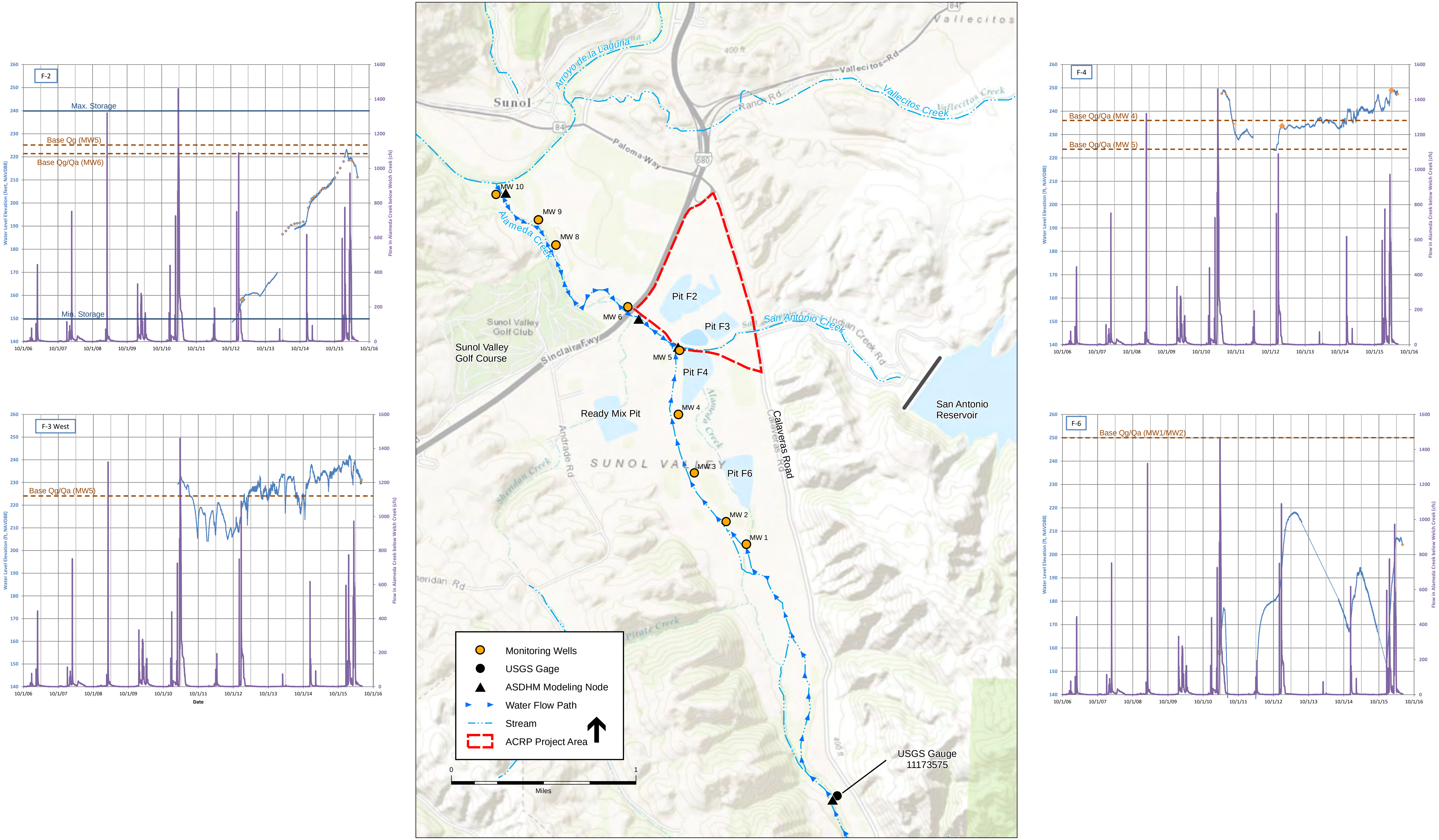

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Figure 3
Water Levels in Quarry Pits for WY 2011 to Present

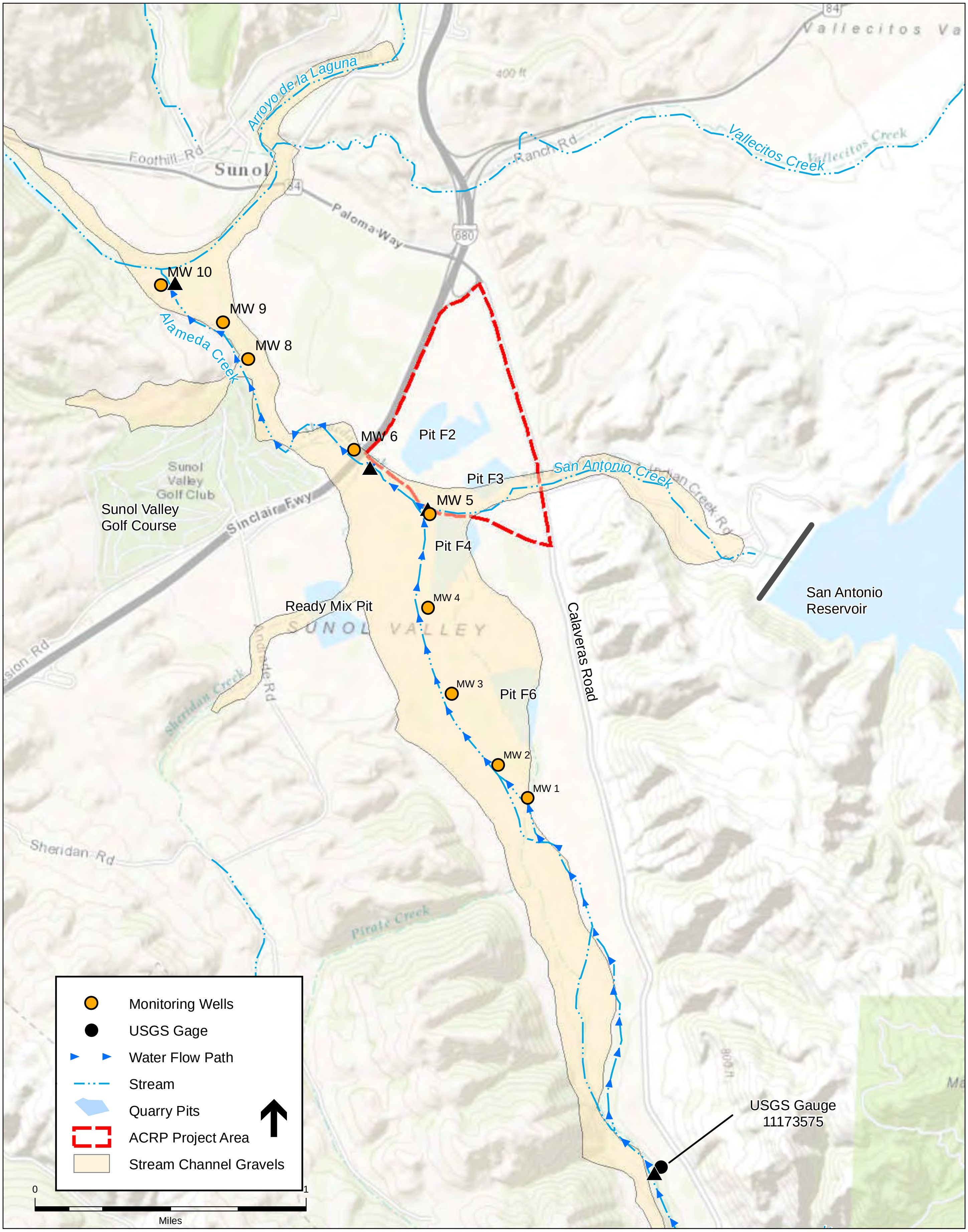

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Figure 4
Occurrence of Stream Channel Gravels (Qg)

