Appendix A

NOP and Scoping Period Public Meeting Comments

APPENDIX A

Notice of Preparation and Scoping Period Public Meeting Comments

Appendix A includes the Notice of Preparation for this EIR (March 2014); and scoping letters submitted by local organizations, and state and federal agencies during the comment period. Additional questions and comments were presented by attendees during the public meeting on April 9, 2014. The major environmental concerns raised during the scoping period, and the EIR sections where the comments are addressed, are summarized in **Table A-1**.

TABLE A-1
COMMENTS ON THE NOTICE OF PREPARATION

Commenter	Comments	EIR Chapter/Section
California Department of Transportation (Caltrans)	A Traffic Impact Study (TIS) may be required, if the Project would generate traffic at volumes sufficient to impact the operations of nearby State highway facilities.	Section 3.O, Transportation
	A Transportation Management Plan (TMP) or construction TIS may be required for approval by Caltrans prior to construction, if the Project would restrict traffic and detours are needed on or affecting State highways.	Section 3.O, Transportation
	Transportation permits issued by Caltrans would be required, if the Project would require movement of oversized or excessive load vehicles on State roadways.	Section 3.O, Transportation
National Oceanic and Atmospheric Administration (NOAA)	Increase the area of the Project to include the contiguous ponded area between Coleman Road and Alamitos Diversion Dam.	Chapter 2, Project Description Chapter 4, Alternatives
	Develop alternatives for the EIR that include the ponded area between Coleman Road and Alamitos Diversion Dam, and assess the ability of the increased Project area to meet project objectives.	Chapter 4, Alternatives
San Francisco Bay Regional Water Quality Control Board (RWQCB)	A Clean Water Act (CWA) Section 401 water quality certification and a CWA Section 404 Permit from the U.S. Army Corps of Engineers (USACE) would be needed for fill impacts to waters of the U.S.	Chapter 2, Project Description (list of permits) Section 3.D, Biological Resources; Section 3.E, Fisheries Resources; Section 3.K, Hydrology and Water Quality
	A Report of Waste Discharge may be needed if the Project may impact waters of the State, even if such waters have been excluded from federal jurisdiction.	Section 3.K, Hydrology and Water Quality

TABLE 1-1 (Continued)
COMMENTS ON THE NOTICE OF PREPARATION

Commenter	Comments	EIR Chapter/Section
San Francisco Bay Regional Water Quality Control Board (RWQCB) (cont.)	According to Section 404(b)(1) Guidelines, discharges of fill material into regulated waters of the U.S. would be prohibited unless the discharge constitutes the least environmentally damaging practicable alternative (LEDPA) that would achieve the basic purpose of the Project.	Section 3.D, Biological Resources; Section 3.E, Fisheries Resources; Section 3.K, Hydrology and Water Quality Chapter 4, Alternatives
	According to Section 404(b)(1) Guidelines, the Project should sequence proposals affecting water body area, functions, and values in the following order: first avoid impacts to the extent possible; then minimize impacts to the extent possible, and finally adequately compensate for the loss.	Section 3.D, Biological Resources
	Under the CWA Section 401 water quality certification, the District would need to exhaust all impact avoidance and minimization measures before relying on compensatory mitigation to determine the LEDPA.	Section 3.D, Biological Resources;
	Include in the EIR hydrologic and sediment transport studies to determine if the new channel design is appropriate to pass the sediment load and stream flow and would not result in any geomorphic changes to channel shape or slope upstream and downstream of the Project site or require frequent maintenance to remove sediment deposited within the channel.	Section 3.K, Hydrology and Water Quality
	Demonstrate in the hydrogeomorphic analysis that the Project design would not cause channel scour or sedimentation downstream and/or create channel slope instabilities.	Section 3.K, Hydrology and Water Quality
	If the Project includes rock slope protection and concrete lining of the channel bed and bank, demonstrate in the EIR, supported by engineering analysis, that bioengineering methods are technically infeasible and that hardscape methods are necessary based on the Project site sheer stresses.	Chapter 2, Project Description Section 3.K, Hydrology and Water Quality
	Analyze in the EIR factors that contribute to erosion and evaluate watershed processes as well as the influences acting on a smaller, more localized reach level which affect erosion processes at individual Project sites.	Section 3.K, Hydrology and Water Quality
	Consider in the EIR all aquatic resource functions together, such that reduction in erosion potential is considered in together with direct loss of aquatic habitat from stream bank rock slope protection and concrete lining of the channel bed and bank.	Section 3.E, Fisheries Resources; Section 3.K, Hydrology and Water Quality
	Include a discussion of the adverse impacts to water quality if the maintenance road would be paved and discuss Project alternatives that would result in fewer impacts to waters of the State, such as topping the maintenance roads with gravel instead of asphalt where possible or routing the runoff through vegetated areas.	Chapter 2, Project Description Section 3.K, Hydrology and Water Quality
	Analyze in the EIR how changes in stream flow velocities may result in erosion, sediment deposition, and changes in channel form in Almaden Lake, Alamitos Creek, and Guadalupe River.	Section 3.K, Hydrology and Water Quality

TABLE 1-1 (Continued)
COMMENTS ON THE NOTICE OF PREPARATION

Commenter	Comments	EIR Chapter/Section
San Francisco Bay Regional Water Quality Control Board (RWQCB) (cont.)	Include in the EIR appropriate best management practices (BMPs) to mitigate impacts, if hydrologic and geomorphic studies indicate adverse impacts to biological resources from the Project.	Section 3.E, Fisheries Resources; Section 3.K, Hydrology and Water Quality
	Analyze in the EIR how upstream fish migration may be impacted, and as necessary, incorporate mitigation measures such as modifying box culvert and bridge replacement design to maintain upstream fish migration.	Section 3.E, Fisheries Resources
	Discuss in the EIR any existing water rights for the Percolation Pond, Almaden Lake, and Alamitos Creek and if any revisions to the existing or new water rights would be required.	Chapter 2, Project Description
	Identify in the EIR buffers around staging areas as a mitigation measure, and consider making the buffer area 100 feet around all waters of the State in the Project area to avoid water quality and habitat impacts from Project staging areas.	Section 3.D, Biological Resources; Section 3.E, Fisheries Resources; Section 3.K, Hydrology and Water Quality
Santa Clara Valley Audubon Society (SCVAS)	Analyze the potential of herbicides, insecticides and rodenticides to impact habitats during the construction and the projected lifespan of the Project, and consider disallowing use of rodent baits and other rodenticides onsite.	Section 3.D, Biological Resources; Section 3.K, Hydrology and Water Quality
	List all the biocides that may be used on the Project site.	Section 3.D, Biological Resources; Section 3.K, Hydrology and Water Quality
	Analyze potential for direct and secondary poisoning of birds and wildlife during construction and operations.	Section 3.D, Biological Resources
	Describe and analyze impacts to nesting egrets and heron species at Almaden Lake.	Section 3.D, Biological Resources
	Consider impacts to upland nesting habitat, particularly the Western Pond Turtles.	Section 3.D, Biological Resources
	Consider keeping paths, trails, and access roads on the levees crossing the lake unpaved, and, if plans exist to pave them, describe impacts to bird watching.	Chapter 2, Project Description Section 3.N, Recreation
April 9, 2014 Public Meeting Comments	Include levee size and details; movement and management of construction materials.	Chapter 2, Project Description
	Second island: do not support use of second island for boating; people will bother the birds on the island; justification and need for second island; do not include the second island.	Chapter 2, Project Description
	Boating facility: will people be allowed to bring boat trailers and boats? Describe whether parking lot expansion for boating area will be included	Chapter 2, Project Description
	Fish and swimming: How will the Project affect the existing fish population in the lake? Will catch and release still be available? Permission for swimming in the lake; separation of predator and native fish; restrictions for non-native fish species in the new lake or restored stream; steelhead study completion.	Chapter 2, Project Description Section 3.E, Fisheries Resources; Section 3.N, Recreation

TABLE 1-1 (Continued)
COMMENTS ON THE NOTICE OF PREPARATION

Commenter	Comments	EIR Chapter/Section
April 9, 2014 Public Meeting Comments (cont.)	Wildlife: Relocation of wildlife during construction; development of a landscaping plan to encourage birds and native plants/animals to grow; what can be done about seagulls?	Chapter 2, Project Description Section 3.D, Biological Resources; Section 3.E, Fisheries Resources
	Lake questions: Size difference for east lake; cap material for bottom of lake	Chapter 2, Project Description
	Methyl Mercury: will the water flowing through the area always have mercury? Mercury-bearing silt; what if target methylmercury levels are not achieved? Potential underground water contamination with methylmercury, and percolation to downstream ponds.	Section 3.K, Hydrology and Water Quality
	Other alternatives: what happened to the pipe alternative? Can any of the [original] four alternatives end up as the final choice? Cost of contaminant removal.	Chapter 2, Project Description Appendix A; cost is not considered under CEQA

NOTICE OF PREPARATION

From: Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118

Subject: **Notice of Preparation of a Draft Environmental Impact Report**

Project Title: Almaden Lake Project

Project Location: Almaden Lake, San Jose, California.

The Santa Clara Valley Water District will be the Lead Agency and will prepare an environmental impact report for the above project. The District needs to know the views of your agency as to the scope and content of the environmental information which is germane to your agency's statutory responsibilities in connection with the proposed project. Your agency will need to use the EIR prepared by our agency when considering your permit or other approval for the project.

The project description, location, and the potential environmental effects are contained in the attached materials.

Due to the time limits mandated by State law, your response must be sent at the earliest possible date but **not later than 30 days after receipt of this notice**. The District will also hold a scoping meeting to provide an additional opportunity for input on the scope and content of the information to be addressed in the draft EIR. The scoping meeting will be held at **6:30 pm on Wednesday, April 9, 2014,** at Castillero Middle School, 6384 Leyland Park Drive, San Jose.

Please send your response to:

Michael Martin
Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118
(408) 630-3095
michaelmartin@valleywater.org

Please provide the name of a contact person in your agency.

Beau Goldie
Chief Executive Officer

3-27-14
Date

Notice of Preparation
Draft Environmental Impact Report
Almaden Lake Project
Santa Clara County, California
March 2014

Introduction

This notice announces that a draft Environmental Impact Report (EIR) will be prepared for the Almaden Lake project (Project). The EIR will identify and evaluate possible environmental impacts of Project alternatives, and develop strategies to avoid, reduce, or compensate for any significant impacts.

As the lead agency responsible for compliance with the California Environmental Quality Act (CEQA), the Santa Clara Valley Water District (District) has determined that the Project may have a significant impact on the physical environment, and has decided to prepare an EIR to provide ample opportunity for public disclosure and participation in the planning and decision making process. The purpose of the draft EIR process is to develop and assess a recommended plan and alternatives for the Project and to avoid and mitigate significant adverse effects on environmental resources, while aiming to achieve the primary project objectives.

This document, which serves as the Notice of Preparation (NOP) required by CEQA and the state's CEQA Guidelines (CCR §15082), contains a brief description of the Project, including its goals and objectives, the Project alternatives identified to date, possible environmental impacts, and the resulting need for an EIR. It also discusses the process that will be used to determine the scope of analysis in the EIR, and provides an overview of the opportunities for participation in review of the EIR, along with contact information.

Project Overview

The District is undertaking the CEQA environmental review process as part of the overall Project review and design process. Pending the outcome of the environmental review process and any subsequent design revisions to improve the project, the proposed Project will be submitted to the District Board of Directors for their review and potential approval. This process is aimed to provide the public with a clear understanding of the activities, elements, and methods involved with the Proposed Project. However, this project description does not presume that the proposed Project is considered approved, or will necessarily be approved until the complete environmental and planning process occurs according to CEQA guidelines and internal District Project review and approval process.

Background

Almaden Lake is located within the City of San Jose's Almaden Lake Park. The lake is a 32-acre man-made water body that is located at a site that was once a privately owned gravel quarry. The historic quarry operation was located along the east side of the downstream end of Alamitos Creek and comprised of two main large pits. Over time, heavy storm events washed away the creek's bank edge that separated the creek from the quarry making it into one large comingled water body.

Almaden Lake Park was developed as a partnership between San Jose and the District in the late 1970s where both agencies purchased lands encompassing the lake and surrounding park land. Most of the property surrounding the lake is owned by the City and most, but not all, of the water area is owned by the District. The District is responsible for flood protection, water resource management, and stream stewardship of the lake. The City is responsible for recreational use of the park, graffiti abatement, patrolling, and any damage to District facilities resulting from public use. The park is a treasured part of this area and offers pathways, playgrounds, picnic areas, bocce courts, swimming, fishing, and boating to the community. However, since August of 2010, the lake has been closed to swimming because of either high concentrations of coliform bacteria, blue-green algae, or lack of City funds to operate the swimming activity.

Almaden Lake lies within the Guadalupe Watershed immediately upstream of the Guadalupe River, Guadalupe Creek, and Alamitos Creek confluence. The Guadalupe Watershed is known to be utilized by the Central California steelhead trout. Migrating steelhead must pass through the lake to reach Alamitos Creek's upstream spawning habitat. Juvenile steelhead trout pass through the lake during out-migration when they head downstream for the ocean. Since the threatened Central California steelhead trout is a federally-listed species, any alternatives which may affect them fall under the jurisdiction of the federal Endangered Species Act and will require consultation and approval from the National Marine Fisheries Service and the California Department of Fish and Wildlife.

Almaden Lake has little vegetation along its banks. The vegetation that does exits provides some habitat for nesting birds, but no known occurrences of special status bird species occur within the area. The lake itself provides open water habitat for seagulls, geese, and several species of duck. Maintenance of the vegetation along the lake's banks is minimal except for some management activities on the island located in the south-central portion of the lake. This large vegetated island serves as a communal roost for several species of wading birds. The District recently completed a four year project to remove the arundo vegetation from the island. The arundo previously covered 100% of the island. Native riparian trees were planted as the arundo was removed to create alternative habitat for the displaced rookery. The riparian vegetation will require a couple of years of maintenance until it becomes self sufficient.

The water surface in Almaden Lake is influenced by the operation of the Alamitos Flashboard Dam. The Alamitos Flashboard Dam is part of the Guadalupe Water Supply Management System and is located on the Guadalupe River approximately 1700 feet downstream of Almaden Lake, and immediately downstream of the Alamitos Creek and Guadalupe Creek confluence. The dam is made up of wood panels and is part of the District's county-wide water supply infrastructure that develops local water supplies from the District's water rights. The wood-paneled flashboard dam is installed to impound water in the channel that is diverted into the nearby District percolation ponds. When the Alamitos Flashboard Dam is installed, the water surface elevation in Almaden Lake increases by approximately 5 feet. Although the dam may be installed or removed at anytime, it is typically installed in April and removed in December of each year to not impede flow conveyance during winter storm events. There is no record of any historical flooding in the Project area and Almaden Lake currently has the capacity to convey a 100-year storm event.

Alamitos Creek flows through Almaden Lake and stretches more than seven miles upstream, five miles from the New Almaden Quicksilver Mines and the heart of mercury contamination. Mercury contamination can trace its roots to the Gold Rush days of the 1800's. Mercury was essential to the process of separating gold from ore and plenty of it could be found in the hills above San Jose, and especially at the New Almaden Mines. The New Almaden Mines would become the largest mercury mine in North America and work there would ultimately seep an estimated 6,500 tons of mercury into the local systems of creeks and rivers between 1850 and 1920.

Because Almaden Lake is located downstream from where the historic mining activities occurred, mercury-laden sediment has ended up in the lake. As a result, the water in the lake has deteriorated from the influx of elemental mercury that has settled at its bottom and is converting to methylmercury as well as producing high concentrations of methylmercury in the lake fish. To address the methylmercury problem, the San Francisco Regional Water Quality Control Board derived site-specific mercury water quality objectives for mercury in fish tissue and a total maximum daily load (TMDL) of mercury in water for Almaden Lake.

Goals and Objectives

The District is under order by the San Francisco Bay Regional Water Quality Control Board to meet site-specific mercury water quality objectives for Almaden Lake (October 2008 Basin Plan Amendment). As a result of the RWQCB mandate and as part of the District's commitment to the Guadalupe Watershed, the Project proposes to address the water quality issues related to mercury and anadromous fish (i.e., those fish that migrate upstream from saltwater to freshwater to spawn, such as steelhead and salmon, also known as migratory fish).

The objectives of the Project are as follows:

- Reduce mercury in fish and production of methylmercury to meet applicable water quality objectives as defined in the 2008 Basin Plan Amendment.
- Reduce thermal barrier to anadromous fish migration.
- Remove entrainment and impacts from predatory species to anadromous fish.
- Minimize impacts to recreational features.

Project Description

The District proposes a project that would substantially reduce the amount of methylmercury produced in the lake and improve conditions for anadromous fish. The Project would include the following elements:

- Isolating Alamitos Creek in an approximately 210-foot wide channel separated from the remaining lake to its east with a new levee.
- Re-contouring the bottom of the lake to a more level surface and capping the existing mercury laden sediment with at least five feet of clean fill.
- Expanding the open park area to the west of the lake by approximately two acres into existing lake and beach area.
- The lake would draw water from the restored Alamitos Creek channel and be connected to Alamitos Percolation Pond to develop a flow through system.
- The embankment between the restored creek and lake would be a minimum of 40-feet wide with dual use as a maintenance road and trail.
- Existing island to be expanded and banks stabilized.
- A second island, up to 0.75 acres in area, would be established in the lake.
- Installation of riparian vegetation along both banks of the new channel and islands.

Topics to be Analyzed in the Draft EIR

Based on the proposed project's potential for significant impacts on the environment, the District will prepare an EIR. No environmental studies have yet to be conducted in support of the Project; however the following general impacts can be inferred from existing information:

Aesthetics

Residents in neighborhoods that overlook the lake to the east enjoy views of the open water. They have expressed a concern about any changes to this view resulting from the Project. The lake is also highly visible to motorists along Almaden Expressway and Coleman Avenue. The proposed Project would divide the lake into segments with new levees that would run through the existing footprint.

Biological Resources

Steelhead are known to utilize Alamitos Creek upstream of Almaden Lake. Some of the objectives of the Project are to improve habitat for steelhead through the Project area. The Project is expected to have a beneficial impact to steelhead. The only other sensitive species with potential to occur at the site is western pond turtle. As open water will still be available after Project implementation, impacts to western pond turtle are not expected to be significant. Both species may be impacted during construction, but these can likely be minimized through construction timing and pre-construction surveys.

Cultural Resources

The site was previously used as a quarry and Project activities mostly involve filling of the site, therefore impacts to cultural resources are not expected.

Water Quality

The objective of the Project is to improve water quality within and coming out of the lake. The Project will be designed to reduce the production of methylmercury and isolate the cold water of the creek from warm water within the lake. However, reducing the depth of the lake may have impacts on water temperature, algae growth, and odor. Construction related impacts to water quality will likely occur but can be minimized by standard BMPs. The Project is expected to have an overall beneficial impact to water quality.

Air Quality / Noise / Traffic

The construction of levees through the site and capping the bottom of remaining lake is expected to require a significant amount of soil. It could require thousands of truckloads of material to accomplish this task. The amount of traffic (and associated dust, air emissions and noise) generated during construction is potentially significant. Neighbors have also expressed a concern about noise and traffic impacts from recreational activities if swimming and/or boating opportunities are moved from the west side of the lake to the east side, or if playing fields are added to the east side of the lake adjacent to existing residential development.

The EIR will serve to further assess the proposed project's effects on the environment, to identify significant impacts, and to identify feasible mitigation measures to reduce or eliminate potentially significant environmental impacts. An analysis of alternatives to the proposed project will also be included in the EIR. Other topics to be analyzed in the EIR include, but are necessarily limited to: soils, greenhouse gas emissions, hazards and hazardous materials, land use, recreation, and utilities. Responses received to this NOP may modify or add to the preliminary assessment of potential issues addressed in the EIR.

Environmental Procedures and Public Scoping Meeting

This NOP initiates the CEQA process through which the District will refine the range of issues and project alternatives to be addressed in the EIR. Comments are invited on the proposal to prepare the EIR and on the scope of issues to be included.

Please submit any comments within 30 days of receipt of this notice to Michael Martin, the District's environmental planner for the Almaden Lake project, at the Santa Clara Valley Water District (see *Contact Information* below). In conjunction with the 30-day review period for the NOP, the District will hold a scoping meeting to provide an additional opportunity to learn about the project, ask questions, and provide comments about the scope and content of the information to be addressed in the EIR. The scoping meeting will be held at 6:30 pm on Wednesday, April 9, 2014, at Castillero Middle School, 6384 Leyland Park Drive, San Jose.

After the 30-day review period for the NOP is complete, a draft EIR will be prepared in accordance with CEQA, as amended (Public Resources Code §21000 et seq.), and the State Guidelines for Implementation of CEQA (CCR §15000 et seq.).

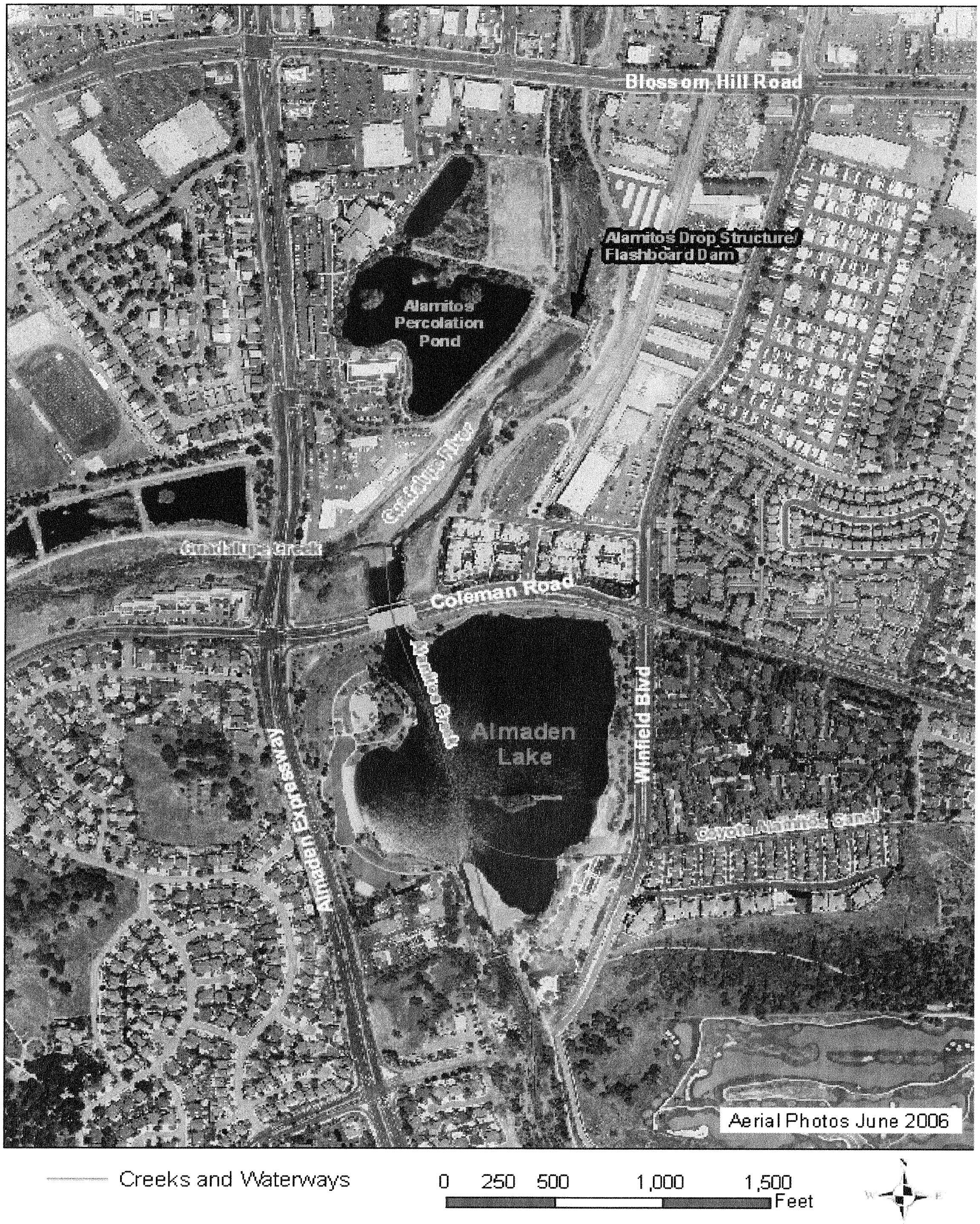
Once the draft EIR is completed, it will be made available for a 45-day public review and comment period. Copies of the draft EIR will be sent directly to those agencies commenting on the NOP, and will also be made available to the public at a number of locations, including the District headquarters and public libraries in the area. Information about availability of the draft EIR will also be posted on the District's website (http://www.valleywater.org).

Contact Information

For further information, contact the following:

Michael Martin
Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118-3686
(408) 630-3095
Michaelmartin@valleywater.org

Additional information relevant to the project and the EIR can also be found at http://www.valleywater.org.



Almaden Lake Project Area

DEPARTMENT OF TRANSPORTATION
DISTRICT 4
P.O. BOX 23660
OAKLAND, CA 94623-0660
PHONE (510) 286-6053
FAX (510) 286-5559
TTY 711
www.dot.ca.gov

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Water District

May 13, 2014

SCL082470
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SCH# 2014042041

Mr. Michael Martin
Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118-3614

Dear Mr. Martin:

Almaden Lake Project – Notice of Preparation (NOP)

Thank you for including the California Department of Transportation (Caltrans) in the environmental review process for the project referenced above. We have reviewed the NOP and have the following comments to offer.

Traffic Impact Study (TIS)
During construction, this project may generate traffic at volumes sufficient to impact the operations of nearby State highway facilities and it may be necessary to prepare a 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 recommend using the Caltrans *Guide for the Preparation of Traffic Impact Studies* for determining which scenarios and methodologies to use in the analysis. It is available at the following website address: http://dot.ca.gov/hq/tpp/offices/ocp/igr_ceqa_files/tisguide.pdf. As the lead agency, the Santa Clara Valley Water District (SCVWD) is responsible for all project mitigation, including any needed improvements to State highways.

Transportation Management Plan (TMP)
If it is determined that traffic restrictions and detours are needed on or affecting State highways, a TMP or construction TIS may be required for approval by Caltrans prior to construction. Traffic Management Plans must be prepared in accordance with Caltrans' *Manual on Uniform Traffic Control Devices.* Further information is available for download at the following web address: http://www.dot.ca.gov/hq/traffops/signtech/mutcdsupp/pdf/camutcd2012/Part6.pdf.

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 at (510) 286-4647.

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: 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/permits.

Should you have any questions regarding this letter, please contact Brian Brandert of my staff at (510) 286-5505 or brian.brandert@dot.ca.gov.

Sincerely,

ERIK ALM, AICP
District Branch Chief
Local Development - Intergovernmental Review

c: Scott Morgan, State Clearinghouse

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
West Coast Region
777 Sonoma Avenue, Room 325
Santa Rosa, California 95404-4731

May 7, 2014

Michael Martin
Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, California 95118

Re: Almaden Lake Project, Notice of Preparation of an Environmental Impact Report

Dear Mr. Martin:

Thank you for the opportunity to provide comments on the Notice of Preparation (NOP) of an Environmental Impact Report (EIR) for the Almaden Lake Project. The Santa Clara Valley Water District (District) proposes to modify Almaden Lake to reduce the amount of methylmercury produced in the lake and improve conditions for anadromous fish. This project has also been proposed by the District as a conservation measure in the February 2014 draft Three Creeks Habitat Conservation Plan (Guadalupe River Channel Enhancement, Conservation Measure 89-GMS-MEAS).

NOAA's National Marine Fisheries Service (NMFS) has reviewed the NOP, and we support the project's stated objectives: (1) reduce mercury in fish and production of methylmercury; (2) reduce thermal barrier to anadromous fish migration; (3) remove entrainment and impacts from predatory species to anadromous fish; and (4) minimize impacts to recreational features. Methylmercury and degraded habitat conditions for anadromous fish are significant issues at this location, and remediation of these problems will support the restoration of threatened Central California Coast steelhead (*Oncorhynchus mykiss*) in the Guadalupe River watershed.

The District presents on its website[1] five project alternatives for remediation of Almaden Lake and all five alternatives limit the footprint of the project to the ponded water body upstream of Coleman Road (approximately 1,750 linear feet of Alamitos Creek). Contiguous with this 32-acre portion of Almaden Lake is an additional 10-acre ponded water body extending from Coleman Road downstream to the District's Alamitos Diversion Dam/Drop Structure (Alamitos Diversion Dam). This additional channel length of approximately 1,700 feet also contains severely degraded habitat conditions for anadromous fish and most of the solutions to the 32-acre footprint of Almaden Lake would also be applicable to this downstream portion of Alamitos Creek. NMFS recommends the footprint of the Almaden Lake Project be extended to include this contiguous ponded area between Coleman Road and the Alamitos Diversion Dam. The following comments pertain to the merits of expanding the scope of the Almaden Lake Project to include this downstream reach of Alamitos Creek.

[1] http://www.valleywater.org/Mercury/AlmadenLake.aspx

As stated in the NOP, Almaden Lake has little vegetation on its banks. The open water conditions extending upstream from the Alamitos Diversion Dam to the upstream end of Almaden Lake provide habitat for piscivorous birds and non-native piscivorous fish. Riffles, runs, and other fast water riverine habitat features that support native anadromous salmonids are absent in this 3,450-foot long (0.65 mile) reach of Alamitos Creek. Water temperatures in Alamitos Creek warm significantly as creek flows pass through this long and unshaded reach of open water.[2] By setting the project's downstream boundary at Coleman Road, the existing project scope presented in the NOP is limited to approximately half the channel distance of this problem area. This truncated distance also prevents the project from addressing significant habitat problems for anadromous salmonids in this reach. By extending the project area to the Alamitos Diversion Dam, the amount of stream habitat restoration in Alamitos Creek could double to 3,450 linear feet of channel and habitat improvements by the project could replace long, open, and low velocity pools with productive riffle-pool complexes and instream habitat complexity features.

As the project is currently proposed, Alamitos Diversion Dam is not within the project area, but its operation significantly constrains the ability of the project to restore fish habitat within Almaden Lake. As stated in the NOP, the installation of flashboards at the Alamitos Diversion Dam raises the water surface elevation in Almaden Lake by approximately 5 feet. Thus, any instream habitat features designed for steelhead and Chinook salmon in the Almaden Lake reach would be inundated by several feet of water when the District's water diversion dam is operated. Juvenile steelhead rearing in streams of Santa Clara County are typically found in fast water areas of runs, riffles, and the heads of pools, where drift feeding is possible. At these sites, juveniles can exploit the higher rate of prey delivery required to meet energy demands associated with higher water temperatures. With the continued operation of the Alamitos Diversion Dam, the upstream 0.65 mile reach of Alamitos Creek which includes Almaden Lake will not provide fast-water feeding habitat during the summer/fall months and cannot provide suitable spawning habitat during the winter.

As described in the NOP, the modification of Almaden Lake requires a flow through system that would be connected to the Alamitos Percolation Pond. This project creates new opportunities to draw water from the restored Alamitos Creek to the District's off-channel percolation ponds. As exemplified by the Bureau of Reclamation's 2010 Red Bluff Fish Passage Improvement Project on the Upper Sacramento River, on-channel diversion dams are being replaced with state-of-the-art pumping plants and fish screens. If the Alamitos Diversion Dam was replaced with an alternative water diversion system, the full 0.65 mile length of Alamitos Creek extending from the top of Almaden Lake to the existing diversion dam could be restored to healthy riverine habitat conditions which support the migration, spawning, and rearing of anadromous salmonids; better supporting project objectives 2 and 3.

Additional benefits associated with the creation of a new water diversion system for the District's percolation ponds are numerous including: (1) the possibility of replacing the existing Alamitos fish ladder with a natural rock pool/weir fish passage structure and elimination of the fish

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[2] Simulated Water Temperature Effects of Bypassing Almaden Lake, Prepared for U.S. Army Corps of Engineers by Jones & Stokes, July 2004.

entrapment problem on the downstream side of the Alamitos Diversion Dam; (2) sediment transport at the mouth of Guadalupe Creek would be improved which would reduce the District's maintenance requirements for flood flow conveyance under the Almaden Expressway bridge and fish passage to Guadalupe Creek; (3) would eliminate the need for the District's 2015-2019 Capitol Improvement Project, Alamitos Diversion Dam Improvements with an estimate cost of $3.27 million; and (4) further reductions in the production of methylmercury .

Without inclusion of the channel reach between Coleman Road and the Alamitos Diversion Dam, the Almaden Lake Project cannot fully achieve its objectives of removing entrainment and impacts from predatory species to anadromous fish, and reducing thermal impacts. The 1,700 linear feet of ponded area below Coleman Road will continue to subject anadromous salmonids to ponded water conditions and the diversion dam will continue to impede salmonid passage. NMFS strongly encourages the District to develop alternatives for the EIR that include this additional length of Alamitos Creek and assess the ability of the expanded footprint to accomplish the project's objectives.

Please direct questions regarding this letter to Gary Stern, North-Central Coast Office in Santa Rosa, California at (707) 575-6060 or gary.stern@noaa.gov.

Sincerely,

Gary Stern

for

Irma Lagomarsino
Assistant Regional Administrator
California Coastal Area Office

cc: Tami Schane, CDFW, Yountville, CA
Margarete Beth, Regional Water Board, Oakland, CA
Lisa Mangione, USACE, San Francisco, CA
Luisa Valiela, USEPA, San Francisco, CA
Joseph Terry, USFWS, Sacramento, CA
Debra Caldon, SCVWD, San Jose, CA

Santa Clara Valley
Audubon Society

May 1st, 2014 *via email*

Mr. Michael Martin
Santa Clara valley Water District
michaelmartin@valleywater.org

Scoping comments: Almaden Lake Project

Dear Mr. Martin,

Santa Clara Valley Audubon Society (SCVAS) thanks you for the opportunity to provide scoping comments for the Almaden Lake Project (Project). SCVAS has over 3500 members in Santa Clara County who share a passion for birds and wildlife, and the habitats and ecosystems that support them. We have engaged in the planning process that led to the selection of preferred alternatives, and we expect to continue our engagement as the Project moves through the environmental review process.

Comment 1: Use of Herbicides, Insecticides and Rodenticides- Please analyze the potential of herbicides, insecticides and rodenticides to impact habitats during the construction and the projected lifespan of the project. Please list all the biocides that may be used on the Project site. Please analyze potential for direct and secondary poisoning of birds and wildlife during construction and operations. Please consider disallowing use of rodent baits and other chemical rodenticides onsite.

Comment 2. Great Egrets, Snowy Egrets, Green Herons and Black-Capped Night Herons nest on the Almaden Island. Green Herons also nest in vegetation on the East side of the lake. Please describe and analyze impacts to nesting egrets and heron species at Almaden Lake.

Comment 3: The NOP states that Western Pond Turtles should not be impacted since “open water will still be available”. Western pond turtles require both aquatic and terrestrial habitat. Please consider impacts to upland nesting habitat.

Comment 4: It is our preference that the paths/trails/access roads on the levees crossing the lake remain unpaved. This would allow birders and other slow-moving recreationists to use the levees without conflicts with fast moving bikes. If plans exist to pave these levees, please consider conflicts and describe impacts to our sport of bird watching.

Please keep us informed on any further opportunity for public review and input on this project.

22221 McClellan Road, Cupertino, CA 95014 Phone: (408) 252-3748 * Fax: (408) 252-2850
email: scvas@scvas.org * www.scvas.org

Please call us at (650) 868 2114 if we can be of help,

Thank you,

Shani Kleinhaus, Environmental Advocate

22221 McClellan Road, Cupertino, CA 95014 Phone: (408) 252-3748 * Fax: (408) 252-2850
email: scvas@scvas.org * www.scvas.org

May 2, 2014

Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118-3686

Attn: Michael Martin
Email: Michaelmartin@valleywater.org

Subject: Almaden Lake, Notice of Preparation of an Environmental Impact Report

Dear Mr. Martin

Regional Water Board staff appreciates the opportunity to comment on the Notice of Preparation (NOP) of an Environmental Impact Report (EIR) for the Almaden Lake Project.

The Santa Clara Valley Water District (District) proposes to modify Almaden Lake to reduce mercury and production of methymercury in the lake, reduce thermal barrier to anadromous fish, and remove fish entrainment. Alamitos Creek flows through Almaden Lake and downstream to Guadalupe River. Almaden Lake is located within the City of San Jose's Almaden Lake Park. The Project would include isolating Alamitos Creek within a 210-foot wide channel separated from the remaining lake; re-contouring the bottom of the lake and capping the mercury-laden sediment under five feet of clean sediment; expanding the park on the west of the lake two acres into the existing lake, restoring the embankment between Almaden Lake and Alamitos Creek; expanding the existing island, creating a second island; and installing riparian vegetation along the banks of the creek and islands.

Water Board staff has reviewed the NOP and provide the following comments.

1. Both a Clean Water Act (CWA) Section 401 water quality certification and a CWA Section 404 Permit from the U.S. Army Corps of Engineers (USACE) will be necessary for fill impacts to waters of the U.S. Additionally, the District may need to file a Report of Waste Discharge if the Project may impact waters of the State, even if such waters have been excluded from federal jurisdiction (e.g., isolated wetlands, ephemeral streams without a significant nexus, or stream banks above the ordinary high water mark).

2. The Regional Water Board adopted U.S. Environmental Protection Agency's (USEPA) Section 404(b)(1), "Guidelines for Specification of Disposal Sites for Dredge or Fill Material," dated December 24, 1980, in its Basin Plan for

determining the circumstance under which filling of wetlands, streams or other waters of the State may be permitted. The 404(b)(1) Guidelines prohibit all discharges of fill material into regulated waters of the U.S., unless a discharge, as proposed, constitutes the least environmentally damaging practicable alternative (LEDPA) that will achieve the basic project purpose.

The Project includes a significant amount of fill to expand the park into the lake, isolate the channel, and create a second island. The Guidelines sequence the order in which proposals should be approached: 1) avoid—avoid impacts to waters; 2) minimize—modify project to minimize impacts to waters; and, 3) mitigate—once impacts have been fully minimized, compensate for unavoidable impacts to waters. When it is not possible to avoid impacts to water bodies, disturbance should be minimized. Compensatory mitigation for lost water body acreage and functions through restoration or creation should only be considered after disturbance has been minimized. Where impacts cannot be avoided, the creation of adequate mitigation habitat to compensate for the loss of water body acreage, functions, and values must be provided.

The District should be aware that, unlike an analysis of alternatives under CEQA, the 404(b)(1) Guidelines do not allow for the use compensatory mitigation[1] as a method of reducing environmental impacts in the evaluation of LEDPA. The 1990 memorandum of agreement between the USEPA and the Department of the Army states:

Compensatory mitigation may not be used as a method to reduce environmental impacts in the evaluation of the least environmentally damaging practicable alternatives for the purposes of requirements under Section 230.10(a) (USEPA 1990).[2]

Compensatory mitigation cannot be used as a strategy to arrive at a preferred alternative and should only be used after all avoidance and minimization measures have been exhausted. The District will need to exhaust all impact avoidance and minimization measures before relying on compensatory mitigation to determine LEDPA when applying for a CWA Section 401 water quality certification

3. The Project includes isolating Alamitos Creek within a 210-foot wide channel separate from Almaden Lake. This may change stream flow and sedimentation processes in these areas and immediately downstream. The EIR should include hydrologic and sediment transport studies to determine if the new channel design is appropriate to pass the sediment load and stream flow and will not result in

[1] "Compensatory mitigation" refers to the replacement of stream and wetland area, functions, and beneficial uses through creation or restoration as part of a permitting action for a CWA Section 401 water quality certification or waste discharge requirements.

[2] USEPA. 1990. Memorandum of agreement between the environmental protection agency and the department of the army concerning the determination of mitigation under the clean water act section 404(b)(1) guidelines. Reprinted in 55 Federal Register 9210 (March 10, 1990).

any geomorphic changes to channel shape or slope upstream and downstream of the Project site or require frequent maintenance to remove sediment deposited within the channel. The hydrogeomorphic analysis should demonstrate that the Project design will not cause channel scour or sedimentation downstream and/or create channel slope instabilities.

4. Bank Stabilization: If the Project includes rock slope protection and concrete lining of the channel bed and bank, the EIR should demonstrate, supported by engineering analysis, that bioengineering methods are technically infeasible and that hardscape methods are necessary based on the Project site sheer stresses. The USACE has developed tables of allowable shear stresses which relate the capacity of channel conditions assisted with different soil bioengineering systems to offer effective resistance to these shear stresses.[3] This USACE reference (Fischenich 2001) can provide guidance to determine the most appropriate bank stabilization methods based on site-specific conditions.

   The EIR should include more justification on the need for bank repair at erosion sites. The analysis of erosion sites in the EIR should consider factors that contribute to erosion and evaluate watershed processes as well as the influences acting on a smaller, more localized reach level which are affecting erosion processes at individual project sites.

   The Regional Water Board does not consider arresting erosion processes through placement of hardened stream bank materials a beneficial impact but rather an impact to waters of the State. The EIR should weigh all aquatic resource functions together, such that reduction in erosion potential is considered in tandem with direct loss of aquatic habitat from stream bank rock slope protection and concrete lining of the channel bed and bank

5. Maintenance Roads: The EIR should include a discussion of the adverse impacts to water quality if the maintenance road will be paved (e.g., polycyclic aromatic hydrocarbons) and discuss project alternatives that would result in fewer impacts to waters of the State, such as topping the maintenance roads with gravel instead of asphalt where possible or routing the runoff through vegetated areas.

6. Instream Erosion: The EIR should include an analysis of how changes in stream flow velocities may result in erosion, sediment deposition, and changes in channel form in Almaden Lake, Alamitos Creek and Guadalupe River. If hydrologic and geomorphic studies indicate adverse impacts to biological resources from the Project, the EIR should include appropriate BMPs to mitigate such impacts. The EIR should also include an analysis of how the Project may impact upstream fish migration and, as necessary, incorporate mitigation measures such as modifying box culvert and bridge replacement design to maintain upstream fish migration.