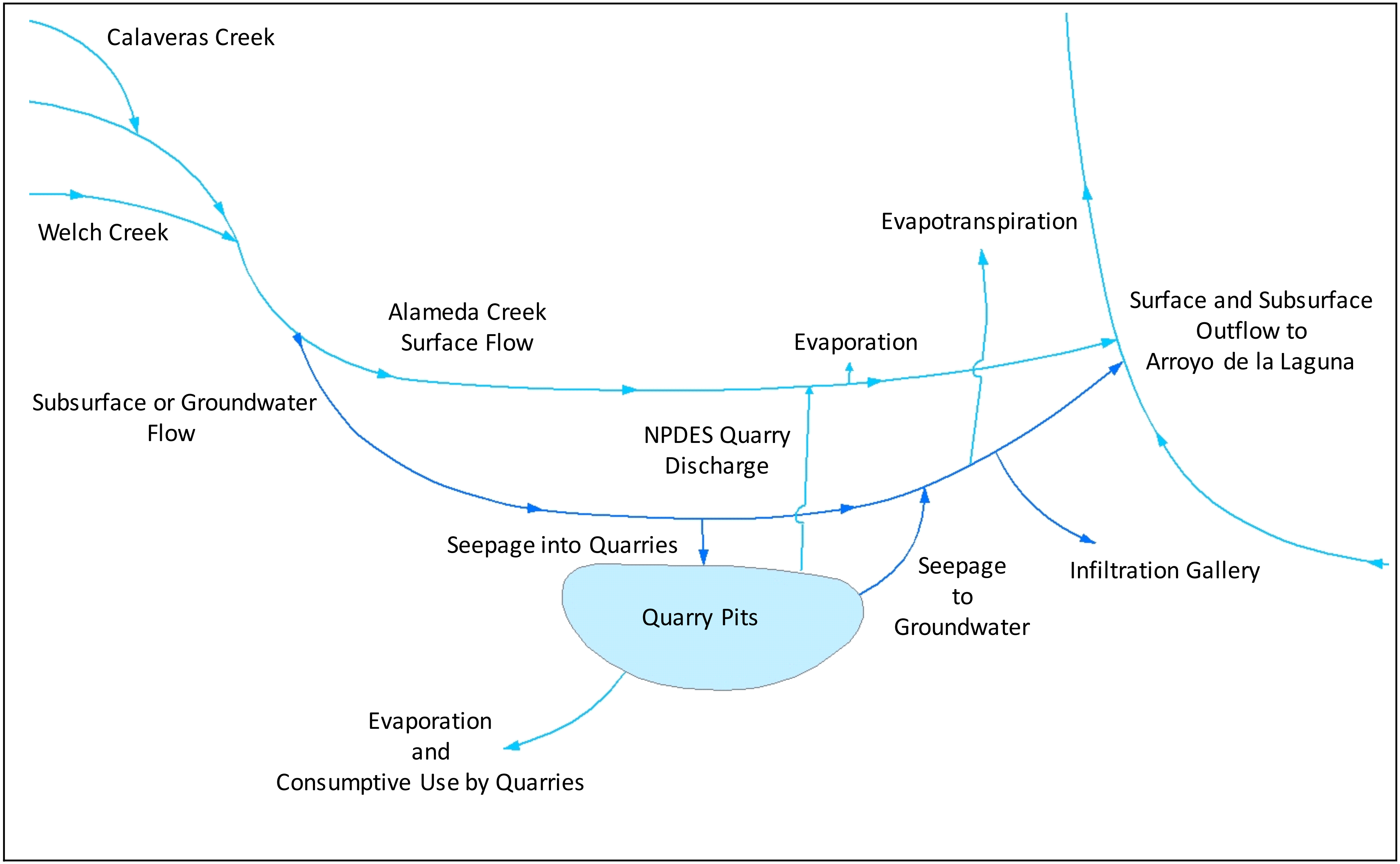

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Figure 5
Conceptual Flow Pathways
ACRP Groundwaeter - Surface Water Interactions

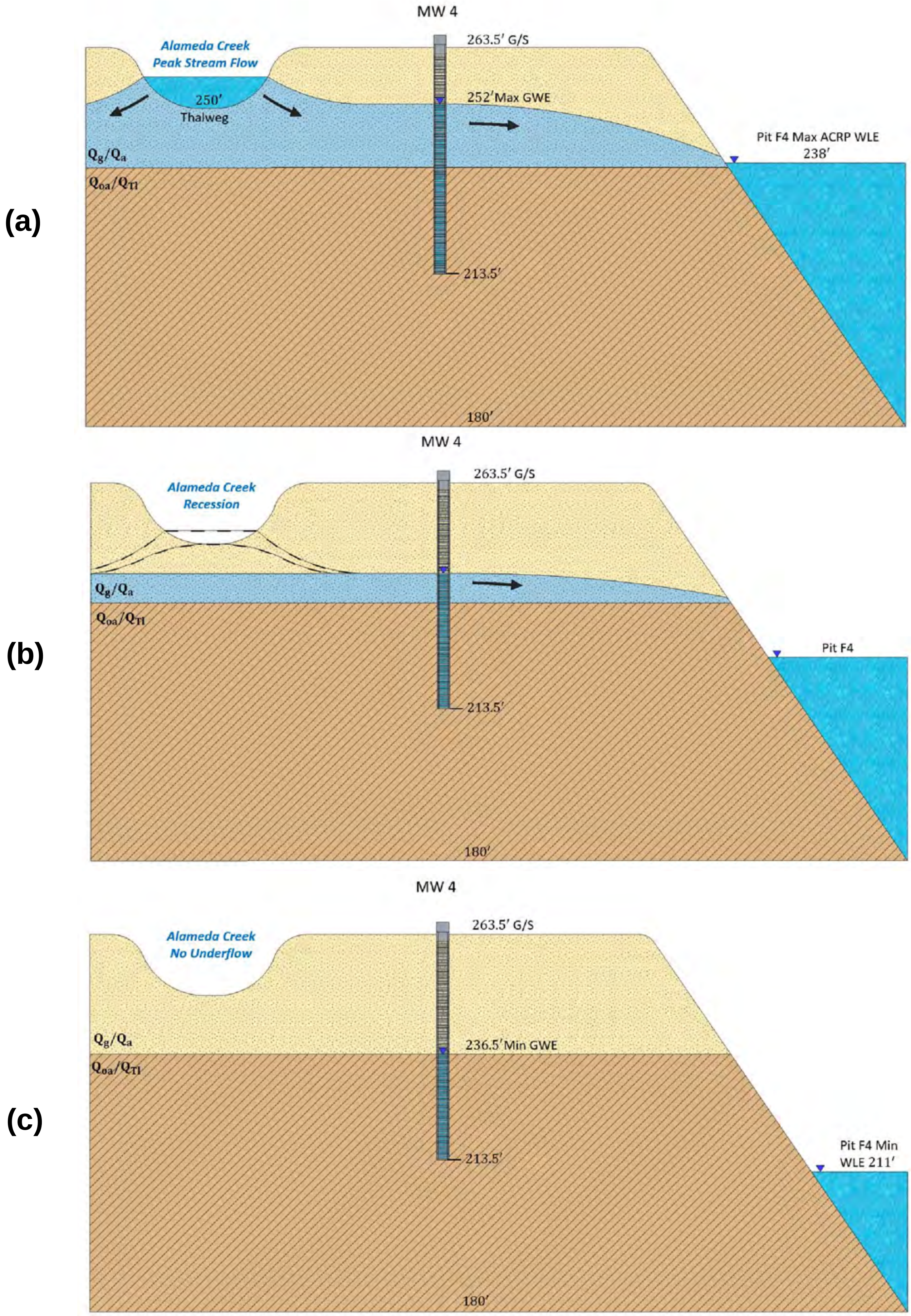

Figure 6
MW 4 and Peak Flow (a), Recession (b), and Minimum (c)

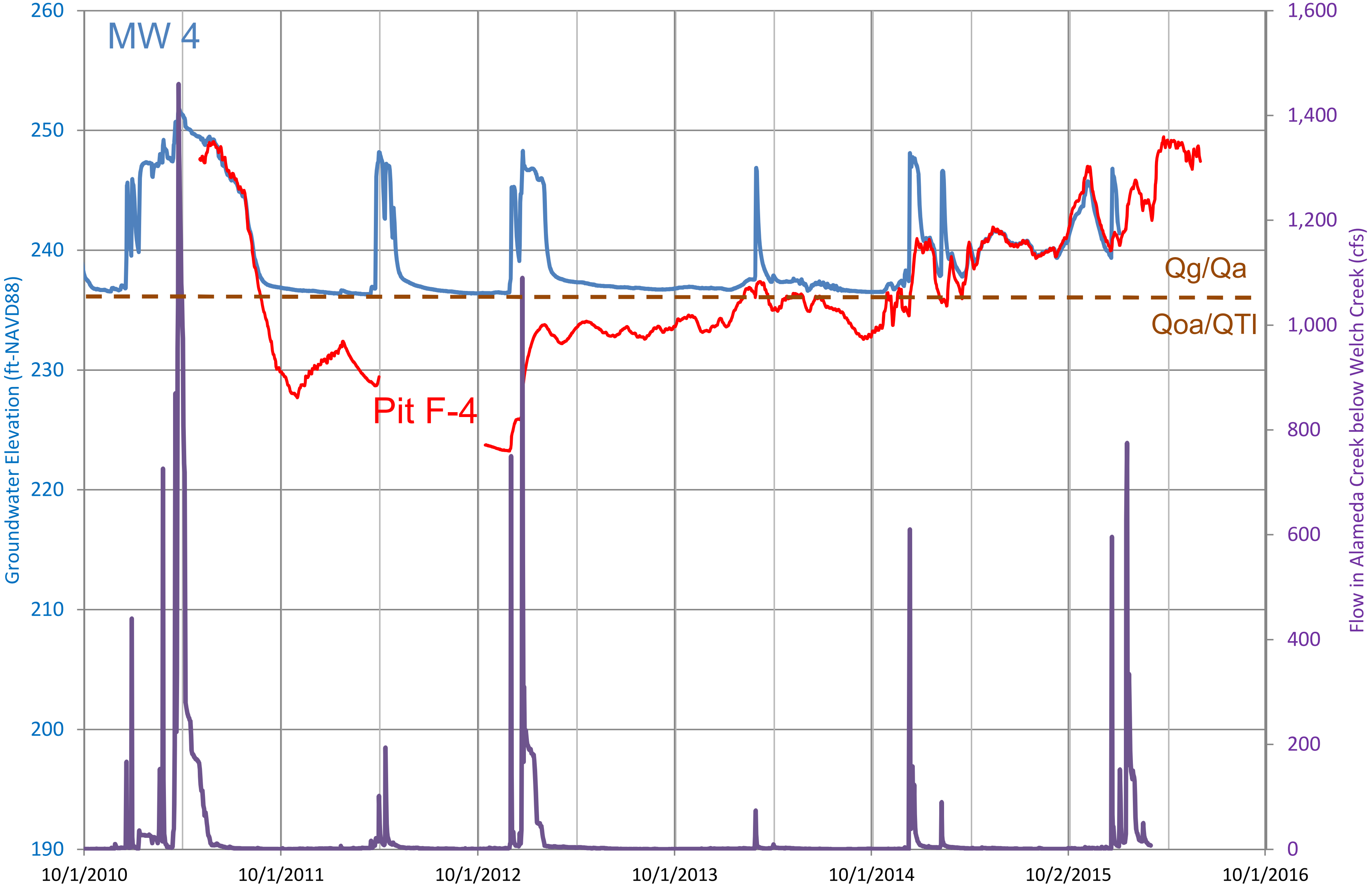

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Figure 7
Hydraulic Connection Between MW 4 and Pit F-4

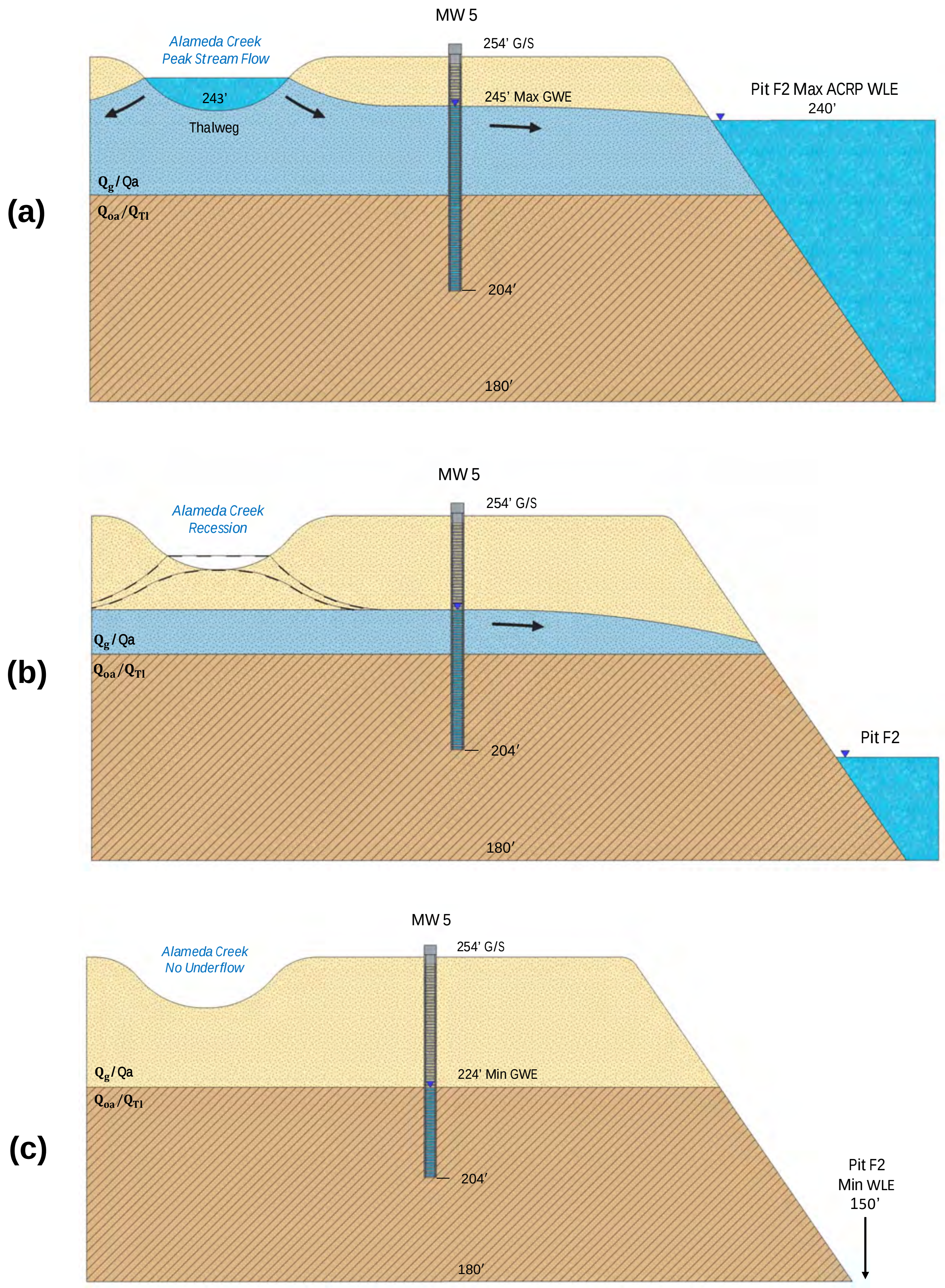

Figure 8
MW 5 and Peak Flow (a), Recession (b), and Minimum (c)

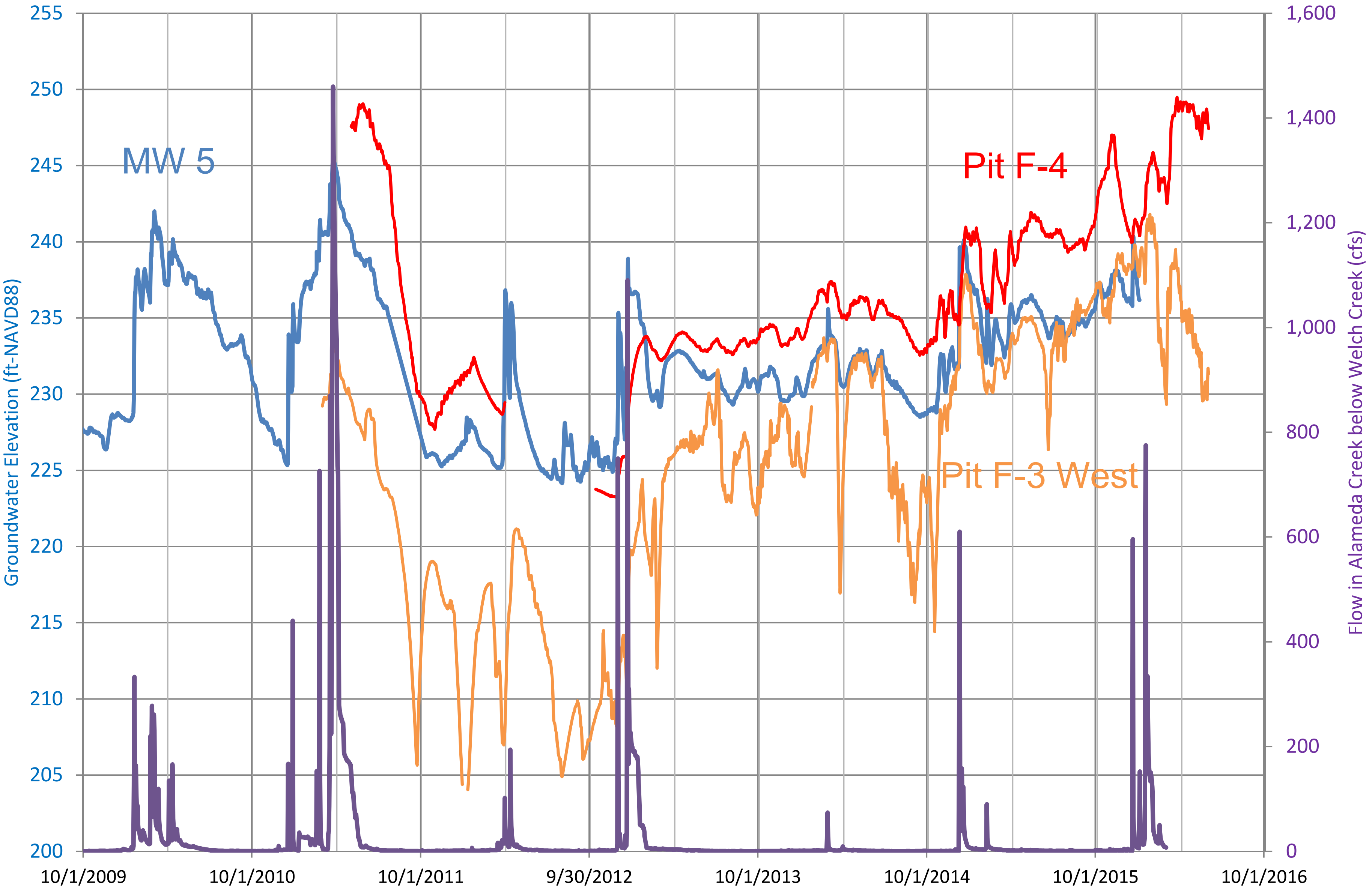

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Figure 9a
Hydraulic Connection Between MW 5 and Pits F-4 and F-3 West