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[3] Fischenich, J.C. 2001. Stability thresholds for stream restoration materials. EMRRP Technical Notes Collection. *ERDC TN-EMRRP-SR-29*. U.S. Army Engineer Research and Development Center, Vicksburg, MS. 10 pp.

7. Percolation Pond and Water Diversion: The Project will draw water from the creek to the lake and overflow will enter the Alamitos Percolation Pond. The EIR should discuss any existing water rights for the Percolation Pond, Almaden Lake, and Alamitos Creek and if any revisions to the existing or new water rights will be required.

8. Staging areas: The EIR should identify the establishment of buffers around staging areas as a mitigation measures. To avoid water quality and habitat impacts from Project staging areas, we recommend establishing a buffer area of 100 feet around all waters of the State in the Project area. This is consistent with the recommendations for construction site BMPs from the California Department of Transportation (2003[4], p. 71) and the California Stormwater Quality Association (2009[5], p. 111).

    - The buffer width needed to maintain water quality ranges from 5 to 30 m (16 to 98 ft)…Buffer widths for habitat concerns are typically wider than those recommended for water quality concerns (30 to 500 m [98 to 1,640 ft]).
    - The buffer width needed to maintain water quality ranges from 15 to 100 ft…Buffer widths for habitat concerns are typically wider than those recommended for water quality concerns (100 to 1500 ft).

Please feel free to contact me at (510) 622-2338 or by email at margarete.beth@waterboards.ca.gov, if you have any questions.

Sincerely,

Margarete Beth
Environmental Specialist

cc:

Lisa Mangione, USACE, Lisa.Mangione@usace.army.mil
Paula Gill, USACE, Paula.C.Gill@usace.army.mil
Ian Liffmann, USACE, Ian.Liffmann@usace.army.mil
Luisa Valiela, U.S. EPA, valiela.luisa@epamail.epa.gov
Joseph Terry, USFWS, joseph_terry@fws.gov
Gary Stern, NMFS, Gary.Stern@noaa.gov
Tami Schane, CDFW, Tami.Schane@wildlife.ca.gov
Brenda Blinn, CDFW, Brenda.blinn@wildlife.ca.gov

[4] California Department of Transportation. 2003. Storm Water Quality Handbooks: Construction Site Best Management Practices (BMPs) Manual.
[5] California Stormwater Quality Association. 2009. Stormwater Best Management Practice Handbook Portal: Construction.

Appendix B

Air Quality and Greenhouse Gas Emissions

B.1 CalEEMod Emissions Output Summaries

B.1 - CalEEMod Emissions Output Summaries

Unmitigated CalEEMod Criteria Pollutant Construction Emissions

Source and Year	ROG	NO_x	PM_{10}	$PM_{2.5}$
Equipment and Vehicles - 2021	0.47	4.87	0.18	0.17
Equipment and Vehicles - 2022	1.13	17.08	0.34	0.32
Equipment and Vehicles - 2023	0.10	0.95	0.03	0.03
Total Tons	1.70	22.91	0.56	0.53
Total Pounds	3,403.80	45,810.20	1,120.60	1,057.80
Average Daily Emissions*	6.73	90.53	2.21	2.09

*Assumes construction of the project would occur over 506 workdays. See CalEEMod output sheets

Unmitigated Total Criteria Pollutant Construction Emissions

Source and Year	ROG	NO_x	PM_{10}	$PM_{2.5}$
Average Daily Emissions*	6.73	90.53	2.21	2.09
Railroad Hauling	0.14	2.84	0.06	0.06
Total	6.87	93.37	2.28	2.15

*Assumes construction of the project would occur over 506 workdays.

Mitigated CalEEMod Criteria Pollutant Construction Emissions

Year	ROG	NO_x	PM_{10}	$PM_{2.5}$
Equipment and Vehicles - 2021	0.12	0.83	0.02	0.02
Equipment and Vehicles - 2022	0.49	10.11	0.05	0.05
Equipment and Vehicles - 2023	0.03	0.29	0.00	0.00
Total Tons	0.63	11.22	0.07	0.07
Total Pounds	1,264.00	22,445.20	139.32	136.28
Average Daily Emissions*	2.50	44.36	0.28	0.27

*Assumes construction of the project would occur over 506 workdays.

Mitigated Total Criteria Pollutant Construction Emissions

Source and Year	ROG	NO_x	PM_{10}	$PM_{2.5}$
Average Daily Emissions*	2.50	44.36	0.28	0.27
Railroad Hauling	0.14	2.84	0.06	0.06
Total	2.64	47.20	0.34	0.33

*Assumes construction of the project would occur over 506 workdays.

CalEEMod Greenhouse Gas Construction Emissions

Year	CO_2e
Equipment and Vehicles - 2021	839.77
Equipment and Vehicles - 2022	4,189.73
Equipment and Vehicles - 2023	251.52
Equipment and Vehicles - Total	5,281.01
Rail Line Haul	667.72
Total Metric Tons	5,948.73
Amortized over 30 years	198.29

Unmitigated Diesel Particulate Matter Emissions for HRA

Project Phase		Source	PM_{10}	$PM_{2.5}$
Creek Diversion and Lake Draining (includes cofferdam installation)	2021	off-road	0.0163	0.0157
		EMFAC	0	0
		subtotal	0.0163	0.0157
Levee footprint, reinforcement of underlying soil by soil cement columns (Lake bed drying)	2021	off-road	0.0732	0.068
		EMFAC	0.00002	0.00002
		subtotal	0.07322	0.06802
	2022	off-road	0.0123	0.0114
		EMFAC	0	0
		subtotal	0.0123	0.0114
Working Surface/Vegetation & Debris Removal	2021	off-road	0.0565	0.052
		EMFAC	0	0
		subtotal	0.0565	0.052
	2022	off-road	0.1004	0.0923
		EMFAC	0.00001	0.00001
		subtotal	0.10041	0.09231
Lake and Levee Foundation Area with 2.5' clay cap (includes maintenance access road fill)	2021	off-road	0.004	0.0037
		EMFAC	0.00006	0.00006
		subtotal	0.00406	0.00376
	2022	off-road	0.0113	0.0105
		EMFAC	0.00017	0.00016
		subtotal	0.01147	0.01066
Expanded and New Islands	2022	off-road	0.025	0.0231
		EMFAC	0.00014	0.00014
		subtotal	0.02514	0.02324
Transfer Pipeline from Almaden Valley PL	2022	off-road	0.0183	0.0168
		EMFAC	0	0
		subtotal	0.0183	0.0168
Lake Area with 2.5’ clay cap	2022	off-road	0.0171	0.0158
		EMFAC	0.00053	0.00051
		subtotal	0.01763	0.01631
Alamitos Restored Channel Area with 2.5’ clay cap	2022	off-road	0.0242	0.0223
		EMFAC	0.00074	0.00071
		subtotal	0.02494	0.02301
Transfer Pipeline to Los Alamitos Perc. Pond	2022	off-road	0.0183	0.0168
		EMFAC	0.00004	0.00004
		subtotal	0.01834	0.01684
New Park Area	2022	off-road	0.0151	0.014
		EMFAC	0.00014	0.00013
		subtotal	0.01524	0.01413
	2023	off-road	0.00554	0.00512
		EMFAC	0.00003	0.00003
		subtotal	0.00557	0.00515
Alamitos Creek West Bank Shore Grading	2022	off-road	0.00113	0.00104
		EMFAC	0.00003	0.00003
		subtotal	0.00116	0.00107
Revegetation and Landscaping	2022	off-road	0.00023	0.00022
		EMFAC	0	0
		subtotal	0.00023	0.00022
Revegetation and Landscaping	2023	off-road	0.00617	0.00603
		EMFAC	0	0
		subtotal	0.00617	0.00603
Dewatering (occurs throughout construction as a conservative assumption)	2021	off-road	0.0324	0.0324
		EMFAC	0	0
		subtotal	0.0324	0.0324
	2022	off-road	0.0723	0.0723
		EMFAC	0	0
		subtotal	0.0723	0.0723
	2023	off-road	0.0224	0.0224
		EMFAC	0	0
		subtotal	0.0224	0.0224
Total Emissions (tons)			0.53408	0.50375
Total Emissions (pounds)			1068.16	1007.5

Construction would be from June 1, 2021 to May 10, 2023, five days a week.
"off-road" emissions represent on-site emissions associated with off-road construction equipment.
"EMFAC" emissions represent on-ste emissions associated with haul truck and vendor trips.
For the purposes of the HRA analysis, each trip is 0.2 miles, representing the vehicle emissions that would occur at the site.

Mitigated Diesel Particulate Matter Emissions for HRA

Project Phase		Source	PM_{10}	$PM_{2.5}$
Creek Diversion and Lake Draining (includes cofferdam installation)	2021	off-road	0.00399	0.00379
		EMFAC	0	0
		subtotal	0.00399	0.00379
Levee footprint, reinforcement of underlying soil by soil cement columns (Lake bed drying)	2021	off-road	0.00501	0.00501
		EMFAC	0.00002	0.00002
		subtotal	0.00503	0.00503
	2022	off-road	0.00103	0.00103
		EMFAC	0	0
		subtotal	0.00103	0.00103
Working Surface/Vegetation & Debris Removal	2021	off-road	0.0036	0.0036
		EMFAC	0	0
		subtotal	0.0036	0.0036
	2022	off-road	0.00695	0.00695
		EMFAC	0.00001	0.00001
		subtotal	0.00696	0.00696
Lake and Levee Foundation Area with 2.5' clay cap (includes maintenance access road fill)	2021	off-road	0.00032	0.00032
		EMFAC	0.00006	0.00006
		subtotal	0.00038	0.00038
	2022	off-road	0.0011	0.0011
		EMFAC	0.00017	0.00016
		subtotal	0.00127	0.00126
Expanded and New Islands	2022	off-road	0.00243	0.00243
		EMFAC	0.00014	0.00014
		subtotal	0.00257	0.00257
Transfer Pipeline from Almaden Valley PL	2022	off-road	0.00148	0.00148
		EMFAC	0	0
		subtotal	0.00148	0.00148
Lake Area with 2.5’ clay cap	2022	off-road	0.00167	0.00167
		EMFAC	0.00053	0.00051
		subtotal	0.0022	0.00218
Alamitos Restored Channel Area with 2.5’ clay cap	2022	off-road	0.00243	0.00243
		EMFAC	0.00074	0.00071
		subtotal	0.00317	0.00314
Transfer Pipeline to Los Alamitos Perc. Pond	2022	off-road	0.00148	0.00148
		EMFAC	0.00004	0.00004
		subtotal	0.00152	0.00152
New Park Area	2022	off-road	0.00147	0.00147
		EMFAC	0.00014	0.00013
		subtotal	0.00161	0.0016
	2023	off-road	0.0006	0.0006
		EMFAC	0.00003	0.00003
		subtotal	0.00063	0.00063
Alamitos Creek West Bank Shore Grading	2022	off-road	0.00011	0.00011
		EMFAC	0.00003	0.00003
		subtotal	0.00014	0.00014
Revegetation and Landscaping	2022	off-road	0.00002	0.00002
		EMFAC	0	0
		subtotal	0.00002	0.00002
	2023	off-road	0.0005	0.0005
		EMFAC	0	0
		subtotal	0.0005	0.0005
Dewatering (occurs throughout construction as a conservative assumption)	2021	off-road	0.0016	0.0016
		EMFAC	0	0
		subtotal	0.0016	0.0016
	2022	off-road	0.00407	0.00407
		EMFAC	0	0
		subtotal	0.00407	0.00407
	2023	off-road	0.00146	0.00146
		EMFAC	0	0
		subtotal	0.00146	0.00146
Total Emissions (tons)			0.04323	0.04296
Total Emissions (pounds)			86.46	85.92

Construction would be from June 1, 2021 to May 10, 2023, five days a week.
"off-road" emissions represent on-site emissions associated with off-road construction equipment.
"EMFAC" emissions represent on-ste emissions associated with haul truck and vendor trips.
For the purposes of the HRA analysis, each trip length is 0.2 miles, representing the vehicle emissions that would occur at the site.

B.2 Construction Truck and Automobile Trip Assumptions

B.2 - Construction Truck and Automobile Trip Assumptions

Construction Schedule and Detailed Assumptions

Phases	Number of Workers (Max.)	Start (month/date/year)	Finish (month/date/year)	Duration (Work Days)	Duration (Days per week)	Cut Volume (cubic yards)	20% cut volume for off haul (yd³)	Fill Volume (cubic yards)	Fill Requiring hauling to the site (yd3)	# of Worker Trips/Day	Worker Trip Distance (mi)	Total # of Haul Trips to Transport Cut Volumes	Total # of Haul Trips/Day to Transport Cut Volumes	Cut Hauling Trip Length Distance (1st leg) 53 mi to Port of Oakland Rail	Cut Hauling Rail Trip Length Distance (2nd leg) Port of Oakland Rail to edge of BAAQMD jurisdiction -	Cut Hauling Rail Trip Length Distance (3rd leg) outside BAAQMD jurisdiction to SLC - 687 mi	Total # of Haul Trips to Transport Fill Volumes	Total # of Haul Trips to Transport Cut and Fill Volumes	Total # of Haul Trips/Day to Transport Fill Volumes	Fill Hauling Trip Length Distance (mi)	Total # of Vendor Trips/Day to Deliver Pipes, Sheet Piles, cement, etc.	Total # of Vendor Trips/Day to Deliver Pipes, Sheet Piles, cement, etc. (ROUNDED UP TO NEAREST EVEN)	Vendor Trip Length Distance (mi)	Grand Total Vendor and Haul Trips/day
Creek Diversion and Lake Draining (includes cofferdam installation)	8	6/1/2021	8/11/2021	52	5	-	-		-	20	12.4	-	0.00								3	4	7.3	4
Levee footprint, reinforcement of underlying soil by soil cement columns (Lake bed drying)	8	8/12/2021	1/31/2022	123	5	-	-		-	20	12.4	-	0.00	53	44	687	-		-		6	10	7.3	10
Working Surface/Vegetation & Debris Removal	8	8/12/2021	10/4/2022	299	5	-	-		-	20	12.4	-	0.00	53	44	687	-		-		2	2	7.3	2
Lake and Levee Foundation Area with 2.5' clay cap (includes maintenance access road fill)	8	12/4/2021	4/6/2022	88	5	120	24	75,455	75,359	20	12.4	3.00	0.03	53	44	687	9,419.88	9,422.88	107.04	18.53	2	2	7.3	109
Expanded and New Islands	8	4/6/2022	7/19/2022	75	5			50,000	50,000	20		-	0.00				6,250.00	6,250.00	83.33	18.53	2	2	7.3	85
Transfer Pipeline from Almaden Valley PL	8	4/6/2022	7/26/2022	80	5	1,665	333	1,521	189	20		41.63					23.63	65.25	0.30	18.53	2	2	7.3	2
Lake Area with 2.5' clay cap	8	4/6/2022	8/26/2022	103	5	91,639	18,328	241,509	168,198	20	12.4	2,290.98	22.24	53	44	687	21,024.73	23,315.70	204.12	18.53	2	2	7.3	228
Alamitos Restored Channel Area with 2.5' clay cap	8	6/1/2022	12/27/2022	150	5	1,556	311	261,283	260,038	20	12.4	38.90	0.26	53	44	687	32,504.78	32,543.68	216.70	18.53	2	2	7.3	219
Transfer Pipeline to Los Alamitos Perc. Pond	5	6/25/2022	10/14/2022	80	5	45,884	9,177	41,174	4,467	2	12.4	1,147.10	14.34	53	44	687	558.35	1,705.45	6.98	18.53	2	2	7.3	23
New Park Area	5	8/26/2022	2/21/2023	128	5	511	102	68,565	68,156	14	12.4	12.78	0.10	53	44	687	8,519.53	8,532.30	66.56	18.53	2	2	7.3	69
Alamitos Creek West Bank Shore Grading	8	10/22/2019	11/1/2022	7	5	203	41	9,664	9,502	20	12.4	5.08	0.73	53	44	687	1,187.70	1,192.78	169.67	18.53	2	2	7.3	172
Revegetation and Landscaping	8	12/28/2022	5/9/2023	95	5		0	0	-	20	12.4	-	0.00	53	44	687	-		-		2	2	7.3	2
Dewatering (occurs throughout construction as a conservative assumption)	0	8/12/2021	5/10/2023	455	5	0	0	0	-			-	0.00				-				0			
ASSUME 80% of cut would be reused on site.						141,578	28,316	749,171	635,909			3,539.45	37.70				79,489	83,028					Maximum Daily Trips	738.01
									Maximum Day	120													Maximum Hourly	82.0
																							Maximum Hourly Trips (7 a.m. to 7 p.m.)	61.5

Haul truck capacity (yd³)	16
# of trips per roundtrip	2

Weighted Average for Cut and Fill Haul Trips Need for CalEEMod Inputs

Trip Types	Total # Trips	Hauling Distance	Total Weighted Cut/Fill Hauling Distance	Grand Total	Total hauling miles travelled
cut	3,539	53	18.53	83,028	1,538,509
fill	79,489	17.00			

Worker trips per worker*	2.5
# of total workdays if construction ends on last day of revegetation and landscapaign	506

*To account for additional travel for lunch.

Sheet piles for cofferdam

Length of each sheet pile section (ft)	50
Width of each sheet pile section (ft)	25
Area of sheet pile (sq feet)	1250
# of sheet pile sections needed	68
Sheet pile total area (SF)	85000
truck capacity (yd^3)	16
Sheet pile weight (lb/sf)	31.8
Truck capacity (tons)	20
# of trucks needed	**68**

Aggregate Needed for Maintenance Ramps

Volume of aggregate (yd^3)	1600
truck capacity (yd^3)	16
# of truckloads needed	**100**

Sand Needed for Working Platform for Levee Construction/Soil Cement Installation

Volume of sand (yd^3)	4000
truck capacity (yd^3)	16
# of truckloads needed	**250**

Cement needed for soil cement

volume soil cement needed (yd3)	-	
volume soil cement needed (ft3)	-	
weight of cement needed for 1 ft3 soil cement	16	lbs
weight soil cement needed (lbs)	-	
weight soil cement needed (tons)	-	
Truckloads	**-**	

Notes:
1 Make: Hammer & Steel, Model: Telescopic Mast Mobilram, TM 18/22D
Source: http://www.hammersteel.com/cmss_files/attachmentlibrary/Brochures/ABI/2009ABIRevisions3-7-09.pdf
2 Make: Hydraulic Power Systems, Inc., Model: 800 Exciter
Source: http://hpsiqualitypiledrivers.com/vibratory-hammers/caisson-hammers/model-800/
3 Make: Arbrux
Source: http://www.arbrux.com/products/pond-aerators/industrial-aerators/

B.3 Operational GHG Emissions – Electricity Consumption

B.3 - Operational GHG Emissions - Electricity Consumption

Source	Quantity	Fuel Type	Horsepower (HP) or kW rating	Annual Throughput Data (kWh, gallons, therms, etc.)	Time of Day Source/Equipment will Operate (Continuous, 9am – 5pm)	
Electric Pump station	2	Electric, 135 HP*	1,587,357	kWh/yr	Continuous, 24 hrs/day, 365 days/year	
1 HP equals	745.7	watts		Assumed pump efficiency	90%	
1kW equals	1000	watts		Capacity factor	100%	(constantly running)
1 year equals	8760	hours		* assumes pump constantly running at max power, a conservative overestimate		

Baseline Indirect Emissions from Electricity Consumption

GHGs from Electricity Consumption					
GHG	Emission Factor (lb/kWh)	Consumption kWhr	metric tons	CO_2e* (metric tons)	kWhr/day
CO_2	0.29000	1,587,357	208.81	208.81	4348.9224
CH_4	0.000031	1,587,357	0.02	0.56	
N_20	0.000006	1,587,357	0.00	1.22	
			Total =	210.58	

Notes: The emission factor for CO_2 was obtained from PG&E, 2015. Emission factors for CH_4 and N_2O are from TCR, 2016.
*Global Warming Potential for CH_4 = 25; GWP for N_2O = 298 (CARB, 2016).

Pacific Gas and Electric Company (PG&E), 2015. Greenhouse Gas Emission Factors: Guidance for PG&E Customers, November 2015.
The Climate Registry (TCR), 2016. The Climate Registry 2016 Default Emission Factors, April 19, 2016.

B.4 Construction Locomotive Emissions

B.4 - Construction Locomotive Emissions

Parameter	Value	Units
density of wet soil[1]	2	tonnes/m^3
total volume of cut soil from Almaden Lake	28,316	yd^3
total mass of cut soil	43,562	tonnes
total mass of cut soil	47,918.71	tons
Maximum Freight Weight	106	tons/car
Weight of Empty Tank Car	37	tons/car
Total railcars needed	452	cars
Total weight of all empty cars needed	16,726.34	tons
Total weight of all cars and soil	64,645	tons
One-way Track Distance from Port of Oakland to edge of BAAQMD jurisdiction[3]	44	miles
One-way Track Distance from Port of Oakland to Salt Lake City[3]	731	miles

Maximum Freight Weight is gross wieght limit (286,000 pounds) minus empty car weight.

One-way Hauling Distance to Kettleman City (mi)	166
One-way Hauling Distance to Salt Lake City (mi)	746
Number of times farther	4.5

Fuel Consumption Related to Track Portion for Criteria Pollutants Emitted Within BAAQMD Jurisdiction

total ton-miles for full cars (outbound)	2,844,382.16	ton-miles
total ton-miles for empty cars (outbound)	735,959.02	ton-miles
Fuel Consumption Index[2]	928	(gross ton-miles/gal)
total gallons for full cars (outbound)	3,065.07	gallons
total gallons for empty cars (inbound)	793	gallons
Total gallons for entire rail operation	3,858	gallons

Fuel Consumption Related to Entire Track Portion for All Greenhouse Gas Emissions Emitted

total ton-miles for full cars (outbound)	47,255,530.86	ton-miles
total ton-miles for empty cars (outbound)	12,226,955.54	ton-miles
Fuel Consumption Index[2]	918	(gross ton-miles/gal)
total gallons for full cars (outbound)	51,477	gallons
total gallons for empty cars (inbound)	13,319	gallons
Total gallons for entire rail operation	64,796	gallons

Conversion Factors

m^3 per yd^3	1.3
tons per tonne	1.1
grams to pounds	0.002205
grams to tonnes	1.00E-06

Year 2021 Locomotive Emission Factors[2]

	Emission Factor (g/gal fuel)					
Operation Type	CO	HC[4]	NO_x	PM_{10}	$PM_{2.5}$	CO_2e
Locomotive Emissions	27.4	8.50	169	3.83	3.83	10,305

Total Locomotive Emissions

grams					
CO	HC[4]	NO_x	PM_{10}	$PM_{2.5}$	CO_2e
105,712.66	32,794	652,023.34	14,789	14,789	667,720,067.90

tons/project					tonnes/project
CO	HC[4]	NO_x	PM_{10}	$PM_{2.5}$	CO_2e
0.12	0.04	0.72	0.02	0.02	667.72

pounds/day					tonnes
CO	HC[4]	NO_x	PM_{10}	$PM_{2.5}$	CO_2e
0.46	0.14	2.84	0.06	0.06	668

total days of construction	506

1 https://answers.yahoo.com/question/index?qid=20090727070001AACuMJl

2 Emission factors for PM, HC, and NOx are from USEPA, 2009, and are averages for large line, large switch, and small railroads for calendar year 2021.
Emission factor for CO is from USEPA, 1997, average locomotive emissions for 2021.
Emission factor for CO2e and fuel consumption index are from Yorke, 2018.
USEPA, 2009, Emission Factors for Locomotives (https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P100500B.pdf)
USEPA, 1997, Emission Factors for Locomotives; Bergin et. El. (https://www3.epa.gov/ttnchie1/conference/ei20/session8/mbergin.pdf); ESA, 2013. Locomotive Input Data from Crude by Rail Project
Yorke, 2018. Phillips 66 Propane Recovery Project Rail Transport Emissions Update and HRA

3 measured using Google Maps

4 Used interchangeably with ROG for a conservative analysis. ROG is a subset of hydrocarbons (HC).

B.5 Construction Fuel Use Estimates

B.5 - Construction Fuel Use Estimates

Total Fuel Use During Contruction

Fuel Type	Fuel Consumed (gal/proj)	(av. gal/yr)	Gallons Sold in Santa Clara County in 2017	% Project gallons comp. to Co. gallons
Gasoline	13,996	6,998	685,000,000	0.001%
Diesel	467,071	233,535	70,588,000	0.331%

Diesel Fuel Use for Off-road Construction Equipment

Phase Name	Equipment Type	HP	Units	Hours/day	Days	Total Hours	Use Factor (Gal/hr)	Total Gallons
	Bore/Drill Rig	221	1	8	52	416	5.35	2,225
	Cranes	231	1	8	52	416	3.24	1,346
	Other Construction Equipm	950	1	8	52	416	17.75	7,386
Creek Diviersion & KD/CI	Pumps	250	2	8	52	832	4.69	3,898
	Cement and Mortar Mixers	100	1	8	123	984	1.75	1,723
	Graders	187	2	8	123	1968	4.34	8,538
	Off-Highway Trucks	402	2	8	123	1968	7.39	14,539
	Other Material Handling Eq	700	1	5	123	615	12.86	7,908
	Plate Compactors	8	2	8	123	1968	0.91	1,795
	Pumps	300	1	5	123	615	7.71	4,742
Levee Footprint	Rubber Tired Dozers	247	1	8	123	984	4.33	4,265
Dewatering	Pumps	100	1	24	455	10920	0.94	10,285
	Excavators	247	3	8	299	7176	4.31	30,920
Working Surface/V & DR	Rubber Tired Dozers	255	2	8	299	4784	4.33	20,736
	Graders	187	1	8	88	704	4.34	3,054
	Off-Highway Trucks	402	1	8	88	704	7.39	5,201
Lake & Levee FA	Plate Compactors	8	2	8	88	1408	0.91	1,284
	Graders	187	2	8	75	1200	4.34	5,206
	Off-Highway Trucks	402	2	8	75	1200	7.39	8,865
Islands (expanded and new)	Plate Compactors	8	4	8	75	2400	0.91	2,189
	Cranes	231	1	8	80	640	3.24	2,071
	Excavators	247	1	8	80	640	4.31	2,758
	Other Construction Equipm	30	1	8	80	640	0.91	584
	Plate Compactors	8	1	8	80	640	0.91	584
Transfer PL (from AVPL)	Rubber Tired Loaders	247	1	8	80	640	4.33	2,774
	Graders	187	1	8	103	824	4.34	3,575
	Off-Highway Trucks	402	1	8	103	824	7.39	6,088
Lake Area 2.5 CC	Plate Compactors	8	2	8	103	1648	0.91	1,503
	Graders	187	1	8	150	1200	4.34	5,206
	Off-Highway Trucks	402	1	8	150	1200	7.39	8,865
Alamitos RCA 2.5 CC	Plate Compactors	8	1	8	150	1200	0.91	1,095
	Cranes	231	1	8	58	464	3.24	1,502
	Excavators	247	1	8	80	640	4.31	2,758
	Other Construction Equipm	30	1	8	80	640	0.91	584
	Plate Compactors	8	1	8	80	640	0.91	584
Transfer PL (to LAPP)	Rubber Tired Loaders	247	1	8	80	640	4.33	2,774
	Graders	187	1	8	128	1024	4.34	4,442
	Off-Highway Trucks	402	1	8	128	1024	7.39	7,565
New Park Area	Plate Compactors	8	2	8	128	2048	0.91	1,868
	Graders	187	1	8	7	56	4.34	243
	Off-Highway Trucks	402	1	8	7	56	7.39	414
Alamitos Creek WBSG	Plate Compactors	8	1	8	7	56	0.91	51
	Excavators	158	1	4	95	380	4.31	1,637
Reveg & Landscaping	Generator Sets	84	1	6	95	570	1.75	998
					Total Hours	60,012	Total	206,629
					Ave. Gal/hr	3.44	Ave. Gal./yr.	103,315

Notes: Total equipment hours obained from Appendix B, Air Quality and Greenhouse Gas Emissions fuel use ratesderived from the Off-road 2011 model (see following page).

Fuel Use for Vehicles/Locamotives During Construction

Trip Type	Total Miles	Vehicle Type	miles/gallon	Gal./project	Max Gal. Year
Diesel Trucks and Locomotives					
Cut and Fill Hauling	1,536,018	HDT	6	256,003	128,002
Vendor Hauling	26,630	HDT	6	4,438	2,219
Total	1,562,648			260,441	130,221
Gasoline Fueled Vehicle Worker Trips					
Worker Commute	307,917	auto and LDT	22	13,996	6,998
Total				13,996	6,998

HDT: heavy-duty diesel truck; auto and LDT (light-duty trucks) are gasoline fueled.
Fuel economy sources: 24/7 Wall Street, 2017; Union of Concerned Scientists, 2017.

Union of Concerned Scientists, 2017. Engines for Change (2015). Accessed webpage (http://www.ucsusa.org/clean-vehicles/fuel-efficiency/heavy-duty-truck-standards#.WO0i-Sj2aUl) April 11, 2017.
24/7 Wall Street, 2017. Average Fuel Economy for 264 Million U.S. Light Vehicles: 22 Miles per Gallon, by Paul Ausick, March 2, 2017.

Vehicle Miles Travelled During Construction

Phases	Duration (Work Days)	# of Worker Trips/Day	Worker Trip Distance (mi)	Total Worker Trip Miles	Total # of Vendor Trips/Day.	Vendor Trip Distance (mi)	Total Vendor Trip Miles
Creek Diviersion & KD/CI	52	20	12.4	12,896	4	7.3	1518.4
Levee Footprint	123	20	12.4	30,504	10	7.3	8979
Dewatering	455	0	12.4	0	0	7.3	0
Working Surface/V & DR	299	20	12.4	74,152	2	7.3	4365.4
Lake & Levee FA	88	20	12.4	21,824	2	7.3	1284.8
Islands (expanded and new)	75	20	12.4	18,600	2	7.3	1095
Transfer PL (from AVPL)	80	20	12.4	19,840	2	7.3	1168
Lake Area 2.5 CC	103	20	12.4	25,544	2	7.3	1503.8
Alamitos RCA 2.5 CC	150	20	12.4	37,200	2	7.3	2190
Transfer PL (to LAPP)	80	20	12.4	19,840	2	7.3	1168
New Park Area	128	14	12.4	22,221	2	7.3	1868.8
Alamitos Creek WBSG	7	20	12.4	1,736	2	7.3	102.2
Reveg & Landscaping	95	20	12.4	23,560	2	7.3	1387
			Total	307,917		Total	26,630
			Ave. Gal./yr.	123,167		Ave. Gal./yr.	10,652

Total Weighted Cut/Fill Hauling Distance (miles) per Trip	Grand Total Trips	Total Miles
18.5	83,028	1,536,018

Source: Weighted trip distance and total trips obtained from Appendix B, Air Quality and GHG

B.6 CalEEMod Output for Regional Emissions

ESA

Almaden Lake

Santa Clara County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
City Park	65.00	Acre	65.00	2,831,400.00	100

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	58
Climate Zone	4			**Operational Year**	2024
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - land use type

Construction Phase - schedule

Off-road Equipment - Equipment assumptions.

Off-road Equipment -

Off-road Equipment - Equipment assumptions.

Off-road Equipment - Equipment assumptions

Off-road Equipment - Equipment assumptions

Off-road Equipment - Equipment assumptions.

Off-road Equipment - equipment assumptions

Off-road Equipment - Equipment assumptions

Off-road Equipment - equipment assumptions

Off-road Equipment - Equipment assumptions.

Off-road Equipment - Equipment assumptions

Off-road Equipment - pipeline construction equipment. Other construction equipment represents butt fusion machine.

Off-road Equipment - Equipment for pipeline construction; other construction equipment represents butt fusion machine.

Off-road Equipment - Equipment assumptions

Trips and VMT - trips values are rounded up to the nearest even whole number; based on cut and fill amounts identified in the Project Description.

Grading -

Construction Off-road Equipment Mitigation - Tier 4 equipment standards for off-road.

Table Name	Column Name	Default Value	New Value
tblAreaCoating	Area_EF_Parking	150	0
tblAreaCoating	Area_Nonresidential_Exterior	1415700	0
tblAreaCoating	Area_Nonresidential_Interior	4247100	0
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00

tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	6.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	9.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	9.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	16.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	4.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
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tblConstEquipMitigation	Tier	No Change	Tier 4 Final
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tblConstructionPhase	NumDays	110.00	88.00
tblConstructionPhase	NumDays	110.00	75.00

tblConstructionPhase	NumDays	75.00	103.00
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tblFleetMix	LDT2	0.18	0.00
tblFleetMix	LHD1	0.01	0.00
tblFleetMix	LHD2	5.0150e-003	0.00
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tblFleetMix	MHD	0.01	0.00
tblFleetMix	OBUS	2.1770e-003	0.00
tblFleetMix	SBUS	6.3200e-004	0.00
tblFleetMix	UBUS	1.5140e-003	0.00
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tblGrading	MaterialSiltContent	6.90	4.30
tblGrading	MeanVehicleSpeed	7.10	40.00
tblLandUse	Population	0.00	100.00
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tblOffRoadEquipment	HorsePower	158.00	247.00
tblOffRoadEquipment	HorsePower	158.00	247.00

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tblTripsAndVMT	HaulingTripLength	20.00	18.50
tblTripsAndVMT	HaulingTripLength	20.00	18.50

tblTripsAndVMT	HaulingTripLength	20.00	18.50
tblTripsAndVMT	HaulingTripLength	20.00	18.50
tblTripsAndVMT	HaulingTripLength	20.00	18.50
tblTripsAndVMT	HaulingTripLength	20.00	18.50
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tblTripsAndVMT	WorkerTripNumber	1,189.00	20.00
tblTripsAndVMT	WorkerTripNumber	10.00	20.00
tblTripsAndVMT	WorkerTripNumber	13.00	20.00
tblTripsAndVMT	WorkerTripNumber	10.00	20.00
tblTripsAndVMT	WorkerTripNumber	8.00	20.00
tblTripsAndVMT	WorkerTripNumber	13.00	20.00
tblTripsAndVMT	WorkerTripNumber	1,189.00	14.00
tblTripsAndVMT	WorkerTripNumber	8.00	20.00
tblTripsAndVMT	WorkerTripNumber	5.00	20.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2021	0.4741	4.8703	3.1060	9.3600e-003	1.1589	0.1836	1.3425	0.3842	0.1728	0.5570	0.0000	835.6479	835.6479	0.1647	0.0000	839.7660
2022	1.1309	17.0840	8.3007	0.0447	1.5925	0.3422	1.9347	0.4295	0.3222	0.7517	0.0000	4,177.4769	4,177.4769	0.4899	0.0000	4,189.7250
2023	0.0969	0.9508	1.0092	2.8000e-003	0.0666	0.0345	0.1011	0.0172	0.0339	0.0511	0.0000	250.9492	250.9492	0.0229	0.0000	251.5207
Maximum	**1.1309**	**17.0840**	**8.3007**	**0.0447**	**1.5925**	**0.3422**	**1.9347**	**0.4295**	**0.3222**	**0.7517**	**0.0000**	**4,177.4769**	**4,177.4769**	**0.4899**	**0.0000**	**4,189.7250**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2021	0.1175	0.8275	3.8407	9.3600e-003	1.1589	0.0157	1.1746	0.3842	0.0154	0.3996	0.0000	835.6471	835.6471	0.1647	0.0000	839.7651
2022	0.4857	10.1092	9.8102	0.0447	1.5925	0.0510	1.6434	0.4295	0.0498	0.4793	0.0000	4,177.4753	4,177.4753	0.4899	0.0000	4,189.7234
2023	0.0288	0.2859	1.1575	2.8000e-003	0.0666	2.9600e-003	0.0695	0.0172	2.9400e-003	0.0201	0.0000	250.9490	250.9490	0.0229	0.0000	251.5205
Maximum	**0.4857**	**10.1092**	**9.8102**	**0.0447**	**1.5925**	**0.0510**	**1.6434**	**0.4295**	**0.0498**	**0.4793**	**0.0000**	**4,177.4753**	**4,177.4753**	**0.4899**	**0.0000**	**4,189.7234**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**62.86**	**51.00**	**-19.27**	**0.00**	**0.00**	**87.58**	**14.53**	**0.00**	**87.12**	**33.89**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
10	**4-24-2021**	**7-23-2021**	0.4134	0.1189
11	**7-24-2021**	**10-23-2021**	2.3793	0.2905
12	**10-24-2021**	**1-23-2022**	3.4406	0.8355
13	**1-24-2022**	**4-23-2022**	3.0921	1.3864
14	**4-24-2022**	**7-23-2022**	6.4580	3.7972
15	**7-24-2022**	**10-23-2022**	5.0914	3.1604
16	**10-24-2022**	**1-23-2023**	2.8884	1.9738
17	**1-24-2023**	**4-23-2023**	0.6758	0.1886
18	**4-24-2023**	**7-23-2023**	0.0861	0.0115
		Highest	6.4580	3.7972

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	11.0581	1.0000e-005	6.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.1600e-003	1.1600e-003	0.0000	0.0000	1.2400e-003
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.3079	0.0000	0.3079	0.0756	0.0000	0.0756	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	1.1347	0.0000	1.1347	0.0671	0.0000	2.8112
Water						0.0000	0.0000		0.0000	0.0000	0.0000	78.8551	78.8551	3.5700e-003	7.4000e-004	79.1640
Total	**11.0581**	**1.0000e-005**	**6.0000e-004**	**0.0000**	**0.3079**	**0.0000**	**0.3079**	**0.0756**	**0.0000**	**0.0756**	**1.1347**	**78.8562**	**79.9909**	**0.0706**	**7.4000e-004**	**81.9765**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	11.0581	1.0000e-005	6.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.1600e-003	1.1600e-003	0.0000	0.0000	1.2400e-003
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.3079	0.0000	0.3079	0.0756	0.0000	0.0756	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	1.1347	0.0000	1.1347	0.0671	0.0000	2.8112
Water						0.0000	0.0000		0.0000	0.0000	0.0000	78.8551	78.8551	3.5700e-003	7.4000e-004	79.1640
Total	**11.0581**	**1.0000e-005**	**6.0000e-004**	**0.0000**	**0.3079**	**0.0000**	**0.3079**	**0.0756**	**0.0000**	**0.0756**	**1.1347**	**78.8562**	**79.9909**	**0.0706**	**7.4000e-004**	**81.9765**

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

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Creek Diviersion & KD/CI	Trenching	6/1/2021	8/11/2021	5	52	Creek Diversion & Lake Drainage/Cofferdam
2	Levee Footprint	Grading	8/12/2021	1/31/2022	5	123	Levee Footprint
3	Dewatering	Trenching	8/12/2021	5/10/2023	5	455	Dewatering
4	Working Surface/V & DR	Building Construction	8/12/2021	10/4/2022	5	299	Working Surface/Vegetation & Debris Removal
5	Lake & Levee FA	Grading	12/4/2021	4/6/2022	5	88	Lake & Levee Foundation Area
6	Islands (expanded and new)	Grading	4/6/2022	7/19/2022	5	75	Expanded Existing Island and New Island
7	Transfer PL (from AVPL)	Trenching	4/6/2022	7/26/2022	5	80	Transfer Pipeline from Almaden Valley Pipeline
8	Lake Area 2.5 CC	Paving	4/6/2022	8/26/2022	5	103	Lake Area w/2.5' Clay Cap
9	Alamitos RCA 2.5 CC	Paving	6/1/2022	12/27/2022	5	150	Alamitos Restored Channel Area w/ 2.5' Clay Cap
10	Transfer PL (to LAPP)	Trenching	6/25/2022	10/14/2022	5	80	Transfer Pipeline to Los Alamitos Percolation Pond
11	New Park Area	Building Construction	8/26/2022	2/21/2023	5	128	New Park Area
12	Alamitos Creek WBSG	Grading	10/22/2022	11/1/2022	5	7	Alamitos Creek West Bank Shore Grading
13	Reveg & Landscaping	Site Preparation	12/28/2022	5/9/2023	5	95	Revegetation & Landscaping

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

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

<u>OffRoad Equipment</u>

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Creek Diviersion & KD/CI	Bore/Drill Rigs	1	8.00	221	0.50
Creek Diviersion & KD/CI	Cranes	1	8.00	231	0.29

Creek Diviersion & KD/CI	Other Construction Equipment	1	8.00	950	0.50
Creek Diviersion & KD/CI	Pumps	2	8.00	250	0.74
Levee Footprint	Cement and Mortar Mixers	1	8.00	100	0.56
Levee Footprint	Graders	2	8.00	187	0.41
Levee Footprint	Off-Highway Trucks	2	8.00	402	0.38
Levee Footprint	Other Material Handling Equipment	1	5.00	700	0.40
Levee Footprint	Plate Compactors	2	8.00	8	0.43
Levee Footprint	Pumps	1	5.00	300	0.74
Levee Footprint	Rubber Tired Dozers	1	8.00	247	0.40
Dewatering	Pumps	1	24.00	100	0.74
Working Surface/V & DR	Excavators	3	8.00	247	0.40
Working Surface/V & DR	Rubber Tired Dozers	2	8.00	255	0.40
Lake & Levee FA	Graders	1	8.00	187	0.41
Lake & Levee FA	Off-Highway Trucks	1	8.00	402	0.38
Lake & Levee FA	Plate Compactors	2	8.00	8	0.43
Islands (expanded and new)	Graders	2	8.00	187	0.41
Islands (expanded and new)	Off-Highway Trucks	2	8.00	402	0.38
Islands (expanded and new)	Plate Compactors	4	8.00	8	0.43
Transfer PL (from AVPL)	Cranes	1	8.00	231	0.29
Transfer PL (from AVPL)	Excavators	1	8.00	247	0.38
Transfer PL (from AVPL)	Other Construction Equipment	1	8.00	30	0.42
Transfer PL (from AVPL)	Plate Compactors	1	8.00	8	0.43
Transfer PL (from AVPL)	Rubber Tired Loaders	1	8.00	247	0.36
Lake Area 2.5 CC	Graders	1	8.00	187	0.41
Lake Area 2.5 CC	Off-Highway Trucks	1	8.00	402	0.38
Lake Area 2.5 CC	Plate Compactors	2	8.00	8	0.43
Alamitos RCA 2.5 CC	Graders	1	8.00	187	0.41