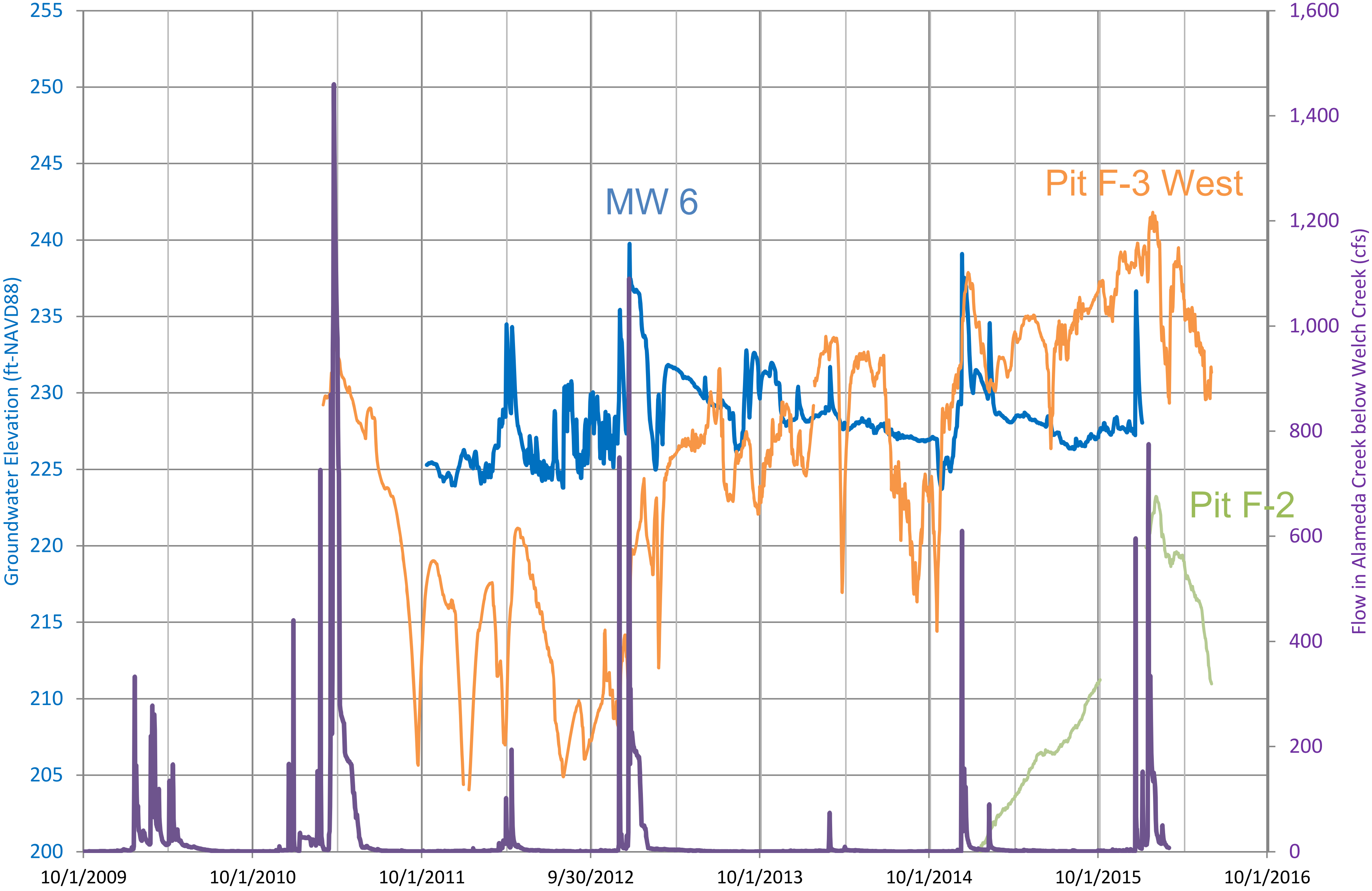

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Figure 9b
Hydraulic Relationship between MW 6 and Pits F3-West and F-2

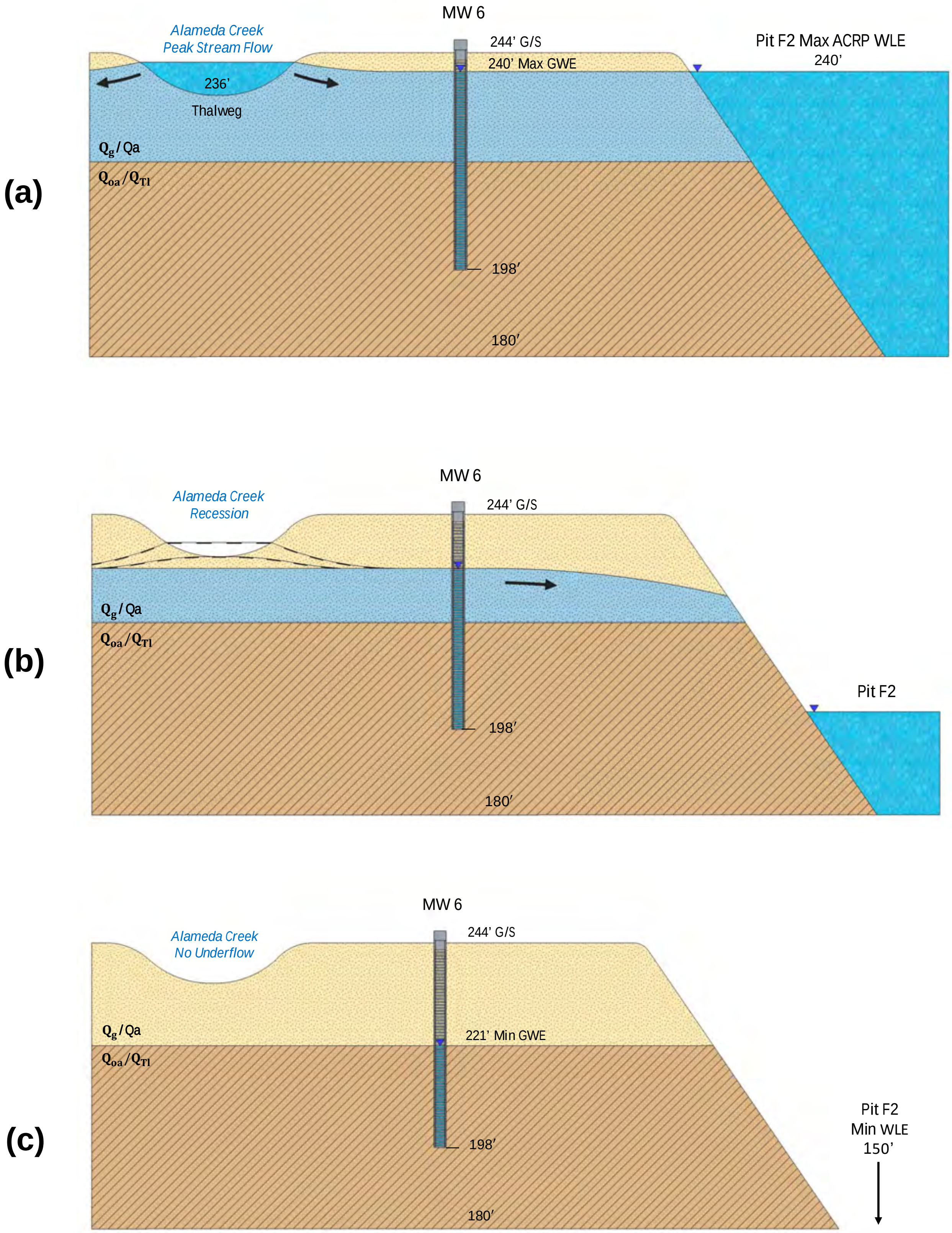

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Figure 10
MW 6 and Peak Flow (a), Recession (b), and Minimum (c)