Alamitos RCA 2.5 CC	Off-Highway Trucks	1	8.00	402	0.38
Alamitos RCA 2.5 CC	Plate Compactors	1	8.00	8	0.43
Transfer PL (to LAPP)	Cranes	1	8.00	231	0.29
Transfer PL (to LAPP)	Excavators	1	8.00	247	0.38
Transfer PL (to LAPP)	Other Construction Equipment	1	8.00	30	0.42
Transfer PL (to LAPP)	Plate Compactors	1	8.00	8	0.43
Transfer PL (to LAPP)	Rubber Tired Loaders	1	8.00	247	0.36
New Park Area	Graders	1	8.00	187	0.41
New Park Area	Off-Highway Trucks	1	8.00	402	0.38
New Park Area	Plate Compactors	2	8.00	8	0.43
Alamitos Creek WBSG	Graders	1	8.00	187	0.41
Alamitos Creek WBSG	Off-Highway Trucks	1	8.00	402	0.38
Alamitos Creek WBSG	Plate Compactors	1	8.00	8	0.43
Reveg & Landscaping	Excavators	1	4.00	158	0.38
Reveg & Landscaping	Generator Sets	1	6.00	84	0.74

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
Creek Diviersion & KD/CL	5	20.00	4.00	0.00	12.40	7.30	18.50	LD_Mix	HDT_Mix	HHDT
Levee Footprint	10	20.00	10.00	0.00	12.40	7.30	18.50	LD_Mix	HDT_Mix	HHDT
Dewatering	1	0.00	0.00	0.00	12.40	7.30	18.50	LD_Mix	HDT_Mix	HHDT
Working Surface/V & DP	5	20.00	2.00	0.00	12.40	7.30	18.50	LD_Mix	HDT_Mix	HHDT
Lake & Levee FA	4	20.00	2.00	9,424.00	12.40	7.30	18.50	LD_Mix	HDT_Mix	HHDT
Islands (expanded and new)	8	20.00	2.00	6,250.00	12.40	7.30	18.50	LD_Mix	HDT_Mix	HHDT
Transfer PL (from AVPL)	5	20.00	2.00	66.00	12.40	7.30	18.50	LD_Mix	HDT_Mix	HHDT
Lake Area 2.5 CC	4	20.00	2.00	23,316.00	12.40	7.30	18.50	LD_Mix	HDT_Mix	HHDT
Alamitos RCA 2.5 CC	3	20.00	2.00	32,544.00	12.40	7.30	18.50	LD_Mix	HDT_Mix	HHDT
Transfer PL (to LAPP)	5	20.00	2.00	1,706.00	12.40	7.30	18.50	LD_Mix	HDT_Mix	HHDT
New Park Area	4	14.00	2.00	8,534.00	12.40	7.30	18.50	LD_Mix	HDT_Mix	HHDT
Alamitos Creek WBSG	3	20.00	2.00	1,194.00	12.40	7.30	18.50	LD_Mix	HDT_Mix	HHDT
Reveg & Landscaping	2	20.00	2.00	0.00	12.40	7.30	18.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

3.2 Creek Diviersion & KD/CI - 2021

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	0.0509	0.5031	0.2804	1.4100e-003		0.0163	0.0163		0.0157	0.0157	0.0000	122.1641	122.1641	0.0138	0.0000	122.5100
Total	**0.0509**	**0.5031**	**0.2804**	**1.4100e-003**		**0.0163**	**0.0163**		**0.0157**	**0.0157**	**0.0000**	**122.1641**	**122.1641**	**0.0138**	**0.0000**	**122.5100**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	3.4000e-004	0.0107	2.8400e-003	3.0000e-005	6.8000e-004	2.0000e-005	7.1000e-004	2.0000e-004	2.0000e-005	2.2000e-004	0.0000	2.6939	2.6939	1.2000e-004	0.0000	2.6968
Worker	1.7800e-003	1.2500e-003	0.0133	4.0000e-005	4.7300e-003	3.0000e-005	4.7600e-003	1.2600e-003	3.0000e-005	1.2900e-003	0.0000	3.9047	3.9047	9.0000e-005	0.0000	3.9069
Total	**2.1200e-003**	**0.0119**	**0.0162**	**7.0000e-005**	**5.4100e-003**	**5.0000e-005**	**5.4700e-003**	**1.4600e-003**	**5.0000e-005**	**1.5100e-003**	**0.0000**	**6.5986**	**6.5986**	**2.1000e-004**	**0.0000**	**6.6038**

3.2 Creek Diviersion & KD/CI - 2021

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0187	0.1307	0.4948	1.4100e-003		3.9900e-003	3.9900e-003		3.7900e-003	3.7900e-003	0.0000	122.1639	122.1639	0.0138	0.0000	122.5099
Total	**0.0187**	**0.1307**	**0.4948**	**1.4100e-003**		**3.9900e-003**	**3.9900e-003**		**3.7900e-003**	**3.7900e-003**	**0.0000**	**122.1639**	**122.1639**	**0.0138**	**0.0000**	**122.5099**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	3.4000e-004	0.0107	2.8400e-003	3.0000e-005	6.8000e-004	2.0000e-005	7.1000e-004	2.0000e-004	2.0000e-005	2.2000e-004	0.0000	2.6939	2.6939	1.2000e-004	0.0000	2.6968
Worker	1.7800e-003	1.2500e-003	0.0133	4.0000e-005	4.7300e-003	3.0000e-005	4.7600e-003	1.2600e-003	3.0000e-005	1.2900e-003	0.0000	3.9047	3.9047	9.0000e-005	0.0000	3.9069
Total	**2.1200e-003**	**0.0119**	**0.0162**	**7.0000e-005**	**5.4100e-003**	**5.0000e-005**	**5.4700e-003**	**1.4600e-003**	**5.0000e-005**	**1.5100e-003**	**0.0000**	**6.5986**	**6.5986**	**2.1000e-004**	**0.0000**	**6.6038**

3.3 Levee Footprint - 2021

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					0.3289	0.0000	0.3289	0.1712	0.0000	0.1712	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1891	1.9240	0.9010	3.1300e-003		0.0732	0.0732		0.0680	0.0680	0.0000	283.4941	283.4941	0.0721	0.0000	285.2967
Total	**0.1891**	**1.9240**	**0.9010**	**3.1300e-003**	**0.3289**	**0.0732**	**0.4021**	**0.1712**	**0.0680**	**0.2391**	**0.0000**	**283.4941**	**283.4941**	**0.0721**	**0.0000**	**285.2967**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.6600e-003	0.0524	0.0140	1.4000e-004	3.3600e-003	1.2000e-004	3.4700e-003	9.7000e-004	1.1000e-004	1.0800e-003	0.0000	13.2105	13.2105	5.8000e-004	0.0000	13.2249
Worker	3.4900e-003	2.4600e-003	0.0262	8.0000e-005	9.2900e-003	6.0000e-005	9.3400e-003	2.4700e-003	5.0000e-005	2.5200e-003	0.0000	7.6592	7.6592	1.7000e-004	0.0000	7.6635
Total	**5.1500e-003**	**0.0549**	**0.0401**	**2.2000e-004**	**0.0127**	**1.8000e-004**	**0.0128**	**3.4400e-003**	**1.6000e-004**	**3.6000e-003**	**0.0000**	**20.8697**	**20.8697**	**7.5000e-004**	**0.0000**	**20.8884**

3.3 Levee Footprint - 2021

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.3289	0.0000	0.3289	0.1712	0.0000	0.1712	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0376	0.1629	1.3781	3.1300e-003		5.0100e-003	5.0100e-003		5.0100e-003	5.0100e-003	0.0000	283.4938	283.4938	0.0721	0.0000	285.2964
Total	**0.0376**	**0.1629**	**1.3781**	**3.1300e-003**	**0.3289**	**5.0100e-003**	**0.3339**	**0.1712**	**5.0100e-003**	**0.1762**	**0.0000**	**283.4938**	**283.4938**	**0.0721**	**0.0000**	**285.2964**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.6600e-003	0.0524	0.0140	1.4000e-004	3.3600e-003	1.2000e-004	3.4700e-003	9.7000e-004	1.1000e-004	1.0800e-003	0.0000	13.2105	13.2105	5.8000e-004	0.0000	13.2249
Worker	3.4900e-003	2.4600e-003	0.0262	8.0000e-005	9.2900e-003	6.0000e-005	9.3400e-003	2.4700e-003	5.0000e-005	2.5200e-003	0.0000	7.6592	7.6592	1.7000e-004	0.0000	7.6635
Total	**5.1500e-003**	**0.0549**	**0.0401**	**2.2000e-004**	**0.0127**	**1.8000e-004**	**0.0128**	**3.4400e-003**	**1.6000e-004**	**3.6000e-003**	**0.0000**	**20.8697**	**20.8697**	**7.5000e-004**	**0.0000**	**20.8884**

3.3 Levee Footprint - 2022

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					0.0850	0.0000	0.0850	0.0371	0.0000	0.0371	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0341	0.3284	0.1744	6.4000e-004		0.0123	0.0123		0.0114	0.0114	0.0000	58.3645	58.3645	0.0148	0.0000	58.7351
Total	**0.0341**	**0.3284**	**0.1744**	**6.4000e-004**	**0.0850**	**0.0123**	**0.0973**	**0.0371**	**0.0114**	**0.0485**	**0.0000**	**58.3645**	**58.3645**	**0.0148**	**0.0000**	**58.7351**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	3.2000e-004	0.0102	2.7100e-003	3.0000e-005	6.9000e-004	2.0000e-005	7.1000e-004	2.0000e-004	2.0000e-005	2.2000e-004	0.0000	2.6938	2.6938	1.1000e-004	0.0000	2.6966
Worker	6.7000e-004	4.5000e-004	4.9500e-003	2.0000e-005	1.9100e-003	1.0000e-005	1.9200e-003	5.1000e-004	1.0000e-005	5.2000e-004	0.0000	1.5196	1.5196	3.0000e-005	0.0000	1.5204
Total	**9.9000e-004**	**0.0107**	**7.6600e-003**	**5.0000e-005**	**2.6000e-003**	**3.0000e-005**	**2.6300e-003**	**7.1000e-004**	**3.0000e-005**	**7.4000e-004**	**0.0000**	**4.2134**	**4.2134**	**1.4000e-004**	**0.0000**	**4.2170**

3.3 Levee Footprint - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0850	0.0000	0.0850	0.0371	0.0000	0.0371	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	7.7400e-003	0.0335	0.2837	6.4000e-004		1.0300e-003	1.0300e-003		1.0300e-003	1.0300e-003	0.0000	58.3645	58.3645	0.0148	0.0000	58.7350
Total	**7.7400e-003**	**0.0335**	**0.2837**	**6.4000e-004**	**0.0850**	**1.0300e-003**	**0.0860**	**0.0371**	**1.0300e-003**	**0.0381**	**0.0000**	**58.3645**	**58.3645**	**0.0148**	**0.0000**	**58.7350**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	3.2000e-004	0.0102	2.7100e-003	3.0000e-005	6.9000e-004	2.0000e-005	7.1000e-004	2.0000e-004	2.0000e-005	2.2000e-004	0.0000	2.6938	2.6938	1.1000e-004	0.0000	2.6966
Worker	6.7000e-004	4.5000e-004	4.9500e-003	2.0000e-005	1.9100e-003	1.0000e-005	1.9200e-003	5.1000e-004	1.0000e-005	5.2000e-004	0.0000	1.5196	1.5196	3.0000e-005	0.0000	1.5204
Total	**9.9000e-004**	**0.0107**	**7.6600e-003**	**5.0000e-005**	**2.6000e-003**	**3.0000e-005**	**2.6300e-003**	**7.1000e-004**	**3.0000e-005**	**7.4000e-004**	**0.0000**	**4.2134**	**4.2134**	**1.4000e-004**	**0.0000**	**4.2170**

3.4 Dewatering - 2021

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	0.0693	0.5847	0.6813	1.2000e-003		0.0324	0.0324		0.0324	0.0324	0.0000	102.9487	102.9487	5.6200e-003	0.0000	103.0891
Total	**0.0693**	**0.5847**	**0.6813**	**1.2000e-003**		**0.0324**	**0.0324**		**0.0324**	**0.0324**	**0.0000**	**102.9487**	**102.9487**	**5.6200e-003**	**0.0000**	**103.0891**

Unmitigated Construction Off-Site

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

3.4 Dewatering - 2021

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0120	0.0519	0.7388	1.2000e-003		1.6000e-003	1.6000e-003		1.6000e-003	1.6000e-003	0.0000	102.9486	102.9486	5.6200e-003	0.0000	103.0890
Total	**0.0120**	**0.0519**	**0.7388**	**1.2000e-003**		**1.6000e-003**	**1.6000e-003**		**1.6000e-003**	**1.6000e-003**	**0.0000**	**102.9486**	**102.9486**	**5.6200e-003**	**0.0000**	**103.0890**

Mitigated Construction Off-Site

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

3.4 Dewatering - 2022

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	0.1634	1.3784	1.7327	3.0500e-003		0.0723	0.0723		0.0723	0.0723	0.0000	262.4178	262.4178	0.0134	0.0000	262.7525
Total	**0.1634**	**1.3784**	**1.7327**	**3.0500e-003**		**0.0723**	**0.0723**		**0.0723**	**0.0723**	**0.0000**	**262.4178**	**262.4178**	**0.0134**	**0.0000**	**262.7525**

Unmitigated Construction Off-Site

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

3.4 Dewatering - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0305	0.1323	1.8833	3.0500e-003		4.0700e-003	4.0700e-003		4.0700e-003	4.0700e-003	0.0000	262.4174	262.4174	0.0134	0.0000	262.7522
Total	**0.0305**	**0.1323**	**1.8833**	**3.0500e-003**		**4.0700e-003**	**4.0700e-003**		**4.0700e-003**	**4.0700e-003**	**0.0000**	**262.4174**	**262.4174**	**0.0134**	**0.0000**	**262.7522**

Mitigated Construction Off-Site

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

3.4 Dewatering - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0544	0.4572	0.6187	1.0900e-003		0.0224	0.0224		0.0224	0.0224	0.0000	93.8648	93.8648	4.2900e-003	0.0000	93.9722
Total	**0.0544**	**0.4572**	**0.6187**	**1.0900e-003**		**0.0224**	**0.0224**		**0.0224**	**0.0224**	**0.0000**	**93.8648**	**93.8648**	**4.2900e-003**	**0.0000**	**93.9722**

Unmitigated Construction Off-Site

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

3.4 Dewatering - 2023

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0109	0.0473	0.6737	1.0900e-003		1.4600e-003	1.4600e-003		1.4600e-003	1.4600e-003	0.0000	93.8647	93.8647	4.2900e-003	0.0000	93.9721
Total	**0.0109**	**0.0473**	**0.6737**	**1.0900e-003**		**1.4600e-003**	**1.4600e-003**		**1.4600e-003**	**1.4600e-003**	**0.0000**	**93.8647**	**93.8647**	**4.2900e-003**	**0.0000**	**93.9721**

Mitigated Construction Off-Site

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

3.5 Working Surface/V & DR - 2021

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	0.1337	1.3871	1.0357	2.2100e-003		0.0565	0.0565		0.0520	0.0520	0.0000	193.8431	193.8431	0.0627	0.0000	195.4104
Total	**0.1337**	**1.3871**	**1.0357**	**2.2100e-003**		**0.0565**	**0.0565**		**0.0520**	**0.0520**	**0.0000**	**193.8431**	**193.8431**	**0.0627**	**0.0000**	**195.4104**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	3.3000e-004	0.0105	2.7900e-003	3.0000e-005	6.7000e-004	2.0000e-005	6.9000e-004	1.9000e-004	2.0000e-005	2.2000e-004	0.0000	2.6421	2.6421	1.2000e-004	0.0000	2.6450
Worker	3.4900e-003	2.4600e-003	0.0262	8.0000e-005	9.2900e-003	6.0000e-005	9.3400e-003	2.4700e-003	5.0000e-005	2.5200e-003	0.0000	7.6592	7.6592	1.7000e-004	0.0000	7.6635
Total	**3.8200e-003**	**0.0129**	**0.0290**	**1.1000e-004**	**9.9600e-003**	**8.0000e-005**	**0.0100**	**2.6600e-003**	**7.0000e-005**	**2.7400e-003**	**0.0000**	**10.3013**	**10.3013**	**2.9000e-004**	**0.0000**	**10.3085**

3.5 Working Surface/V & DR - 2021

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0270	0.1170	0.9902	2.2100e-003		3.6000e-003	3.6000e-003		3.6000e-003	3.6000e-003	0.0000	193.8428	193.8428	0.0627	0.0000	195.4102
Total	**0.0270**	**0.1170**	**0.9902**	**2.2100e-003**		**3.6000e-003**	**3.6000e-003**		**3.6000e-003**	**3.6000e-003**	**0.0000**	**193.8428**	**193.8428**	**0.0627**	**0.0000**	**195.4102**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	3.3000e-004	0.0105	2.7900e-003	3.0000e-005	6.7000e-004	2.0000e-005	6.9000e-004	1.9000e-004	2.0000e-005	2.2000e-004	0.0000	2.6421	2.6421	1.2000e-004	0.0000	2.6450
Worker	3.4900e-003	2.4600e-003	0.0262	8.0000e-005	9.2900e-003	6.0000e-005	9.3400e-003	2.4700e-003	5.0000e-005	2.5200e-003	0.0000	7.6592	7.6592	1.7000e-004	0.0000	7.6635
Total	**3.8200e-003**	**0.0129**	**0.0290**	**1.1000e-004**	**9.9600e-003**	**8.0000e-005**	**0.0100**	**2.6600e-003**	**7.0000e-005**	**2.7400e-003**	**0.0000**	**10.3013**	**10.3013**	**2.9000e-004**	**0.0000**	**10.3085**

3.5 Working Surface/V & DR - 2022

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	0.2447	2.4176	1.9424	4.2600e-003		0.1004	0.1004		0.0923	0.0923	0.0000	374.6032	374.6032	0.1212	0.0000	377.6321
Total	**0.2447**	**2.4176**	**1.9424**	**4.2600e-003**		**0.1004**	**0.1004**		**0.0923**	**0.0923**	**0.0000**	**374.6032**	**374.6032**	**0.1212**	**0.0000**	**377.6321**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	6.0000e-004	0.0191	5.0800e-003	5.0000e-005	1.3000e-003	4.0000e-005	1.3400e-003	3.7000e-004	4.0000e-005	4.1000e-004	0.0000	5.0541	5.0541	2.1000e-004	0.0000	5.0594
Worker	6.2900e-003	4.2600e-003	0.0465	1.6000e-004	0.0179	1.1000e-004	0.0180	4.7700e-003	1.0000e-004	4.8700e-003	0.0000	14.2554	14.2554	3.0000e-004	0.0000	14.2628
Total	**6.8900e-003**	**0.0234**	**0.0515**	**2.1000e-004**	**0.0192**	**1.5000e-004**	**0.0194**	**5.1400e-003**	**1.4000e-004**	**5.2800e-003**	**0.0000**	**19.3094**	**19.3094**	**5.1000e-004**	**0.0000**	**19.3222**

3.5 Working Surface/V & DR - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0522	0.2260	1.9125	4.2600e-003		6.9500e-003	6.9500e-003		6.9500e-003	6.9500e-003	0.0000	374.6028	374.6028	0.1212	0.0000	377.6316
Total	**0.0522**	**0.2260**	**1.9125**	**4.2600e-003**		**6.9500e-003**	**6.9500e-003**		**6.9500e-003**	**6.9500e-003**	**0.0000**	**374.6028**	**374.6028**	**0.1212**	**0.0000**	**377.6316**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	6.0000e-004	0.0191	5.0800e-003	5.0000e-005	1.3000e-003	4.0000e-005	1.3400e-003	3.7000e-004	4.0000e-005	4.1000e-004	0.0000	5.0541	5.0541	2.1000e-004	0.0000	5.0594
Worker	6.2900e-003	4.2600e-003	0.0465	1.6000e-004	0.0179	1.1000e-004	0.0180	4.7700e-003	1.0000e-004	4.8700e-003	0.0000	14.2554	14.2554	3.0000e-004	0.0000	14.2628
Total	**6.8900e-003**	**0.0234**	**0.0515**	**2.1000e-004**	**0.0192**	**1.5000e-004**	**0.0194**	**5.1400e-003**	**1.4000e-004**	**5.2800e-003**	**0.0000**	**19.3094**	**19.3094**	**5.1000e-004**	**0.0000**	**19.3222**

3.6 Lake & Levee FA - 2021

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					0.7405	0.0000	0.7405	0.1898	0.0000	0.1898	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0114	0.1169	0.0579	2.1000e-004		4.0000e-003	4.0000e-003		3.7000e-003	3.7000e-003	0.0000	18.0454	18.0454	5.7000e-003	0.0000	18.1879
Total	**0.0114**	**0.1169**	**0.0579**	**2.1000e-004**	**0.7405**	**4.0000e-003**	**0.7445**	**0.1898**	**3.7000e-003**	**0.1935**	**0.0000**	**18.0454**	**18.0454**	**5.7000e-003**	**0.0000**	**18.1879**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	7.9100e-003	0.2722	0.0589	7.8000e-004	0.0596	8.3000e-004	0.0604	0.0151	7.9000e-004	0.0159	0.0000	75.3630	75.3630	3.4800e-003	0.0000	75.4500
Vendor	7.0000e-005	2.0600e-003	5.5000e-004	1.0000e-005	1.3000e-004	0.0000	1.4000e-004	4.0000e-005	0.0000	4.0000e-005	0.0000	0.5181	0.5181	2.0000e-005	0.0000	0.5186
Worker	6.8000e-004	4.8000e-004	5.1300e-003	2.0000e-005	1.8200e-003	1.0000e-005	1.8300e-003	4.8000e-004	1.0000e-005	4.9000e-004	0.0000	1.5018	1.5018	3.0000e-005	0.0000	1.5027
Total	**8.6600e-003**	**0.2747**	**0.0645**	**8.1000e-004**	**0.0615**	**8.4000e-004**	**0.0624**	**0.0156**	**8.0000e-004**	**0.0164**	**0.0000**	**77.3828**	**77.3828**	**3.5300e-003**	**0.0000**	**77.4713**

3.6 Lake & Levee FA - 2021

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.7405	0.0000	0.7405	0.1898	0.0000	0.1898	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	2.4300e-003	0.0105	0.0890	2.1000e-004		3.2000e-004	3.2000e-004		3.2000e-004	3.2000e-004	0.0000	18.0454	18.0454	5.7000e-003	0.0000	18.1879
Total	**2.4300e-003**	**0.0105**	**0.0890**	**2.1000e-004**	**0.7405**	**3.2000e-004**	**0.7408**	**0.1898**	**3.2000e-004**	**0.1901**	**0.0000**	**18.0454**	**18.0454**	**5.7000e-003**	**0.0000**	**18.1879**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	7.9100e-003	0.2722	0.0589	7.8000e-004	0.0596	8.3000e-004	0.0604	0.0151	7.9000e-004	0.0159	0.0000	75.3630	75.3630	3.4800e-003	0.0000	75.4500
Vendor	7.0000e-005	2.0600e-003	5.5000e-004	1.0000e-005	1.3000e-004	0.0000	1.4000e-004	4.0000e-005	0.0000	4.0000e-005	0.0000	0.5181	0.5181	2.0000e-005	0.0000	0.5186
Worker	6.8000e-004	4.8000e-004	5.1300e-003	2.0000e-005	1.8200e-003	1.0000e-005	1.8300e-003	4.8000e-004	1.0000e-005	4.9000e-004	0.0000	1.5018	1.5018	3.0000e-005	0.0000	1.5027
Total	**8.6600e-003**	**0.2747**	**0.0645**	**8.1000e-004**	**0.0615**	**8.4000e-004**	**0.0624**	**0.0156**	**8.0000e-004**	**0.0164**	**0.0000**	**77.3828**	**77.3828**	**3.5300e-003**	**0.0000**	**77.4713**

3.6 Lake & Levee FA - 2022

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					0.7405	0.0000	0.7405	0.1898	0.0000	0.1898	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0348	0.3323	0.1871	7.1000e-004		0.0113	0.0113		0.0105	0.0105	0.0000	61.3562	61.3562	0.0194	0.0000	61.8406
Total	**0.0348**	**0.3323**	**0.1871**	**7.1000e-004**	**0.7405**	**0.0113**	**0.7518**	**0.1898**	**0.0105**	**0.2003**	**0.0000**	**61.3562**	**61.3562**	**0.0194**	**0.0000**	**61.8406**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0253	0.8511	0.1966	2.6100e-003	0.0697	2.4200e-003	0.0721	0.0188	2.3100e-003	0.0211	0.0000	252.7913	252.7913	0.0116	0.0000	253.0801
Vendor	2.1000e-004	6.6100e-003	1.7500e-003	2.0000e-005	4.5000e-004	1.0000e-005	4.6000e-004	1.3000e-004	1.0000e-005	1.4000e-004	0.0000	1.7446	1.7446	7.0000e-005	0.0000	1.7464
Worker	2.1700e-003	1.4700e-003	0.0160	5.0000e-005	6.1900e-003	4.0000e-005	6.2300e-003	1.6500e-003	3.0000e-005	1.6800e-003	0.0000	4.9206	4.9206	1.0000e-004	0.0000	4.9232
Total	**0.0277**	**0.8591**	**0.2144**	**2.6800e-003**	**0.0763**	**2.4700e-003**	**0.0788**	**0.0206**	**2.3500e-003**	**0.0229**	**0.0000**	**259.4564**	**259.4564**	**0.0117**	**0.0000**	**259.7497**

3.6 Lake & Levee FA - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.7405	0.0000	0.7405	0.1898	0.0000	0.1898	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	8.2500e-003	0.0358	0.3027	7.1000e-004		1.1000e-003	1.1000e-003		1.1000e-003	1.1000e-003	0.0000	61.3561	61.3561	0.0194	0.0000	61.8405
Total	**8.2500e-003**	**0.0358**	**0.3027**	**7.1000e-004**	**0.7405**	**1.1000e-003**	**0.7416**	**0.1898**	**1.1000e-003**	**0.1909**	**0.0000**	**61.3561**	**61.3561**	**0.0194**	**0.0000**	**61.8405**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0253	0.8511	0.1966	2.6100e-003	0.0697	2.4200e-003	0.0721	0.0188	2.3100e-003	0.0211	0.0000	252.7913	252.7913	0.0116	0.0000	253.0801
Vendor	2.1000e-004	6.6100e-003	1.7500e-003	2.0000e-005	4.5000e-004	1.0000e-005	4.6000e-004	1.3000e-004	1.0000e-005	1.4000e-004	0.0000	1.7446	1.7446	7.0000e-005	0.0000	1.7464
Worker	2.1700e-003	1.4700e-003	0.0160	5.0000e-005	6.1900e-003	4.0000e-005	6.2300e-003	1.6500e-003	3.0000e-005	1.6800e-003	0.0000	4.9206	4.9206	1.0000e-004	0.0000	4.9232
Total	**0.0277**	**0.8591**	**0.2144**	**2.6800e-003**	**0.0763**	**2.4700e-003**	**0.0788**	**0.0206**	**2.3500e-003**	**0.0229**	**0.0000**	**259.4564**	**259.4564**	**0.0117**	**0.0000**	**259.7497**

3.7 Islands (expanded and new) - 2022

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					0.0398	0.0000	0.0398	4.2900e-003	0.0000	4.2900e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0768	0.7330	0.4126	1.5600e-003		0.0250	0.0250		0.0231	0.0231	0.0000	135.3445	135.3445	0.0427	0.0000	136.4130
Total	**0.0768**	**0.7330**	**0.4126**	**1.5600e-003**	**0.0398**	**0.0250**	**0.0647**	**4.2900e-003**	**0.0231**	**0.0274**	**0.0000**	**135.3445**	**135.3445**	**0.0427**	**0.0000**	**136.4130**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0217	0.7304	0.1688	2.2400e-003	0.0490	2.0800e-003	0.0511	0.0135	1.9900e-003	0.0155	0.0000	216.9604	216.9604	9.9200e-003	0.0000	217.2084
Vendor	2.3000e-004	7.2900e-003	1.9300e-003	2.0000e-005	4.9000e-004	1.0000e-005	5.1000e-004	1.4000e-004	1.0000e-005	1.6000e-004	0.0000	1.9241	1.9241	8.0000e-005	0.0000	1.9262
Worker	2.3900e-003	1.6200e-003	0.0177	6.0000e-005	6.8300e-003	4.0000e-005	6.8700e-003	1.8200e-003	4.0000e-005	1.8500e-003	0.0000	5.4272	5.4272	1.1000e-004	0.0000	5.4300
Total	**0.0244**	**0.7393**	**0.1884**	**2.3200e-003**	**0.0563**	**2.1300e-003**	**0.0585**	**0.0154**	**2.0400e-003**	**0.0175**	**0.0000**	**224.3117**	**224.3117**	**0.0101**	**0.0000**	**224.5645**

3.7 Islands (expanded and new) - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0398	0.0000	0.0398	4.2900e-003	0.0000	4.2900e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0182	0.0789	0.6677	1.5600e-003		2.4300e-003	2.4300e-003		2.4300e-003	2.4300e-003	0.0000	135.3443	135.3443	0.0427	0.0000	136.4129
Total	**0.0182**	**0.0789**	**0.6677**	**1.5600e-003**	**0.0398**	**2.4300e-003**	**0.0422**	**4.2900e-003**	**2.4300e-003**	**6.7200e-003**	**0.0000**	**135.3443**	**135.3443**	**0.0427**	**0.0000**	**136.4129**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0217	0.7304	0.1688	2.2400e-003	0.0490	2.0800e-003	0.0511	0.0135	1.9900e-003	0.0155	0.0000	216.9604	216.9604	9.9200e-003	0.0000	217.2084
Vendor	2.3000e-004	7.2900e-003	1.9300e-003	2.0000e-005	4.9000e-004	1.0000e-005	5.1000e-004	1.4000e-004	1.0000e-005	1.6000e-004	0.0000	1.9241	1.9241	8.0000e-005	0.0000	1.9262
Worker	2.3900e-003	1.6200e-003	0.0177	6.0000e-005	6.8300e-003	4.0000e-005	6.8700e-003	1.8200e-003	4.0000e-005	1.8500e-003	0.0000	5.4272	5.4272	1.1000e-004	0.0000	5.4300
Total	**0.0244**	**0.7393**	**0.1884**	**2.3200e-003**	**0.0563**	**2.1300e-003**	**0.0585**	**0.0154**	**2.0400e-003**	**0.0175**	**0.0000**	**224.3117**	**224.3117**	**0.0101**	**0.0000**	**224.5645**

3.8 Transfer PL (from AVPL) - 2022

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	0.0487	0.4586	0.2769	9.3000e-004		0.0183	0.0183		0.0168	0.0168	0.0000	80.8944	80.8944	0.0259	0.0000	81.5416
Total	**0.0487**	**0.4586**	**0.2769**	**9.3000e-004**		**0.0183**	**0.0183**		**0.0168**	**0.0168**	**0.0000**	**80.8944**	**80.8944**	**0.0259**	**0.0000**	**81.5416**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	2.3000e-004	7.7100e-003	1.7800e-003	2.0000e-005	5.2000e-004	2.0000e-005	5.4000e-004	1.4000e-004	2.0000e-005	1.6000e-004	0.0000	2.2911	2.2911	1.0000e-004	0.0000	2.2937
Vendor	2.4000e-004	7.7700e-003	2.0600e-003	2.0000e-005	5.3000e-004	2.0000e-005	5.4000e-004	1.5000e-004	2.0000e-005	1.7000e-004	0.0000	2.0524	2.0524	9.0000e-005	0.0000	2.0546
Worker	2.5500e-003	1.7300e-003	0.0189	6.0000e-005	7.2800e-003	4.0000e-005	7.3300e-003	1.9400e-003	4.0000e-005	1.9800e-003	0.0000	5.7890	5.7890	1.2000e-004	0.0000	5.7920
Total	**3.0200e-003**	**0.0172**	**0.0227**	**1.0000e-004**	**8.3300e-003**	**8.0000e-005**	**8.4100e-003**	**2.2300e-003**	**8.0000e-005**	**2.3100e-003**	**0.0000**	**10.1325**	**10.1325**	**3.1000e-004**	**0.0000**	**10.1403**

3.8 Transfer PL (from AVPL) - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0116	0.0703	0.4241	9.3000e-004		1.4800e-003	1.4800e-003		1.4800e-003	1.4800e-003	0.0000	80.8943	80.8943	0.0259	0.0000	81.5415
Total	**0.0116**	**0.0703**	**0.4241**	**9.3000e-004**		**1.4800e-003**	**1.4800e-003**		**1.4800e-003**	**1.4800e-003**	**0.0000**	**80.8943**	**80.8943**	**0.0259**	**0.0000**	**81.5415**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	2.3000e-004	7.7100e-003	1.7800e-003	2.0000e-005	5.2000e-004	2.0000e-005	5.4000e-004	1.4000e-004	2.0000e-005	1.6000e-004	0.0000	2.2911	2.2911	1.0000e-004	0.0000	2.2937
Vendor	2.4000e-004	7.7700e-003	2.0600e-003	2.0000e-005	5.3000e-004	2.0000e-005	5.4000e-004	1.5000e-004	2.0000e-005	1.7000e-004	0.0000	2.0524	2.0524	9.0000e-005	0.0000	2.0546
Worker	2.5500e-003	1.7300e-003	0.0189	6.0000e-005	7.2800e-003	4.0000e-005	7.3300e-003	1.9400e-003	4.0000e-005	1.9800e-003	0.0000	5.7890	5.7890	1.2000e-004	0.0000	5.7920
Total	**3.0200e-003**	**0.0172**	**0.0227**	**1.0000e-004**	**8.3300e-003**	**8.0000e-005**	**8.4100e-003**	**2.2300e-003**	**8.0000e-005**	**2.3100e-003**	**0.0000**	**10.1325**	**10.1325**	**3.1000e-004**	**0.0000**	**10.1403**

3.9 Lake Area 2.5 CC - 2022

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	0.0527	0.5034	0.2833	1.0700e-003		0.0171	0.0171		0.0158	0.0158	0.0000	92.9365	92.9365	0.0294	0.0000	93.6703
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0527**	**0.5034**	**0.2833**	**1.0700e-003**		**0.0171**	**0.0171**		**0.0158**	**0.0158**	**0.0000**	**92.9365**	**92.9365**	**0.0294**	**0.0000**	**93.6703**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0811	2.7249	0.6296	8.3500e-003	0.1829	7.7400e-003	0.1906	0.0503	7.4100e-003	0.0577	0.0000	809.3839	809.3839	0.0370	0.0000	810.3088
Vendor	3.1000e-004	0.0100	2.6500e-003	3.0000e-005	6.8000e-004	2.0000e-005	7.0000e-004	2.0000e-004	2.0000e-005	2.2000e-004	0.0000	2.6425	2.6425	1.1000e-004	0.0000	2.6453
Worker	3.2900e-003	2.2300e-003	0.0243	8.0000e-005	9.3800e-003	6.0000e-005	9.4300e-003	2.4900e-003	5.0000e-005	2.5500e-003	0.0000	7.4533	7.4533	1.6000e-004	0.0000	7.4572
Total	**0.0847**	**2.7371**	**0.6565**	**8.4600e-003**	**0.1929**	**7.8200e-003**	**0.2007**	**0.0530**	**7.4800e-003**	**0.0605**	**0.0000**	**819.4797**	**819.4797**	**0.0373**	**0.0000**	**820.4113**

3.9 Lake Area 2.5 CC - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0125	0.0542	0.4585	1.0700e-003		1.6700e-003	1.6700e-003		1.6700e-003	1.6700e-003	0.0000	92.9364	92.9364	0.0294	0.0000	93.6702
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0125**	**0.0542**	**0.4585**	**1.0700e-003**		**1.6700e-003**	**1.6700e-003**		**1.6700e-003**	**1.6700e-003**	**0.0000**	**92.9364**	**92.9364**	**0.0294**	**0.0000**	**93.6702**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0811	2.7249	0.6296	8.3500e-003	0.1829	7.7400e-003	0.1906	0.0503	7.4100e-003	0.0577	0.0000	809.3839	809.3839	0.0370	0.0000	810.3088
Vendor	3.1000e-004	0.0100	2.6500e-003	3.0000e-005	6.8000e-004	2.0000e-005	7.0000e-004	2.0000e-004	2.0000e-005	2.2000e-004	0.0000	2.6425	2.6425	1.1000e-004	0.0000	2.6453
Worker	3.2900e-003	2.2300e-003	0.0243	8.0000e-005	9.3800e-003	6.0000e-005	9.4300e-003	2.4900e-003	5.0000e-005	2.5500e-003	0.0000	7.4533	7.4533	1.6000e-004	0.0000	7.4572
Total	**0.0847**	**2.7371**	**0.6565**	**8.4600e-003**	**0.1929**	**7.8200e-003**	**0.2007**	**0.0530**	**7.4800e-003**	**0.0605**	**0.0000**	**819.4797**	**819.4797**	**0.0373**	**0.0000**	**820.4113**

3.10 Alamitos RCA 2.5 CC - 2022

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	0.0738	0.7142	0.3968	1.5200e-003		0.0242	0.0242		0.0223	0.0223	0.0000	132.9985	132.9985	0.0425	0.0000	134.0610
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0738**	**0.7142**	**0.3968**	**1.5200e-003**		**0.0242**	**0.0242**		**0.0223**	**0.0223**	**0.0000**	**132.9985**	**132.9985**	**0.0425**	**0.0000**	**134.0610**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.1132	3.8034	0.8787	0.0117	0.2552	0.0108	0.2661	0.0702	0.0103	0.0805	0.0000	1,129.7216	1,129.7216	0.0516	0.0000	1,131.0126
Vendor	4.6000e-004	0.0146	3.8600e-003	4.0000e-005	9.9000e-004	3.0000e-005	1.0200e-003	2.9000e-004	3.0000e-005	3.1000e-004	0.0000	3.8483	3.8483	1.6000e-004	0.0000	3.8523
Worker	4.7900e-003	3.2400e-003	0.0354	1.2000e-004	0.0137	8.0000e-005	0.0137	3.6300e-003	8.0000e-005	3.7100e-003	0.0000	10.8543	10.8543	2.3000e-004	0.0000	10.8600
Total	**0.1185**	**3.8212**	**0.9180**	**0.0118**	**0.2699**	**0.0109**	**0.2808**	**0.0741**	**0.0105**	**0.0846**	**0.0000**	**1,144.4242**	**1,144.4242**	**0.0520**	**0.0000**	**1,145.7250**

3.10 Alamitos RCA 2.5 CC - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0182	0.0789	0.6677	1.5200e-003		2.4300e-003	2.4300e-003		2.4300e-003	2.4300e-003	0.0000	132.9984	132.9984	0.0425	0.0000	134.0608
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0182**	**0.0789**	**0.6677**	**1.5200e-003**		**2.4300e-003**	**2.4300e-003**		**2.4300e-003**	**2.4300e-003**	**0.0000**	**132.9984**	**132.9984**	**0.0425**	**0.0000**	**134.0608**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.1132	3.8034	0.8787	0.0117	0.2552	0.0108	0.2661	0.0702	0.0103	0.0805	0.0000	1,129.7216	1,129.7216	0.0516	0.0000	1,131.0126
Vendor	4.6000e-004	0.0146	3.8600e-003	4.0000e-005	9.9000e-004	3.0000e-005	1.0200e-003	2.9000e-004	3.0000e-005	3.1000e-004	0.0000	3.8483	3.8483	1.6000e-004	0.0000	3.8523
Worker	4.7900e-003	3.2400e-003	0.0354	1.2000e-004	0.0137	8.0000e-005	0.0137	3.6300e-003	8.0000e-005	3.7100e-003	0.0000	10.8543	10.8543	2.3000e-004	0.0000	10.8600
Total	**0.1185**	**3.8212**	**0.9180**	**0.0118**	**0.2699**	**0.0109**	**0.2808**	**0.0741**	**0.0105**	**0.0846**	**0.0000**	**1,144.4242**	**1,144.4242**	**0.0520**	**0.0000**	**1,145.7250**

3.11 Transfer PL (to LAPP) - 2022

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	0.0487	0.4586	0.2769	9.3000e-004		0.0183	0.0183		0.0168	0.0168	0.0000	80.8944	80.8944	0.0259	0.0000	81.5416
Total	**0.0487**	**0.4586**	**0.2769**	**9.3000e-004**		**0.0183**	**0.0183**		**0.0168**	**0.0168**	**0.0000**	**80.8944**	**80.8944**	**0.0259**	**0.0000**	**81.5416**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	5.9300e-003	0.1994	0.0461	6.1000e-004	0.0134	5.7000e-004	0.0140	3.6800e-003	5.4000e-004	4.2200e-003	0.0000	59.2215	59.2215	2.7100e-003	0.0000	59.2892
Vendor	2.4000e-004	7.7700e-003	2.0600e-003	2.0000e-005	5.3000e-004	2.0000e-005	5.4000e-004	1.5000e-004	2.0000e-005	1.7000e-004	0.0000	2.0524	2.0524	9.0000e-005	0.0000	2.0546
Worker	2.5500e-003	1.7300e-003	0.0189	6.0000e-005	7.2800e-003	4.0000e-005	7.3300e-003	1.9400e-003	4.0000e-005	1.9800e-003	0.0000	5.7890	5.7890	1.2000e-004	0.0000	5.7920
Total	**8.7200e-003**	**0.2089**	**0.0670**	**6.9000e-004**	**0.0212**	**6.3000e-004**	**0.0218**	**5.7700e-003**	**6.0000e-004**	**6.3700e-003**	**0.0000**	**67.0629**	**67.0629**	**2.9200e-003**	**0.0000**	**67.1358**

3.11 Transfer PL (to LAPP) - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0116	0.0703	0.4241	9.3000e-004		1.4800e-003	1.4800e-003		1.4800e-003	1.4800e-003	0.0000	80.8943	80.8943	0.0259	0.0000	81.5415
Total	**0.0116**	**0.0703**	**0.4241**	**9.3000e-004**		**1.4800e-003**	**1.4800e-003**		**1.4800e-003**	**1.4800e-003**	**0.0000**	**80.8943**	**80.8943**	**0.0259**	**0.0000**	**81.5415**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	5.9300e-003	0.1994	0.0461	6.1000e-004	0.0134	5.7000e-004	0.0140	3.6800e-003	5.4000e-004	4.2200e-003	0.0000	59.2215	59.2215	2.7100e-003	0.0000	59.2892
Vendor	2.4000e-004	7.7700e-003	2.0600e-003	2.0000e-005	5.3000e-004	2.0000e-005	5.4000e-004	1.5000e-004	2.0000e-005	1.7000e-004	0.0000	2.0524	2.0524	9.0000e-005	0.0000	2.0546
Worker	2.5500e-003	1.7300e-003	0.0189	6.0000e-005	7.2800e-003	4.0000e-005	7.3300e-003	1.9400e-003	4.0000e-005	1.9800e-003	0.0000	5.7890	5.7890	1.2000e-004	0.0000	5.7920
Total	**8.7200e-003**	**0.2089**	**0.0670**	**6.9000e-004**	**0.0212**	**6.3000e-004**	**0.0218**	**5.7700e-003**	**6.0000e-004**	**6.3700e-003**	**0.0000**	**67.0629**	**67.0629**	**2.9200e-003**	**0.0000**	**67.1358**

3.12 New Park Area - 2022

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	0.0466	0.4447	0.2503	9.5000e-004		0.0151	0.0151		0.0140	0.0140	0.0000	82.1090	82.1090	0.0259	0.0000	82.7572
Total	**0.0466**	**0.4447**	**0.2503**	**9.5000e-004**		**0.0151**	**0.0151**		**0.0140**	**0.0140**	**0.0000**	**82.1090**	**82.1090**	**0.0259**	**0.0000**	**82.7572**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0211	0.7091	0.1638	2.1700e-003	0.0621	2.0100e-003	0.0641	0.0166	1.9300e-003	0.0186	0.0000	210.6127	210.6127	9.6300e-003	0.0000	210.8534
Vendor	2.8000e-004	8.8400e-003	2.3400e-003	2.0000e-005	6.0000e-004	2.0000e-005	6.2000e-004	1.7000e-004	2.0000e-005	1.9000e-004	0.0000	2.3346	2.3346	1.0000e-004	0.0000	2.3371
Worker	2.0300e-003	1.3800e-003	0.0150	5.0000e-005	5.8000e-003	4.0000e-005	5.8300e-003	1.5400e-003	3.0000e-005	1.5700e-003	0.0000	4.6095	4.6095	1.0000e-004	0.0000	4.6119
Total	**0.0234**	**0.7193**	**0.1812**	**2.2400e-003**	**0.0685**	**2.0700e-003**	**0.0705**	**0.0184**	**1.9800e-003**	**0.0203**	**0.0000**	**217.5568**	**217.5568**	**9.8300e-003**	**0.0000**	**217.8023**

3.12 New Park Area - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0111	0.0479	0.4051	9.5000e-004		1.4700e-003	1.4700e-003		1.4700e-003	1.4700e-003	0.0000	82.1089	82.1089	0.0259	0.0000	82.7571
Total	**0.0111**	**0.0479**	**0.4051**	**9.5000e-004**		**1.4700e-003**	**1.4700e-003**		**1.4700e-003**	**1.4700e-003**	**0.0000**	**82.1089**	**82.1089**	**0.0259**	**0.0000**	**82.7571**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0211	0.7091	0.1638	2.1700e-003	0.0621	2.0100e-003	0.0641	0.0166	1.9300e-003	0.0186	0.0000	210.6127	210.6127	9.6300e-003	0.0000	210.8534
Vendor	2.8000e-004	8.8400e-003	2.3400e-003	2.0000e-005	6.0000e-004	2.0000e-005	6.2000e-004	1.7000e-004	2.0000e-005	1.9000e-004	0.0000	2.3346	2.3346	1.0000e-004	0.0000	2.3371
Worker	2.0300e-003	1.3800e-003	0.0150	5.0000e-005	5.8000e-003	4.0000e-005	5.8300e-003	1.5400e-003	3.0000e-005	1.5700e-003	0.0000	4.6095	4.6095	1.0000e-004	0.0000	4.6119
Total	**0.0234**	**0.7193**	**0.1812**	**2.2400e-003**	**0.0685**	**2.0700e-003**	**0.0705**	**0.0184**	**1.9800e-003**	**0.0203**	**0.0000**	**217.5568**	**217.5568**	**9.8300e-003**	**0.0000**	**217.8023**

3.12 New Park Area - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0179	0.1614	0.0999	3.9000e-004		5.5400e-003	5.5400e-003		5.1200e-003	5.1200e-003	0.0000	33.3930	33.3930	0.0106	0.0000	33.6567
Total	**0.0179**	**0.1614**	**0.0999**	**3.9000e-004**		**5.5400e-003**	**5.5400e-003**		**5.1200e-003**	**5.1200e-003**	**0.0000**	**33.3930**	**33.3930**	**0.0106**	**0.0000**	**33.6567**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	5.8700e-003	0.1912	0.0605	8.5000e-004	0.0550	3.4000e-004	0.0553	0.0141	3.2000e-004	0.0144	0.0000	82.3341	82.3341	3.5100e-003	0.0000	82.4218
Vendor	8.0000e-005	2.7200e-003	8.6000e-004	1.0000e-005	2.4000e-004	0.0000	2.5000e-004	7.0000e-005	0.0000	7.0000e-005	0.0000	0.9223	0.9223	3.0000e-005	0.0000	0.9231
Worker	7.7000e-004	5.0000e-004	5.6200e-003	2.0000e-005	2.3600e-003	1.0000e-005	2.3700e-003	6.3000e-004	1.0000e-005	6.4000e-004	0.0000	1.8030	1.8030	4.0000e-005	0.0000	1.8039
Total	**6.7200e-003**	**0.1944**	**0.0670**	**8.8000e-004**	**0.0576**	**3.5000e-004**	**0.0579**	**0.0148**	**3.3000e-004**	**0.0151**	**0.0000**	**85.0593**	**85.0593**	**3.5800e-003**	**0.0000**	**85.1488**

3.12 New Park Area - 2023

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	4.4900e-003	0.0195	0.1647	3.9000e-004		6.0000e-004	6.0000e-004		6.0000e-004	6.0000e-004	0.0000	33.3930	33.3930	0.0106	0.0000	33.6566
Total	**4.4900e-003**	**0.0195**	**0.1647**	**3.9000e-004**		**6.0000e-004**	**6.0000e-004**		**6.0000e-004**	**6.0000e-004**	**0.0000**	**33.3930**	**33.3930**	**0.0106**	**0.0000**	**33.6566**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	5.8700e-003	0.1912	0.0605	8.5000e-004	0.0550	3.4000e-004	0.0553	0.0141	3.2000e-004	0.0144	0.0000	82.3341	82.3341	3.5100e-003	0.0000	82.4218
Vendor	8.0000e-005	2.7200e-003	8.6000e-004	1.0000e-005	2.4000e-004	0.0000	2.5000e-004	7.0000e-005	0.0000	7.0000e-005	0.0000	0.9223	0.9223	3.0000e-005	0.0000	0.9231
Worker	7.7000e-004	5.0000e-004	5.6200e-003	2.0000e-005	2.3600e-003	1.0000e-005	2.3700e-003	6.3000e-004	1.0000e-005	6.4000e-004	0.0000	1.8030	1.8030	4.0000e-005	0.0000	1.8039
Total	**6.7200e-003**	**0.1944**	**0.0670**	**8.8000e-004**	**0.0576**	**3.5000e-004**	**0.0579**	**0.0148**	**3.3000e-004**	**0.0151**	**0.0000**	**85.0593**	**85.0593**	**3.5800e-003**	**0.0000**	**85.1488**

3.13 Alamitos Creek WBSG - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					1.5900e-003	0.0000	1.5900e-003	1.7000e-004	0.0000	1.7000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	3.4400e-003	0.0333	0.0185	7.0000e-005		1.1300e-003	1.1300e-003		1.0400e-003	1.0400e-003	0.0000	6.2066	6.2066	1.9800e-003	0.0000	6.2562
Total	**3.4400e-003**	**0.0333**	**0.0185**	**7.0000e-005**	**1.5900e-003**	**1.1300e-003**	**2.7200e-003**	**1.7000e-004**	**1.0400e-003**	**1.2100e-003**	**0.0000**	**6.2066**	**6.2066**	**1.9800e-003**	**0.0000**	**6.2562**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	4.1500e-003	0.1395	0.0322	4.3000e-004	9.3600e-003	4.0000e-004	9.7600e-003	2.5800e-003	3.8000e-004	2.9500e-003	0.0000	41.4481	41.4481	1.8900e-003	0.0000	41.4955
Vendor	2.0000e-005	6.8000e-004	1.8000e-004	0.0000	5.0000e-005	0.0000	5.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.1796	0.1796	1.0000e-005	0.0000	0.1798
Worker	2.2000e-004	1.5000e-004	1.6500e-003	1.0000e-005	6.4000e-004	0.0000	6.4000e-004	1.7000e-004	0.0000	1.7000e-004	0.0000	0.5065	0.5065	1.0000e-005	0.0000	0.5068
Total	**4.3900e-003**	**0.1404**	**0.0341**	**4.4000e-004**	**0.0101**	**4.0000e-004**	**0.0105**	**2.7600e-003**	**3.8000e-004**	**3.1300e-003**	**0.0000**	**42.1343**	**42.1343**	**1.9100e-003**	**0.0000**	**42.1821**

3.13 Alamitos Creek WBSG - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					1.5900e-003	0.0000	1.5900e-003	1.7000e-004	0.0000	1.7000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	8.5000e-004	3.6800e-003	0.0312	7.0000e-005		1.1000e-004	1.1000e-004		1.1000e-004	1.1000e-004	0.0000	6.2066	6.2066	1.9800e-003	0.0000	6.2562
Total	**8.5000e-004**	**3.6800e-003**	**0.0312**	**7.0000e-005**	**1.5900e-003**	**1.1000e-004**	**1.7000e-003**	**1.7000e-004**	**1.1000e-004**	**2.8000e-004**	**0.0000**	**6.2066**	**6.2066**	**1.9800e-003**	**0.0000**	**6.2562**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	4.1500e-003	0.1395	0.0322	4.3000e-004	9.3600e-003	4.0000e-004	9.7600e-003	2.5800e-003	3.8000e-004	2.9500e-003	0.0000	41.4481	41.4481	1.8900e-003	0.0000	41.4955
Vendor	2.0000e-005	6.8000e-004	1.8000e-004	0.0000	5.0000e-005	0.0000	5.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.1796	0.1796	1.0000e-005	0.0000	0.1798
Worker	2.2000e-004	1.5000e-004	1.6500e-003	1.0000e-005	6.4000e-004	0.0000	6.4000e-004	1.7000e-004	0.0000	1.7000e-004	0.0000	0.5065	0.5065	1.0000e-005	0.0000	0.5068
Total	**4.3900e-003**	**0.1404**	**0.0341**	**4.4000e-004**	**0.0101**	**4.0000e-004**	**0.0105**	**2.7600e-003**	**3.8000e-004**	**3.1300e-003**	**0.0000**	**42.1343**	**42.1343**	**1.9100e-003**	**0.0000**	**42.1821**

3.14 Reveg & Landscaping - 2022

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	5.2000e-004	4.6300e-003	6.5800e-003	1.0000e-005		2.3000e-004	2.3000e-004		2.2000e-004	2.2000e-004	0.0000	0.9761	0.9761	1.4000e-004	0.0000	0.9796
Total	**5.2000e-004**	**4.6300e-003**	**6.5800e-003**	**1.0000e-005**	**0.0000**	**2.3000e-004**	**2.3000e-004**	**0.0000**	**2.2000e-004**	**2.2000e-004**	**0.0000**	**0.9761**	**0.9761**	**1.4000e-004**	**0.0000**	**0.9796**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.0000e-005	2.9000e-004	8.0000e-005	0.0000	2.0000e-005	0.0000	2.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0770	0.0770	0.0000	0.0000	0.0771
Worker	1.0000e-004	6.0000e-005	7.1000e-004	0.0000	2.7000e-004	0.0000	2.7000e-004	7.0000e-005	0.0000	7.0000e-005	0.0000	0.2171	0.2171	0.0000	0.0000	0.2172
Total	**1.1000e-004**	**3.5000e-004**	**7.9000e-004**	**0.0000**	**2.9000e-004**	**0.0000**	**2.9000e-004**	**8.0000e-005**	**0.0000**	**8.0000e-005**	**0.0000**	**0.2941**	**0.2941**	**0.0000**	**0.0000**	**0.2943**

3.14 Reveg & Landscaping - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					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	1.2000e-004	5.3000e-004	7.5000e-003	1.0000e-005		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	0.9761	0.9761	1.4000e-004	0.0000	0.9796
Total	**1.2000e-004**	**5.3000e-004**	**7.5000e-003**	**1.0000e-005**	**0.0000**	**2.0000e-005**	**2.0000e-005**	**0.0000**	**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.9761**	**0.9761**	**1.4000e-004**	**0.0000**	**0.9796**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.0000e-005	2.9000e-004	8.0000e-005	0.0000	2.0000e-005	0.0000	2.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0770	0.0770	0.0000	0.0000	0.0771
Worker	1.0000e-004	6.0000e-005	7.1000e-004	0.0000	2.7000e-004	0.0000	2.7000e-004	7.0000e-005	0.0000	7.0000e-005	0.0000	0.2171	0.2171	0.0000	0.0000	0.2172
Total	**1.1000e-004**	**3.5000e-004**	**7.9000e-004**	**0.0000**	**2.9000e-004**	**0.0000**	**2.9000e-004**	**8.0000e-005**	**0.0000**	**8.0000e-005**	**0.0000**	**0.2941**	**0.2941**	**0.0000**	**0.0000**	**0.2943**

3.14 Reveg & Landscaping - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
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	0.0149	0.1293	0.2015	3.5000e-004		6.1700e-003	6.1700e-003		6.0300e-003	6.0300e-003	0.0000	29.9345	29.9345	4.2300e-003	0.0000	30.0403
Total	**0.0149**	**0.1293**	**0.2015**	**3.5000e-004**	**0.0000**	**6.1700e-003**	**6.1700e-003**	**0.0000**	**6.0300e-003**	**6.0300e-003**	**0.0000**	**29.9345**	**29.9345**	**4.2300e-003**	**0.0000**	**30.0403**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	2.1000e-004	6.7700e-003	2.1300e-003	2.0000e-005	6.1000e-004	1.0000e-005	6.1000e-004	1.8000e-004	1.0000e-005	1.8000e-004	0.0000	2.2932	2.2932	8.0000e-005	0.0000	2.2953
Worker	2.7500e-003	1.7900e-003	0.0200	7.0000e-005	8.3800e-003	5.0000e-005	8.4300e-003	2.2300e-003	5.0000e-005	2.2700e-003	0.0000	6.4044	6.4044	1.2000e-004	0.0000	6.4075
Total	**2.9600e-003**	**8.5600e-003**	**0.0221**	**9.0000e-005**	**8.9900e-003**	**6.0000e-005**	**9.0400e-003**	**2.4100e-003**	**6.0000e-005**	**2.4500e-003**	**0.0000**	**8.6976**	**8.6976**	**2.0000e-004**	**0.0000**	**8.7028**

3.14 Reveg & Landscaping - 2023

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
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	3.7300e-003	0.0162	0.2301	3.5000e-004		5.0000e-004	5.0000e-004		5.0000e-004	5.0000e-004	0.0000	29.9345	29.9345	4.2300e-003	0.0000	30.0403
Total	**3.7300e-003**	**0.0162**	**0.2301**	**3.5000e-004**	**0.0000**	**5.0000e-004**	**5.0000e-004**	**0.0000**	**5.0000e-004**	**5.0000e-004**	**0.0000**	**29.9345**	**29.9345**	**4.2300e-003**	**0.0000**	**30.0403**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	2.1000e-004	6.7700e-003	2.1300e-003	2.0000e-005	6.1000e-004	1.0000e-005	6.1000e-004	1.8000e-004	1.0000e-005	1.8000e-004	0.0000	2.2932	2.2932	8.0000e-005	0.0000	2.2953
Worker	2.7500e-003	1.7900e-003	0.0200	7.0000e-005	8.3800e-003	5.0000e-005	8.4300e-003	2.2300e-003	5.0000e-005	2.2700e-003	0.0000	6.4044	6.4044	1.2000e-004	0.0000	6.4075
Total	**2.9600e-003**	**8.5600e-003**	**0.0221**	**9.0000e-005**	**8.9900e-003**	**6.0000e-005**	**9.0400e-003**	**2.4100e-003**	**6.0000e-005**	**2.4500e-003**	**0.0000**	**8.6976**	**8.6976**	**2.0000e-004**	**0.0000**	**8.7028**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.3079	0.0000	0.3079	0.0756	0.0000	0.0756	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.3079	0.0000	0.3079	0.0756	0.0000	0.0756	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
City Park	122.85	1,478.75	1088.10	970,169	970,169
Total	122.85	1,478.75	1,088.10	970,169	970,169

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
City Park	9.50	7.30	7.30	33.00	48.00	19.00	66	28	6

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
City Park	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
City Park	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
City Park	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	11.0581	1.0000e-005	6.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.1600e-003	1.1600e-003	0.0000	0.0000	1.2400e-003
Unmitigated	11.0581	1.0000e-005	6.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.1600e-003	1.1600e-003	0.0000	0.0000	1.2400e-003

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	11.0580					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	6.0000e-005	1.0000e-005	6.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.1600e-003	1.1600e-003	0.0000	0.0000	1.2400e-003
Total	**11.0581**	**1.0000e-005**	**6.0000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**1.1600e-003**	**1.1600e-003**	**0.0000**	**0.0000**	**1.2400e-003**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	11.0580					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	6.0000e-005	1.0000e-005	6.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.1600e-003	1.1600e-003	0.0000	0.0000	1.2400e-003
Total	**11.0581**	**1.0000e-005**	**6.0000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**1.1600e-003**	**1.1600e-003**	**0.0000**	**0.0000**	**1.2400e-003**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	78.8551	3.5700e-003	7.4000e-004	79.1640
Unmitigated	78.8551	3.5700e-003	7.4000e-004	79.1640

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
City Park	0 / 77.4463	78.8551	3.5700e-003	7.4000e-004	79.1640
Total		**78.8551**	**3.5700e-003**	**7.4000e-004**	**79.1640**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
City Park	0 / 77.4463	78.8551	3.5700e-003	7.4000e-004	79.1640
Total		**78.8551**	**3.5700e-003**	**7.4000e-004**	**79.1640**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	1.1347	0.0671	0.0000	2.8112
Unmitigated	1.1347	0.0671	0.0000	2.8112

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
City Park	5.59	1.1347	0.0671	0.0000	2.8112
Total		**1.1347**	**0.0671**	**0.0000**	**2.8112**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
City Park	5.59	1.1347	0.0671	0.0000	2.8112
Total		**1.1347**	**0.0671**	**0.0000**	**2.8112**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

B.7 CalEEMod Output for Health Risk Assessment

ESA

Almaden Lake - For HRA

Santa Clara County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
City Park	65.00	Acre	65.00	2,831,400.00	100

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	58
Climate Zone	4			**Operational Year**	2024
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - land use type

Construction Phase - schedule

Off-road Equipment - Equipment assumptions.

Off-road Equipment -

Off-road Equipment - Equipment assumptions.

Off-road Equipment - Equipment assumptions

Off-road Equipment - Equipment assumptions

Off-road Equipment - Equipment assumptions.

Off-road Equipment - equipment assumptions

Off-road Equipment - Equipment assumptions

Off-road Equipment - equipment assumptions

Off-road Equipment - Equipment assumptions.

Off-road Equipment - Equipment assumptions

Off-road Equipment - pipeline construction equipment. Other construction equipment represents butt fusion machine.

Off-road Equipment - Equipment for pipeline construction; other construction equipment represents butt fusion machine.

Off-road Equipment - Equipment assumptions

Trips and VMT - trips values are rounded up to the nearest even whole number; based on cut and fill amounts identified in the Project Description.

Grading -

Construction Off-road Equipment Mitigation - Tier 4 equipment standards for off-road.

Table Name	Column Name	Default Value	New Value
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tblAreaCoating	Area_Nonresidential_Exterior	1415700	0
tblAreaCoating	Area_Nonresidential_Interior	4247100	0
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tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00

tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	6.00
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tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	9.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	9.00
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tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	16.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	4.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
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tblFleetMix	OBUS	2.1770e-003	0.00
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tblFleetMix	UBUS	1.5140e-003	0.00
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tblGrading	AcresOfGrading	3.50	3.00
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tblGrading	MeanVehicleSpeed	7.10	40.00
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tblOffRoadEquipment	HorsePower	158.00	247.00
tblOffRoadEquipment	HorsePower	158.00	247.00

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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					
2021	0.4574	4.6576	2.9834	8.3100e-003	1.0702	0.1825	1.2527	0.3612	0.1718	0.5330	0.0000	735.6163	735.6163	0.1618	0.0000	739.6603
2022	0.8956	11.3531	6.5219	0.0199	0.8748	0.3174	1.1922	0.2336	0.2984	0.5320	0.0000	1,771.5646	1,771.5646	0.4088	0.0000	1,781.7854
2023	0.0888	0.8466	0.9370	1.9500e-003	6.5000e-004	0.0341	0.0348	1.7000e-004	0.0336	0.0337	0.0000	169.8939	169.8939	0.0202	0.0000	170.3994
Maximum	**0.8956**	**11.3531**	**6.5219**	**0.0199**	**1.0702**	**0.3174**	**1.2527**	**0.3612**	**0.2984**	**0.5330**	**0.0000**	**1,771.5646**	**1,771.5646**	**0.4088**	**0.0000**	**1,781.7854**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2021	0.1008	0.6148	3.7181	8.3100e-003	1.0702	0.0146	1.0848	0.3612	0.0144	0.3756	0.0000	735.6154	735.6154	0.1618	0.0000	739.6595
2022	0.2504	4.3782	8.0314	0.0199	0.8748	0.0261	0.9009	0.2336	0.0260	0.2596	0.0000	1,771.5630	1,771.5630	0.4088	0.0000	1,781.7838
2023	0.0208	0.1817	1.0853	1.9500e-003	6.5000e-004	2.5800e-003	3.2300e-003	1.7000e-004	2.5800e-003	2.7500e-003	0.0000	169.8937	169.8937	0.0202	0.0000	170.3992
Maximum	**0.2504**	**4.3782**	**8.0314**	**0.0199**	**1.0702**	**0.0261**	**1.0848**	**0.3612**	**0.0260**	**0.3756**	**0.0000**	**1,771.5630**	**1,771.5630**	**0.4088**	**0.0000**	**1,781.7838**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**74.21**	**69.30**	**-22.91**	**0.00**	**0.00**	**91.90**	**19.79**	**0.00**	**91.47**	**41.94**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
10	**4-24-2021**	**7-23-2021**	0.4079	0.1134
11	**7-24-2021**	**10-23-2021**	2.3570	0.2682
12	**10-24-2021**	**1-23-2022**	3.0941	0.4889
13	**1-24-2022**	**4-23-2022**	2.3631	0.6574
14	**4-24-2022**	**7-23-2022**	4.3610	1.7002
15	**7-24-2022**	**10-23-2022**	3.3085	1.3774
16	**10-24-2022**	**1-23-2023**	1.7284	0.8139
17	**1-24-2023**	**4-23-2023**	0.6107	0.1235
18	**4-24-2023**	**7-23-2023**	0.0853	0.0107
		Highest	4.3610	1.7002

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	11.0581	1.0000e-005	6.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.1600e-003	1.1600e-003	0.0000	0.0000	1.2400e-003
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.3079	0.0000	0.3079	0.0756	0.0000	0.0756	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	1.1347	0.0000	1.1347	0.0671	0.0000	2.8112
Water						0.0000	0.0000		0.0000	0.0000	0.0000	78.8551	78.8551	3.5700e-003	7.4000e-004	79.1640
Total	**11.0581**	**1.0000e-005**	**6.0000e-004**	**0.0000**	**0.3079**	**0.0000**	**0.3079**	**0.0756**	**0.0000**	**0.0756**	**1.1347**	**78.8562**	**79.9909**	**0.0706**	**7.4000e-004**	**81.9765**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	11.0581	1.0000e-005	6.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.1600e-003	1.1600e-003	0.0000	0.0000	1.2400e-003
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.3079	0.0000	0.3079	0.0756	0.0000	0.0756	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	1.1347	0.0000	1.1347	0.0671	0.0000	2.8112
Water						0.0000	0.0000		0.0000	0.0000	0.0000	78.8551	78.8551	3.5700e-003	7.4000e-004	79.1640
Total	**11.0581**	**1.0000e-005**	**6.0000e-004**	**0.0000**	**0.3079**	**0.0000**	**0.3079**	**0.0756**	**0.0000**	**0.0756**	**1.1347**	**78.8562**	**79.9909**	**0.0706**	**7.4000e-004**	**81.9765**

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

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Creek Diviersion & KD/CI	Trenching	6/1/2021	8/11/2021	5	52	Creek Diversion & Lake Drainage/Cofferdam
2	Levee Footprint	Grading	8/12/2021	1/31/2022	5	123	Levee Footprint
3	Dewatering	Trenching	8/12/2021	5/10/2023	5	455	Dewatering
4	Working Surface/V & DR	Building Construction	8/12/2021	10/4/2022	5	299	Working Surface/Vegetation & Debris Removal
5	Lake & Levee FA	Grading	12/4/2021	4/6/2022	5	88	Lake & Levee Foundation Area
6	Islands (expanded and new)	Grading	4/6/2022	7/19/2022	5	75	Expanded Existing Island and New Island
7	Transfer PL (from AVPL)	Trenching	4/6/2022	7/26/2022	5	80	Transfer Pipeline from Almaden Valley Pipeline
8	Lake Area 2.5 CC	Paving	4/6/2022	8/26/2022	5	103	Lake Area w/2.5' Clay Cap
9	Alamitos RCA 2.5 CC	Paving	6/1/2022	12/27/2022	5	150	Alamitos Restored Channel Area w/ 2.5' Clay Cap
10	Transfer PL (to LAPP)	Trenching	6/25/2022	10/14/2022	5	80	Transfer Pipeline to Los Alamitos Percolation Pond
11	New Park Area	Building Construction	8/26/2022	2/21/2023	5	128	New Park Area
12	Alamitos Creek WBSG	Grading	10/22/2022	11/1/2022	5	7	Alamitos Creek West Bank Shore Grading
13	Reveg & Landscaping	Site Preparation	12/28/2022	5/9/2023	5	95	Revegetation & Landscaping

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

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

<u>OffRoad Equipment</u>

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Creek Diviersion & KD/CI	Bore/Drill Rigs	1	8.00	221	0.50
Creek Diviersion & KD/CI	Cranes	1	8.00	231	0.29

Creek Diviersion & KD/CI	Other Construction Equipment	1	8.00	950	0.50
Creek Diviersion & KD/CI	Pumps	2	8.00	250	0.74
Levee Footprint	Cement and Mortar Mixers	1	8.00	100	0.56
Levee Footprint	Graders	2	8.00	187	0.41
Levee Footprint	Off-Highway Trucks	2	8.00	402	0.38
Levee Footprint	Other Material Handling Equipment	1	5.00	700	0.40
Levee Footprint	Plate Compactors	2	8.00	8	0.43
Levee Footprint	Pumps	1	5.00	300	0.74
Levee Footprint	Rubber Tired Dozers	1	8.00	247	0.40
Dewatering	Pumps	1	24.00	100	0.74
Working Surface/V & DR	Excavators	3	8.00	247	0.40
Working Surface/V & DR	Rubber Tired Dozers	2	8.00	255	0.40
Lake & Levee FA	Graders	1	8.00	187	0.41
Lake & Levee FA	Off-Highway Trucks	1	8.00	402	0.38
Lake & Levee FA	Plate Compactors	2	8.00	8	0.43
Islands (expanded and new)	Graders	2	8.00	187	0.41
Islands (expanded and new)	Off-Highway Trucks	2	8.00	402	0.38
Islands (expanded and new)	Plate Compactors	4	8.00	8	0.43
Transfer PL (from AVPL)	Cranes	1	8.00	231	0.29
Transfer PL (from AVPL)	Excavators	1	8.00	247	0.38
Transfer PL (from AVPL)	Other Construction Equipment	1	8.00	30	0.42
Transfer PL (from AVPL)	Plate Compactors	1	8.00	8	0.43
Transfer PL (from AVPL)	Rubber Tired Loaders	1	8.00	247	0.36
Lake Area 2.5 CC	Graders	1	8.00	187	0.41
Lake Area 2.5 CC	Off-Highway Trucks	1	8.00	402	0.38
Lake Area 2.5 CC	Plate Compactors	2	8.00	8	0.43
Alamitos RCA 2.5 CC	Graders	1	8.00	187	0.41

Alamitos RCA 2.5 CC	Off-Highway Trucks	1	8.00	402	0.38
Alamitos RCA 2.5 CC	Plate Compactors	1	8.00	8	0.43
Transfer PL (to LAPP)	Cranes	1	8.00	231	0.29
Transfer PL (to LAPP)	Excavators	1	8.00	247	0.38
Transfer PL (to LAPP)	Other Construction Equipment	1	8.00	30	0.42
Transfer PL (to LAPP)	Plate Compactors	1	8.00	8	0.43
Transfer PL (to LAPP)	Rubber Tired Loaders	1	8.00	247	0.36
New Park Area	Graders	1	8.00	187	0.41
New Park Area	Off-Highway Trucks	1	8.00	402	0.38
New Park Area	Plate Compactors	2	8.00	8	0.43
Alamitos Creek WBSG	Graders	1	8.00	187	0.41
Alamitos Creek WBSG	Off-Highway Trucks	1	8.00	402	0.38
Alamitos Creek WBSG	Plate Compactors	1	8.00	8	0.43
Reveg & Landscaping	Excavators	1	4.00	158	0.38
Reveg & Landscaping	Generator Sets	1	6.00	84	0.74

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
Creek Diviersion & KD/CL	5	0.00	4.00	0.00	0.00	0.20	0.20	LD_Mix	HDT_Mix	HHDT
Levee Footprint	10	0.00	10.00	0.00	0.00	0.20	0.20	LD_Mix	HDT_Mix	HHDT
Dewatering	1	0.00	0.00	0.00	0.00	0.20	0.20	LD_Mix	HDT_Mix	HHDT
Working Surface/V & DP	5	0.00	2.00	0.00	0.00	0.20	0.20	LD_Mix	HDT_Mix	HHDT
Lake & Levee FA	4	0.00	2.00	9,424.00	0.00	0.20	0.20	LD_Mix	HDT_Mix	HHDT
Islands (expanded and new)	8	0.00	2.00	6,250.00	0.00	0.20	0.20	LD_Mix	HDT_Mix	HHDT
Transfer PL (from AVPL)	5	0.00	2.00	66.00	0.00	0.20	0.20	LD_Mix	HDT_Mix	HHDT
Lake Area 2.5 CC	4	0.00	2.00	23,316.00	0.00	0.20	0.20	LD_Mix	HDT_Mix	HHDT
Alamitos RCA 2.5 CC	3	0.00	2.00	32,544.00	0.00	0.20	0.20	LD_Mix	HDT_Mix	HHDT
Transfer PL (to LAPP)	5	0.00	2.00	1,706.00	0.00	0.20	0.20	LD_Mix	HDT_Mix	HHDT
New Park Area	4	0.00	2.00	8,534.00	0.00	0.20	0.20	LD_Mix	HDT_Mix	HHDT
Alamitos Creek WBSG	3	0.00	2.00	1,194.00	0.00	0.20	0.20	LD_Mix	HDT_Mix	HHDT
Reveg & Landscaping	2	0.00	2.00	0.00	0.00	0.20	0.20	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

3.2 Creek Diviersion & KD/CI - 2021

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	0.0509	0.5031	0.2804	1.4100e-003		0.0163	0.0163		0.0157	0.0157	0.0000	122.1641	122.1641	0.0138	0.0000	122.5100
Total	**0.0509**	**0.5031**	**0.2804**	**1.4100e-003**		**0.0163**	**0.0163**		**0.0157**	**0.0157**	**0.0000**	**122.1641**	**122.1641**	**0.0138**	**0.0000**	**122.5100**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.5000e-004	6.0900e-003	1.6500e-003	1.0000e-005	2.0000e-005	0.0000	2.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.5899	0.5899	7.0000e-005	0.0000	0.5916
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**1.5000e-004**	**6.0900e-003**	**1.6500e-003**	**1.0000e-005**	**2.0000e-005**	**0.0000**	**2.0000e-005**	**1.0000e-005**	**0.0000**	**1.0000e-005**	**0.0000**	**0.5899**	**0.5899**	**7.0000e-005**	**0.0000**	**0.5916**

3.2 Creek Diviersion & KD/CI - 2021

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0187	0.1307	0.4948	1.4100e-003		3.9900e-003	3.9900e-003		3.7900e-003	3.7900e-003	0.0000	122.1639	122.1639	0.0138	0.0000	122.5099
Total	**0.0187**	**0.1307**	**0.4948**	**1.4100e-003**		**3.9900e-003**	**3.9900e-003**		**3.7900e-003**	**3.7900e-003**	**0.0000**	**122.1639**	**122.1639**	**0.0138**	**0.0000**	**122.5099**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.5000e-004	6.0900e-003	1.6500e-003	1.0000e-005	2.0000e-005	0.0000	2.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.5899	0.5899	7.0000e-005	0.0000	0.5916
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**1.5000e-004**	**6.0900e-003**	**1.6500e-003**	**1.0000e-005**	**2.0000e-005**	**0.0000**	**2.0000e-005**	**1.0000e-005**	**0.0000**	**1.0000e-005**	**0.0000**	**0.5899**	**0.5899**	**7.0000e-005**	**0.0000**	**0.5916**

3.3 Levee Footprint - 2021

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					0.3289	0.0000	0.3289	0.1712	0.0000	0.1712	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1891	1.9240	0.9010	3.1300e-003		0.0732	0.0732		0.0680	0.0680	0.0000	283.4941	283.4941	0.0721	0.0000	285.2967
Total	**0.1891**	**1.9240**	**0.9010**	**3.1300e-003**	**0.3289**	**0.0732**	**0.4021**	**0.1712**	**0.0680**	**0.2391**	**0.0000**	**283.4941**	**283.4941**	**0.0721**	**0.0000**	**285.2967**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	7.6000e-004	0.0299	8.0700e-003	3.0000e-005	1.0000e-004	2.0000e-005	1.2000e-004	3.0000e-005	2.0000e-005	5.0000e-005	0.0000	2.8925	2.8925	3.5000e-004	0.0000	2.9013
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**7.6000e-004**	**0.0299**	**8.0700e-003**	**3.0000e-005**	**1.0000e-004**	**2.0000e-005**	**1.2000e-004**	**3.0000e-005**	**2.0000e-005**	**5.0000e-005**	**0.0000**	**2.8925**	**2.8925**	**3.5000e-004**	**0.0000**	**2.9013**

3.3 Levee Footprint - 2021

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.3289	0.0000	0.3289	0.1712	0.0000	0.1712	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0376	0.1629	1.3781	3.1300e-003		5.0100e-003	5.0100e-003		5.0100e-003	5.0100e-003	0.0000	283.4938	283.4938	0.0721	0.0000	285.2964
Total	**0.0376**	**0.1629**	**1.3781**	**3.1300e-003**	**0.3289**	**5.0100e-003**	**0.3339**	**0.1712**	**5.0100e-003**	**0.1762**	**0.0000**	**283.4938**	**283.4938**	**0.0721**	**0.0000**	**285.2964**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	7.6000e-004	0.0299	8.0700e-003	3.0000e-005	1.0000e-004	2.0000e-005	1.2000e-004	3.0000e-005	2.0000e-005	5.0000e-005	0.0000	2.8925	2.8925	3.5000e-004	0.0000	2.9013
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**7.6000e-004**	**0.0299**	**8.0700e-003**	**3.0000e-005**	**1.0000e-004**	**2.0000e-005**	**1.2000e-004**	**3.0000e-005**	**2.0000e-005**	**5.0000e-005**	**0.0000**	**2.8925**	**2.8925**	**3.5000e-004**	**0.0000**	**2.9013**

3.3 Levee Footprint - 2022

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					0.0850	0.0000	0.0850	0.0371	0.0000	0.0371	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0341	0.3284	0.1744	6.4000e-004		0.0123	0.0123		0.0114	0.0114	0.0000	58.3645	58.3645	0.0148	0.0000	58.7351
Total	**0.0341**	**0.3284**	**0.1744**	**6.4000e-004**	**0.0850**	**0.0123**	**0.0973**	**0.0371**	**0.0114**	**0.0485**	**0.0000**	**58.3645**	**58.3645**	**0.0148**	**0.0000**	**58.7351**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.4000e-004	5.9800e-003	1.5500e-003	1.0000e-005	2.0000e-005	0.0000	2.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.5903	0.5903	7.0000e-005	0.0000	0.5920
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**1.4000e-004**	**5.9800e-003**	**1.5500e-003**	**1.0000e-005**	**2.0000e-005**	**0.0000**	**2.0000e-005**	**1.0000e-005**	**0.0000**	**1.0000e-005**	**0.0000**	**0.5903**	**0.5903**	**7.0000e-005**	**0.0000**	**0.5920**

3.3 Levee Footprint - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0850	0.0000	0.0850	0.0371	0.0000	0.0371	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	7.7400e-003	0.0335	0.2837	6.4000e-004		1.0300e-003	1.0300e-003		1.0300e-003	1.0300e-003	0.0000	58.3645	58.3645	0.0148	0.0000	58.7350
Total	**7.7400e-003**	**0.0335**	**0.2837**	**6.4000e-004**	**0.0850**	**1.0300e-003**	**0.0860**	**0.0371**	**1.0300e-003**	**0.0381**	**0.0000**	**58.3645**	**58.3645**	**0.0148**	**0.0000**	**58.7350**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.4000e-004	5.9800e-003	1.5500e-003	1.0000e-005	2.0000e-005	0.0000	2.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.5903	0.5903	7.0000e-005	0.0000	0.5920
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**1.4000e-004**	**5.9800e-003**	**1.5500e-003**	**1.0000e-005**	**2.0000e-005**	**0.0000**	**2.0000e-005**	**1.0000e-005**	**0.0000**	**1.0000e-005**	**0.0000**	**0.5903**	**0.5903**	**7.0000e-005**	**0.0000**	**0.5920**

3.4 Dewatering - 2021

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	0.0693	0.5847	0.6813	1.2000e-003		0.0324	0.0324		0.0324	0.0324	0.0000	102.9487	102.9487	5.6200e-003	0.0000	103.0891
Total	**0.0693**	**0.5847**	**0.6813**	**1.2000e-003**		**0.0324**	**0.0324**		**0.0324**	**0.0324**	**0.0000**	**102.9487**	**102.9487**	**5.6200e-003**	**0.0000**	**103.0891**

Unmitigated Construction Off-Site

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

3.4 Dewatering - 2021

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0120	0.0519	0.7388	1.2000e-003		1.6000e-003	1.6000e-003		1.6000e-003	1.6000e-003	0.0000	102.9486	102.9486	5.6200e-003	0.0000	103.0890
Total	**0.0120**	**0.0519**	**0.7388**	**1.2000e-003**		**1.6000e-003**	**1.6000e-003**		**1.6000e-003**	**1.6000e-003**	**0.0000**	**102.9486**	**102.9486**	**5.6200e-003**	**0.0000**	**103.0890**

Mitigated Construction Off-Site

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

3.4 Dewatering - 2022

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	0.1634	1.3784	1.7327	3.0500e-003		0.0723	0.0723		0.0723	0.0723	0.0000	262.4178	262.4178	0.0134	0.0000	262.7525
Total	**0.1634**	**1.3784**	**1.7327**	**3.0500e-003**		**0.0723**	**0.0723**		**0.0723**	**0.0723**	**0.0000**	**262.4178**	**262.4178**	**0.0134**	**0.0000**	**262.7525**

Unmitigated Construction Off-Site

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

3.4 Dewatering - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0305	0.1323	1.8833	3.0500e-003		4.0700e-003	4.0700e-003		4.0700e-003	4.0700e-003	0.0000	262.4174	262.4174	0.0134	0.0000	262.7522
Total	**0.0305**	**0.1323**	**1.8833**	**3.0500e-003**		**4.0700e-003**	**4.0700e-003**		**4.0700e-003**	**4.0700e-003**	**0.0000**	**262.4174**	**262.4174**	**0.0134**	**0.0000**	**262.7522**

Mitigated Construction Off-Site

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

3.4 Dewatering - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0544	0.4572	0.6187	1.0900e-003		0.0224	0.0224		0.0224	0.0224	0.0000	93.8648	93.8648	4.2900e-003	0.0000	93.9722
Total	**0.0544**	**0.4572**	**0.6187**	**1.0900e-003**		**0.0224**	**0.0224**		**0.0224**	**0.0224**	**0.0000**	**93.8648**	**93.8648**	**4.2900e-003**	**0.0000**	**93.9722**

Unmitigated Construction Off-Site

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

3.4 Dewatering - 2023

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0109	0.0473	0.6737	1.0900e-003		1.4600e-003	1.4600e-003		1.4600e-003	1.4600e-003	0.0000	93.8647	93.8647	4.2900e-003	0.0000	93.9721
Total	**0.0109**	**0.0473**	**0.6737**	**1.0900e-003**		**1.4600e-003**	**1.4600e-003**		**1.4600e-003**	**1.4600e-003**	**0.0000**	**93.8647**	**93.8647**	**4.2900e-003**	**0.0000**	**93.9721**