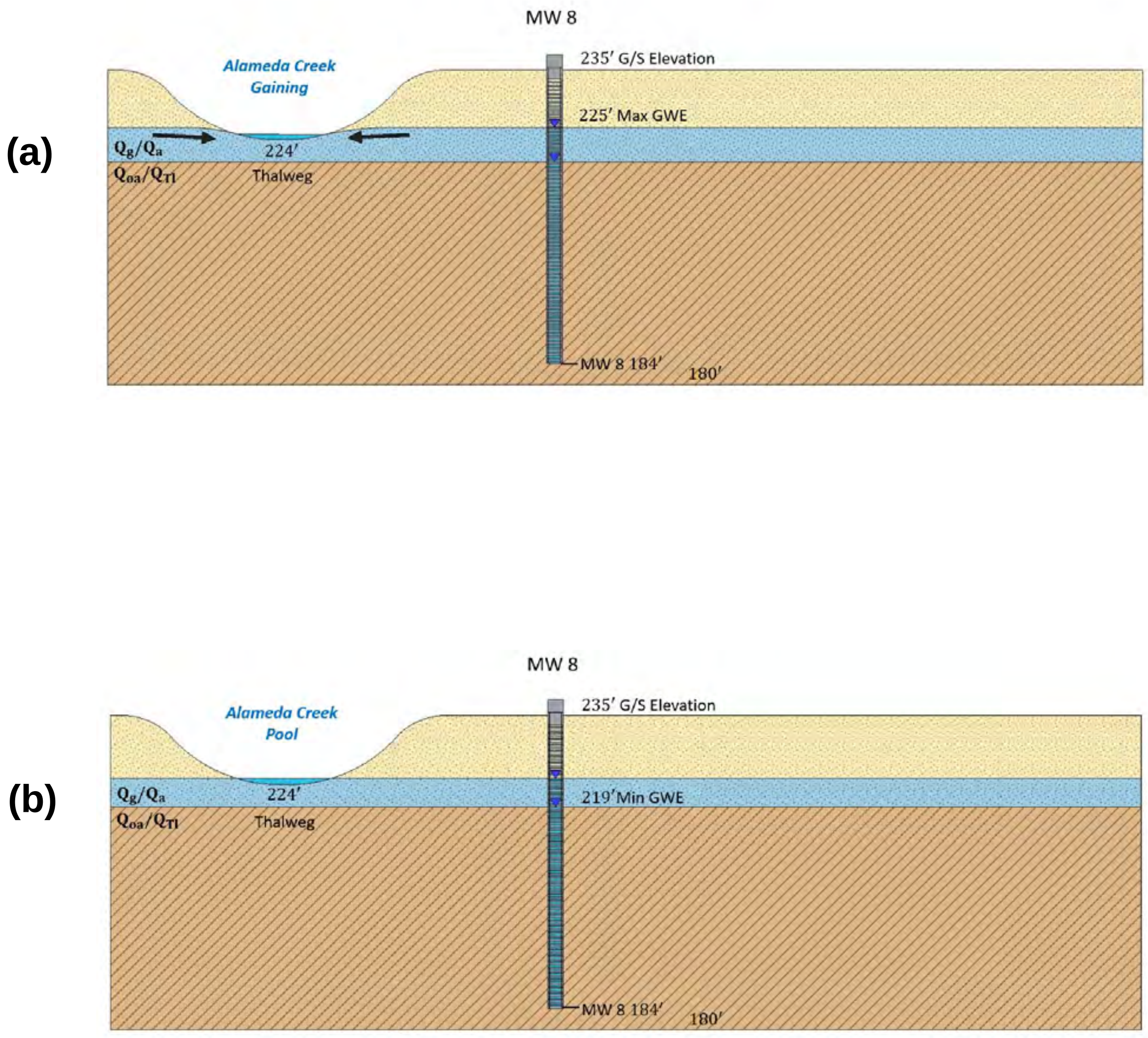

Figure 11
MW 8 Gaining (a), and Pool Recession (b)

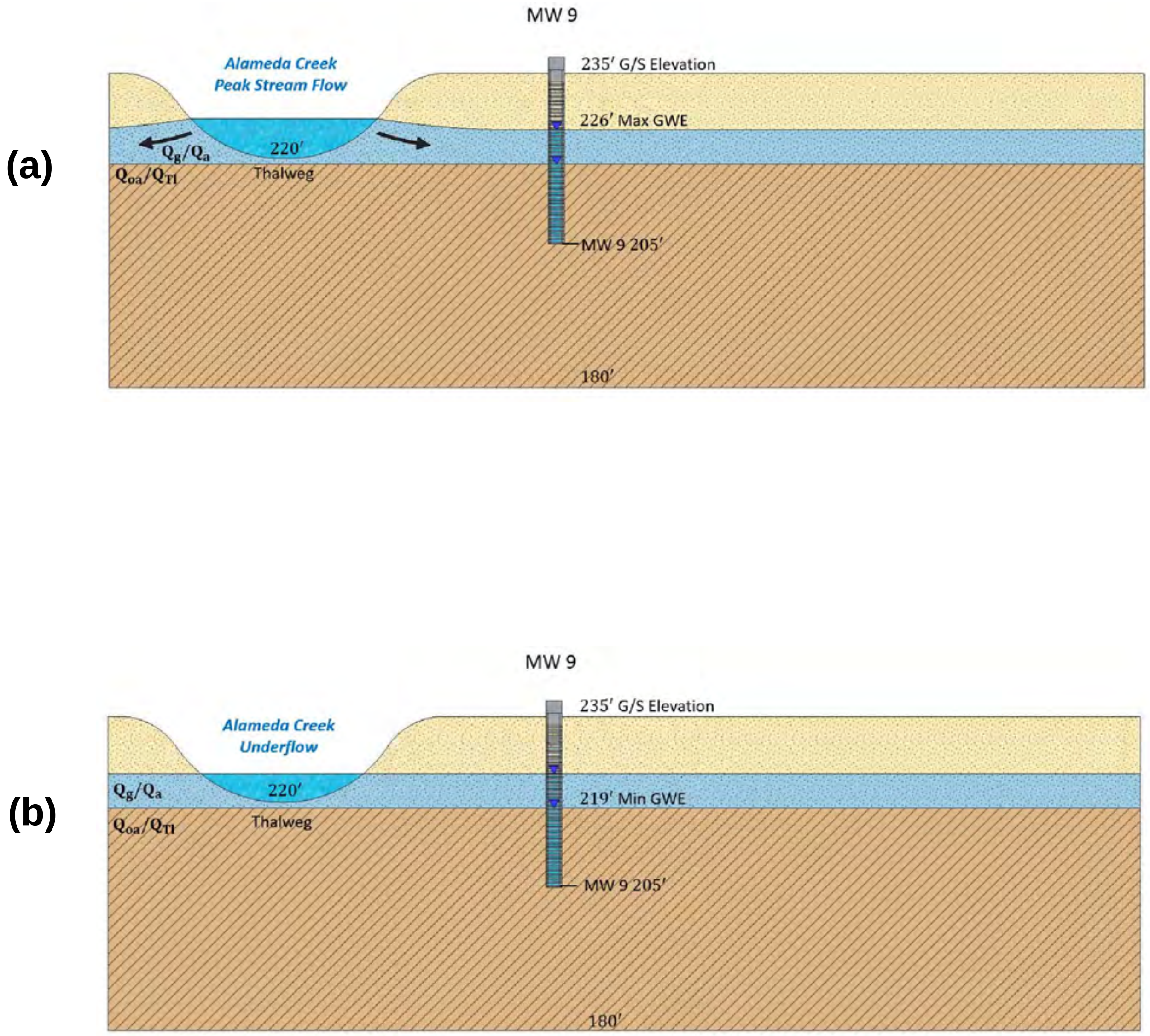

Figure 12
MW 9 Peak Flow (a) and Underflow (b)