Mitigated Construction Off-Site

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

3.5 Working Surface/V & DR - 2021

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	0.1337	1.3871	1.0357	2.2100e-003		0.0565	0.0565		0.0520	0.0520	0.0000	193.8431	193.8431	0.0627	0.0000	195.4104
Total	**0.1337**	**1.3871**	**1.0357**	**2.2100e-003**		**0.0565**	**0.0565**		**0.0520**	**0.0520**	**0.0000**	**193.8431**	**193.8431**	**0.0627**	**0.0000**	**195.4104**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.5000e-004	5.9800e-003	1.6100e-003	1.0000e-005	2.0000e-005	0.0000	2.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.5785	0.5785	7.0000e-005	0.0000	0.5803
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**1.5000e-004**	**5.9800e-003**	**1.6100e-003**	**1.0000e-005**	**2.0000e-005**	**0.0000**	**2.0000e-005**	**1.0000e-005**	**0.0000**	**1.0000e-005**	**0.0000**	**0.5785**	**0.5785**	**7.0000e-005**	**0.0000**	**0.5803**

3.5 Working Surface/V & DR - 2021

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0270	0.1170	0.9902	2.2100e-003		3.6000e-003	3.6000e-003		3.6000e-003	3.6000e-003	0.0000	193.8428	193.8428	0.0627	0.0000	195.4102
Total	**0.0270**	**0.1170**	**0.9902**	**2.2100e-003**		**3.6000e-003**	**3.6000e-003**		**3.6000e-003**	**3.6000e-003**	**0.0000**	**193.8428**	**193.8428**	**0.0627**	**0.0000**	**195.4102**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.5000e-004	5.9800e-003	1.6100e-003	1.0000e-005	2.0000e-005	0.0000	2.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.5785	0.5785	7.0000e-005	0.0000	0.5803
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**1.5000e-004**	**5.9800e-003**	**1.6100e-003**	**1.0000e-005**	**2.0000e-005**	**0.0000**	**2.0000e-005**	**1.0000e-005**	**0.0000**	**1.0000e-005**	**0.0000**	**0.5785**	**0.5785**	**7.0000e-005**	**0.0000**	**0.5803**

3.5 Working Surface/V & DR - 2022

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	0.2447	2.4176	1.9424	4.2600e-003		0.1004	0.1004		0.0923	0.0923	0.0000	374.6032	374.6032	0.1212	0.0000	377.6321
Total	**0.2447**	**2.4176**	**1.9424**	**4.2600e-003**		**0.1004**	**0.1004**		**0.0923**	**0.0923**	**0.0000**	**374.6032**	**374.6032**	**0.1212**	**0.0000**	**377.6321**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	2.7000e-004	0.0112	2.9000e-003	1.0000e-005	4.0000e-005	1.0000e-005	5.0000e-005	1.0000e-005	1.0000e-005	2.0000e-005	0.0000	1.1075	1.1075	1.3000e-004	0.0000	1.1107
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**2.7000e-004**	**0.0112**	**2.9000e-003**	**1.0000e-005**	**4.0000e-005**	**1.0000e-005**	**5.0000e-005**	**1.0000e-005**	**1.0000e-005**	**2.0000e-005**	**0.0000**	**1.1075**	**1.1075**	**1.3000e-004**	**0.0000**	**1.1107**

3.5 Working Surface/V & DR - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0522	0.2260	1.9125	4.2600e-003		6.9500e-003	6.9500e-003		6.9500e-003	6.9500e-003	0.0000	374.6028	374.6028	0.1212	0.0000	377.6316
Total	**0.0522**	**0.2260**	**1.9125**	**4.2600e-003**		**6.9500e-003**	**6.9500e-003**		**6.9500e-003**	**6.9500e-003**	**0.0000**	**374.6028**	**374.6028**	**0.1212**	**0.0000**	**377.6316**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	2.7000e-004	0.0112	2.9000e-003	1.0000e-005	4.0000e-005	1.0000e-005	5.0000e-005	1.0000e-005	1.0000e-005	2.0000e-005	0.0000	1.1075	1.1075	1.3000e-004	0.0000	1.1107
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**2.7000e-004**	**0.0112**	**2.9000e-003**	**1.0000e-005**	**4.0000e-005**	**1.0000e-005**	**5.0000e-005**	**1.0000e-005**	**1.0000e-005**	**2.0000e-005**	**0.0000**	**1.1075**	**1.1075**	**1.3000e-004**	**0.0000**	**1.1107**

3.6 Lake & Levee FA - 2021

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					0.7405	0.0000	0.7405	0.1898	0.0000	0.1898	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0114	0.1169	0.0579	2.1000e-004		4.0000e-003	4.0000e-003		3.7000e-003	3.7000e-003	0.0000	18.0454	18.0454	5.7000e-003	0.0000	18.1879
Total	**0.0114**	**0.1169**	**0.0579**	**2.1000e-004**	**0.7405**	**4.0000e-003**	**0.7445**	**0.1898**	**3.7000e-003**	**0.1935**	**0.0000**	**18.0454**	**18.0454**	**5.7000e-003**	**0.0000**	**18.1879**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.9200e-003	0.0987	0.0155	1.1000e-004	6.7000e-004	6.0000e-005	7.2000e-004	1.7000e-004	6.0000e-005	2.3000e-004	0.0000	10.9466	10.9466	1.3100e-003	0.0000	10.9793
Vendor	3.0000e-005	1.1700e-003	3.2000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.1134	0.1134	1.0000e-005	0.0000	0.1138
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**1.9500e-003**	**0.0998**	**0.0158**	**1.1000e-004**	**6.7000e-004**	**6.0000e-005**	**7.2000e-004**	**1.7000e-004**	**6.0000e-005**	**2.3000e-004**	**0.0000**	**11.0600**	**11.0600**	**1.3200e-003**	**0.0000**	**11.0931**

3.6 Lake & Levee FA - 2021

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.7405	0.0000	0.7405	0.1898	0.0000	0.1898	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	2.4300e-003	0.0105	0.0890	2.1000e-004		3.2000e-004	3.2000e-004		3.2000e-004	3.2000e-004	0.0000	18.0454	18.0454	5.7000e-003	0.0000	18.1879
Total	**2.4300e-003**	**0.0105**	**0.0890**	**2.1000e-004**	**0.7405**	**3.2000e-004**	**0.7408**	**0.1898**	**3.2000e-004**	**0.1901**	**0.0000**	**18.0454**	**18.0454**	**5.7000e-003**	**0.0000**	**18.1879**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.9200e-003	0.0987	0.0155	1.1000e-004	6.7000e-004	6.0000e-005	7.2000e-004	1.7000e-004	6.0000e-005	2.3000e-004	0.0000	10.9466	10.9466	1.3100e-003	0.0000	10.9793
Vendor	3.0000e-005	1.1700e-003	3.2000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.1134	0.1134	1.0000e-005	0.0000	0.1138
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**1.9500e-003**	**0.0998**	**0.0158**	**1.1000e-004**	**6.7000e-004**	**6.0000e-005**	**7.2000e-004**	**1.7000e-004**	**6.0000e-005**	**2.3000e-004**	**0.0000**	**11.0600**	**11.0600**	**1.3200e-003**	**0.0000**	**11.0931**

3.6 Lake & Levee FA - 2022

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					0.7405	0.0000	0.7405	0.1898	0.0000	0.1898	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0348	0.3323	0.1871	7.1000e-004		0.0113	0.0113		0.0105	0.0105	0.0000	61.3562	61.3562	0.0194	0.0000	61.8406
Total	**0.0348**	**0.3323**	**0.1871**	**7.1000e-004**	**0.7405**	**0.0113**	**0.7518**	**0.1898**	**0.0105**	**0.2003**	**0.0000**	**61.3562**	**61.3562**	**0.0194**	**0.0000**	**61.8406**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	6.1400e-003	0.3242	0.0510	3.8000e-004	8.3000e-004	1.7000e-004	1.0000e-003	2.3000e-004	1.6000e-004	3.9000e-004	0.0000	36.8701	36.8701	4.1800e-003	0.0000	36.9747
Vendor	9.0000e-005	3.8700e-003	1.0000e-003	0.0000	1.0000e-005	0.0000	2.0000e-005	0.0000	0.0000	1.0000e-005	0.0000	0.3823	0.3823	4.0000e-005	0.0000	0.3834
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**6.2300e-003**	**0.3281**	**0.0520**	**3.8000e-004**	**8.4000e-004**	**1.7000e-004**	**1.0200e-003**	**2.3000e-004**	**1.6000e-004**	**4.0000e-004**	**0.0000**	**37.2524**	**37.2524**	**4.2200e-003**	**0.0000**	**37.3580**

3.6 Lake & Levee FA - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.7405	0.0000	0.7405	0.1898	0.0000	0.1898	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	8.2500e-003	0.0358	0.3027	7.1000e-004		1.1000e-003	1.1000e-003		1.1000e-003	1.1000e-003	0.0000	61.3561	61.3561	0.0194	0.0000	61.8405
Total	**8.2500e-003**	**0.0358**	**0.3027**	**7.1000e-004**	**0.7405**	**1.1000e-003**	**0.7416**	**0.1898**	**1.1000e-003**	**0.1909**	**0.0000**	**61.3561**	**61.3561**	**0.0194**	**0.0000**	**61.8405**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	6.1400e-003	0.3242	0.0510	3.8000e-004	8.3000e-004	1.7000e-004	1.0000e-003	2.3000e-004	1.6000e-004	3.9000e-004	0.0000	36.8701	36.8701	4.1800e-003	0.0000	36.9747
Vendor	9.0000e-005	3.8700e-003	1.0000e-003	0.0000	1.0000e-005	0.0000	2.0000e-005	0.0000	0.0000	1.0000e-005	0.0000	0.3823	0.3823	4.0000e-005	0.0000	0.3834
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**6.2300e-003**	**0.3281**	**0.0520**	**3.8000e-004**	**8.4000e-004**	**1.7000e-004**	**1.0200e-003**	**2.3000e-004**	**1.6000e-004**	**4.0000e-004**	**0.0000**	**37.2524**	**37.2524**	**4.2200e-003**	**0.0000**	**37.3580**

3.7 Islands (expanded and new) - 2022

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					0.0398	0.0000	0.0398	4.2900e-003	0.0000	4.2900e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0768	0.7330	0.4126	1.5600e-003		0.0250	0.0250		0.0231	0.0231	0.0000	135.3445	135.3445	0.0427	0.0000	136.4130
Total	**0.0768**	**0.7330**	**0.4126**	**1.5600e-003**	**0.0398**	**0.0250**	**0.0647**	**4.2900e-003**	**0.0231**	**0.0274**	**0.0000**	**135.3445**	**135.3445**	**0.0427**	**0.0000**	**136.4130**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	5.2700e-003	0.2782	0.0438	3.3000e-004	6.0000e-004	1.4000e-004	7.4000e-004	1.7000e-004	1.4000e-004	3.1000e-004	0.0000	31.6441	31.6441	3.5900e-003	0.0000	31.7338
Vendor	1.0000e-004	4.2700e-003	1.1000e-003	0.0000	2.0000e-005	0.0000	2.0000e-005	0.0000	0.0000	1.0000e-005	0.0000	0.4217	0.4217	5.0000e-005	0.0000	0.4229
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**5.3700e-003**	**0.2825**	**0.0449**	**3.3000e-004**	**6.2000e-004**	**1.4000e-004**	**7.6000e-004**	**1.7000e-004**	**1.4000e-004**	**3.2000e-004**	**0.0000**	**32.0657**	**32.0657**	**3.6400e-003**	**0.0000**	**32.1567**

3.7 Islands (expanded and new) - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0398	0.0000	0.0398	4.2900e-003	0.0000	4.2900e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0182	0.0789	0.6677	1.5600e-003		2.4300e-003	2.4300e-003		2.4300e-003	2.4300e-003	0.0000	135.3443	135.3443	0.0427	0.0000	136.4129
Total	**0.0182**	**0.0789**	**0.6677**	**1.5600e-003**	**0.0398**	**2.4300e-003**	**0.0422**	**4.2900e-003**	**2.4300e-003**	**6.7200e-003**	**0.0000**	**135.3443**	**135.3443**	**0.0427**	**0.0000**	**136.4129**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	5.2700e-003	0.2782	0.0438	3.3000e-004	6.0000e-004	1.4000e-004	7.4000e-004	1.7000e-004	1.4000e-004	3.1000e-004	0.0000	31.6441	31.6441	3.5900e-003	0.0000	31.7338
Vendor	1.0000e-004	4.2700e-003	1.1000e-003	0.0000	2.0000e-005	0.0000	2.0000e-005	0.0000	0.0000	1.0000e-005	0.0000	0.4217	0.4217	5.0000e-005	0.0000	0.4229
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**5.3700e-003**	**0.2825**	**0.0449**	**3.3000e-004**	**6.2000e-004**	**1.4000e-004**	**7.6000e-004**	**1.7000e-004**	**1.4000e-004**	**3.2000e-004**	**0.0000**	**32.0657**	**32.0657**	**3.6400e-003**	**0.0000**	**32.1567**

3.8 Transfer PL (from AVPL) - 2022

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	0.0487	0.4586	0.2769	9.3000e-004		0.0183	0.0183		0.0168	0.0168	0.0000	80.8944	80.8944	0.0259	0.0000	81.5416
Total	**0.0487**	**0.4586**	**0.2769**	**9.3000e-004**		**0.0183**	**0.0183**		**0.0168**	**0.0168**	**0.0000**	**80.8944**	**80.8944**	**0.0259**	**0.0000**	**81.5416**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	6.0000e-005	2.9400e-003	4.6000e-004	0.0000	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0000	0.0000	0.0000	0.3342	0.3342	4.0000e-005	0.0000	0.3351
Vendor	1.1000e-004	4.5600e-003	1.1800e-003	0.0000	2.0000e-005	0.0000	2.0000e-005	0.0000	0.0000	1.0000e-005	0.0000	0.4498	0.4498	5.0000e-005	0.0000	0.4511
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**1.7000e-004**	**7.5000e-003**	**1.6400e-003**	**0.0000**	**3.0000e-005**	**0.0000**	**3.0000e-005**	**0.0000**	**0.0000**	**1.0000e-005**	**0.0000**	**0.7839**	**0.7839**	**9.0000e-005**	**0.0000**	**0.7862**

3.8 Transfer PL (from AVPL) - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0116	0.0703	0.4241	9.3000e-004		1.4800e-003	1.4800e-003		1.4800e-003	1.4800e-003	0.0000	80.8943	80.8943	0.0259	0.0000	81.5415
Total	**0.0116**	**0.0703**	**0.4241**	**9.3000e-004**		**1.4800e-003**	**1.4800e-003**		**1.4800e-003**	**1.4800e-003**	**0.0000**	**80.8943**	**80.8943**	**0.0259**	**0.0000**	**81.5415**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	6.0000e-005	2.9400e-003	4.6000e-004	0.0000	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0000	0.0000	0.0000	0.3342	0.3342	4.0000e-005	0.0000	0.3351
Vendor	1.1000e-004	4.5600e-003	1.1800e-003	0.0000	2.0000e-005	0.0000	2.0000e-005	0.0000	0.0000	1.0000e-005	0.0000	0.4498	0.4498	5.0000e-005	0.0000	0.4511
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**1.7000e-004**	**7.5000e-003**	**1.6400e-003**	**0.0000**	**3.0000e-005**	**0.0000**	**3.0000e-005**	**0.0000**	**0.0000**	**1.0000e-005**	**0.0000**	**0.7839**	**0.7839**	**9.0000e-005**	**0.0000**	**0.7862**

3.9 Lake Area 2.5 CC - 2022

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	0.0527	0.5034	0.2833	1.0700e-003		0.0171	0.0171		0.0158	0.0158	0.0000	92.9365	92.9365	0.0294	0.0000	93.6703
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0527**	**0.5034**	**0.2833**	**1.0700e-003**		**0.0171**	**0.0171**		**0.0158**	**0.0158**	**0.0000**	**92.9365**	**92.9365**	**0.0294**	**0.0000**	**93.6703**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0197	1.0380	0.1633	1.2200e-003	2.2200e-003	5.3000e-004	2.7500e-003	6.3000e-004	5.1000e-004	1.1400e-003	0.0000	118.0502	118.0502	0.0134	0.0000	118.3850
Vendor	1.4000e-004	5.8700e-003	1.5200e-003	1.0000e-005	2.0000e-005	0.0000	2.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.5791	0.5791	7.0000e-005	0.0000	0.5807
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0198**	**1.0438**	**0.1648**	**1.2300e-003**	**2.2400e-003**	**5.3000e-004**	**2.7700e-003**	**6.4000e-004**	**5.1000e-004**	**1.1500e-003**	**0.0000**	**118.6292**	**118.6292**	**0.0135**	**0.0000**	**118.9657**

3.9 Lake Area 2.5 CC - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0125	0.0542	0.4585	1.0700e-003		1.6700e-003	1.6700e-003		1.6700e-003	1.6700e-003	0.0000	92.9364	92.9364	0.0294	0.0000	93.6702
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0125**	**0.0542**	**0.4585**	**1.0700e-003**		**1.6700e-003**	**1.6700e-003**		**1.6700e-003**	**1.6700e-003**	**0.0000**	**92.9364**	**92.9364**	**0.0294**	**0.0000**	**93.6702**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0197	1.0380	0.1633	1.2200e-003	2.2200e-003	5.3000e-004	2.7500e-003	6.3000e-004	5.1000e-004	1.1400e-003	0.0000	118.0502	118.0502	0.0134	0.0000	118.3850
Vendor	1.4000e-004	5.8700e-003	1.5200e-003	1.0000e-005	2.0000e-005	0.0000	2.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.5791	0.5791	7.0000e-005	0.0000	0.5807
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0198**	**1.0438**	**0.1648**	**1.2300e-003**	**2.2400e-003**	**5.3000e-004**	**2.7700e-003**	**6.4000e-004**	**5.1000e-004**	**1.1500e-003**	**0.0000**	**118.6292**	**118.6292**	**0.0135**	**0.0000**	**118.9657**

3.10 Alamitos RCA 2.5 CC - 2022

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	0.0738	0.7142	0.3968	1.5200e-003		0.0242	0.0242		0.0223	0.0223	0.0000	132.9985	132.9985	0.0425	0.0000	134.0610
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0738**	**0.7142**	**0.3968**	**1.5200e-003**		**0.0242**	**0.0242**		**0.0223**	**0.0223**	**0.0000**	**132.9985**	**132.9985**	**0.0425**	**0.0000**	**134.0610**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0274	1.4488	0.2280	1.7000e-003	3.1000e-003	7.4000e-004	3.8400e-003	8.8000e-004	7.1000e-004	1.5900e-003	0.0000	164.7720	164.7720	0.0187	0.0000	165.2393
Vendor	2.1000e-004	8.5500e-003	2.2100e-003	1.0000e-005	3.0000e-005	0.0000	3.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.8433	0.8433	1.0000e-004	0.0000	0.8457
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0277**	**1.4573**	**0.2302**	**1.7100e-003**	**3.1300e-003**	**7.4000e-004**	**3.8700e-003**	**8.9000e-004**	**7.1000e-004**	**1.6000e-003**	**0.0000**	**165.6153**	**165.6153**	**0.0188**	**0.0000**	**166.0851**

3.10 Alamitos RCA 2.5 CC - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0182	0.0789	0.6677	1.5200e-003		2.4300e-003	2.4300e-003		2.4300e-003	2.4300e-003	0.0000	132.9984	132.9984	0.0425	0.0000	134.0608
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0182**	**0.0789**	**0.6677**	**1.5200e-003**		**2.4300e-003**	**2.4300e-003**		**2.4300e-003**	**2.4300e-003**	**0.0000**	**132.9984**	**132.9984**	**0.0425**	**0.0000**	**134.0608**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0274	1.4488	0.2280	1.7000e-003	3.1000e-003	7.4000e-004	3.8400e-003	8.8000e-004	7.1000e-004	1.5900e-003	0.0000	164.7720	164.7720	0.0187	0.0000	165.2393
Vendor	2.1000e-004	8.5500e-003	2.2100e-003	1.0000e-005	3.0000e-005	0.0000	3.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.8433	0.8433	1.0000e-004	0.0000	0.8457
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0277**	**1.4573**	**0.2302**	**1.7100e-003**	**3.1300e-003**	**7.4000e-004**	**3.8700e-003**	**8.9000e-004**	**7.1000e-004**	**1.6000e-003**	**0.0000**	**165.6153**	**165.6153**	**0.0188**	**0.0000**	**166.0851**

3.11 Transfer PL (to LAPP) - 2022

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	0.0487	0.4586	0.2769	9.3000e-004		0.0183	0.0183		0.0168	0.0168	0.0000	80.8944	80.8944	0.0259	0.0000	81.5416
Total	**0.0487**	**0.4586**	**0.2769**	**9.3000e-004**		**0.0183**	**0.0183**		**0.0168**	**0.0168**	**0.0000**	**80.8944**	**80.8944**	**0.0259**	**0.0000**	**81.5416**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.4400e-003	0.0760	0.0120	9.0000e-005	1.6000e-004	4.0000e-005	2.0000e-004	5.0000e-005	4.0000e-005	8.0000e-005	0.0000	8.6376	8.6376	9.8000e-004	0.0000	8.6621
Vendor	1.1000e-004	4.5600e-003	1.1800e-003	0.0000	2.0000e-005	0.0000	2.0000e-005	0.0000	0.0000	1.0000e-005	0.0000	0.4498	0.4498	5.0000e-005	0.0000	0.4511
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**1.5500e-003**	**0.0805**	**0.0131**	**9.0000e-005**	**1.8000e-004**	**4.0000e-005**	**2.2000e-004**	**5.0000e-005**	**4.0000e-005**	**9.0000e-005**	**0.0000**	**9.0873**	**9.0873**	**1.0300e-003**	**0.0000**	**9.1131**

3.11 Transfer PL (to LAPP) - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0116	0.0703	0.4241	9.3000e-004		1.4800e-003	1.4800e-003		1.4800e-003	1.4800e-003	0.0000	80.8943	80.8943	0.0259	0.0000	81.5415
Total	**0.0116**	**0.0703**	**0.4241**	**9.3000e-004**		**1.4800e-003**	**1.4800e-003**		**1.4800e-003**	**1.4800e-003**	**0.0000**	**80.8943**	**80.8943**	**0.0259**	**0.0000**	**81.5415**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.4400e-003	0.0760	0.0120	9.0000e-005	1.6000e-004	4.0000e-005	2.0000e-004	5.0000e-005	4.0000e-005	8.0000e-005	0.0000	8.6376	8.6376	9.8000e-004	0.0000	8.6621
Vendor	1.1000e-004	4.5600e-003	1.1800e-003	0.0000	2.0000e-005	0.0000	2.0000e-005	0.0000	0.0000	1.0000e-005	0.0000	0.4498	0.4498	5.0000e-005	0.0000	0.4511
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**1.5500e-003**	**0.0805**	**0.0131**	**9.0000e-005**	**1.8000e-004**	**4.0000e-005**	**2.2000e-004**	**5.0000e-005**	**4.0000e-005**	**9.0000e-005**	**0.0000**	**9.0873**	**9.0873**	**1.0300e-003**	**0.0000**	**9.1131**

3.12 New Park Area - 2022

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	0.0466	0.4447	0.2503	9.5000e-004		0.0151	0.0151		0.0140	0.0140	0.0000	82.1090	82.1090	0.0259	0.0000	82.7572
Total	**0.0466**	**0.4447**	**0.2503**	**9.5000e-004**		**0.0151**	**0.0151**		**0.0140**	**0.0140**	**0.0000**	**82.1090**	**82.1090**	**0.0259**	**0.0000**	**82.7572**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	5.1200e-003	0.2701	0.0425	3.2000e-004	7.3000e-004	1.4000e-004	8.7000e-004	2.0000e-004	1.3000e-004	3.4000e-004	0.0000	30.7183	30.7183	3.4800e-003	0.0000	30.8054
Vendor	1.2000e-004	5.1900e-003	1.3400e-003	1.0000e-005	2.0000e-005	0.0000	2.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.5116	0.5116	6.0000e-005	0.0000	0.5131
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**5.2400e-003**	**0.2753**	**0.0438**	**3.3000e-004**	**7.5000e-004**	**1.4000e-004**	**8.9000e-004**	**2.1000e-004**	**1.3000e-004**	**3.5000e-004**	**0.0000**	**31.2299**	**31.2299**	**3.5400e-003**	**0.0000**	**31.3185**

3.12 New Park Area - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0111	0.0479	0.4051	9.5000e-004		1.4700e-003	1.4700e-003		1.4700e-003	1.4700e-003	0.0000	82.1089	82.1089	0.0259	0.0000	82.7571
Total	**0.0111**	**0.0479**	**0.4051**	**9.5000e-004**		**1.4700e-003**	**1.4700e-003**		**1.4700e-003**	**1.4700e-003**	**0.0000**	**82.1089**	**82.1089**	**0.0259**	**0.0000**	**82.7571**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	5.1200e-003	0.2701	0.0425	3.2000e-004	7.3000e-004	1.4000e-004	8.7000e-004	2.0000e-004	1.3000e-004	3.4000e-004	0.0000	30.7183	30.7183	3.4800e-003	0.0000	30.8054
Vendor	1.2000e-004	5.1900e-003	1.3400e-003	1.0000e-005	2.0000e-005	0.0000	2.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.5116	0.5116	6.0000e-005	0.0000	0.5131
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**5.2400e-003**	**0.2753**	**0.0438**	**3.3000e-004**	**7.5000e-004**	**1.4000e-004**	**8.9000e-004**	**2.1000e-004**	**1.3000e-004**	**3.5000e-004**	**0.0000**	**31.2299**	**31.2299**	**3.5400e-003**	**0.0000**	**31.3185**

3.12 New Park Area - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0179	0.1614	0.0999	3.9000e-004		5.5400e-003	5.5400e-003		5.1200e-003	5.1200e-003	0.0000	33.3930	33.3930	0.0106	0.0000	33.6567
Total	**0.0179**	**0.1614**	**0.0999**	**3.9000e-004**		**5.5400e-003**	**5.5400e-003**		**5.1200e-003**	**5.1200e-003**	**0.0000**	**33.3930**	**33.3930**	**0.0106**	**0.0000**	**33.6567**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.4700e-003	0.0924	0.0152	1.2000e-004	6.2000e-004	3.0000e-005	6.5000e-004	1.6000e-004	3.0000e-005	1.9000e-004	0.0000	12.0028	12.0028	1.0800e-003	0.0000	12.0299
Vendor	4.0000e-005	1.8300e-003	4.9000e-004	0.0000	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0000	0.0000	0.0000	0.2004	0.2004	2.0000e-005	0.0000	0.2009
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**1.5100e-003**	**0.0942**	**0.0157**	**1.2000e-004**	**6.3000e-004**	**3.0000e-005**	**6.6000e-004**	**1.6000e-004**	**3.0000e-005**	**1.9000e-004**	**0.0000**	**12.2032**	**12.2032**	**1.1000e-003**	**0.0000**	**12.2308**

3.12 New Park Area - 2023

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	4.4900e-003	0.0195	0.1647	3.9000e-004		6.0000e-004	6.0000e-004		6.0000e-004	6.0000e-004	0.0000	33.3930	33.3930	0.0106	0.0000	33.6566
Total	**4.4900e-003**	**0.0195**	**0.1647**	**3.9000e-004**		**6.0000e-004**	**6.0000e-004**		**6.0000e-004**	**6.0000e-004**	**0.0000**	**33.3930**	**33.3930**	**0.0106**	**0.0000**	**33.6566**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.4700e-003	0.0924	0.0152	1.2000e-004	6.2000e-004	3.0000e-005	6.5000e-004	1.6000e-004	3.0000e-005	1.9000e-004	0.0000	12.0028	12.0028	1.0800e-003	0.0000	12.0299
Vendor	4.0000e-005	1.8300e-003	4.9000e-004	0.0000	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0000	0.0000	0.0000	0.2004	0.2004	2.0000e-005	0.0000	0.2009
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**1.5100e-003**	**0.0942**	**0.0157**	**1.2000e-004**	**6.3000e-004**	**3.0000e-005**	**6.6000e-004**	**1.6000e-004**	**3.0000e-005**	**1.9000e-004**	**0.0000**	**12.2032**	**12.2032**	**1.1000e-003**	**0.0000**	**12.2308**

3.13 Alamitos Creek WBSG - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					1.5900e-003	0.0000	1.5900e-003	1.7000e-004	0.0000	1.7000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	3.4400e-003	0.0333	0.0185	7.0000e-005		1.1300e-003	1.1300e-003		1.0400e-003	1.0400e-003	0.0000	6.2066	6.2066	1.9800e-003	0.0000	6.2562
Total	**3.4400e-003**	**0.0333**	**0.0185**	**7.0000e-005**	**1.5900e-003**	**1.1300e-003**	**2.7200e-003**	**1.7000e-004**	**1.0400e-003**	**1.2100e-003**	**0.0000**	**6.2066**	**6.2066**	**1.9800e-003**	**0.0000**	**6.2562**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.0100e-003	0.0532	8.3600e-003	6.0000e-005	1.1000e-004	3.0000e-005	1.4000e-004	3.0000e-005	3.0000e-005	6.0000e-005	0.0000	6.0453	6.0453	6.9000e-004	0.0000	6.0624
Vendor	1.0000e-005	4.0000e-004	1.0000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0394	0.0394	0.0000	0.0000	0.0395
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**1.0200e-003**	**0.0536**	**8.4600e-003**	**6.0000e-005**	**1.1000e-004**	**3.0000e-005**	**1.4000e-004**	**3.0000e-005**	**3.0000e-005**	**6.0000e-005**	**0.0000**	**6.0846**	**6.0846**	**6.9000e-004**	**0.0000**	**6.1019**

3.13 Alamitos Creek WBSG - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					1.5900e-003	0.0000	1.5900e-003	1.7000e-004	0.0000	1.7000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	8.5000e-004	3.6800e-003	0.0312	7.0000e-005		1.1000e-004	1.1000e-004		1.1000e-004	1.1000e-004	0.0000	6.2066	6.2066	1.9800e-003	0.0000	6.2562
Total	**8.5000e-004**	**3.6800e-003**	**0.0312**	**7.0000e-005**	**1.5900e-003**	**1.1000e-004**	**1.7000e-003**	**1.7000e-004**	**1.1000e-004**	**2.8000e-004**	**0.0000**	**6.2066**	**6.2066**	**1.9800e-003**	**0.0000**	**6.2562**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.0100e-003	0.0532	8.3600e-003	6.0000e-005	1.1000e-004	3.0000e-005	1.4000e-004	3.0000e-005	3.0000e-005	6.0000e-005	0.0000	6.0453	6.0453	6.9000e-004	0.0000	6.0624
Vendor	1.0000e-005	4.0000e-004	1.0000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0394	0.0394	0.0000	0.0000	0.0395
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**1.0200e-003**	**0.0536**	**8.4600e-003**	**6.0000e-005**	**1.1000e-004**	**3.0000e-005**	**1.4000e-004**	**3.0000e-005**	**3.0000e-005**	**6.0000e-005**	**0.0000**	**6.0846**	**6.0846**	**6.9000e-004**	**0.0000**	**6.1019**

3.14 Reveg & Landscaping - 2022

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	5.2000e-004	4.6300e-003	6.5800e-003	1.0000e-005		2.3000e-004	2.3000e-004		2.2000e-004	2.2000e-004	0.0000	0.9761	0.9761	1.4000e-004	0.0000	0.9796
Total	**5.2000e-004**	**4.6300e-003**	**6.5800e-003**	**1.0000e-005**	**0.0000**	**2.3000e-004**	**2.3000e-004**	**0.0000**	**2.2000e-004**	**2.2000e-004**	**0.0000**	**0.9761**	**0.9761**	**1.4000e-004**	**0.0000**	**0.9796**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	1.7000e-004	4.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0169	0.0169	0.0000	0.0000	0.0169
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**1.7000e-004**	**4.0000e-005**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0169**	**0.0169**	**0.0000**	**0.0000**	**0.0169**

3.14 Reveg & Landscaping - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					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	1.2000e-004	5.3000e-004	7.5000e-003	1.0000e-005		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	0.9761	0.9761	1.4000e-004	0.0000	0.9796
Total	**1.2000e-004**	**5.3000e-004**	**7.5000e-003**	**1.0000e-005**	**0.0000**	**2.0000e-005**	**2.0000e-005**	**0.0000**	**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.9761**	**0.9761**	**1.4000e-004**	**0.0000**	**0.9796**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	1.7000e-004	4.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0169	0.0169	0.0000	0.0000	0.0169
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**1.7000e-004**	**4.0000e-005**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0169**	**0.0169**	**0.0000**	**0.0000**	**0.0169**

3.14 Reveg & Landscaping - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
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	0.0149	0.1293	0.2015	3.5000e-004		6.1700e-003	6.1700e-003		6.0300e-003	6.0300e-003	0.0000	29.9345	29.9345	4.2300e-003	0.0000	30.0403
Total	**0.0149**	**0.1293**	**0.2015**	**3.5000e-004**	**0.0000**	**6.1700e-003**	**6.1700e-003**	**0.0000**	**6.0300e-003**	**6.0300e-003**	**0.0000**	**29.9345**	**29.9345**	**4.2300e-003**	**0.0000**	**30.0403**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.0000e-004	4.5500e-003	1.2200e-003	1.0000e-005	2.0000e-005	0.0000	2.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.4983	0.4983	5.0000e-005	0.0000	0.4995
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**1.0000e-004**	**4.5500e-003**	**1.2200e-003**	**1.0000e-005**	**2.0000e-005**	**0.0000**	**2.0000e-005**	**1.0000e-005**	**0.0000**	**1.0000e-005**	**0.0000**	**0.4983**	**0.4983**	**5.0000e-005**	**0.0000**	**0.4995**

3.14 Reveg & Landscaping - 2023

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
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	3.7300e-003	0.0162	0.2301	3.5000e-004		5.0000e-004	5.0000e-004		5.0000e-004	5.0000e-004	0.0000	29.9345	29.9345	4.2300e-003	0.0000	30.0403
Total	**3.7300e-003**	**0.0162**	**0.2301**	**3.5000e-004**	**0.0000**	**5.0000e-004**	**5.0000e-004**	**0.0000**	**5.0000e-004**	**5.0000e-004**	**0.0000**	**29.9345**	**29.9345**	**4.2300e-003**	**0.0000**	**30.0403**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.0000e-004	4.5500e-003	1.2200e-003	1.0000e-005	2.0000e-005	0.0000	2.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.4983	0.4983	5.0000e-005	0.0000	0.4995
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**1.0000e-004**	**4.5500e-003**	**1.2200e-003**	**1.0000e-005**	**2.0000e-005**	**0.0000**	**2.0000e-005**	**1.0000e-005**	**0.0000**	**1.0000e-005**	**0.0000**	**0.4983**	**0.4983**	**5.0000e-005**	**0.0000**	**0.4995**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.3079	0.0000	0.3079	0.0756	0.0000	0.0756	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.3079	0.0000	0.3079	0.0756	0.0000	0.0756	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
City Park	122.85	1,478.75	1088.10	970,169	970,169
Total	122.85	1,478.75	1,088.10	970,169	970,169

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
City Park	9.50	7.30	7.30	33.00	48.00	19.00	66	28	6

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
City Park	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
City Park	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
City Park	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	11.0581	1.0000e-005	6.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.1600e-003	1.1600e-003	0.0000	0.0000	1.2400e-003
Unmitigated	11.0581	1.0000e-005	6.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.1600e-003	1.1600e-003	0.0000	0.0000	1.2400e-003

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	11.0580					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	6.0000e-005	1.0000e-005	6.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.1600e-003	1.1600e-003	0.0000	0.0000	1.2400e-003
Total	**11.0581**	**1.0000e-005**	**6.0000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**1.1600e-003**	**1.1600e-003**	**0.0000**	**0.0000**	**1.2400e-003**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	11.0580					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	6.0000e-005	1.0000e-005	6.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.1600e-003	1.1600e-003	0.0000	0.0000	1.2400e-003
Total	**11.0581**	**1.0000e-005**	**6.0000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**1.1600e-003**	**1.1600e-003**	**0.0000**	**0.0000**	**1.2400e-003**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	78.8551	3.5700e-003	7.4000e-004	79.1640
Unmitigated	78.8551	3.5700e-003	7.4000e-004	79.1640

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
City Park	0 / 77.4463	78.8551	3.5700e-003	7.4000e-004	79.1640
Total		**78.8551**	**3.5700e-003**	**7.4000e-004**	**79.1640**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
City Park	0 / 77.4463	78.8551	3.5700e-003	7.4000e-004	79.1640
Total		**78.8551**	**3.5700e-003**	**7.4000e-004**	**79.1640**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	1.1347	0.0671	0.0000	2.8112
Unmitigated	1.1347	0.0671	0.0000	2.8112

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
City Park	5.59	1.1347	0.0671	0.0000	2.8112
Total		**1.1347**	**0.0671**	**0.0000**	**2.8112**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
City Park	5.59	1.1347	0.0671	0.0000	2.8112
Total		**1.1347**	**0.0671**	**0.0000**	**2.8112**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

B.8 Health Risk Assessment

1425 N. McDowell Boulevard
Suite 200
Petaluma, CA 94954
707.795.0900 phone
707.795.0902 fax

www.esassoc.com

Construction Health Risk Assessment

date	July 16, 2019
to	Matthew Fagundes, ESA
from	Sarah Patterson, ESA
subject	Almaden Lake Improvement Project – Construction Period Health Risk Assessment (HRA)

Executive Summary

The Almaden Lake Improvement Project (Project) would be located in the City of San José's (City) Almaden Lake Park (Park). The 32-acre Almaden Lake (located entirely within the Park) formed when a quarry levee breached. The loss of the integrity of the Alamitos Creek channel and commingling of creek water with lake water has created adverse conditions for anadromous fish populations. Further, mercury-laden sediment from historic upstream mining activities continues to be transported downstream in Alamitos Creek and is deposited in Almaden Lake. Seasonal lake conditions contribute to the conversion of elemental mercury to methylmercury as well as other negative water quality conditions. The Project would address these issues by reestablishing the Alamitos Creek channel, separate the creek from Almaden Lake (lake) in order to improve anadromous fish access to spawning and rearing habitat within the upper portions of the Guadalupe River Watershed, and reduce methylmercury levels in the lake.

Construction of the Project would generate diesel particulate matter (DPM) emissions from operation of off-road equipment and heavy duty trucks. Diesel particulate matter is recognized as a carcinogen by the Office of Environmental Health Hazard Assessment (OEHHA) and based on Proposition 65. Proposition 65, also known as the Safe Drinking Water and Toxic Enforcement Act of 1986, requires California to maintain and update a list of chemicals known to cause cancer. In March 2015, OEHHA revised its health risk assessment guidelines to consider short-term emissions such as construction activities, while clarifying that, "[t]here is considerable uncertainty in trying to evaluate the cancer risk from projects that will only last a small fraction of a lifetime" (OEHHA 2015). The Bay Area Air Quality Management District (BAAQMD) health risk assessment (HRA) Guidelines generally conform to the Health Risk Assessment Guidelines adopted by OEHHA in evaluating construction impacts in environmental documents prepared pursuant to the California Environmental Quality Act (CEQA) (BAAQMD, 2017). Consequently, ESA has prepared a screening-level construction period HRA for the Project based on the revised OEHHA guidelines.

Table ES-1, Maximum Increase in Health Risk from Construction Emissions for Off-Site Residential Sensitive Receptors, summarizes the incremental increase in lifetime cancer risk, non-cancer chronic hazards, and annual average fine particulate matter ($PM_{2.5}$) concentrations for the maximally exposed residential and school receptor that would be caused by construction of the Project as proposed, and by construction of the Project with incorporation of mitigation. As shown in the table, the Project would result in a significant cancer risk for residential land uses in the vicinity of the Almaden Lake Improvement Project. However, with mitigation, the cancer risk for residential land uses would be reduced to below the BAAQMD-recommended significance threshold of 10 in one million (BAAQMD, 2017).

TABLE ES-1
MAXIMUM INCREASE IN HEALTH RISK FROM CONSTRUCTION EMISSIONS FOR OFF-SITE RESIDENTIAL SENSITIVE RECEPTORS

Scenario	Maximum Cancer Risk (# in one million)	Maximum Non-Cancer Risk (Chronic Hazard Index)	Maximum Annual Average PM2.5 Concentration (µ/m^3)
Unmitigated Project	48.4	0.15	0.22
BAAQMD Threshold	10	1	0.3
Exceeds Threshold?	Yes	No	No
Mitigated Project	5.1	0.01	0.03
BAAQMD Threshold	10	1	0.3
Exceeds Threshold?	No	No	No

Introduction

The Almaden Lake Improvement Project (Project) is located in the City of San José's (City) Almaden Lake Park (Park). As discussed in detail in Draft EIR Section 2.C, *Project Background, Need, and Objectives*, the 32-acre Almaden Lake (located entirely within Almaden Lake Park) formed when a quarry levee breached. The loss of the integrity of the Alamitos Creek channel and commingling of creek water with lake water has created adverse conditions for anadromous fish populations. Further, mercury-laden sediment from historic upstream mining activities continues to be transported downstream in Alamitos Creek and is deposited in Almaden Lake. Seasonal lake conditions contribute to the conversion of elemental mercury to methylmercury as well as other negative water quality conditions. The Project would address these issues by reestablishing the Alamitos Creek channel, separate the creek from Almaden Lake (lake) in order to improve anadromous fish access to spawning and rearing habitat within the upper portions of the Guadalupe River Watershed, and reduce methylmercury levels in the lake. Specifically, the Project would include the following improvements:

- Separation of Alamitos Creek from Almaden Lake by constructing a levee;
- Re-contouring the remaining lake bottom and capping it with clean fill;
- Expanding the Park area into a small portion of the existing lake at the beach area;
- Stabilizing the existing island and constructing a new additional island;
- Establishing appropriate native vegetation along the banks and floodplain of the restored Alamitos Creek channel, new lake edge, and the islands;
- Connecting the lake via pipeline to an imported water supply from the nearby Almaden Valley Pipeline;
- Adding a pipeline connection between the lake and the Los Alamitos Percolation Pond (Pond), which is a groundwater recharge pond operated by the District; and
- Continuing to implement source control measures, such as solar-powered circulators, to manage and reduce future methylmercury production.

Construction health risks were calculated for sensitive receptor locations within 1,000 feet of construction activities, per BAAQMD CEQA guidelines, *California Environmental Quality Act: Air Quality Guidelines* (BAAQMD, 2017).

In March 2015, the OEHHA adopted a revised guidance manual for use in the Air Toxics Hot Spots Program or for the permitting of existing, new, or modified stationary sources, the *Air Toxics Hot Spots Program Guidance Manual for the Preparation of Health Risk Assessments*. Unlike previous iterations of this manual, the revised manual provides considerations for short-term temporary exposure for durations as short as two months, such as during construction activities, while noting that there is "considerable uncertainty in trying to evaluate the cancer risk from projects that will only last a small fraction of a lifetime." The revised OEHHA's guidance also considers more conservative assumptions and updated scientific research. Health risk impacts calculated in accordance with the OEHHA's revised manual are approximately two to ten times higher than those calculated in accordance with the previous methodology. In accordance with Regulation 2-5-402, the BAAQMD HRA Guidelines generally conform to the Health Risk Assessment Guidelines adopted by OEHHA for use in the Air Toxics Hot Spots Program (BAAQMD, 2016).

A screening-level HRA was conducted to estimate the health risk impact associated with construction of the Project. The methodology used to evaluate the health risks from on-site construction activities is summarized below, along with the results of the HRA. Due to the short-term nature of construction activities, the screening-level approach is appropriate to estimate the worst-case health risks that would be associated with Project construction.

Methods

The methods and assumptions used in this HRA are consistent with the guidance recommended by OEHHA's *Air Toxic Hot Spots Program Risk Assessment Guidelines* (2015), the BAAQMD's *Recommended Methods for Screening and Modeling Local Risks and Hazards* (2012), and the BAAQMD's *Air Toxics NSR Program Health Risk Assessment Guidelines* (2016). The OEHHA methodology used in this assessment uses a dose-response assessment to characterize risk from cancer due to inhaled TACs. Refer to Appendix A for the calculation and modeling files used in the screening HRA.

Based on the OEHHA guidance, the evaluation of potential health risks uses the following standard four-step risk assessment process:

1. hazard identification;
2. exposure assessment;
3. dose-response assessment; and
4. risk characterization.

Each step is described in detail below.

Hazard Identification

The hazard identification process is undertaken to determine what TACs would potentially be present in the assessment area, and if present, identifies what the pollutants of concern are along with their potential adverse health effects. In this HRA, the primary hazard is DPM emissions from operation of off-road construction equipment. DPM from heavy duty trucks was considered along the truck haul routes contained within the 1,000-foot Project radius. Truck haul routes outside of the Project radius were not considered, since contributions from haul trucks within the Project radius would represent the worst case DPM emissions of the sensitive receptors surrounding the Project site. In addition, total on-road truck emissions for all travel locations would be minor compared to off-road construction equipment emissions (on-road truck emissions would represent approximately 6 percent of total DPM emissions from construction).

DPM historically has been used as a surrogate measure of exposure for whole diesel exhaust emissions. Diesel exhaust is a complex mixture of thousands of gases and fine particles (commonly known as soot). Diesel exhaust particles and gases are suspended in the air due to thermal buoyancy and the small size of the particles. The composition of diesel exhaust varies depending on engine type, operating conditions, fuel composition, lubricating oil, and presence of an emission control system. One of the main characteristics of diesel exhaust is the release of particles at a relative rate approximately 20 times greater than from gasoline exhaust, on an equivalent fuel basis. Diesel particulates are mainly aggregates of spherical carbon particles coated with inorganic and organic substances. The inorganic fraction primarily consists of small carbon (elemental carbon) particles ranging from 0.01 to 0.08 micron in diameter. The organic fraction consists of soluble organic compounds (CARB, 1998).

Exposure Assessment

The degree of the residences exposure to DPM from Project construction activities was evaluated under the exposure assessment portion of the HRA. This assessment involves the quantification of DPM emissions and dispersion modeling. The amount of DPM emissions generated by construction activities was determined using particulate matter with an aerodynamic diameter equal to or less than 10 microns (PM_{10}) from diesel exhaust as a surrogate. OEHHA guidance indicates that the cancer potency factor to be used to evaluate cancer risks were developed based on whole (gas and particulate matter) diesel exhaust, and that the surrogate for whole diesel exhaust is DPM, with PM_{10} serving as the basis for the potential risk calculations (OEHHA, 2003). In addition to evaluating the effects of TAC concentrations, this screening HRA also evaluated annual average exhaust $PM_{2.5}$ concentrations. This is consistent with BAAQMD's CEQA Guidelines, which indicate that $PM_{2.5}$ be evaluated in community-scale impacts of air pollution based on scientific studies and recommendations by the Bay Area Health Directors to the BAAQMD's Advisory Council (BAAQMD, 2017).

The greatest potential for TAC emissions would be related to DPM emissions associated with off-road heavy equipment operations during demolition, grading and excavation, and construction activities. The potential exposure through other pathways (e.g., ingestion) requires substance and site-specific data, and the specific parameters for DPM are not known for these pathways (CARB, 1998). OEHHA developed necessary data to evaluate carcinogenicity of DPM through the inhalation pathway only. Once determined, the dose is multiplied by the compound-specific inhalation cancer potency factor to derive the cancer risk estimate. The dose takes into account the concentration at a sensitive receptor. The cancer potency factor is compound-specific.

Emissions Inventory

Emissions analyzed in the HRA were based on the air quality emissions estimates for the Project prepared for the Draft Environmental Impact Report (DEIR). The construction emissions were estimated using the BAAQMD-approved California Emissions Estimator Model (CalEEMod) model (version 2016.3.2). The air quality analysis prepared for the DEIR estimated average daily emissions for each construction phase. The construction emissions used in this HRA assumed the same construction schedule and equipment types as the analysis prepared for the DEIR.

The emissions estimates represent the average daily emissions from each phase that would be expected from construction of the Project using annual average daily heavy-duty construction equipment activity levels. For the purposes of this quantitative construction HRA, the use of average daily emissions to estimate health risks results in a reasonable approximation of impacts because construction-related health risks are calculated based on long-term emissions and not short-term maximum daily emissions.

The U.S. Environmental Protection Agency (USEPA) sets emissions standards for off-road (construction) equipment ranging from Tier 0 through Tier 4. Tier 4 emissions compliant equipment is the most stringent standard and is required for model years 2015 and newer. The Project evaluated impacts under an unmitigated scenario where emissions were uncontrolled and a mitigated scenario where construction equipment would be compliant with Tier 4 interim emissions standards.

For the Project, total unmitigated off-road construction (average fleet mix) DPM and $PM_{2.5}$ emissions are 909 pounds and 861 pounds, respectively; total mitigated (Tier 4) DPM and $PM_{2.5}$ emissions are 68 pounds each. Total on-road construction (haul truck trips) DPM and $PM_{2.5}$ emissions are 55 pounds and 53 pounds, respectively.

Emission Rates

Because each emission source was modeled separately within AERMOD (see section below), ESA used a unitized emission rate concept for each source, where each source is modeled with a unitized emission rate of 1 gram/second (g/s). The modeled concentration at each receptor ($[\mu/m^3]/[g/s]$) represents a "dispersion factor," which was then multiplied by the actual emission rate of each source to determine actual concentrations, and the final result from all the sources was superimposed. This approach is called the "Summation Concept," where the concentration and deposition fluxes at each receptor are the linear addition of the resulting values from each source.

Actual emission rates from construction activities were based on the anticipated hours of activity for each source and other information as described in the *Emissions Inventory* section above. A total emission rate in terms of grams per second was calculated for each emission source to multiply with the AERMOD dispersion factors to estimate actual concentrations for each source. The emission rates would vary day to day, with some days having no emissions. For simplicity, the model assumed a constant emission rate during an entire year, and is based on the total duration of construction activities (708 calendar days or approximately 2 years), 13 hours per day, and 3,600 seconds per hour, consistent with AERMOD dispersion parameters. Construction activities would likely not occur 13 hours per day but a generous daytime construction window was modeled as a conservative approach.

Dispersion Modeling

Dispersion modeling predicts the air pollutant concentrations due to emissions from a source at defined receptor point locations. The most current version (18081) of the American Meteorological Society/Environmental Protection Agency Regulatory Model (AERMOD) was used in the modeling analysis for this Project. The AERMOD model is a USEPA-approved model that was introduced to incorporate air dispersion based on planetary boundary layer turbulence structure and scaling concepts, including treatment of both surface and elevated sources and both simple and complex terrain. The AERMOD model requires numerous inputs, such as meteorological data, source parameters, topographical data, and receptor characteristics. Where Project-specific information is not available, ESA used default parameter sets that are designed to produce conservative (i.e., overestimates of) air concentrations (USEPA, 2018). **Table 1**, **Overall AERMOD Modeling Parameters**, summarizes the overall modeling parameters used in AERMOD. For values not listed, defaults were used. Refer to Appendix A for the AERMOD modeling outputs used in the screening HRA.

TABLE 1
OVERALL AERMOD MODELING PARAMETERS

Pathway	Description	Parameter
Control	Rural/Urban	Rural [a]
	Terrain	Elevated
	Model Version	AERMOD v 18081
Receptor	Receptor Height	1.5 m [b]
Meteorology [c]	Surface Station	N.Y. MINETA SN JO INTL APT (23293)
	Upper Air Station	OAKLAND/WSO AP (23230)
	MET Years	2009-2014
	Base Elevation (MSL)	15.5 m

NOTES:
[a] From BAAQMD (2012). Urban R2 defined as: Dense single/multi-family with less than 30% vegetation.
[b] From BAAQMD (2012).
[c] From CARB (2015).

ABBREVIATIONS: m = meters

SOURCES:
1. Bay Area Air Quality Management District. 2012. *Recommended Methods for Screening and Modeling Local Risks and Hazards*. Available at http://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/risk-modeling-approach-may-2012.pdf. Accessed February 2019.
2. California Air Resources Board. 2015. Meteorological Data from Air Districts (Met Station: Norman Y. Mineta San Jose International Airport). Available online at https://www.arb.ca.gov/toxics/harp/metfiles2.htm. Accessed February 2019

Source Parameters

Source parameters are required to model the dispersion of emissions. Off-road construction equipment was modeled as an area source within AERMOD using the same release parameters used in the San Francisco Citywide HRA, which evaluates the cumulative lifetime cancer risks and annual average exhaust $PM_{2.5}$ concentrations from existing known sources of air pollution as part of the development of a Community Risk Reduction Plan (CRRP) (referred to as the CRRP-HRA). Parameters from the CRRP-HRA include a release height of 3.89 meters and an initial vertical dimension of 1.4 meters for off-road sources and an initial vertical dimension of 2.3 meters for on-road sources (BAAQMD, SF DPH & SF Planning, 2012). The release height for on-road sources was considered as the height of a truck or 10 feet (3.05 meters) as recommended by the BAAQMD (BAAQMD, 2012). Construction activities at the site were modeled as a single area source occupying 39.5-acres. The truck haul trips were modeled as line sources along the major roadways the haul trucks could potentially take within the 1,000 feet parameter modeling domain.. **Table 2**, **Source Modeling Parameters for Off-Road and On-Road Construction Equipment**, summarizes the source modeling parameters used in AERMOD.

TABLE 2
SOURCE MODELING PARAMETERS FOR OFF-ROAD AND ON-ROAD CONSTRUCTION EQUIPMENT

Source	Project Component	Source Type	Source Dimension	Number of Sources	Release Height [m]	Initial Vertical Dimension [m]
Off-Road Construction Equipment	Lake Improvement	Area Poly	39.5 acre	1	3.89	1.4
On-Road Construction Equipment (Haul Trucks)	Almaden Expressway	Line Area	0.92 miles long x 120 ft. wide	1	3.05	2.3
	Coleman Road	Line Area	0.57 miles long X 70 ft. wide	1	3.05	2.3
	Winfield Boulevard	Line Area	0.41 miles long X 70 ft. wide	1	3.05	2.3

Sensitive Receptors

Sensitive receptors were formed in 50 meter by 50 meter grids within the residential areas existing in the 1,000-foot project parameter as determined by BAAQMD modeling guidance (BAAQMD, 2012). There are no schools or daycares within 1,000 feet of this site. The Pioneer High School is located 1,600 feet northwest of the site; although this is beyond 1,000 feet, this school receptor was modeled to determine the health risk at the school closest to the Project. Receptor heights were set at 1.5 meters to represent flagpole receptor concentrations, consistent with BAAQMD modeling guidance (BAAQMD, 2012). The Project would not include any residential uses and would not include any sensitive receptors on site. Consequently, no on-site receptors were modeled.

Dose-Response Assessment

The dose-response assessment is the process of characterizing the relationship between exposure to diesel exhaust and the incidence of an adverse health effect in exposed populations.

The estimation of potential inhalation cancer risk posed by exposure to DPM requires a cancer potency factor. Cancer potency factors are expressed as the upper bound probability of developing cancer assuming continuous lifetime exposure to diesel exhaust at a dose of one milligram per kilogram of body weight, and are expressed in units of inverse dose as a potency slope (i.e., $[mg/kg/day]^{-1}$). A cancer potency factor when multiplied by the dose of a carcinogen gives the associated lifetime cancer risk. OEHHA's recommended cancer potency factor for DPM is 1.1 $(mg/kg/day)^{-1}$. The estimation of potential inhalation chronic non-cancer effects posed by exposure to DPM requires a chronic reference exposure level (REL). A chronic REL is a concentration level (that is expressed in units of $\mu g/m^3$ for inhalation exposures), at or below which no adverse health effects are anticipated following long-term exposure. OEEHA's recommended chronic REL for DPM is 5 $\mu g/m^3$ (CARB & OEHHA, 2017). The chronic hazard index target organ for DPM is the respiratory system.

Risk Characterization

Risk characterization combines the maximum annual average ground-level DPM concentration from the exposure assessment and the cancer potency factor and chronic REL from the dose-response analysis to estimate the potential inhalation cancer risk from exposure to DPM emissions.

In performing health risk calculations, carcinogenic compounds are not considered to have threshold levels (i.e., dose levels below which there are no risks). Any exposure, therefore, will have some associated risk. Incremental health risks associated with exposure to carcinogenic compounds is defined in terms of the probability of developing cancer as a result of exposure to a chemical at a given concentration. Under a deterministic approach (i.e., point estimate methodology), the cancer risk probability is determined by multiplying the chemical's annual concentration by its unit risk factor (URF). The URF for DPM recommended by the Scientific Review Panel[1] is 3.0×10^{-4} µg/m^3 (CARB, 1998). This value corresponds to a Cancer Potency Factor (CPF) of 1.1 per milligram/kilogram (body weight) per day (mg/kg(bw)-day) (CARB & OEHHA, 2017). The URF for DPM means that for receptors with an annual average concentration of 1 µg/m^3 in the ambient air, the probability of contracting cancer over a 70-year lifetime of exposure is 300 in 1 million. The URF also assumes that a person is exposed continuously for a 70-year lifetime. This approach for calculating cancer risk is intended to result in conservative (i.e., health protective) estimates of health impacts and is used for assessing risks to sensitive receptors. The estimation of cancer risk generally uses the following algorithms (OEHHA, 2015):

Cancer Risk = Dose inhalation × Inhalation CPF × ASF × ED/AT × FAH (Equation 1)

Where:

Cancer Risk = residential inhalation cancer risk

Dose inhalation (mg/kg-day) = C_{AIR} × DBR × A × EF × 10^{-6} (Equation 2)

Inhalation CPF = inhalation cancer potency factor ([mg/kg/day]$^{-1}$)

ASF = age sensitivity factor for a specified age group (unitless)

ED = exposure duration for a specified age group (years)

AT = averaging time period over which exposure is averaged in days (years)

FAH = fraction of time at home (unitless)

1 The Scientific Review Panel is charged with evaluating the risk assessments of substances proposed for identification as toxic air contaminants by CARB, OEHHA, and the Department of Pesticide Regulation (DPR), and the review of guidelines prepared by OEHHA.

Where:

C_{AIR} = concentration of compound in air in micrograms per cubic meter ($\mu g/m^3$)

DBR = daily breathing rate in liter per kilogram of body weight per day (L/kg-body weight/day)

A = inhalation absorption factor (1 for DPM, unitless)

EF = exposure frequency in days per year (unitless, days/365 days)

10^{-6} = micrograms to milligrams conversion, liters to cubic meters conversion

The OEHHA-recommended values for the parameters listed above were used in the HRA analysis. The daily breathing rate (DBR) used in the analysis was based on OEHHA recommendations, which vary depending on age, as shown in **Table 3, Daily Breathing Rates, Fraction of Time at Home, and Age Sensitivity Factors**. The recommended residential exposure frequency (EF) is 350 days per year, which is equivalent to 0.96 (350 days / 365 days a year). The recommended school exposure frequency (EF) is 180 days per year, which is equivalent to 0.49 (180 days / 365 days a year). The inhalation absorption factor (A) is assumed to be 1 for inhalation based risk assessment. As indicated in Equation 1 above, each age group has different exposure parameters that require cancer risk to be calculated separately for each age group. Values for fraction of time at home (FAH) also vary depending on age, as shown in Table 3. Once dose is calculated, cancer risk is calculated by accounting for cancer potency of the specific pollutant, and the age sensitivity factor (ASF), which also varies by age as shown in Table 3.

TABLE 3
DAILY BREATHING RATES, FRACTION OF TIME AT HOME, AND AGE SENSITIVITY FACTORS

Parameter	3rd Trimester	Age 0 < 2	Age 2 < 16
Daily Breathing Rate (DBR) (L/kg-body weight/day)			
Residential Child Receptor [a]	361	1,090	n/a
School Receptor [b]	n/a	n/a	745
Exposure Frequency (EF)			
Residential Child Receptor [c]	0.96	0.96	n/a
School Receptor [d]	n/a	n/a	0.49
Fraction of Time at Home (FAH)			
Residential Child Receptor [e]	0.85	0.85	n/a
School Receptor	n/a	n/a	0.33
Age Sensitivity Factor (ASF) [f]	10	10	3

NOTES:

a Daily breathing rate for residential receptor is based on the OEHHA 95th percentile values (Table 5.6). Since total exposure is 390 days, the 2<9 age group is not applicable.

b Daily breathing rate for school receptor is based on the OEHHA 95th percentile 8-hour moderate intensity breathing rates (Table 5.8). School receptor assumed to start exposure as early as age 2. Recommendation of BAAQMD (2016)

c The recommended residential exposure frequency (EF) is 350 days per year, which is equivalent to 0.96 (350 days / 365 days a year).

d The recommended school exposure frequency (EF) is 180 days per year, which is equivalent to 0.49 (180 days / 365 days a year).

[e] Fraction of time at home is set to 0.85 for residential since the nearest school has an unmitigated cancer risk of <1 per million (see Table 2 below), per OEHHA Table 8.4. FAH is not applicable to school receptors.

The estimation of non-cancer inhalation chronic risk uses the following algorithm (OEHHA, 2015):

Hazard Quotient = C_{air} / REL **(Equation 3)**

Where:

Hazard Quotient = chronic non-cancer hazard

C_{AIR} = concentration of compound in air in micrograms per cubic meter (µg/m^3)

REL = Chronic non-cancer Reference Exposure Level for substance (µg/m^3)

As noted above, the REL for DPM is 5 µg/m^3 (CARB & OEHHA, 2017). The chronic hazard index target organ for DPM is the respiratory system.

Health Risk Calculations

The resulting health risk calculations were performed using a the OEHHA guidance and the results of the AERMOD dispersion model. **Table 4, Maximum Increase in Health Risk from Construction Emissions for Off-Site Sensitive Receptors - Unmitigated** summarizes the carcinogenic risk for the maximum impacted sensitive receptors for the unmitigated scenario. **Table 5, Maximum Increase in Health Risk from Construction Emissions for Off-Site Sensitive Receptors - Mitigated** summarizes the carcinogenic risk for the maximum impacted sensitive receptors for the mitigated scenario.

For carcinogenic exposures, the cancer risk from DPM emissions for the unmitigated construction scenario is estimated to result in a maximum carcinogenic risk of approximately 48.4 per one million for the Project. Under the mitigated construction scenario, the Project is estimated to result in a maximum incremental increase in carcinogenic risk of 5.1 per one million. The maximum impact for the Project would occur at the residential land uses directly east of the site. As discussed previously, the lifetime exposure under OEHHA guidelines takes into account early life (infant and children) exposure. It should be noted that the calculated cancer risk assumes sensitive receptors (residential uses) would not have any emission controls such as mechanical filtration and exposure would occur with windows open. This HRA focuses on residential and school impacts and does not include impacts for on-site or off-site workers. Although off-site workers may be in close proximity to the Project site, their intermittent exposure duration would be less than that of a residence (8 hours compared to 24 hours) and adult breathing rates compared to children are also lower (e.g. 261 for age 16 < 30 versus 1,090 for age 0 < 2 years). Therefore, worker impacts would be less than that of a residence.

TABLE 4
MAXIMUM INCREASE IN HEALTH RISK FROM CONSTRUCTION EMISSIONS FOR OFF-SITE SENSITIVE RECEPTORS - UNMITIGATED

Project Component / Sensitive Receptor Type	Maximum Cancer Risk (# in one million)	Maximum Non-Cancer Risk (Chronic Hazard Index)	Maximum Annual Average PM2.5 Concentration (μ/m^3)
Residential Receptor	48.4	0.15	0.22
School Receptor	0.7	<0.01	0.01
BAAQMD Threshold	**10**	**1**	**0.3**
Exceeds Threshold at Residential Receptors?	**Yes**	**No**	**No**
Exceeds Threshold at School Receptor?	**No**	**No**	**No**

Health risk calculations are provided in Appendix A.

TABLE 5
MAXIMUM INCREASE IN HEALTH RISK FROM CONSTRUCTION EMISSIONS FOR OFF-SITE SENSITIVE RECEPTORS - MITIGATED

Project Component / Sensitive Receptor Type	Maximum Cancer Risk (# in one million)	Maximum Non-Cancer Risk (Chronic Hazard Index)	Maximum Annual Average PM2.5 Concentration (μ/m^3)
Residential Receptor	5.1	0.01	0.03
School Receptor	0.02	<0.001	<0.01
BAAQMD Threshold	**10**	**1**	**0.3**
Exceeds Threshold at Residential Receptors?	**No**	**No**	**No**
Exceeds Threshold at School Receptor?	**No**	**No**	**No**

Health risk calculations are provided in Appendix A.

The process of assessing health risks and impacts includes a degree of uncertainty. The level of uncertainty is dependent on the availability of data and the extent to which assumptions are relied upon in cases where the data are incomplete or unknown. All HRAs rely upon scientific studies in order to reduce the level of uncertainty; however, it is not possible to completely eliminate uncertainty from the analysis. Where assumptions are used to substitute for incomplete or unknown data, it is standard practice in performing HRAs to err on the side of health protection in order to avoid underestimating or underreporting the risk to the public by assessing risk on the most sensitive populations, such as children and the elderly.

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AERMOD Modeling Files

```
**
**************************************
**
** AERMOD Input Produced by:
** AERMOD View Ver. 9.6.5
** Lakes Environmental Software Inc.
** Date: 7/15/2019
** File: C:\Model\Almaden Lake\Almaden Lake_AERMOD_v2\Almaden Lake_AERMOD_v2.ADI
**
**************************************
**
**
**************************************
** AERMOD Control Pathway
**************************************
**
**
CO STARTING
   TITLEONE C:\Model\Almaden Lake\Almaden Lake_AERMOD_v2\Almaden Lake_AERMOD_v2.
   MODELOPT DFAULT CONC
   AVERTIME 1 PERIOD
   POLLUTID PM_10
   FLAGPOLE 1.50
   RUNORNOT RUN
   ERRORFIL "Almaden Lake_AERMOD_v2.err"
CO FINISHED
**
**************************************
** AERMOD Source Pathway
**************************************
**
**
SO STARTING
** Source Location **
** Source ID - Type - X Coord. - Y Coord. **
   LOCATION CONSTR1      AREAPOLY   599939.317  4122392.363       60.190
** DESCRSRC Almaden Lake - main construction
** ------------------------------------------------------------------
** Line Source Represented by Area Sources
** LINE AREA Source ID = HAUL2
** DESCRSRC Haul Truck _ POO
** PREFIX
** Length of Side = 36.58
** Ratio = 10
** Vertical Dimension = 2.30
** Emission Rate = 0.0000183975
** Nodes = 6
** 599975.693, 4121603.259, 64.01, 3.05
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** 599899.259, 4121931.264, 61.29, 3.05
** 599802.919, 4122246.956, 61.45, 3.05
** 599788.880, 4122373.940, 61.27, 3.05
** 599807.840, 4122619.685, 60.64, 3.05
** 599768.028, 4123062.900, 58.02, 3.05
** ------------------------------------------------------------------------
   LOCATION A0000019     AREA     599993.504 4121607.409 64.01
   LOCATION A0000020     AREA     599916.751 4121936.602 61.64
   LOCATION A0000021     AREA     599821.096 4122248.966 61.16
   LOCATION A0000022     AREA     599807.114 4122372.533 61.27
   LOCATION A0000023     AREA     599826.054 4122621.322 60.26
   LOCATION A0000024     AREA     599806.149 4122842.929 58.90
** End of LINE AREA Source ID = HAUL2
** ------------------------------------------------------------------------
** Line Source Represented by Area Sources
** LINE AREA Source ID = HAUL1
** DESCRSRC Haule Route to SCQ
** PREFIX
** Length of Side = 21.34
** Ratio = 10
** Vertical Dimension = 2.30
** Emission Rate = 0.0000515424
** Nodes = 4
** 599810.485, 4122380.298, 61.25, 3.05
** 600140.671, 4122463.900, 60.57, 3.05
** 600236.186, 4122455.627, 61.97, 3.05
** 600689.694, 4122321.756, 66.76, 3.05
** ------------------------------------------------------------------------
   LOCATION A0000006     AREA     599813.104 4122369.956 61.27
   LOCATION A0000007     AREA     599978.197 4122411.757 60.05
   LOCATION A0000008     AREA     600139.750 4122453.272 60.19
   LOCATION A0000009     AREA     600233.166 4122445.396 60.88
   LOCATION A0000010     AREA     600384.335 4122400.772 62.20
   LOCATION A0000018     AREA     600535.505 4122356.148 63.73
** End of LINE AREA Source ID = HAUL1
** ------------------------------------------------------------------------
** Line Source Represented by Area Sources
** LINE AREA Source ID = HAUL3
** DESCRSRC Haul 3
** PREFIX
** Length of Side = 21.34
** Ratio = 10
** Vertical Dimension = 2.30
** Emission Rate = 0.0000710695
** Nodes = 4
** 600193.521, 4121792.076, 63.25, 3.05
** 600246.495, 4121847.913, 66.56, 3.05
** 600318.080, 4122071.259, 61.88, 3.05
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** 600310.921, 4122419.163, 60.93, 3.05
** --------------------------------------------------------------------
   LOCATION A0000012     AREA     600201.261 4121784.734 63.59
   LOCATION A0000013     AREA     600256.654 4121844.657 66.02
   LOCATION A0000014     AREA     600292.446 4121956.330 63.08
   LOCATION A0000015     AREA     600328.746 4122071.478 62.04
   LOCATION A0000016     AREA     600325.166 4122245.431 61.30
** End of LINE AREA Source ID = HAUL3
** Source Parameters **
   SRCPARAM CONSTR1      6.2597E-06     3.890        18     1.400
   AREAVERT CONSTR1      599939.317 4122392.363 599946.319 4122320.936
   AREAVERT CONSTR1      599967.327 4122292.926 599968.728 4122234.104
   AREAVERT CONSTR1      599915.508 4122215.897 599891.699 4122187.886
   AREAVERT CONSTR1      599883.295 4122134.666 599905.704 4122091.249
   AREAVERT CONSTR1      599909.905 4122067.440 600033.152 4122019.822
   AREAVERT CONSTR1      600063.964 4121989.011 600098.977 4121899.377
   AREAVERT CONSTR1      600153.598 4121913.382 600244.632 4122053.435
   AREAVERT CONSTR1      600304.855 4122059.037 600295.051 4122417.573
   AREAVERT CONSTR1      600128.388 4122446.984 599968.728 4122404.968
** LINE AREA Source ID = HAUL2
   SRCPARAM A0000019     0.0000183975     3.048   336.793    36.576  -103.117
2.300
   SRCPARAM A0000020     0.0000183975     3.048   330.065    36.576  -106.971
2.300
   SRCPARAM A0000021     0.0000183975     3.048   127.757    36.576   -96.309
2.300
   SRCPARAM A0000022     0.0000183975     3.048   246.476    36.576   -85.588
2.300
   SRCPARAM A0000023     0.0000183975     3.048   222.499    36.576   -95.133
2.300
   SRCPARAM A0000024     0.0000183975     3.048   222.499    36.576   -95.133
2.300
** --------------------------------------------------------------------
** LINE AREA Source ID = HAUL1
   SRCPARAM A0000006     0.0000515424     3.048   170.302    21.336   -14.209
2.300
   SRCPARAM A0000007     0.0000515424     3.048   170.302    21.336   -14.209
2.300
   SRCPARAM A0000008     0.0000515424     3.048    95.873    21.336     4.950
2.300
   SRCPARAM A0000009     0.0000515424     3.048   157.618    21.336    16.446
2.300
   SRCPARAM A0000010     0.0000515424     3.048   157.618    21.336    16.446
2.300
   SRCPARAM A0000018     0.0000515424     3.048   157.618    21.336    16.446
2.300
** --------------------------------------------------------------------
** LINE AREA Source ID = HAUL3
```

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   SRCPARAM A0000012     0.0000710695     3.048    76.967    21.336   -46.507
2.300
   SRCPARAM A0000013     0.0000710695     3.048   117.269    21.336   -72.229
2.300
   SRCPARAM A0000014     0.0000710695     3.048   117.269    21.336   -72.229
2.300
   SRCPARAM A0000015     0.0000710695     3.048   173.989    21.336   -91.179
2.300
   SRCPARAM A0000016     0.0000710695     3.048   173.989    21.336   -91.179
2.300
** --------------------------------------------------------------------------

** Variable Emissions Type: "By Hour / Seven Days (HRDOW7)"
** Variable Emission Scenario: "Scenario 2"
   EMISFACT CONSTR1      HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
   EMISFACT CONSTR1      HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
   EMISFACT CONSTR1      HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
   EMISFACT CONSTR1      HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
   EMISFACT CONSTR1      HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
   EMISFACT CONSTR1      HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
   EMISFACT CONSTR1      HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
   EMISFACT CONSTR1      HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
   EMISFACT CONSTR1      HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
   EMISFACT CONSTR1      HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
   EMISFACT CONSTR1      HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
   EMISFACT CONSTR1      HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
   EMISFACT CONSTR1      HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
   EMISFACT CONSTR1      HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
   EMISFACT CONSTR1      HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
   EMISFACT CONSTR1      HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT CONSTR1      HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT CONSTR1      HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT CONSTR1      HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT CONSTR1      HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT CONSTR1      HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT A0000019     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
   EMISFACT A0000019     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
   EMISFACT A0000019     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
   EMISFACT A0000020     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
   EMISFACT A0000020     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
   EMISFACT A0000020     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
   EMISFACT A0000021     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
   EMISFACT A0000021     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
   EMISFACT A0000021     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
   EMISFACT A0000022     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
   EMISFACT A0000022     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
   EMISFACT A0000022     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
   EMISFACT A0000023     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
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EMISFACT A0000023     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000023     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000024     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
EMISFACT A0000024     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000024     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000019     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
EMISFACT A0000019     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000019     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000020     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
EMISFACT A0000020     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000020     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000021     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
EMISFACT A0000021     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000021     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000022     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
EMISFACT A0000022     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000022     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000023     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
EMISFACT A0000023     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000023     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000024     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
EMISFACT A0000024     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000024     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000019     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
EMISFACT A0000019     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000019     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000020     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
EMISFACT A0000020     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000020     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000021     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
EMISFACT A0000021     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000021     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000022     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
EMISFACT A0000022     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000022     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000023     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
EMISFACT A0000023     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000023     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000024     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
EMISFACT A0000024     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000024     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000019     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
EMISFACT A0000019     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000019     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000020     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
EMISFACT A0000020     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000020     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000021     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
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EMISFACT A0000021     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000021     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000022     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
EMISFACT A0000022     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000022     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000023     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
EMISFACT A0000023     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000023     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000024     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
EMISFACT A0000024     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000024     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000019     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
EMISFACT A0000019     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000019     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
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EMISFACT A0000020     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000021     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
EMISFACT A0000021     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000021     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000022     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
EMISFACT A0000022     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000022     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000023     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
EMISFACT A0000023     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000023     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000024     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
EMISFACT A0000024     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000024     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000019     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000019     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000019     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000020     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000020     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000020     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000021     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000021     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000021     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000022     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000022     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000022     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000023     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000023     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000023     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000024     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000024     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000024     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000019     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
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EMISFACT A0000019     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
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EMISFACT A0000020     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
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EMISFACT A0000022     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
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EMISFACT A0000023     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000024     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
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EMISFACT A0000006     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
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EMISFACT A0000006     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000007     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
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EMISFACT A0000007     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000008     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
EMISFACT A0000008     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000008     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000009     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
EMISFACT A0000009     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000009     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000010     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
EMISFACT A0000010     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000010     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000018     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
EMISFACT A0000018     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000018     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000006     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
EMISFACT A0000006     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000006     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000007     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
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EMISFACT A0000007     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000008     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
EMISFACT A0000008     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000008     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000009     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
EMISFACT A0000009     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000009     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000010     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
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EMISFACT A0000010     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000010     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000018     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
EMISFACT A0000018     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000018     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000006     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
EMISFACT A0000006     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000006     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000007     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
EMISFACT A0000007     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000007     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000008     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
EMISFACT A0000008     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000008     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000009     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
EMISFACT A0000009     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000009     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000010     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
EMISFACT A0000010     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000010     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000018     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
EMISFACT A0000018     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000018     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000006     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
EMISFACT A0000006     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000006     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000007     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
EMISFACT A0000007     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000007     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000008     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
EMISFACT A0000008     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000008     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000009     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
EMISFACT A0000009     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000009     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000010     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
EMISFACT A0000010     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000010     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000018     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
EMISFACT A0000018     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000018     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000006     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
EMISFACT A0000006     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000006     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000007     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
EMISFACT A0000007     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000007     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000008     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
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EMISFACT A0000008     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000009     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
EMISFACT A0000009     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000009     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000010     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
EMISFACT A0000010     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000010     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000018     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
EMISFACT A0000018     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000018     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000006     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000006     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000006     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000007     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000007     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000007     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000008     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000008     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000008     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000009     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000009     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000009     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000010     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000010     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000010     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000018     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000018     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000018     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
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EMISFACT A0000006     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000006     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000007     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000007     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000007     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
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EMISFACT A0000008     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
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EMISFACT A0000009     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000009     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000010     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000010     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000010     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000018     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000018     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000018     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000012     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
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EMISFACT A0000012     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000012     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000013     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
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EMISFACT A0000013     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
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EMISFACT A0000014     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000015     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
EMISFACT A0000015     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000015     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000016     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
EMISFACT A0000016     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000016     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000012     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
EMISFACT A0000012     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000012     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000013     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
EMISFACT A0000013     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
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EMISFACT A0000014     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
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EMISFACT A0000016     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000016     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
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EMISFACT A0000012     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
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EMISFACT A0000013     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
EMISFACT A0000013     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000013     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000014     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
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EMISFACT A0000015     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
EMISFACT A0000015     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000015     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000016     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
EMISFACT A0000016     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000016     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000012     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
EMISFACT A0000012     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000012     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000013     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
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EMISFACT A0000013     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
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EMISFACT A0000014     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
EMISFACT A0000014     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000014     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
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EMISFACT A0000015     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
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EMISFACT A0000016     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000016     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000012     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
EMISFACT A0000012     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000012     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000013     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
EMISFACT A0000013     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000013     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000014     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
EMISFACT A0000014     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000014     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000015     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
EMISFACT A0000015     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000015     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000016     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
EMISFACT A0000016     HRDOW7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT A0000016     HRDOW7 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
EMISFACT A0000012     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000012     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000012     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000013     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000013     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000013     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000014     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000014     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000014     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000015     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000015     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000015     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000016     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000016     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000016     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000012     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000012     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000012     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000013     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000013     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000013     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000014     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
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   EMISFACT A0000014     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT A0000015     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT A0000015     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT A0000015     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT A0000016     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT A0000016     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT A0000016     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
   SRCGROUP CONSTR1  CONSTR1
   SRCGROUP HAULROUT A0000019 A0000020 A0000021 A0000022 A0000023 A0000024
   SRCGROUP HAULROUT A0000006 A0000007 A0000008 A0000009 A0000010 A0000018
   SRCGROUP HAULROUT A0000012 A0000013 A0000014 A0000015 A0000016
   SRCGROUP ALL
SO FINISHED
**
****************************************
** AERMOD Receptor Pathway
****************************************
**
**
RE STARTING
   INCLUDED "Almaden Lake_AERMOD_v2.rou"
RE FINISHED
**
****************************************
** AERMOD Meteorology Pathway
****************************************
**
**
ME STARTING
   SURFFILE 724945\724945.SFC
   PROFFILE 724945\724945.PFL
   SURFDATA 23293 2009
   UAIRDATA 23230 2009 OAKLAND/WSO_AP
   PROFBASE 15.5 METERS
ME FINISHED
**
****************************************
** AERMOD Output Pathway
****************************************
**
**
OU STARTING
   RECTABLE ALLAVE 1ST
   RECTABLE 1 1ST
** Auto-Generated Plotfiles
   PLOTFILE 1 ALL 1ST "ALMADEN LAKE_AERMOD_V2.AD\01H1GALL.PLT" 31
   PLOTFILE 1 CONSTR1 1ST "ALMADEN LAKE_AERMOD_V2.AD\01H1G001.PLT" 32
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   PLOTFILE 1 HAULROUT 1ST "ALMADEN LAKE_AERMOD_V2.AD\01H1G002.PLT" 33
   PLOTFILE PERIOD ALL "ALMADEN LAKE_AERMOD_V2.AD\PE00GALL.PLT" 34
   PLOTFILE PERIOD CONSTR1 "ALMADEN LAKE_AERMOD_V2.AD\PE00G001.PLT" 35
   PLOTFILE PERIOD HAULROUT "ALMADEN LAKE_AERMOD_V2.AD\PE00G002.PLT" 36
   SUMMFILE "Almaden Lake_AERMOD_v2.sum"
OU FINISHED
**
****************************************
** Project Parameters
****************************************
** PROJCTN  CoordinateSystemUTM
** DESCPTN  UTM: Universal Transverse Mercator
** DATUM    World Geodetic System 1984
** DTMRGN   Global Definition
** UNITS    m
** ZONE     10
** ZONEINX  0
**
```

```
 *** MODELOPTs:    RegDFAULT  CONC  ELEV  FLGPOL  RURAL

                                             ***     MODEL SETUP OPTIONS SUMMARY ***
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

 **Model Is Setup For Calculation of Average CONCentration Values.

   --  DEPOSITION LOGIC  --
 **NO GAS DEPOSITION Data Provided.
 **NO PARTICLE DEPOSITION Data Provided.
 **Model Uses NO DRY DEPLETION.  DRYDPLT  =  F
 **Model Uses NO WET DEPLETION.  WETDPLT  =  F

 **Model Uses RURAL Dispersion Only.

 **Model Uses Regulatory DEFAULT Options:
        1. Stack-tip Downwash.
        2. Model Accounts for ELEVated Terrain Effects.
        3. Use Calms Processing Routine.
        4. Use Missing Data Processing Routine.
        5. No Exponential Decay.