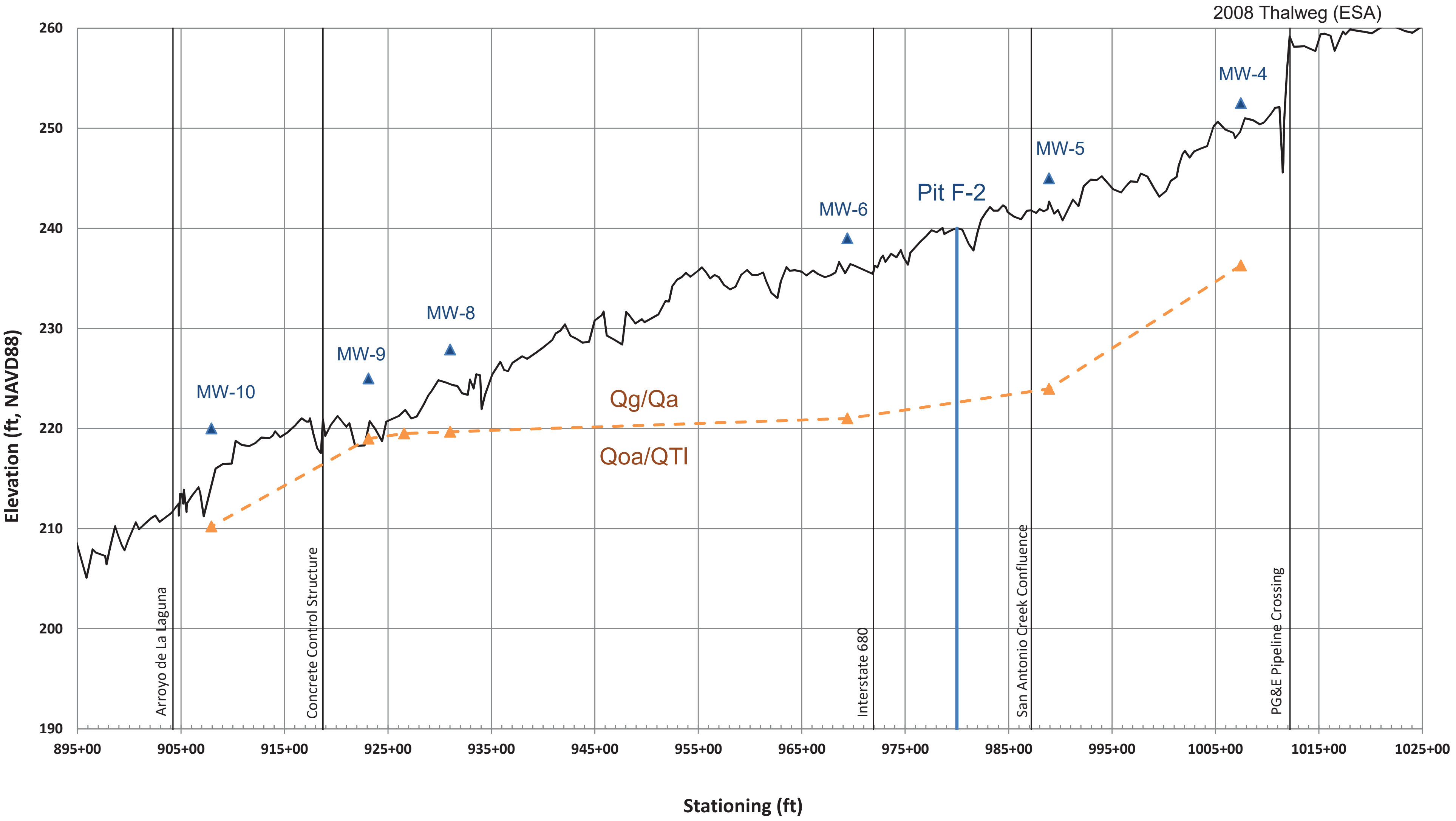

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Figure 13
Profiles of Thalweg and Shallow Aquifer Base (Qg/Qa)

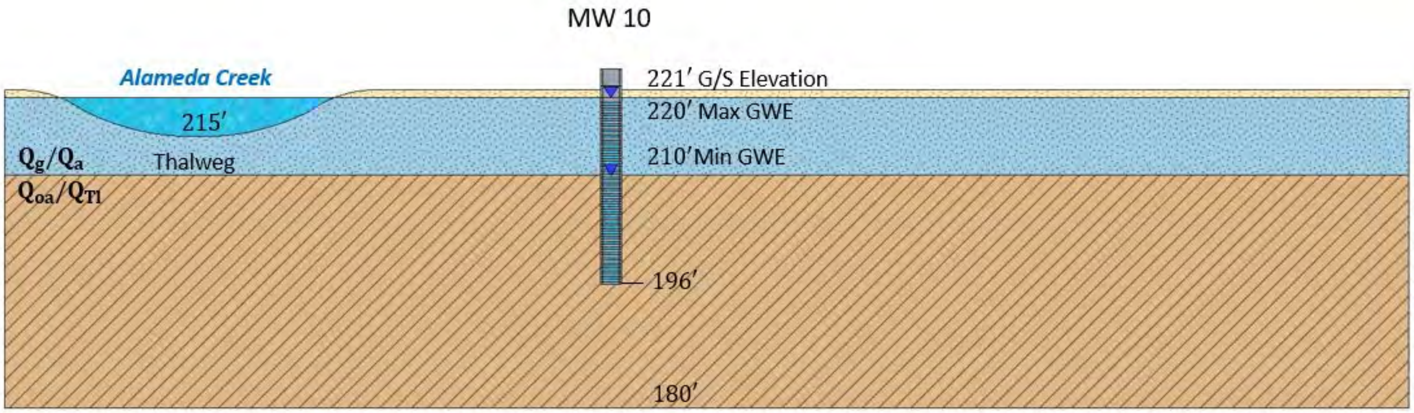

Figure 14
MW 10 Maximum Groundwater Elevation

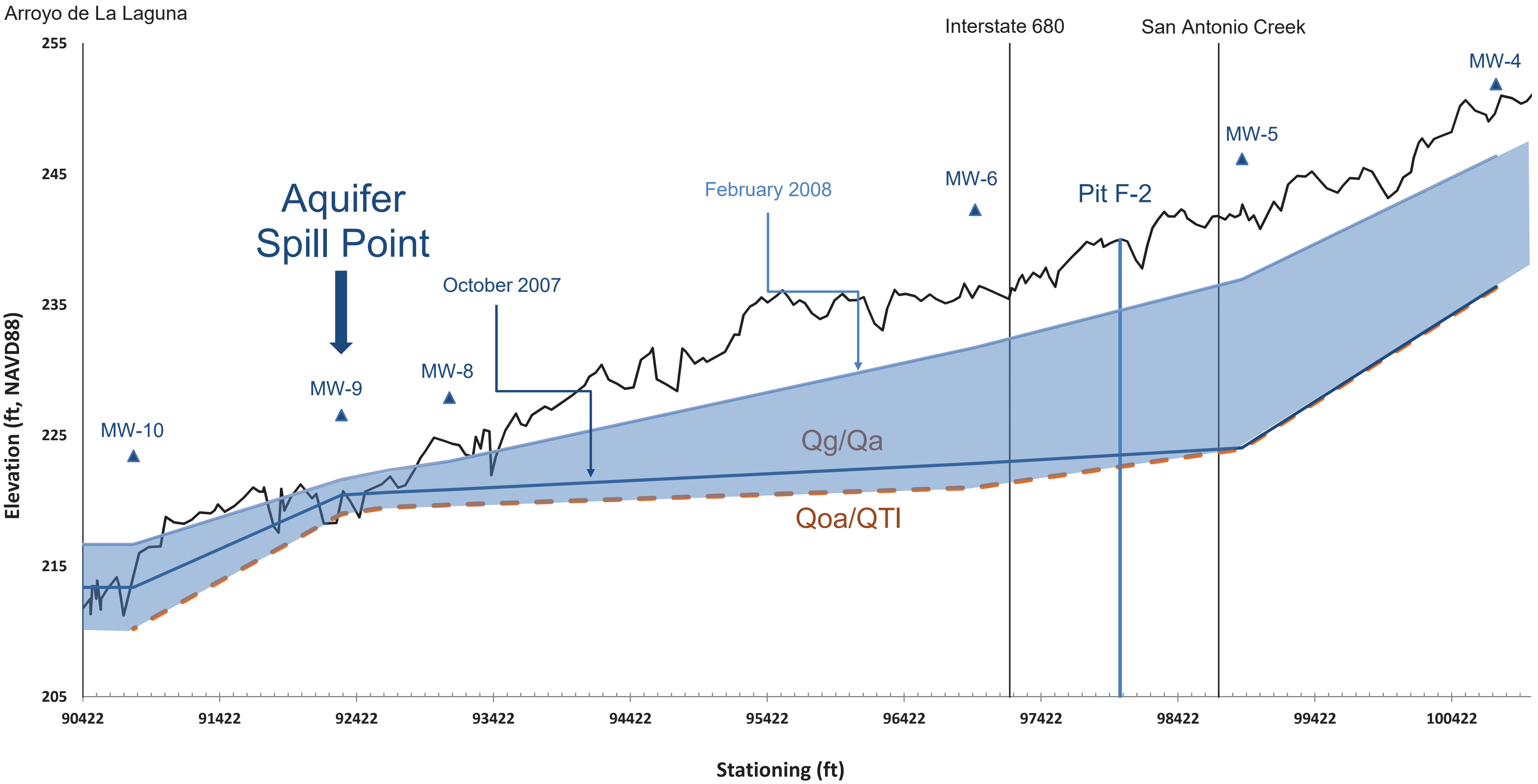

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Figure 15
Aquifer Spill Point - Groundwater Levels in February 2008 and October 2007