 **Other Options Specified:
        CCVR_Sub - Meteorological data includes CCVR substitutions
        TEMP_Sub - Meteorological data includes TEMP substitutions

 **Model Accepts FLAGPOLE Receptor Heights.

 **The User Specified a Pollutant Type of:  PM_10

 **Model Calculates  1 Short Term Average(s) of:   1-HR
    and Calculates PERIOD Averages

 **This Run Includes:     18 Source(s);       3 Source Group(s); and     188 Receptor(s)

                with:      0 POINT(s), including
                           0 POINTCAP(s) and      0 POINTHOR(s)
                 and:      0 VOLUME source(s)
                 and:     18 AREA type source(s)
```

```
                              Almaden Lake_AERMOD_v2
                 and:      0 LINE source(s)
                 and:      0 OPENPIT source(s)
                 and:      0 BUOYANT LINE source(s) with      0 line(s)


 **Model Set To Continue RUNning After the Setup Testing.

 **The AERMET Input Meteorological Data Version Date:  14134

 **Output Options Selected:
          Model Outputs Tables of PERIOD Averages by Receptor
          Model Outputs Tables of Highest Short Term Values by Receptor (RECTABLE
Keyword)
          Model Outputs External File(s) of High Values for Plotting (PLOTFILE
Keyword)
          Model Outputs Separate Summary File of High Ranked Values (SUMMFILE
Keyword)

 **NOTE:  The Following Flags May Appear Following CONC Values:  c for Calm Hours
                                                                 m for Missing Hours
                                                                 b for Both Calm and
Missing Hours

 **Misc. Inputs:  Base Elev. for Pot. Temp. Profile (m MSL) =    15.50 ;  Decay
Coef. =    0.000     ;  Rot. Angle =     0.0
                  Emission Units = GRAMS/SEC                                ;
Emission Rate Unit Factor =   0.10000E+07
                  Output Units   = MICROGRAMS/M**3

 **Approximate Storage Requirements of Model =      3.6 MB of RAM.

 **Input Runstream File:          aermod.inp

 **Output Print File:             aermod.out


 **Detailed Error/Message File:   Almaden Lake_AERMOD_v2.err

 **File for Summary of Results:   Almaden Lake_AERMOD_v2.sum

↑ *** AERMOD - VERSION  18081 ***   *** C:\Model\Almaden Lake\Almaden
Lake_AERMOD_v2\Almaden Lake_AERMOD_v2. ***        07/15/19
 *** AERMET - VERSION  14134 ***   ***
                       ***        16:21:51

                                  PAGE   2
 *** MODELOPTs:    RegDFAULT  CONC  ELEV  FLGPOL  RURAL
```

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Almaden Lake_AERMOD_v2
*** METEOROLOGICAL DAYS SELECTED FOR PROCESSING ***
(1=YES; 0=NO)

1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1

NOTE: METEOROLOGICAL DATA ACTUALLY PROCESSED WILL ALSO DEPEND ON WHAT IS INCLUDED IN THE DATA FILE.

*** UPPER BOUND OF FIRST THROUGH FIFTH WIND SPEED CATEGORIES ***
(METERS/SEC)

1.54,   3.09,   5.14,   8.23,   10.80,

↑ *** AERMOD - VERSION 18081 ***   *** C:\Model\Almaden Lake\Almaden Lake_AERMOD_v2\Almaden Lake_AERMOD_v2. ***   07/15/19
*** AERMET - VERSION 14134 ***   ***   ***   16:21:51

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*** MODELOPTs: RegDFAULT CONC ELEV FLGPOL RURAL

*** UP TO THE FIRST 24 HOURS OF METEOROLOGICAL DATA ***

Surface file: 724945\724945.SFC
Met Version: 14134
Profile file: 724945\724945.PFL

Surface format: FREE

```
   Profile format: FREE

   Surface station no.:    23293                 Upper air station no.:    23230
                  Name: UNKNOWN                                Name:
OAKLAND/WSO_AP
                  Year:   2009                                 Year:   2009

 First 24 hours of scalar data
 YR MO DY JDY HR     H0     U*     W*  DT/DZ ZICNV ZIMCH  M-O LEN    Z0  BOWEN
ALBEDO  REF WS   WD     HT  REF TA     HT
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - - - -
 09 01 01   1 01 -999.0 -9.000 -9.000 -9.000 -999. -999. -99999.0  0.25   1.10
1.00    0.00    0.   10.0  282.5    2.0
 09 01 01   1 02  -13.4  0.236 -9.000 -9.000 -999.  275.     89.0  0.32   1.10
1.00    2.36   18.   10.0  282.5    2.0
 09 01 01   1 03   -7.9  0.139 -9.000 -9.000 -999.  128.     30.9  0.32   1.10
1.00    1.76    4.   10.0  282.0    2.0
 09 01 01   1 04  -12.4  0.217 -9.000 -9.000 -999.  242.     74.8  0.25   1.10
1.00    2.36   73.   10.0  281.4    2.0
 09 01 01   1 05 -999.0 -9.000 -9.000 -9.000 -999. -999. -99999.0  0.25   1.10
1.00    0.00    0.   10.0  282.0    2.0
 09 01 01   1 06   -9.7  0.170 -9.000 -9.000 -999.  168.     46.1  0.47   1.10
1.00    1.76  342.   10.0  281.4    2.0
 09 01 01   1 07  -13.5  0.236 -9.000 -9.000 -999.  275.     88.6  0.32   1.10
1.00    2.36    5.   10.0  281.4    2.0
 09 01 01   1 08  -19.7  0.345 -9.000 -9.000 -999.  486.    189.6  0.47   1.10
0.74    2.86  333.   10.0  280.9    2.0
 09 01 01   1 09   -8.3  0.363 -9.000 -9.000 -999.  526.    525.4  0.47   1.10
0.39    2.86  327.   10.0  280.9    2.0
 09 01 01   1 10    8.1  0.382  0.288  0.014  106.  566.   -625.1  0.47   1.10
0.27    2.86  351.   10.0  280.9    2.0
 09 01 01   1 11   17.6 -9.000 -9.000 -9.000  189. -999. -99999.0  0.25   1.10
0.23    0.00    0.   10.0  280.9    2.0
 09 01 01   1 12   23.0 -9.000 -9.000 -9.000  259. -999. -99999.0  0.25   1.10
0.21    0.00    0.   10.0  281.4    2.0
 09 01 01   1 13   23.9 -9.000 -9.000 -9.000  315. -999. -99999.0  0.25   1.10
0.21    0.00    0.   10.0  281.4    2.0
 09 01 01   1 14   48.5 -9.000 -9.000 -9.000  407. -999. -99999.0  0.25   1.10
0.22    0.00    0.   10.0  283.1    2.0
 09 01 01   1 15   69.5  0.319  0.953  0.016  453.  433.    -42.6  0.32   1.10
0.25    2.36   32.   10.0  283.1    2.0
 09 01 01   1 16   24.5 -9.000 -9.000 -9.000  460. -999. -99999.0  0.25   1.10
0.33    0.00    0.   10.0  283.1    2.0
 09 01 01   1 17 -999.0 -9.000 -9.000 -9.000 -999. -999. -99999.0  0.25   1.10
0.57    0.00    0.   10.0  283.1    2.0
 09 01 01   1 18 -999.0 -9.000 -9.000 -9.000 -999. -999. -99999.0  0.25   1.10
1.00    0.00    0.   10.0  282.5    2.0
```

```
 09 01 01   1 19  -24.2  0.212 -9.000 -9.000 -999.  235.     35.9  0.47   1.10
1.00    2.36  324.   10.0  281.4    2.0
 09 01 01   1 20 -999.0 -9.000 -9.000 -9.000 -999. -999. -99999.0  0.25   1.10
1.00    0.00    0.   10.0  281.4    2.0
 09 01 01   1 21 -999.0 -9.000 -9.000 -9.000 -999. -999. -99999.0  0.25   1.10
1.00    0.00    0.   10.0  280.9    2.0
 09 01 01   1 22 -999.0 -9.000 -9.000 -9.000 -999. -999. -99999.0  0.25   1.10
1.00    0.00    0.   10.0  280.9    2.0
 09 01 01   1 23 -999.0 -9.000 -9.000 -9.000 -999. -999. -99999.0  0.25   1.10
1.00    0.00    0.   10.0  280.4    2.0
 09 01 01   1 24   -9.7  0.170 -9.000 -9.000 -999.  168.     45.7  0.47   1.10
1.00    1.76  310.   10.0  280.4    2.0


 First hour of profile data
 YR MO DY HR HEIGHT F  WDIR    WSPD AMB_TMP sigmaA  sigmaW  sigmaV
 09 01 01 01   10.0 1 -999.  -99.00   282.6   99.0  -99.00  -99.00

 F indicates top of profile (=1) or below (=0)
↑ *** AERMOD - VERSION  18081 ***   *** C:\Model\Almaden Lake\Almaden
Lake_AERMOD_v2\Almaden Lake_AERMOD_v2. ***        07/15/19
 *** AERMET - VERSION  14134 ***   ***
                       ***        16:21:51

                                  PAGE   4
 *** MODELOPTs:    RegDFAULT  CONC  ELEV  FLGPOL  RURAL

                                        *** THE SUMMARY OF MAXIMUM PERIOD ( 43872
HRS) RESULTS ***


                                    ** CONC OF PM_10    IN MICROGRAMS/M**3
               **


                        NETWORK
GROUP ID                       AVERAGE CONC                RECEPTOR  (XR, YR, ZELEV,
ZHILL, ZFLAG)  OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - -

CONSTR1   1ST HIGHEST VALUE IS       9.43079 AT (  600331.70,  4122140.15,    61.73,
 1062.53,    1.50)  DC
          2ND HIGHEST VALUE IS       9.37403 AT (  600331.70,  4122090.15,    61.91,
 1062.53,    1.50)  DC
          3RD HIGHEST VALUE IS       9.25666 AT (  600331.70,  4122190.15,    61.48,
 1062.53,    1.50)  DC
          4TH HIGHEST VALUE IS       8.85211 AT (  600331.70,  4122240.15,    61.44,
```

```
 1062.53,    1.50)  DC
         5TH HIGHEST VALUE IS       8.16820 AT (  600331.70,  4122290.15,    61.44,
 1062.53,    1.50)  DC
         6TH HIGHEST VALUE IS       7.88468 AT (  600331.70,  4122040.15,    62.40,
 1062.53,    1.50)  DC
         7TH HIGHEST VALUE IS       7.01198 AT (  600331.70,  4122340.15,    61.44,
 1062.53,    1.50)  DC
         8TH HIGHEST VALUE IS       6.37480 AT (  600381.70,  4122140.15,    62.47,
 1062.53,    1.50)  DC
         9TH HIGHEST VALUE IS       6.35138 AT (  600381.70,  4122090.15,    62.64,
 1062.53,    1.50)  DC
        10TH HIGHEST VALUE IS       6.20335 AT (  600381.70,  4122190.15,    62.23,
 1062.53,    1.50)  DC

HAULROUT  1ST HIGHEST VALUE IS      51.06861 AT (  600431.70,  4122390.15,    62.81,
 1062.53,    1.50)  DC
         2ND HIGHEST VALUE IS      45.62420 AT (  600481.70,  4122390.15,    63.32,
 1062.53,    1.50)  DC
         3RD HIGHEST VALUE IS      44.10445 AT (  600331.70,  4122090.15,    61.91,
 1062.53,    1.50)  DC
         4TH HIGHEST VALUE IS      43.70862 AT (  600331.70,  4122390.15,    61.44,
 1062.53,    1.50)  DC
         5TH HIGHEST VALUE IS      43.59071 AT (  600331.70,  4122140.15,    61.73,
 1062.53,    1.50)  DC
         6TH HIGHEST VALUE IS      42.76555 AT (  600331.70,  4122190.15,    61.48,
 1062.53,    1.50)  DC
         7TH HIGHEST VALUE IS      42.05474 AT (  600331.70,  4122240.15,    61.44,
 1062.53,    1.50)  DC
         8TH HIGHEST VALUE IS      41.87204 AT (  600331.70,  4122340.15,    61.44,
 1062.53,    1.50)  DC
         9TH HIGHEST VALUE IS      41.68965 AT (  600331.70,  4122290.15,    61.44,
 1062.53,    1.50)  DC
        10TH HIGHEST VALUE IS      35.08596 AT (  600331.70,  4122040.15,    62.40,
 1062.53,    1.50)  DC

ALL       1ST HIGHEST VALUE IS      53.47848 AT (  600331.70,  4122090.15,    61.91,
 1062.53,    1.50)  DC
         2ND HIGHEST VALUE IS      53.10506 AT (  600431.70,  4122390.15,    62.81,
 1062.53,    1.50)  DC
         3RD HIGHEST VALUE IS      53.02150 AT (  600331.70,  4122140.15,    61.73,
 1062.53,    1.50)  DC
         4TH HIGHEST VALUE IS      52.02220 AT (  600331.70,  4122190.15,    61.48,
 1062.53,    1.50)  DC
         5TH HIGHEST VALUE IS      50.90685 AT (  600331.70,  4122240.15,    61.44,
 1062.53,    1.50)  DC
         6TH HIGHEST VALUE IS      49.85785 AT (  600331.70,  4122290.15,    61.44,
 1062.53,    1.50)  DC
         7TH HIGHEST VALUE IS      48.88401 AT (  600331.70,  4122340.15,    61.44,
```

```
 1062.53,    1.50)  DC
         8TH HIGHEST VALUE IS      48.49554 AT (  600331.70,  4122390.15,    61.44,
 1062.53,    1.50)  DC
         9TH HIGHEST VALUE IS      47.21339 AT (  600481.70,  4122390.15,    63.32,
 1062.53,    1.50)  DC
        10TH HIGHEST VALUE IS      42.97064 AT (  600331.70,  4122040.15,    62.40,
 1062.53,    1.50)  DC


 *** RECEPTOR TYPES:  GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
  *** AERMOD - VERSION  18081 ***   *** C:\Model\Almaden Lake\Almaden
Lake_AERMOD_v2\Almaden Lake_AERMOD_v2. ***        07/15/19
 *** AERMET - VERSION  14134 ***   ***
                       ***       16:21:51

                                 PAGE   5
 *** MODELOPTs:    RegDFAULT  CONC  ELEV  FLGPOL  RURAL

                                                *** THE SUMMARY OF HIGHEST  1-HR
RESULTS ***


                                    ** CONC OF PM_10    IN MICROGRAMS/M**3
               **

                                                      DATE
                                         NETWORK
GROUP ID                          AVERAGE CONC     (YYMMDDHH)            RECEPTOR
(XR, YR, ZELEV, ZHILL, ZFLAG)    OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - - - - - -

CONSTR1  HIGH   1ST HIGH VALUE IS     384.76262  ON 13120520: AT (  600131.70,
4122490.15,    61.00,  1062.53,    1.50)  DC

HAULROUT HIGH   1ST HIGH VALUE IS    1806.37250  ON 09011320: AT (  600331.70,
4122440.15,    61.84,  1062.53,    1.50)  DC

ALL      HIGH   1ST HIGH VALUE IS    1905.11321  ON 09011619: AT (  600331.70,
4122440.15,    61.84,  1062.53,    1.50)  DC


 *** RECEPTOR TYPES:  GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
```

```
 *** Message Summary : AERMOD Model Execution ***

  --------- Summary of Total Messages --------

 A Total of            0 Fatal Error Message(s)
 A Total of            0 Warning Message(s)
 A Total of        13130 Informational Message(s)

 A Total of        43872 Hours Were Processed

 A Total of        11611 Calm Hours Identified

 A Total of         1519 Missing Hours Identified (  3.46 Percent)