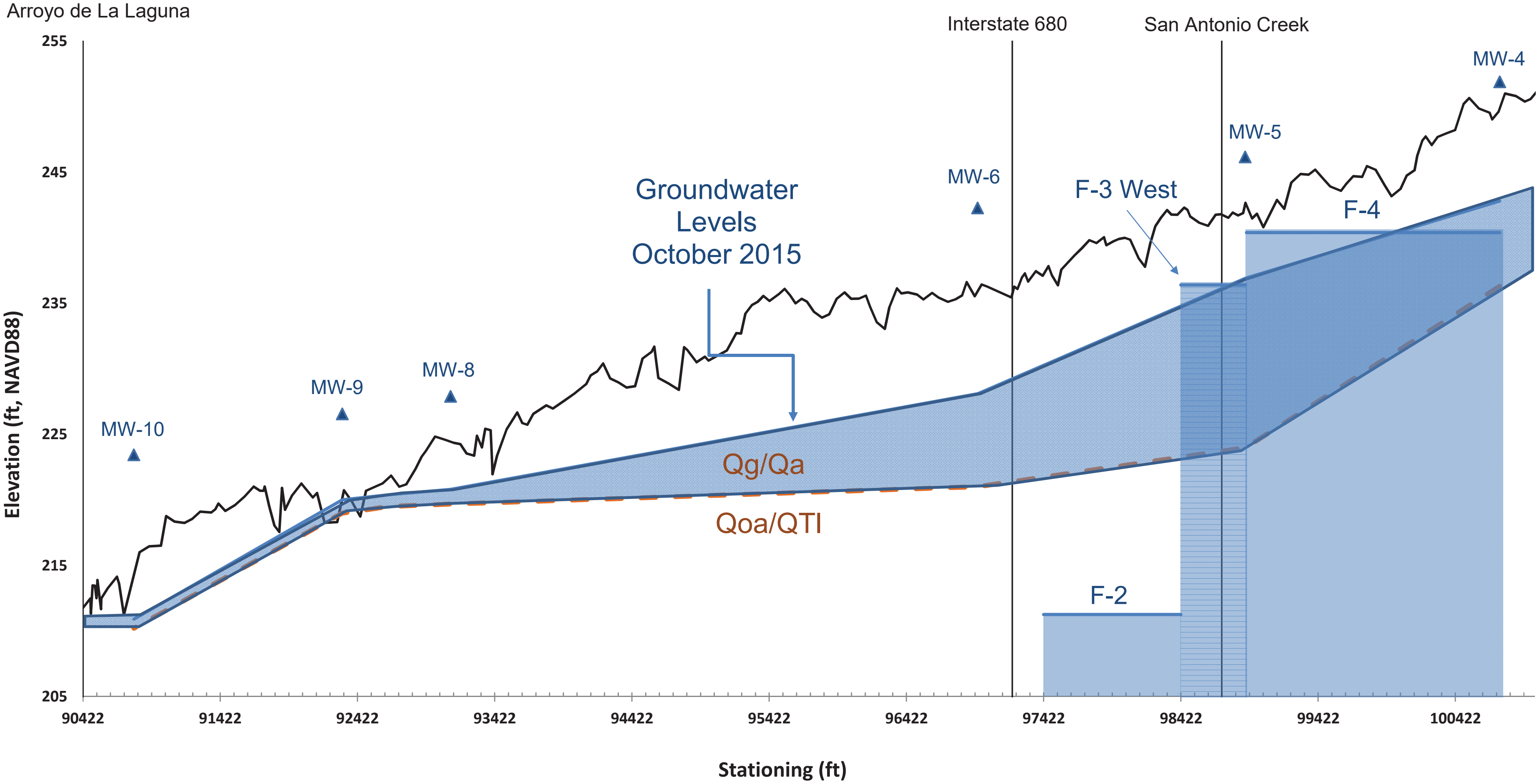

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Figure 16
Gradient from Pits to Groundwater - October 2015

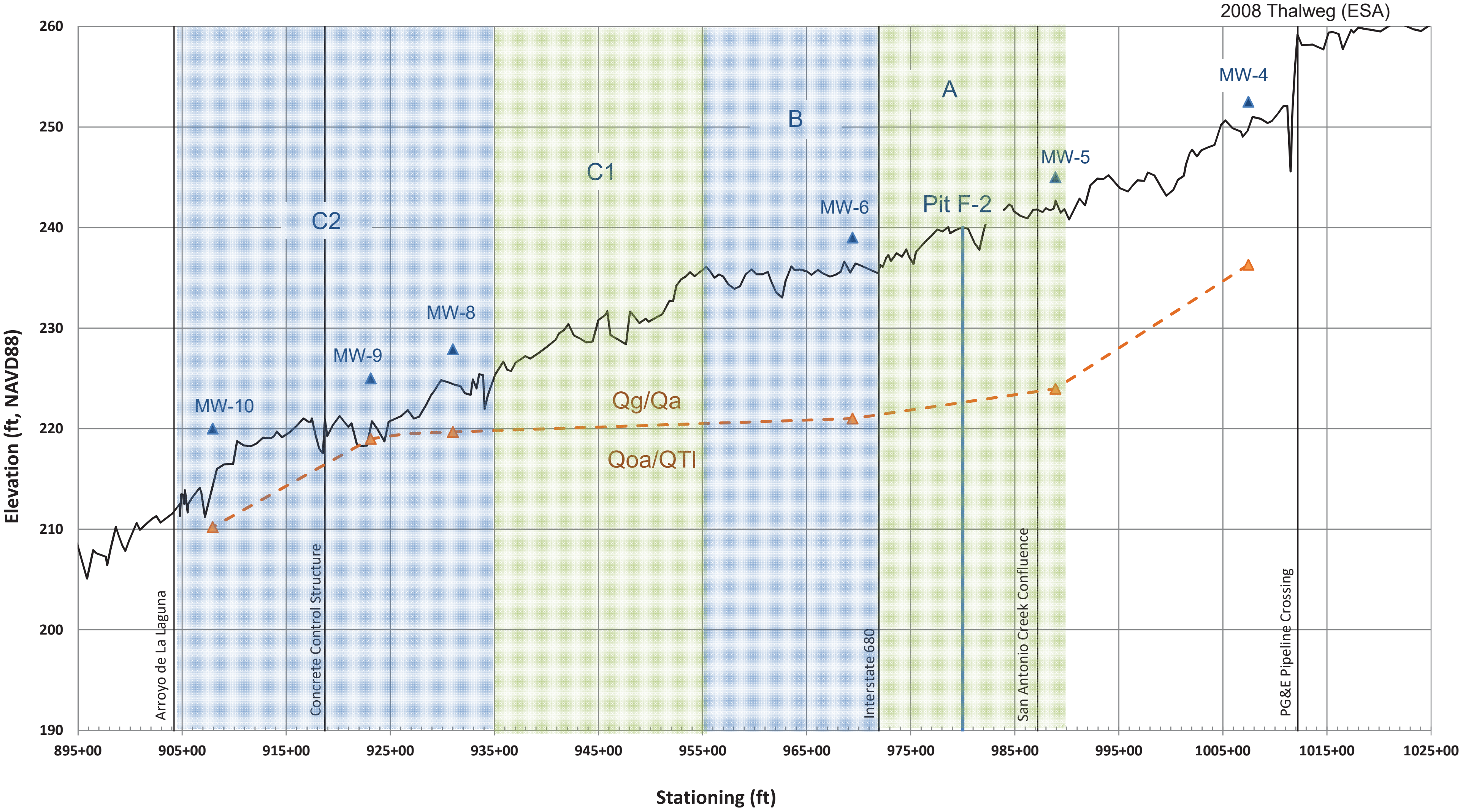

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Figure 17
Subreaches for Impact Analysis Based on Aquifer Geometry

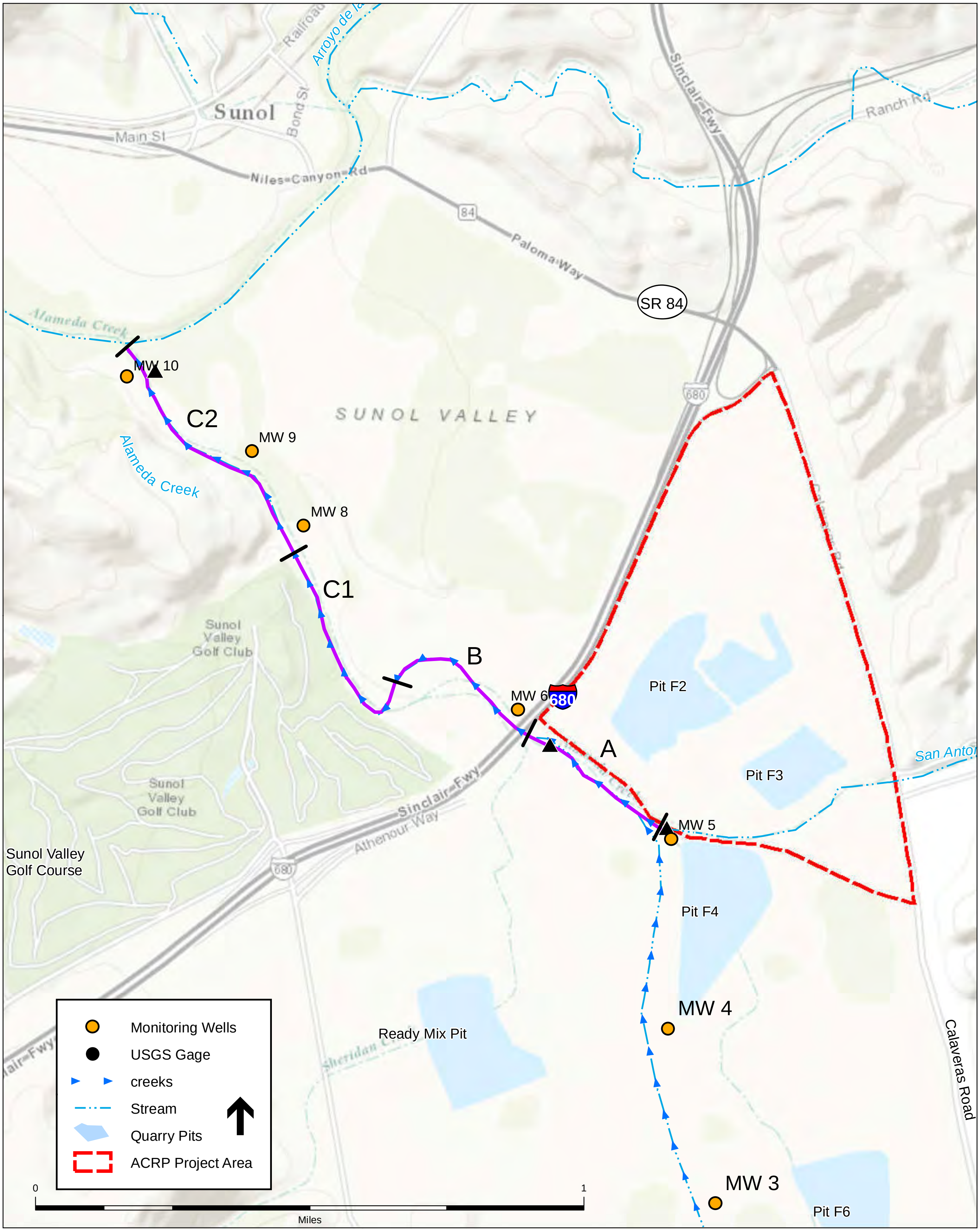

Figure 18
Study Area Subreaches

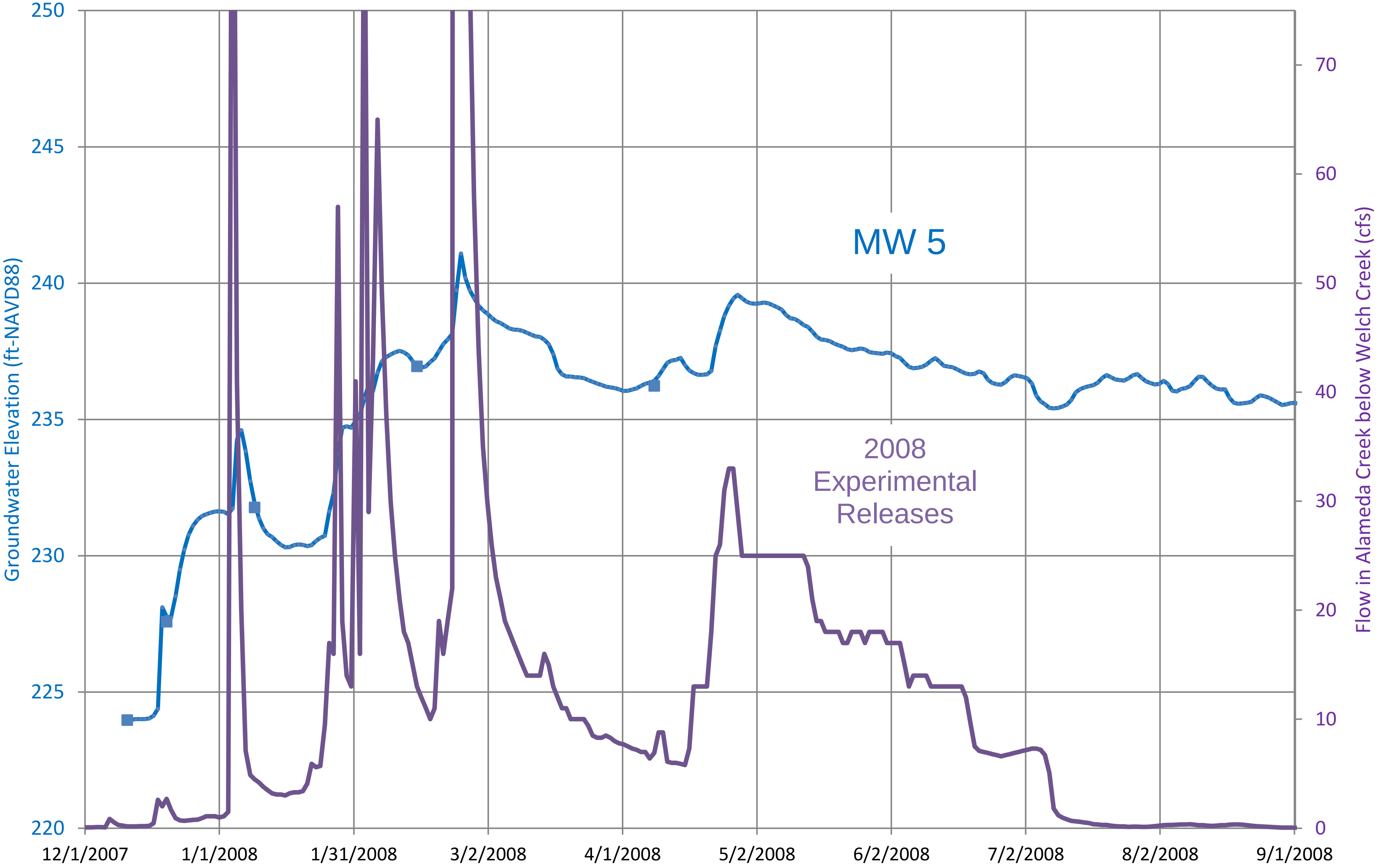

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Figure 19
Groundwater Levels during Calaveras Experimental Releases

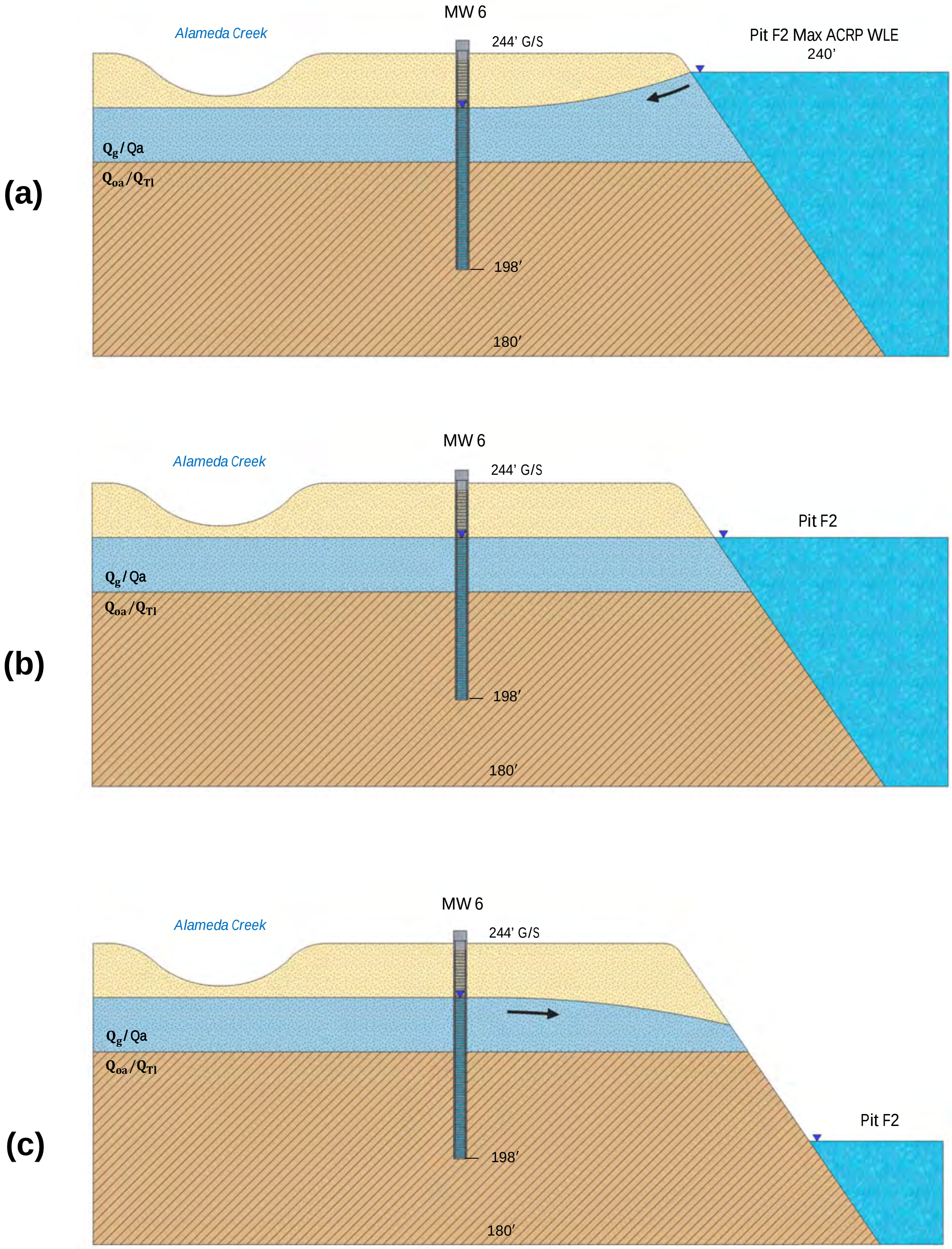

Figure 20
MW 6 With Maximum Storage (a), Storage Same as Groundwater (b) and Storage Disconnected (c)