    ******** FATAL ERROR MESSAGES ********
               ***  NONE  ***


    ********   WARNING MESSAGES   ********
               ***  NONE  ***
```

Construction Health Risk Calculations

HRA Calculations

Haul Route Information

CalEEMod Distance	18.5	miles
AERMOD Distance	1.9	miles
Emission Fraction	10.3%	

Onsite DPM Emissions per Year

Year	Start Date	End Date	Calendar Days	Work Days	Onsite Unmitigated (tpy)	Onsite Mitigated (tpy)	Haul Routes (tpy)	Onsite Unmitigated (g/s)	Onsite Mitigated (g/s)	Haul Routes (g/s)
2021	6/1/2021	12/31/2021	213	154	0.18248	0.0146	0.00083	2.30E-02	1.84E-03	1.04E-04
2022	1/1/2022	12/31/2022	364	260	0.31746	0.0260	0.02604	2.37E-02	1.94E-03	1.94E-03
2023	1/1/2023	5/10/2023	129	93	0.03414	0.0026	0.00034	7.12E-03	5.40E-04	7.09E-05

Onsite PM2.5 (exhaust) Emissions per Year

Year	Start Date	End Date	Calendar Days	Work Days	Onsite Unmitigated (tpy)	Onsite Mitigated (tpy)	Haul Routes (tpy)	Onsite Unmitigated (g/s)	Onsite Mitigated (g/s)	Haul Routes (g/s)
2021	6/1/2021	12/31/2021	213	154	0.17188	0.0144	0.00079	2.16E-02	1.81E-03	9.94E-05
2022	1/1/2022	12/31/2022	364	260	0.29829	0.0260	0.02488	2.22E-02	1.94E-03	1.85E-03
2023	1/1/2023	5/10/2023	129	93	0.03358	0.0026	0.00032	7.00E-03	5.40E-04	6.67E-05

AERMOD Out (emission rate = 1 g/s)

UTM Easting (m)	UTM Northing (m)	Output - [ug/m³]/[g/s]		Unmitigated						Mitigated					
				DPM ug/m³			PM2.5 ug/m³			DPM ug/m³			PM2.5 ug/m³		
		Main Construction	Haul Routes	2021	2022	2023	2021	2022	2023	2021	2022	2023	2021	2022	2023
599781.7	4121640.15	0.04457	0.30537	1.03E-03	1.12E-03	3.19E-04	9.67E-04	1.05E-03	3.14E-04	8.52E-05	1.47E-04	2.63E-05	8.39E-05	1.44E-04	2.62E-05
599831.7	4121640.15	0.05133	0.44125	1.18E-03	1.30E-03	3.68E-04	1.12E-03	1.23E-03	3.62E-04	9.91E-05	1.88E-04	3.09E-05	9.75E-05	1.83E-04	3.07E-05
600031.7	4121640.15	0.12257	6.49958	2.88E-03	4.20E-03	9.19E-04	2.72E-03	3.96E-03	9.02E-04	2.95E-04	1.53E-03	1.13E-04	2.88E-04	1.47E-03	1.11E-04
600081.7	4121640.15	0.17417	3.93251	4.04E-03	4.91E-03	1.27E-03	3.81E-03	4.62E-03	1.25E-03	3.62E-04	1.12E-03	1.23E-04	3.56E-04	1.09E-03	1.21E-04
600131.7	4121640.15	0.24761	2.9023	5.72E-03	6.44E-03	1.78E-03	5.39E-03	6.06E-03	1.75E-03	4.86E-04	1.06E-03	1.55E-04	4.78E-04	1.03E-03	1.54E-04
599731.7	4121690.15	0.04609	0.31101	1.06E-03	1.15E-03	3.30E-04	1.00E-03	1.08E-03	3.25E-04	8.80E-05	1.51E-04	2.71E-05	8.67E-05	1.48E-04	2.70E-05
599781.7	4121690.15	0.05124	0.42875	1.18E-03	1.30E-03	3.68E-04	1.11E-03	1.22E-03	3.62E-04	9.88E-05	1.85E-04	3.08E-05	9.72E-05	1.81E-04	3.06E-05
599831.7	4121690.15	0.05925	0.66783	1.37E-03	1.54E-03	4.26E-04	1.29E-03	1.44E-03	4.19E-04	1.16E-04	2.48E-04	3.68E-05	1.14E-04	2.42E-04	3.66E-05
599881.7	4121690.15	0.07224	1.3154	1.67E-03	1.97E-03	5.24E-04	1.58E-03	1.86E-03	5.15E-04	1.47E-04	4.02E-04	4.86E-05	1.44E-04	3.90E-04	4.80E-05
600031.7	4121690.15	0.15358	6.02721	3.59E-03	4.84E-03	1.14E-03	3.38E-03	4.56E-03	1.12E-03	3.47E-04	1.50E-03	1.27E-04	3.40E-04	1.44E-03	1.24E-04
600081.7	4121690.15	0.26018	3.92901	6.02E-03	6.94E-03	1.88E-03	5.67E-03	6.53E-03	1.85E-03	5.20E-04	1.29E-03	1.69E-04	5.12E-04	1.25E-03	1.67E-04
600131.7	4121690.15	0.36934	2.9873	8.52E-03	9.34E-03	2.65E-03	8.02E-03	8.78E-03	2.61E-03	7.11E-04	1.31E-03	2.21E-04	7.00E-04	1.28E-03	2.20E-04
599731.7	4121740.15	0.05411	0.40571	1.25E-03	1.36E-03	3.88E-04	1.17E-03	1.28E-03	3.82E-04	1.04E-04	1.86E-04	3.22E-05	1.02E-04	1.82E-04	3.20E-05
599781.7	4121740.15	0.06008	0.57381	1.39E-03	1.54E-03	4.32E-04	1.31E-03	1.45E-03	4.24E-04	1.17E-04	2.31E-04	3.66E-05	1.15E-04	2.26E-04	3.64E-05
599831.7	4121740.15	0.06961	0.92091	1.61E-03	1.83E-03	5.02E-04	1.52E-03	1.72E-03	4.94E-04	1.38E-04	3.19E-04	4.43E-05	1.36E-04	3.10E-04	4.39E-05
599881.7	4121740.15	0.08585	1.88208	1.99E-03	2.41E-03	6.25E-04	1.88E-03	2.27E-03	6.14E-04	1.78E-04	5.42E-04	6.00E-05	1.75E-04	5.24E-04	5.92E-05
599981.7	4121740.15	0.15974	11.11814	3.79E-03	6.00E-03	1.22E-03	3.57E-03	5.67E-03	1.19E-03	4.13E-04	2.52E-03	1.67E-04	4.03E-04	2.43E-03	1.62E-04
600031.7	4121740.15	0.23306	5.6321	5.41E-03	6.64E-03	1.70E-03	5.10E-03	6.25E-03	1.67E-03	4.89E-04	1.57E-03	1.67E-04	4.80E-04	1.52E-03	1.64E-04
600081.7	4121740.15	0.34437	3.87243	7.95E-03	8.92E-03	2.48E-03	7.49E-03	8.40E-03	2.44E-03	6.74E-04	1.44E-03	2.14E-04	6.64E-04	1.40E-03	2.12E-04
599681.7	4121790.15	0.05958	0.38244	1.37E-03	1.49E-03	4.27E-04	1.29E-03	1.40E-03	4.20E-04	1.14E-04	1.92E-04	3.49E-05	1.12E-04	1.88E-04	3.48E-05
599731.7	4121790.15	0.06487	0.50743	1.50E-03	1.64E-03	4.65E-04	1.41E-03	1.54E-03	4.58E-04	1.25E-04	2.27E-04	3.87E-05	1.23E-04	2.22E-04	3.85E-05
599781.7	4121790.15	0.07219	0.72826	1.67E-03	1.85E-03	5.19E-04	1.57E-03	1.74E-03	5.10E-04	1.40E-04	2.85E-04	4.43E-05	1.38E-04	2.78E-04	4.40E-05
599831.7	4121790.15	0.08388	1.18461	1.94E-03	2.22E-03	6.05E-04	1.83E-03	2.09E-03	5.95E-04	1.67E-04	3.99E-04	5.39E-05	1.64E-04	3.88E-04	5.34E-05
599881.7	4121790.15	0.1045	2.54038	2.43E-03	2.98E-03	7.62E-04	2.29E-03	2.81E-03	7.49E-04	2.19E-04	7.09E-04	7.49E-05	2.15E-04	6.86E-04	7.38E-05
599681.7	4121840.15	0.06847	0.45582	1.58E-03	1.71E-03	4.91E-04	1.49E-03	1.61E-03	4.82E-04	1.31E-04	2.24E-04	4.03E-05	1.29E-04	2.19E-04	4.01E-05
599731.7	4121840.15	0.07959	0.6111	1.83E-03	2.01E-03	5.71E-04	1.73E-03	1.89E-03	5.61E-04	1.53E-04	2.76E-04	4.74E-05	1.50E-04	2.70E-04	4.71E-05
599781.7	4121840.15	0.08926	0.88579	2.06E-03	2.29E-03	6.42E-04	1.94E-03	2.15E-03	6.31E-04	1.74E-04	3.50E-04	5.46E-05	1.71E-04	3.41E-04	5.42E-05
599831.7	4121840.15	0.10454	1.46468	2.42E-03	2.77E-03	7.55E-04	2.28E-03	2.60E-03	7.42E-04	2.08E-04	4.95E-04	6.71E-05	2.04E-04	4.81E-04	6.65E-05
599881.7	4121840.15	0.13236	3.48156	3.08E-03	3.83E-03	9.67E-04	2.90E-03	3.61E-03	9.50E-04	2.81E-04	9.50E-04	9.68E-05	2.75E-04	9.19E-04	9.53E-05
599631.7	4121890.15	0.07826	0.4193	1.80E-03	1.94E-03	5.60E-04	1.70E-03	1.82E-03	5.51E-04	1.48E-04	2.35E-04	4.53E-05	1.46E-04	2.31E-04	4.51E-05
599681.7	4121890.15	0.08557	0.53313	1.97E-03	2.13E-03	6.13E-04	1.86E-03	2.00E-03	6.03E-04	1.63E-04	2.72E-04	5.01E-05	1.61E-04	2.67E-04	4.98E-05
599731.7	4121890.15	0.10068	0.71839	2.32E-03	2.53E-03	7.22E-04	2.19E-03	2.38E-03	7.10E-04	1.93E-04	3.39E-04	5.96E-05	1.90E-04	3.32E-04	5.93E-05
599781.7	4121890.15	0.11461	1.05053	2.64E-03	2.92E-03	8.23E-04	2.49E-03	2.75E-03	8.09E-04	2.22E-04	4.32E-04	6.95E-05	2.18E-04	4.22E-04	6.91E-05
599831.7	4121890.15	0.13643	1.79255	3.15E-03	3.59E-03	9.84E-04	2.97E-03	3.38E-03	9.67E-04	2.70E-04	6.22E-04	8.67E-05	2.66E-04	6.05E-04	8.59E-05
599881.7	4121890.15	0.17829	5.06991	4.15E-03	5.23E-03	1.31E-03	3.91E-03	4.93E-03	1.28E-03	3.82E-04	1.36E-03	1.33E-04	3.75E-04	1.31E-03	1.31E-04
599631.7	4121940.15	0.0971	0.48088	2.24E-03	2.39E-03	6.94E-04	2.11E-03	2.25E-03	6.83E-04	1.84E-04	2.84E-04	5.59E-05	1.81E-04	2.80E-04	5.57E-05
599681.7	4121940.15	0.1085	0.61463	2.50E-03	2.69E-03	7.77E-04	2.35E-03	2.53E-03	7.64E-04	2.06E-04	3.33E-04	6.30E-05	2.03E-04	3.27E-04	6.28E-05
599731.7	4121940.15	0.13042	0.83091	3.00E-03	3.25E-03	9.34E-04	2.83E-03	3.06E-03	9.19E-04	2.49E-04	4.19E-04	7.64E-05	2.45E-04	4.11E-04	7.61E-05
599781.7	4121940.15	0.15184	1.23084	3.50E-03	3.84E-03	1.09E-03	3.30E-03	3.61E-03	1.07E-03	2.92E-04	5.40E-04	9.09E-05	2.88E-04	5.28E-04	9.04E-05
599831.7	4121940.15	0.18504	2.22622	4.27E-03	4.82E-03	1.33E-03	4.03E-03	4.54E-03	1.31E-03	3.64E-04	8.03E-04	1.16E-04	3.58E-04	7.82E-04	1.15E-04
600331.7	4121940.15	4.27957	19.3764	9.85E-02	1.05E-01	3.06E-02	9.28E-02	9.89E-02	3.01E-02	8.07E-03	1.22E-02	2.45E-03	7.95E-03	1.20E-02	2.44E-03
599631.7	4121990.15	0.12166	0.54677	2.80E-03	2.99E-03	8.70E-04	2.64E-03	2.81E-03	8.55E-04	2.29E-04	3.45E-04	6.97E-05	2.26E-04	3.40E-04	6.94E-05
599681.7	4121990.15	0.13927	0.70044	3.21E-03	3.44E-03	9.96E-04	3.02E-03	3.23E-03	9.80E-04	2.63E-04	4.10E-04	8.03E-05	2.60E-04	4.03E-04	8.00E-05
599731.7	4121990.15	0.17261	0.95234	3.97E-03	4.28E-03	1.24E-03	3.74E-03	4.02E-03	1.21E-03	3.27E-04	5.25E-04	1.00E-04	3.23E-04	5.15E-04	9.97E-05
599781.7	4121990.15	0.20725	1.44955	4.78E-03	5.19E-03	1.49E-03	4.50E-03	4.88E-03	1.46E-03	3.96E-04	6.91E-04	1.22E-04	3.90E-04	6.77E-04	1.22E-04
599831.7	4121990.15	0.26184	2.96312	6.05E-03	6.79E-03	1.88E-03	5.70E-03	6.39E-03	1.85E-03	5.13E-04	1.10E-03	1.63E-04	5.05E-04	1.07E-03	1.62E-04
600331.7	4121990.15	5.69921	24.91087	1.31E-01	1.40E-01	4.07E-02	1.24E-01	1.31E-01	4.01E-02	1.07E-02	1.60E-02	3.26E-03	1.06E-02	1.58E-02	3.25E-03
600381.7	4121990.15	4.77695	13.982	1.10E-01	1.16E-01	3.41E-02	1.03E-01	1.09E-01	3.35E-02	8.93E-03	1.21E-02	2.68E-03	8.80E-03	1.19E-02	2.67E-03
600431.7	4121990.15	4.02942	9.9514	9.27E-02	9.74E-02	2.87E-02	8.73E-02	9.15E-02	2.83E-02	7.51E-03	9.81E-03	2.25E-03	7.41E-03	9.70E-03	2.24E-03
600481.7	4121990.15	3.32921	7.77973	7.66E-02	8.03E-02	2.37E-02	7.21E-02	7.55E-02	2.34E-02	6.20E-03	8.01E-03	1.85E-03	6.11E-03	7.93E-03	1.85E-03
600531.7	4121990.15	2.64188	6.01882	6.07E-02	6.37E-02	1.88E-02	5.72E-02	5.99E-02	1.85E-02	4.92E-03	6.33E-03	1.47E-03	4.85E-03	6.26E-03	1.47E-03
600581.7	4121990.15	2.08991	4.73522	4.81E-02	5.04E-02	1.49E-02	4.53E-02	4.74E-02	1.47E-02	3.89E-03	5.00E-03	1.16E-03	3.84E-03	4.95E-03	1.16E-03
599631.7	4122040.15	0.15454	0.61564	3.56E-03	3.78E-03	1.10E-03	3.35E-03	3.55E-03	1.09E-03	2.91E-04	4.23E-04	8.79E-05	2.86E-04	4.16E-04	8.76E-05
599681.7	4122040.15	0.18092	0.78819	4.16E-03	4.44E-03	1.29E-03	3.92E-03	4.17E-03	1.27E-03	3.41E-04	5.08E-04	1.03E-04	3.36E-04	5.00E-04	1.03E-04
599731.7	4122040.15	0.23369	1.08858	5.38E-03	5.75E-03	1.67E-03	5.07E-03	5.40E-03	1.64E-03	4.41E-04	6.71E-04	1.34E-04	4.35E-04	6.60E-04	1.34E-04
599781.7	4122040.15	0.29433	1.74039	6.78E-03	7.31E-03	2.11E-03	6.39E-03	6.88E-03	2.07E-03	5.60E-04	9.18E-04	1.72E-04	5.51E-04	9.01E-04	1.71E-04
599831.7	4122040.15	0.39251	4.352	9.06E-03	1.02E-02	2.82E-03	8.54E-03	9.56E-03	2.78E-03	7.68E-04	1.63E-03	2.44E-04	7.56E-04	1.59E-03	2.42E-04
600331.7	4122040.15	7.88468	35.08596	1.81E-01	1.94E-01	5.64E-02	1.71E-01	1.82E-01	5.54E-02	1.49E-02	2.23E-02	4.51E-03	1.46E-02	2.19E-02	4.50E-03
600381.7	4122040.15	5.84737	16.35508	1.34E-01	1.42E-01	4.17E-02	1.27E-01	1.33E-01	4.10E-02	1.09E-02	1.46E-02	3.28E-03	1.08E-02	1.44E-02	3.27E-03
600431.7	4122040.15	4.59905	10.87481	1.06E-01	1.11E-01	3.28E-02	9.96E-02	1.04E-01	3.23E-02	8.57E-03	1.11E-02	2.56E-03	8.45E-03	1.10E-02	2.56E-03
600481.7	4122040.15	3.74375	8.30366	8.61E-02	9.03E-02	2.67E-02	8.11E-02	8.48E-02	2.63E-02	6.97E-03	8.92E-03	2.08E-03	6.87E-03	8.83E-03	2.08E-03
600531.7	4122040.15	3.1232	6.81511	7.18E-02	7.53E-02	2.23E-02	6.76E-02	7.08E-02	2.19E-02	5.81E-03	7.42E-03	1.74E-03	5.73E-03	7.34E-03	1.73E-03
600581.7	4122040.15	2.45829	5.70437	5.65E-02	5.93E-02	1.75E-02	5.32E-02	5.58E-02	1.72E-02	4.58E-03	5.91E-03	1.37E-03	4.51E-03	5.85E-03	1.37E-03
599631.7	4122090.15	0.19455	0.68657	4.48E-03	4.74E-03	1.39E-03	4.22E-03	4.46E-03	1.37E-03	3.65E-04	5.14E-04	1.10E-04	3.60E-04	5.07E-04	1.10E-04
599681.7	4122090.15	0.23565	0.88347	5.42E-03	5.75E-03	1.68E-03	5.11E-03	5.41E-03	1.66E-03	4.43E-04	6.33E-04	1.34E-04	4.36E-04	6.24E-04	1.33E-04
599731.7	4122090.15	0.29731	1.23758	6.84E-03	7.28E-03	2.12E-03	6.44E-03	6.85E-03	2.09E-03	5.60E-04	8.24E-04	1.69E-04	5.52E-04	8.11E-04	1.69E-04
599781.7	4122090.15	0.42494	2.12269	9.78E-03	1.05E-02	3.04E-03	9.22E-03	9.85E-03	2.99E-03	8.04E-04	1.25E-03	2.45E-04	7.92E-04	1.23E-03	2.44E-04
600331.7	4122090.15	9.37403	44.10445	2.16E-01	2.31E-01	6.70E-02	2.03E-01	2.17E-01	6.59E-02	1.77E-02	2.70E-02	5.38E-03	1.74E-02	2.65E-02	5.36E-03
600381.7	4122090.15	6.35138	17.38455	1.46E-01	1.54E-01	4.53E-02	1.38E-01	1.45E-01	4.46E-02	1.19E-02	1.58E-02	3.56E-03	1.17E-02	1.56E-02	3.55E-03
600431.7	4122090.15	4.80238	11.24781	1.10E-01	1.16E-01	3.43E-02	1.04E-01	1.09E-01	3.37E-02	8.95E-03	1.16E-02	2.67E-03	8.82E-03	1.14E-02	2.67E-03
600481.7	4122090.15	3.84341	8.60967	8.84E-02	9.27E-02	2.74E-02	8.32E-02	8.71E-02	2.70E-02	7.16E-03	9.18E-03	2.14E-03	7.05E-03	9.08E-03	2.13E-03
600531.7	4122090.15	3.00862	7.06556	6.92E-02	7.26E-02	2.15E-02	6.52E-02	6.83E-02	2.11E-02	5.60E-03	7.25E-03	1.68E-03	5.53E-03	7.17E-03	1.67E-03
600581.7	4122090.15	2.34422	5.75637	5.39E-02	5.66E-02	1.67E-02	5.08E-02	5.32E-02	1.64E-02	4.37E-03	5.70E-03	1.31E-03	4.31E-03	5.63E-03	1.30E-03
599581.7	4122140.15	0.21162	0.61869	4.87E-03	5.13E-03	1.51E-03	4.58E-03	4.82E-03	1.49E-03	3.96E-04	5.34E-04	1.19E-04	3.90E-04	5.27E-04	1.18E-04
599631.7	4122140.15	0.24333	0.76141	5.60E-03	5.91E-03	1.74E-03	5.27E-03	5.56E-03	1.71E-03	4.55E-04	6.24E-04	1.37E-04	4.49E-04	6.16E-04	1.37E-04
599681.7	4122140.15	0.30403	0.98755	6.99E-03	7.39E-03	2.17E-03	6.59E-03	6.95E-03	2.13E-03	5.69E-04	7.87E-04	1.71E-04	5.61E-04	7.77E-04	1.71E-04
599731.7	4122140.15	0.3971	1.41116	9.14E-03	9.68E-03	2.84E-03	8.61E-03	9.10E-03	2.79E-03	7.45E-04	1.05E-03	2.25E-04	7.34E-04	1.04E-03	2.24E-04
599781.7	4122140.15	0.59906	2.67884	1.38E-02	1.47E-02	4.28E-03	1.30E-02	1.38E-02	4.21E-03	1.13E-03	1.70E-03	3.43E-04	1.11E-03	1.67E-03	3.42E-04
600331.7	4122140.15	9.43079	43.59071	2.17E-01	2.32E-01	6.74E-02	2.04E-01	2.18E-01	6.63E-02	1.78E-02	2.70E-02	5.41E-03	1.75E-02	2.66E-02	5.39E-03
600381.7	4122140.15	6.3748	17.61966	1.47E-01	1.54E-01	4.55E-02	1.38E-01	1.45E-01	4.47E-02	1.19E-02	1.59E-02	3.57E-03	1.17E-02	1.57E-02	3.56E-03
600431.7	4122140.15	4.76036	11.50484	1.09E-01	1.15E-01	3.40E-02	1.03E-01	1.08E-01	3.34E-02	8.87E-03	1.15E-02	2.65E-03	8.75E-03	1.14E-02	2.65E-03
600481.7	4122140.15	3.36699	8.37134	7.74E-02	8.14E-02	2.40E-02	7.29E-02	7.65E-02	2.36E-02	6.28E-03	8.20E-03	1.88E-03	6.19E-03	8.11E-03	1.87E-03
600531.7	4122140.15	2.46244	6.41162	5.66E-02	5.96E-02	1.76E-02	5.33E-02	5.60E-02	1.73E-02	4.59E-03	6.06E-03	1.38E-03	4.53E-03	5.99E-03	1.37E-03
599581.7	4122190.15	0.25308	0.68369	5.82E-03	6.13E-03	1.81E-03	5.48E-03	5.76E-03	1.78E-03	4.72E-04	6.28E-04	1.42E-04	4.66E-04	6.20E-04	1.41E-04

599631.7	4122190.15	0.29799	0.84372	6.85E-03	7.22E-03	2.13E-03	6.46E-03	6.79E-03	2.09E-03	5.57E-04	7.47E-04	1.67E-04	5.49E-04	7.38E-04	1.67E-04
599681.7	4122190.15	0.37882	1.10617	8.71E-03	9.19E-03	2.70E-03	8.21E-03	8.64E-03	2.66E-03	7.08E-04	9.56E-04	2.13E-04	6.98E-04	9.44E-04	2.12E-04
599731.7	4122190.15	0.52883	1.64271	1.22E-02	1.28E-02	3.78E-03	1.15E-02	1.21E-02	3.71E-03	9.89E-04	1.35E-03	2.97E-04	9.75E-04	1.34E-03	2.97E-04
599781.7	4122190.15	0.76272	3.64441	1.76E-02	1.88E-02	5.45E-03	1.65E-02	1.77E-02	5.36E-03	1.44E-03	2.21E-03	4.38E-04	1.42E-03	2.17E-03	4.37E-04
600331.7	4122190.15	9.25666	42.76555	2.13E-01	2.28E-01	6.62E-02	2.01E-01	2.14E-01	6.51E-02	1.75E-02	2.65E-02	5.31E-03	1.72E-02	2.61E-02	5.29E-03
600381.7	4122190.15	6.20335	17.96201	1.43E-01	1.50E-01	4.43E-02	1.34E-01	1.41E-01	4.35E-02	1.16E-02	1.56E-02	3.48E-03	1.14E-02	1.54E-02	3.47E-03
600431.7	4122190.15	4.57879	11.85407	1.05E-01	1.11E-01	3.27E-02	9.92E-02	1.04E-01	3.21E-02	8.54E-03	1.13E-02	2.56E-03	8.42E-03	1.11E-02	2.55E-03
600481.7	4122190.15	3.15107	8.64995	7.25E-02	7.63E-02	2.25E-02	6.83E-02	7.17E-02	2.21E-02	5.88E-03	7.84E-03	1.76E-03	5.80E-03	7.75E-03	1.76E-03
600531.7	4122190.15	1.7155	5.28453	3.95E-02	4.17E-02	1.22E-02	3.72E-02	3.92E-02	1.20E-02	3.21E-03	4.38E-03	9.65E-04	3.16E-03	4.33E-03	9.62E-04
599581.7	4122240.15	0.29294	0.7529	6.74E-03	7.08E-03	2.09E-03	6.35E-03	6.66E-03	2.06E-03	5.46E-04	7.19E-04	1.64E-04	5.39E-04	7.10E-04	1.63E-04
599631.7	4122240.15	0.3619	0.93901	8.32E-03	8.75E-03	2.58E-03	7.84E-03	8.23E-03	2.54E-03	6.75E-04	8.90E-04	2.02E-04	6.66E-04	8.79E-04	2.02E-04
599681.7	4122240.15	0.46078	1.25039	1.06E-02	1.12E-02	3.29E-03	9.98E-03	1.05E-02	3.23E-03	8.60E-04	1.14E-03	2.58E-04	8.48E-04	1.13E-03	2.57E-04
599731.7	4122240.15	0.6117	1.94372	1.41E-02	1.49E-02	4.37E-03	1.33E-02	1.40E-02	4.29E-03	1.14E-03	1.57E-03	3.44E-04	1.13E-03	1.55E-03	3.44E-04
599781.7	4122240.15	0.85365	5.5736	1.97E-02	2.13E-02	6.11E-03	1.85E-02	2.00E-02	6.01E-03	1.63E-03	2.77E-03	5.01E-04	1.60E-03	2.71E-03	4.99E-04
600331.7	4122240.15	8.85211	42.05474	2.04E-01	2.18E-01	6.33E-02	1.92E-01	2.05E-01	6.22E-02	1.67E-02	2.56E-02	5.08E-03	1.65E-02	2.51E-02	5.07E-03
600381.7	4122240.15	5.82076	18.26822	1.34E-01	1.41E-01	4.16E-02	1.26E-01	1.33E-01	4.09E-02	1.09E-02	1.49E-02	3.28E-03	1.07E-02	1.47E-02	3.27E-03
600431.7	4122240.15	4.23963	12.33379	9.75E-02	1.03E-01	3.03E-02	9.18E-02	9.66E-02	2.98E-02	7.92E-03	1.07E-02	2.38E-03	7.81E-03	1.06E-02	2.37E-03
600481.7	4122240.15	3.00474	9.75575	6.91E-02	7.31E-02	2.15E-02	6.51E-02	6.87E-02	2.11E-02	5.63E-03	7.78E-03	1.69E-03	5.55E-03	7.67E-03	1.69E-03
600531.7	4122240.15	1.69182	6.58594	3.89E-02	4.14E-02	1.21E-02	3.67E-02	3.89E-02	1.19E-02	3.18E-03	4.60E-03	9.61E-04	3.13E-03	4.53E-03	9.58E-04
599581.7	4122290.15	0.32773	0.82627	7.54E-03	7.92E-03	2.34E-03	7.10E-03	7.45E-03	2.30E-03	6.11E-04	8.01E-04	1.83E-04	6.02E-04	7.92E-04	1.83E-04
599631.7	4122290.15	0.40296	1.04146	9.27E-03	9.74E-03	2.87E-03	8.73E-03	9.16E-03	2.83E-03	7.52E-04	9.90E-04	2.25E-04	7.41E-04	9.78E-04	2.25E-04
599681.7	4122290.15	0.50773	1.40716	1.17E-02	1.23E-02	3.62E-03	1.10E-02	1.16E-02	3.56E-03	9.48E-04	1.27E-03	2.84E-04	9.35E-04	1.25E-03	2.84E-04
599731.7	4122290.15	0.65914	2.25759	1.52E-02	1.61E-02	4.71E-03	1.43E-02	1.51E-02	4.63E-03	1.24E-03	1.73E-03	3.72E-04	1.22E-03	1.71E-03	3.71E-04
600331.7	4122290.15	8.1682	41.68965	1.88E-01	2.02E-01	5.84E-02	1.77E-01	1.90E-01	5.75E-02	1.55E-02	2.42E-02	4.71E-03	1.52E-02	2.37E-02	4.69E-03
600381.7	4122290.15	5.22451	18.81822	1.20E-01	1.27E-01	3.73E-02	1.13E-01	1.20E-01	3.67E-02	9.80E-03	1.39E-02	2.96E-03	9.66E-03	1.37E-02	2.95E-03
600431.7	4122290.15	3.7093	13.28765	8.53E-02	9.04E-02	2.65E-02	8.04E-02	8.50E-02	2.61E-02	6.96E-03	9.85E-03	2.10E-03	6.86E-03	9.71E-03	2.09E-03
600481.7	4122290.15	2.78738	11.32654	6.41E-02	6.82E-02	1.99E-02	6.04E-02	6.41E-02	1.96E-02	5.24E-03	7.67E-03	1.59E-03	5.17E-03	7.55E-03	1.58E-03
600531.7	4122290.15	2.00737	10.83395	4.62E-02	4.97E-02	1.44E-02	4.35E-02	4.67E-02	1.41E-02	3.81E-03	6.06E-03	1.16E-03	3.75E-03	5.95E-03	1.16E-03
600581.7	4122290.15	0.92948	7.49327	2.14E-02	2.35E-02	6.67E-03	2.02E-02	2.21E-02	6.56E-03	1.79E-03	3.30E-03	5.56E-04	1.76E-03	3.23E-03	5.53E-04
599581.7	4122340.15	0.35301	0.91478	8.12E-03	8.54E-03	2.52E-03	7.65E-03	8.02E-03	2.48E-03	6.59E-04	8.68E-04	1.97E-04	6.49E-04	8.58E-04	1.97E-04
599631.7	4122340.15	0.43095	1.1592	9.91E-03	1.04E-02	3.08E-03	9.34E-03	9.80E-03	3.02E-03	8.04E-04	1.07E-03	2.41E-04	7.93E-04	1.06E-03	2.41E-04
599681.7	4122340.15	0.53611	1.58226	1.23E-02	1.30E-02	3.83E-03	1.16E-02	1.22E-02	3.76E-03	1.00E-03	1.36E-03	3.01E-04	9.88E-04	1.34E-03	3.00E-04
599731.7	4122340.15	0.67951	2.57049	1.56E-02	1.66E-02	4.85E-03	1.47E-02	1.56E-02	4.77E-03	1.28E-03	1.83E-03	3.86E-04	1.26E-03	1.80E-03	3.84E-04
600331.7	4122340.15	7.01198	41.87204	1.62E-01	1.74E-01	5.02E-02	1.52E-01	1.64E-01	4.94E-02	1.33E-02	2.20E-02	4.09E-03	1.31E-02	2.15E-02	4.07E-03
600381.7	4122340.15	4.25815	20.33818	9.80E-02	1.05E-01	3.04E-02	9.23E-02	9.86E-02	2.99E-02	8.04E-03	1.23E-02	2.45E-03	7.93E-03	1.21E-02	2.44E-03
600431.7	4122340.15	2.93592	16.4129	6.76E-02	7.28E-02	2.10E-02	6.37E-02	6.84E-02	2.07E-02	5.57E-03	8.97E-03	1.70E-03	5.49E-03	8.81E-03	1.70E-03
600481.7	4122340.15	2.18207	17.053	5.03E-02	5.50E-02	1.57E-02	4.74E-02	5.18E-02	1.54E-02	4.19E-03	7.63E-03	1.30E-03	4.13E-03	7.47E-03	1.29E-03
600531.7	4122340.15	1.70967	21.63889	3.95E-02	4.48E-02	1.23E-02	3.72E-02	4.21E-02	1.21E-02	3.37E-03	7.63E-03	1.08E-03	3.32E-03	7.43E-03	1.07E-03
600581.7	4122340.15	1.04187	27.32084	2.42E-02	3.01E-02	7.61E-03	2.28E-02	2.84E-02	7.48E-03	2.21E-03	7.47E-03	7.61E-04	2.17E-03	7.22E-03	7.49E-04
599581.7	4122390.15	0.36825	1.0065	8.47E-03	8.92E-03	2.63E-03	7.98E-03	8.38E-03	2.58E-03	6.88E-04	9.15E-04	2.06E-04	6.78E-04	9.05E-04	2.06E-04
599631.7	4122390.15	0.44596	1.29755	1.03E-02	1.08E-02	3.18E-03	9.66E-03	1.02E-02	3.13E-03	8.33E-04	1.12E-03	2.50E-04	8.22E-04	1.11E-03	2.50E-04
599681.7	4122390.15	0.5476	1.81602	1.26E-02	1.33E-02	3.91E-03	1.19E-02	1.25E-02	3.85E-03	1.03E-03	1.42E-03	3.09E-04	1.01E-03	1.41E-03	3.08E-04
599731.7	4122390.15	0.68173	3.08335	1.57E-02	1.67E-02	4.87E-03	1.48E-02	1.57E-02	4.79E-03	1.29E-03	1.94E-03	3.90E-04	1.27E-03	1.91E-03	3.89E-04
600331.7	4122390.15	4.78692	43.70862	1.10E-01	1.22E-01	3.44E-02	1.04E-01	1.15E-01	3.38E-02	9.27E-03	1.80E-02	2.90E-03	9.12E-03	1.76E-02	2.88E-03
600381.7	4122390.15	2.83946	30.738	6.55E-02	7.33E-02	2.04E-02	6.17E-02	6.90E-02	2.01E-02	5.55E-03	1.16E-02	1.76E-03	5.46E-03	1.13E-02	1.74E-03
600431.7	4122390.15	2.03644	51.06861	4.73E-02	5.84E-02	1.49E-02	4.46E-02	5.50E-02	1.46E-02	4.29E-03	1.41E-02	1.47E-03	4.21E-03	1.37E-02	1.45E-03
600481.7	4122390.15	1.58918	45.6242	3.70E-02	4.67E-02	1.16E-02	3.48E-02	4.40E-02	1.14E-02	3.41E-03	1.22E-02	1.19E-03	3.35E-03	1.18E-02	1.17E-03
600531.7	4122390.15	1.30114	20.38925	3.01E-02	3.49E-02	9.41E-03	2.84E-02	3.28E-02	9.25E-03	2.61E-03	6.59E-03	8.51E-04	2.57E-03	6.40E-03	8.42E-04
600581.7	4122390.15	0.6495	7.46703	1.50E-02	1.69E-02	4.68E-03	1.41E-02	1.59E-02	4.60E-03	1.27E-03	2.75E-03	4.05E-04	1.25E-03	2.68E-03	4.02E-04
599581.7	4122440.15	0.37638	1.07828	8.66E-03	9.12E-03	2.69E-03	8.15E-03	8.58E-03	2.64E-03	7.03E-04	9.45E-04	2.11E-04	6.93E-04	9.34E-04	2.11E-04
599631.7	4122440.15	0.45111	1.40969	1.04E-02	1.10E-02	3.22E-03	9.77E-03	1.03E-02	3.17E-03	8.44E-04	1.16E-03	2.54E-04	8.32E-04	1.14E-03	2.53E-04
599681.7	4122440.15	0.54502	2.0015	1.25E-02	1.33E-02	3.89E-03	1.18E-02	1.25E-02	3.83E-03	1.02E-03	1.46E-03	3.09E-04	1.01E-03	1.44E-03	3.08E-04
599731.7	4122440.15	0.66613	3.3704	1.53E-02	1.64E-02	4.76E-03	1.44E-02	1.55E-02	4.69E-03	1.26E-03	1.96E-03	3.84E-04	1.24E-03	1.93E-03	3.83E-04
599781.7	4122440.15	0.82958	12.25197	1.92E-02	2.21E-02	5.99E-03	1.81E-02	2.08E-02	5.89E-03	1.66E-03	4.05E-03	5.37E-04	1.63E-03	3.94E-03	5.32E-04
600331.7	4122440.15	2.19625	33.10676	5.08E-02	5.86E-02	1.59E-02	4.79E-02	5.51E-02	1.56E-02	4.39E-03	1.09E-02	1.43E-03	4.32E-03	1.06E-02	1.41E-03
600381.7	4122440.15	1.68976	17.53798	3.90E-02	4.35E-02	1.22E-02	3.67E-02	4.09E-02	1.19E-02	3.29E-03	6.77E-03	1.04E-03	3.24E-03	6.61E-03	1.03E-03
600431.7	4122440.15	1.37553	12.34576	3.17E-02	3.50E-02	9.88E-03	2.99E-02	3.29E-02	9.71E-03	2.66E-03	5.13E-03	8.32E-04	2.62E-03	5.01E-03	8.27E-04
600481.7	4122440.15	1.03771	9.42721	2.39E-02	2.64E-02	7.45E-03	2.25E-02	2.49E-02	7.33E-03	2.01E-03	3.89E-03	6.29E-04	1.98E-03	3.80E-03	6.25E-04
600531.7	4122440.15	0.79276	6.49856	1.83E-02	2.01E-02	5.69E-03	1.72E-02	1.89E-02	5.59E-03	1.53E-03	2.83E-03	4.75E-04	1.50E-03	2.77E-03	4.72E-04
600581.7	4122440.15	0.37692	2.94405	8.69E-03	9.51E-03	2.70E-03	8.18E-03	8.94E-03	2.66E-03	7.24E-04	1.32E-03	2.25E-04	7.13E-04	1.29E-03	2.24E-04
600031.7	4122490.15	2.1792	8.49474	5.01E-02	5.33E-02	1.56E-02	4.72E-02	5.01E-02	1.53E-02	4.10E-03	5.92E-03	1.24E-03	4.04E-03	5.84E-03	1.23E-03
600081.7	4122490.15	2.41508	9.66103	5.56E-02	5.91E-02	1.73E-02	5.23E-02	5.55E-02	1.70E-02	4.54E-03	6.61E-03	1.37E-03	4.48E-03	6.51E-03	1.37E-03
600131.7	4122490.15	2.47651	11.23744	5.70E-02	6.09E-02	1.77E-02	5.37E-02	5.72E-02	1.74E-02	4.67E-03	7.05E-03	1.42E-03	4.60E-03	6.93E-03	1.41E-03
600181.7	4122490.15	2.26258	10.96879	5.21E-02	5.57E-02	1.62E-02	4.91E-02	5.24E-02	1.59E-02	4.28E-03	6.58E-03	1.30E-03	4.21E-03	6.47E-03	1.30E-03
600231.7	4122490.15	1.76468	9.82142	4.06E-02	4.37E-02	1.26E-02	3.83E-02	4.11E-02	1.24E-02	3.35E-03	5.38E-03	1.02E-03	3.30E-03	5.29E-03	1.02E-03
600281.7	4122490.15	1.72697	9.63455	3.98E-02	4.28E-02	1.24E-02	3.75E-02	4.02E-02	1.22E-02	3.28E-03	5.27E-03	1.00E-03	3.23E-03	5.18E-03	9.98E-04
600331.7	4122490.15	1.41659	8.98489	3.26E-02	3.53E-02	1.01E-02	3.07E-02	3.32E-02	9.98E-03	2.70E-03	4.54E-03	8.30E-04	2.66E-03	4.45E-03	8.26E-04
600381.7	4122490.15	1.0169	7.09952	2.34E-02	2.55E-02	7.29E-03	2.21E-02	2.40E-02	7.17E-03	1.94E-03	3.39E-03	6.01E-04	1.92E-03	3.32E-03	5.98E-04
600431.7	4122490.15	0.75276	5.07269	1.73E-02	1.88E-02	5.39E-03	1.63E-02	1.77E-02	5.30E-03	1.44E-03	2.47E-03	4.43E-04	1.42E-03	2.42E-03	4.41E-04
600481.7	4122490.15	0.5396	3.71611	1.24E-02	1.35E-02	3.87E-03	1.17E-02	1.27E-02	3.80E-03	1.03E-03	1.79E-03	3.18E-04	1.02E-03	1.75E-03	3.17E-04
600531.7	4122490.15	0.32548	2.29329	7.50E-03	8.16E-03	2.33E-03	7.07E-03	7.67E-03	2.29E-03	6.23E-04	1.09E-03	1.92E-04	6.13E-04	1.07E-03	1.91E-04
600581.7	4122490.15	0.22006	1.48184	5.07E-03	5.50E-03	1.58E-03	4.78E-03	5.18E-03	1.55E-03	4.20E-04	7.22E-04	1.30E-04	4.14E-04	7.08E-04	1.29E-04
600031.7	4122540.15	1.53738	6.13396	3.54E-02	3.76E-02	1.10E-02	3.33E-02	3.54E-02	1.08E-02	2.89E-03	4.21E-03	8.75E-04	2.85E-03	4.14E-03	8.72E-04
600081.7	4122540.15	1.64115	6.24853	3.78E-02	4.01E-02	1.17E-02	3.56E-02	3.77E-02	1.15E-02	3.08E-03	4.43E-03	9.31E-04	3.04E-03	4.37E-03	9.29E-04
600131.7	4122540.15	1.66002	6.35007	3.82E-02	4.06E-02	1.19E-02	3.60E-02	3.81E-02	1.17E-02	3.12E-03	4.49E-03	9.42E-04	3.07E-03	4.42E-03	9.40E-04
600181.7	4122540.15	1.54605	6.10792	3.56E-02	3.78E-02	1.10E-02	3.35E-02	3.55E-02	1.09E-02	2.91E-03	4.22E-03	8.79E-04	2.86E-03	4.16E-03	8.76E-04
600231.7	4122540.15	0.74505	3.95675	1.72E-02	1.84E-02	5.33E-03	1.62E-02	1.73E-02	5.24E-03	1.41E-03	2.23E-03	4.31E-04	1.39E-03	2.20E-03	4.29E-04
600281.7	4122540.15	0.5974	3.56099	1.38E-02	1.48E-02	4.28E-03	1.30E-02	1.40E-02	4.21E-03	1.14E-03	1.87E-03	3.48E-04	1.12E-03	1.83E-03	3.47E-04
600331.7	4122540.15	0.61959	3.87138	1.43E-02	1.54E-02	4.44E-03	1.34E-02	1.45E-02	4.36E-03	1.18E-03	1.97E-03	3.63E-04	1.16E-03	1.94E-03	3.61E-04
600381.7	4122540.15	0.35537	2.44066	8.19E-03	8.90E-03	2.55E-03	7.71E-03	8.37E-03	2.50E-03	6.79E-04	1.18E-03	2.10E-04	6.69E-04	1.15E-03	2.09E-04
600431.7	4122540.15	0.274	1.87607	6.31E-03	6.86E-03	1.96E-03	5.95E-03	6.45E-03	1.93E-03	5.24E-04	9.06E-04	1.62E-04	5.16E-04	8.88E-04	1.61E-04
600481.7	4122540.15	0.22107	1.48333	5.09E-03	5.53E-03	1.58E-03	4.80E-03	5.20E-03	1.56E-03	4.22E-04	7.25E-04	1.30E-04	4.16E-04	7.10E-04	1.29E-04
600531.7	4122540.15	0.18835	1.21963	4.34E-03	4.70E-03	1.35E-03	4.09E-03	4.42E-03	1.33E-03	3.59E-04	6.09E-04	1.11E-04	3.54E-04	5.97E-04	1.10E-04
600581.7	4122540.15	0.17429	1.07764	4.01E-03	4.34E-03	1.25E-03	3.78E-03	4.08E-03	1.23E-03	3.32E-04	5.53E-04	1.02E-04	3.27E-04	5.43E-04	1.01E-04
600331.7	4122590.15	0.29297	1.96746	6.75E-03	7.33E-03	2.10E-03	6.36E-03	6.89E-03	2.06E-03	5.59E-04	9.61E-04	1.72E-04	5.51E-04	9.42E-04	1.72E-04
600381.7	4122590.15	0.20226	1.39854	4.66E-03	5.07E-03	1.45E-03	4.39E-03	4.76E-03	1.43E-03	3.87E-04	6.71E-04	1.19E-04	3.81E-04	6.58E-04	1.19E-04
600431.7	4122590.15	0.1821	1.22844	4.20E-03	4.55E-03	1.30E-03	3.95E-03	4.28E-03	1.28E-03	3.48E-04	5.98E-04	1.07E-04	3.43E-04	5.86E-04	1.07E-04
600481.7	4122590.15	0.17777	1.15049	4.10E-03	4.44E-03	1.27E-03	3.86E-03	4.17E-03	1.25E-03	3.39E-04	5.74E-04	1.04E-04	3.34E-04	5.63E-04	1.04E-04
600531.7	4122590.15	0.16954	1.04767	3.91E-03	4.22E-03	1.21E-03	3.68E-03	3.97E-03	1.19E-03	3.23E-04	5.38E-04	9.91E-05	3.18E-04	5.28E-04	9.87E-05
600331.7	4122640.15	0.58091	3.01755	1.34E-02	1.44E-02	4.16E-03	1.26E-02	1.35E-02	4.09E-03	1.10E-03	1.73E-03	3.36E-04	1.08E-03	1.70E-03	3.34E-04
600381.7	4122640.15	0.21505	1.42173	4.95E-03	5.37E-03	1.54E-03	4.67E-03	5.05E-03	1.51E-03	4.10E-04	7.01E-04	1.26E-04	4.04E-04	6.87E-04	1.26E-04
600431.7	4122640.15	0.21678	1.38398	4.99E-03	5.41E-03	1.55E-03	4.70E-03	5.08E-03	1.53E-03	4.13E-04	6.97E-04	1.27E-04	4.07E-04	6.83E-04	1.26E-04
600481.7	4122640.15	0.44364	2.29593	1.02E-02	1.10E-02	3.17E-03	9.62E-03	1.03E-02	3.12E-03	8.40E-04	1.32E-03	2.56E-04	8.28E-04	1.30E-03	2.55E-04
600531.7	4122640.15	0.4414	2.26243	1.02E-02	1.09E-02	3.16E-03	9.57E-03	1.02E-02	3.10E-03	8.35E-04	1.31E-03	2.55E-04	8.23E-04	1.29E-03	2.54E-04
600331.7	4122690.15	0.65198	2.90406	1.50E-02	1.60E-02	4.66E-03	1.41E-02	1.51E-02	4.58E-03	1.23E-03	1.84E-03	3.73E-04	1.21E-03	1.82E-03	3.72E-04
600381.7	4122690.15	0.56589	2.65413	1.30E-02	1.39E-02	4.05E-03	1.23E-02	1.31E-02	3.98E-03	1.07E-03	1.63E-03	3.25E-04	1.05E-03	1.60E-03	3.24E-04
600431.7	4122690.15	0.51632	2.42358	1.19E-02	1.27E-02	3.69E-03	1.12E-02	1.19E-02	3.63E-03	9.75E-04	1.49E-03	2.96E-04	9.61E-04	1.46E-03	2.95E-04
600481.7	4122690.15	0.48674	2.22414	1.12E-02	1.20E-02	3.48E-03	1.06E-02	1.12E-02	3.42E-03	9.18E-04	1.39E-03	2.79E-04	9.05E-04	1.37E-03	2.78E-04
600581.7	4122290.15	0.92948	7.49327	2.14E-02	2.35E-02	6.67E-03	2.02E-02	2.21E-02	6.56E-03	1.79E-03	3.30E-03	5.56E-04	1.76E-03	3.23E-03	5.53E-04
600581.7	4122140.15	1.90742	5.35925	4.39E-02	4.62E-02	1.36E-02	4.13E-02	4.34E-02	1.34E-02	3.56E-03	4.77E-03	1.07E-03	3.51E-03	4.71E-03	1.07E-03
600581.7	4122190.15	1.21282	4.25262	2.79E-02	2.96E-02	8.66E-03	2.63E-02	2.78E-02	8.52E-03	2.27E-03	3.20E-03	6.86E-04	2.24E-03	3.16E-03	6.84E-04
600581.7	4122240.15	0.89323	4.31439	2.06E-02	2.20E-02	6.39E-03	1.94E-02	2.07E-02	6.28E-03	1.69E-03	2.59E-03	5.14E-04	1.66E-03	2.55E-03	5.12E-04
599524.18	4122705.96	0.27144	0.93969	6.24E-03	6.61E-03	1.94E-03	5.88E-03	6.22E-03	1.91E-03	5.09E-04	7.14E-04	1.53E-04	5.02E-04	7.04E-04	1.53E-04
599209.41	4122867.81	0.13537	0.4322	3.11E-03	3.29E-03	9.66E-04	2.93E-03	3.09E-03	9.50E-04	2.53E-04	3.49E-04	7.62E-05	2.50E-04	3.44E-04	7.60E-05

MEISR

		UTM X	UTM Y	Unmitigated DPM (ug/m^3)	Unmitigated $PM_{2.5}$ (ug/m^3)	Mitigated DPM (ug/m^3)	Mitigated $PM_{2.5}$ (ug/m^3)
Resident	2021	600331.7	4122140.15	2.17E-01	2.04E-01	1.78E-02	1.75E-02
	2022	600331.7	4122140.15	2.32E-01	2.18E-01	2.70E-02	2.66E-02
	2023	600331.7	4122140.15	6.74E-02	6.63E-02	5.41E-03	5.39E-03
School	2021	599524.18	4122705.96	6.24E-03	5.88E-03	5.09E-04	5.02E-04
	2022	599524.18	4122705.96	6.61E-03	6.22E-03	7.14E-04	7.04E-04
	2023	599524.18	4122705.96	1.94E-03	1.91E-03	1.53E-04	1.53E-04

Cancer Risk = Dose inhalation × Inhalation CPF × ASF × ED/AT × FAH **(Equation 8.2.4 A)**

Where:

Cancer Risk = residential inhalation cancer risk

Dose inhalation (mg/kg-day) = C_{AIR} × DBR × A × EF × 10^{-6} **(Equation 5.4.1.1)**

Inhalation CPF = inhalation cancer potency factor ([mg/kg/day]$^{-1}$)

ASF = age sensitivity factor for a specified age group (unitless)

ED = exposure duration for a specified age group (years)

AT = averaging time period over which exposure is averaged in days (years)

FAH = fraction of time at home (unitless)

Where:

C_{AIR} = concentration of compound in air in micrograms per cubic meter (μg/m^3)

DBR = daily breathing rate in liter per kilogram of body weight per day (L/kg-body weight/day)

A = inhalation absorption factor (1 for DPM, unitless)

EF = exposure frequency in days per year (unitless, days/365 days)

10^{-6} = micrograms to milligrams conversion, liters to cubic meters conversion

Hazard Quotient = C_{air} / REL **(Section 8.3.1)**

Where:

Hazard Quotient = chronic non-cancer hazard

C_{AIR} = concentration of compound in air in micrograms per cubic meter (μg/m^3)

REL = Chronic non-cancer Reference Exposure Level for substance (μg/m^3)

Dose Inhalation Inputs

Receptor Type	Exposure Scenario	Receptor Group Age	Construction Year	C_{AIR} (μg/m^3) Unmitigated	C_{AIR} (μg/m^3) Mitigated	DBR (L/kg-day)	A (unitless)	EF (days/year)
Off-Site Child Resident	Construction	3rd Trimester	2021	2.17E-01	1.78E-02	361	1	0.96
		Age 0<2	2021	2.17E-01	1.78E-02	1090	1	0.96
			2022	2.32E-01	2.70E-02	1090	1	0.96
			2023	6.74E-02	5.41E-03	1090	1	0.96
School (highschool)	Construction	Age 2<16	2021	6.24E-03	5.09E-04	745	1	0.49
			2022	6.61E-03	7.14E-04	745	1	0.49
			2023	1.94E-03	1.53E-04	745	1	0.49

Dose Inhalation Outputs

Receptor Type	Exposure Scenario	Receptor Group Age	Construction Year	Dose inhalation (mg/kg-day) Unmitigated	Dose inhalation (mg/kg-day) Mitigated
Off-Site Child Resident	Construction	3rd Trimester	2021	7.51E-05	6.16E-06
		Age 0<2	2021	2.27E-04	1.86E-05
			2022	2.43E-04	2.82E-05
			2023	7.05E-05	5.65E-06
School (highschool)	Construction	Age 2<16	2021	2.29E-06	1.87E-07
			2022	2.43E-06	2.62E-07
			2023	7.12E-07	5.63E-08

Risk Inputs

Receptor Type	Exposure Scenario	Receptor Group Age	Construction Year	CPF (mg/kg-day^{-1})	ASF (unitless)	ED (years)	AT (years)	FAH (unitless)	MAF (unitless)
Off-Site Child Resident	Construction	3rd Trimester	2021	1.1	10	0.25	70.00	0.85	1
		Age 0<2	2021	1.1	10	0.33	70.00	0.85	1
			2022	1.1	10	1	70.00	0.85	1
			2023	1.1	10	0.35	70.00	0.85	1
School (highschool)	Construction	Age 2<16	2021	1.1	3	0.58	70.00	0.33	2.6
			2022	1.1	3	1.00	70.00	0.33	2.6
			2023	1.1	3	0.35	70.00	0.33	2.6

Risk Outputs

Receptor Type	Exposure Scenario	Receptor Group Age	Construction Year	Cancer Risk Unmitigated	Cancer Risk Mitigated	Total Risk (per million) Unmitigated	Total Risk (per million) Mitigated
Off-Site Child Resident	Construction	3rd Trimester	2021	2.51E-06	2.06E-07	48.37	5.08
		Age 0<2	2021	1.01E-05	8.30E-07		
			2022	3.24E-05	3.77E-06		
			2023	3.33E-06	2.67E-07		
School (highschool)	Construction	Age 2<16	2021	5.38E-08	4.39E-09	0.16	0.02
			2022	9.77E-08	1.06E-08		
			2023	1.01E-08	8.01E-10		

Receptor Type	Risk Type	Unmitigated	Mitigated	
Off-Site Child Resident	Chronic HI	0.15	0.01	unitless
	Annual PM2.5	0.22	0.03	ug/m^3
School (highschool)	Chronic HI	0.003	0.000	unitless
	Annual PM2.5	0.01	0.00	ug/m^3

SOURCE: Office of Environmental Health Hazard Assessment, 2015. *Air Toxics Hot Spots Program Guidance Manual for the Preparation of Health Risk Assessments* . February.

Daily breathing rate for school receptor is based on the OEHHA 95th percentile 8-hour moderate intensity breathing rates (Table 5.8).

Fraction of time at home is set to 0.85 for residential since the nearest school has an unmitigated cancer risk of <1 per million, per OEHHA Table 8.4.

Inhalation cancer potency factor from Table 7.1

Appendix C
Biological Resources

C.1 Table C-1: Special-Status Plants and Animals Documented in the Project Region

TABLE C-1
SPECIAL-STATUS PLANTS AND ANIMALS DOCUMENTED IN THE PROJECT REGION

Scientific and Common Names	Status Federal/State/ CRPR	Habitat Requirements	Potential Occurrence in Study Area
FEDERAL OR STATE LISTED SPECIES			
Plants			
Castilleja affinis var. *neglecta* Tiburon paintbrush	FE/ST/1B.2	Valley and foothill grassland on rocky serpentine sites. 75-400 meters. April-June	Low. Suitable habitat not present in Study Area.
Ceanothus ferrisiae Coyote ceanothus	FE/-/1B.1	Serpentinite soils in chaparral, coastal scrub, and valley and foothill grassland. 120-460 meters. January to May.	Low. Suitable habitat not present in Study Area.
Chorizanthe pungens var. hartwegiana Ben Lomond spineflower	FE/-/1B.1	Lower montane coniferous forest, usually associated with maritime ponderosa pine sandhills. 90-610 meters. April – June	Low. No ponderosa pine or sandhill habitats present within the Study Area.
Chorizanthe pungens var. *pungens* Monterey spineflower	FT/-/1B.2	Occurs in sandy maritime chaparral, cistmontane woodland, coastal dunes, coastal scrub, and valley and foothill grassland.	Absent. Local occurrence is historical.
Chorizanthe pungens var. hartwegii Scotts Valley spineflower	FE/-/1B.1	Meadows and seeps in valley and foothill grassland known only in Scotts Valley. 230-245 meters. April - July	Absent. Only occurs in Scotts Valley.
Chorizanthe robusta var. robusta Robust spineflower	FE/–/1B.1	Coastal scrub and coastal dunes.	Low. Suitable habitat not present in Study Area. Only occurrence in San Jose is historical.
Dudleya setchellii Santa Clara Valley dudleya	FE/-/1B.1	Rocky serpentinite areas in woodland and grassland. 60-455 meters.	Low. Lack of serpentine soils likely precludes presence of this species in Study Area.
Erysimum teretifolium Santa Cruz wallflower	FE/SE/1B.1	Chaparral, lower montane coniferous forest and inland marine sands. 120-610 meters	Absent. The Study Area lacks suitable coniferous forest and inland marine sand habitat.
Holocarpha macradenia Santa Cruz tarplant	FT/SE/1B.1	Light, sandy soil or sandy clay; often with non-natives in coastal prairie, scrub, or valley and foothill grassland.	Low. Suitable habitat not present in Study Area.
Lasthienia conjugens Contra Costa goldfields	FE/-/1B.1	Valley and foothill grassland, vernal pools, cismontane woodland; vernal pools and swales and low depressions in open grassy areas. 0-470 meters.	Low. Only local occurrence of species is assumed extirpated.
Plagiobothrys diffuses San Francisco popcorn flower	-/SE/1B.1	Historically on grassy slopes with marine influence. 60-485 meters	Low. Suitable habitat not present in Study Area.

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SPECIAL-STATUS PLANTS AND ANIMALS DOCUMENTED IN THE PROJECT REGION

Scientific and Common Names	Status Federal/State/ CRPR	Habitat Requirements	Potential Occurrence in Study Area
FEDERAL OR STATE LISTED SPECIES			
Invertebrates			
Euphydryas editha bayensis Bay checkerspot butterfly	FT/-	Associated with specific host plants that typically grow on serpentine soils.	Low. Suitable habitat not present in Study Area.
Cicindela ohlone Ohlone tiger beetle	FE/-	Remnant native grasslands with California oatgrass & purple needlegrass (coastal prairie) in Santa Cruz County. Substrate is poorly-drained clay or sandy clay soil over bedrock of Santa Cruz mudstone.	Absent. Outside of species' known range and coastal prairie habitat not present in Study Area.
Fish			
Oncorhynchus mykiss coho salmon – central California coast	FT/-	Requires cold, freshwater streams with suitable gravel for spawning. Rears in rivers and tributaries to the San Francisco Bay.	Moderate. Known to occur in multiple South Bay streams including the Guadalupe River and Alamitos Creek. Likely present in all accessible reaches of these streams (Leidy et al. 2005a).
Oncorhynchus tshawytscha Central Valley fall-run Chinook salmon	-/SSC	Requires cold, freshwater streams with suitable gravel for spawning. More common in Central Valley streams, occasionally rears in tributaries to San Francisco Bay.	Moderate. Known to occur in small numbers in multiple South Bay streams including the Guadalupe River and Alamitos Creek (Leidy 2007). Genetic analysis has determined that Chinook in South Bay streams are derived hatchery stock (Moyle, 2002).
Entosphenus tridentatus Pacific lamprey	-/SSC	Requires cool, freshwater streams with suitable gravel for spawning. Rears in rivers and tributaries to San Francisco Bay.	Moderate. Known to occur in multiple South Bay streams including the Guadalupe River and Alamitos Creek (Leidy 2007). This species' status is poorly documented, and its relative abundance in streams is unknown.
Lavinia exilicauda Sacramento hitch	-/SSC	Inhabit warm, lowland waters, and clear streams. Prefer shallow stream habitat with smaller gravel and mud substrates.	Moderate. Known to occur throughout the Guadalupe River watershed and within Alamitos Creek (Leidy 2007; Smith, 2013).
Cottus gulosus Riffle sculpin	-/SSC	Require cool, headwater streams where riffle and rocky substrates predominate.	Moderate. Know to occur in the Guadalupe River watershed. Primarily confined to the swift, cool upper reaches of streams (Leidy 2007; Smith, 2013).
Amphibians			
Ambystoma californiense California tiger salamander	FT/ST	Small ponds, lakes, or vernal pools in grasslands and oak woodlands for larvae; rodent burrows, rock crevices, or fallen logs for cover for adults and for summer dormancy.	Low. Local occurrences are historical. Suitable habitat not present in Study Area.
Rana draytonii California red-legged frog	FT/SSC	Permanent and semipermanent aquatic habitats, such as creeks and cold-water ponds, with emergent and submergent vegetation; may aestivate in rodent burrows or cracks during dry periods.	Moderate. Nearest occurrence is in Guadalupe Creek, less than 2.5 miles from Study Area; however, limited suitable habitat is present within Study Area.

TABLE C-1
SPECIAL-STATUS PLANTS AND ANIMALS DOCUMENTED IN THE PROJECT REGION

Scientific and Common Names	Status Federal/State/ CRPR	Habitat Requirements	Potential Occurrence in Study Area
FEDERAL OR STATE LISTED SPECIES			
Birds			
Aquila chrysaetos golden eagle	BCC/FP&WL	Foothills and mountains throughout California. Uncommon non-breeding visitor to lowlands such as the Central Valley. Nest on cliffs and escarpments or in tall trees overlooking open country. Forages in annual grasslands, chaparral, and oak woodlands with plentiful medium and large-sized mammals.	Low (foraging only). May occur over the Study Area on a transient basis. Nearest occurrence is ~5 miles southeast near Calero Reservoir; however, suitable nesting habitat not present in Study Area.
Buteo swainsoni Swainson's hawk	-/ST	Breeds in grasslands with scattered trees, juniper-sage flats, riparian areas, and agricultural lands with groves of trees. Requires adjacent suitable foraging areas such as grasslands, or alfalfa or grain fields to support rodent populations.	Low (foraging only). May occur in the Study Area riparian areas on a transient basis; however, suitable nesting habitat not present in Study Area.
Falco peregrinus anatum American peregrine falcon	DL&BCC/ DL&FP	Nests near wetlands, lakes, rivers, or other water on cliffs, banks, human structures. Feeds on birds taken in flight.	Low. Research group provided a nest box less than 2 miles north of Almaden Lake in high-rise building; however, suitable nesting habitat not present in Study Area.
OTHER SPECIAL STATUS SPECIES			
Plants			
Arctostaphylos andersonii Anderson's manzanita	-/-/1B.2	Broadleaved upland forest, chaparral, edges and openings of north coast coniferous forests. 60-730 meters.	Low. Suitable habitat not present.
Arctostaphylos silvicola Bonny dune manzanita	-/-/1B.2	Closed cone coniferous forests, chaparral and lower montane coniferous forests on inland marine-derived sandy soils. 120-600 meters.	Low. Suitable habitat not present.
Amsinckia lunaris bent-flowered fiddleneck	-/-/1B.2	Occurs in coastal bluff scrub, cismontane woodland, and valley and foothill grassland. 50-500 meters.	Low. Local occurrence in oak woodlands and grasslands; however, suitable nesting habitat not present in Study Area.
Balsamorhiza macrolepis var. *macrolepis* big scale balsamroot	-/-/1B.2	Chaparral, cismontane woodland, and valley and foothill grassland, sometimes on serpentine soils. 90-1400 meters. Blooms March – June.	Low. Suitable habitat not present.
California macrophylla round-leaved filaree	–/–/1B.1	Cismontane woodland, valley and foothill grassland.	Low. Suitable habitat not present.

TABLE C-1
SPECIAL-STATUS PLANTS AND ANIMALS DOCUMENTED IN THE PROJECT REGION

Scientific and Common Names	Status Federal/State/ CRPR	Habitat Requirements	Potential Occurrence in Study Area
OTHER SPECIAL STATUS SPECIES			
Plants (*cont.*)			
Calyptridium parryi Santa Cruz Mountains pussypaws	-/-/1B.2	Sandy or gravelly openings in chaparral and cistmontane woodland.	Low. Suitable habitat not present.
Campanula exigua chaparral harebell	-/-/1B.2	Found in rocky, usually serpentine, chaparral sites.	Low. Suitable habitat not present.
Carex comosa bristly sedge	-/-/2B.1	Lake margins, wet places; site below sea level is on a Delta island. 5-1620 meters.	Low. Suitable habitat present along creek fringes in the Study Area; however, site remains highly disturbed.
Castilleja rubicundula var. rubicundula pink creamsacs	-/-/1B.2	Openings in chaparral, cismontane woodland, meadows and seeps, valley and foothill grassland. Serpentine soils. 20-915 meters. Blooms April – June.	Low. Suitable habitat not present in Study Area.
Centromadia parryi ssp. *congdonii* Congdon's tarplant	-/-/1B.1	Alkaline soils in annual grassland, on lower slopes, flats, and swales, sometimes on saline soils; below 230 meters above MSL. Blooms May - October	Absent. Only occurrence to Study Area is historical; extirpated.
Cirsium fontinale var. fontinale Mt. Hamilton fountain thistle	-/-/1B.2	Serpentine seeps; openings in cismontane woodland, chaparral, valley and foothill grassland.	Low. Suitable habitat not present in Study Area.
Clarkia concinna ssp. *automixa* Santa Clara red ribbons	-/-/4.3	Cismontane woodland and chaparral, on slopes and near drainages. 90-970 meters.	Low. Suitable habitat not present in Study Area.
Collinsia multicolor San Francisco collinsia	-/-/1B.2	Closed cone coniferous forests, coastal scrub (sometimes on serpentine soils). 30-250 meters. Blooms June-October	Low. No suitable habitat present in the Study Area. Nearest occurrence in Almaden Quicksilver Park approximately 3.5 miles south of the lake.
Eryngium aristulatum var. *hooveri* Hoover's button-celery	-/-/1B.1	Vernal pools. 3-45 meters above MSL. Blooms June - August	Low. Suitable habitat not present in Study Area.
Fissidens pauperculus minute pocket moss	-/-/1B.2	Moss growing on damp soil along coast. In dry streambeds and on stream banks. 10-1024 meters	Absent. Suitable habitat not present in Study Area.
Fritillaria liliacea fragrant fillary	-/-1B.2	Often on serpentine; although can be found in various soils, including clay in grasslands. 3-400 meters	Low. Nearest occurrence in New Almaden Quicksilver County Park, less than five miles from the Study Area.
Hoita stobilina Loma Prieta hoita	-/-/1B.1	Chaparral, cismontane woodland, riparian woodland, usually on serpentine soil and mesic sites. 30-860 meters	Low. Suitable habitat not present in Study Area.

TABLE C-1
SPECIAL-STATUS PLANTS AND ANIMALS DOCUMENTED IN THE PROJECT REGION

Scientific and Common Names	Status Federal/State/ CRPR	Habitat Requirements	Potential Occurrence in Study Area
OTHER SPECIAL STATUS SPECIES			
Plants (*cont.*)			
Leptosyne hamiltonii Mt. Hamilton coreopsis	-/-/1B.2	On steep shale talus with open southwestern exposure in cismontane woodland. 530-130 meters	Low. Suitable habitat not present in Study Area.
Lessingia micradenia var. *glabrata* smooth lessingia	-/-/1B.2	Serpentine; often on roadsides in chaparral and cismontane woodland. 120-420 meters	Low. Although nearest occurrence is less than 5 miles away in New Almaden, lack of serpentine soils present in Study Area.
Lomatium observatorium Mt. Hamilton lomatium	-/-/1B.2	Open to partially shaded openings in coulter pine forest and oak woodland. Typically found in sedimentary Franciscan rock and volcanics. 1219-1330 meters	Low. Suitable habitat not present in Study Area.
Madia radiata showy golden madia	-/-/1B.1	Mostly on adobe clay in grassland or among shrubs is cismontane woodland and chenopod scrub. 25-1125 meters	Low. Suitable habitat not present in Study Area.
Malacothamnus arcuatus arcuate bush-mallow	-/-/1B.2	Chaparral, needs gravelly alluvium. 1-735 meters Blooms April - September	Low. Suitable habitat not present in Study Area.
Malacothamnus hallii Hall's bush-mallow	-/-/1B.2	Chaparral and coastal scrub; steep south-facing slopes, near seeps, on thin sandy soils on sedimentary rocks, some populations on serpentine. With chamise, black sage, coyote bush, yerba santa. More abundant in burned areas. 10-730 meters	Low. Suitable habitat not present in Study Area.
Monardella sinuate ssp. nigrescens Northern curly-leaved monardella	-/-/1B.2	Coastal dunes, coastal scrub, chaparral, lower montane coniferous forest. Sandy soils. 0-300 meters.	Low. Suitable habitat not present in Study Area.
Monolopia gracilens woodland woolythreads	-/-/1B.2	Broadleaved upland forests, openings in chaparral, cismontane woodland, coastal scrub, valley and foothill grasslands. 100-915 meters	Low. Nearest occurrence near Los Alamitos Creek (New Almaden) is historical. Suitable habitat not present in Study Area.
Penstemon rattanii var. *kleei* Santa Cruz Mountains beardtounge	-/-/1B.2	Chaparral, lower montane coniferous forest, north coast coniferous forest, usually on sandy shale slopes and sometimes in the transition zone between forest and chaparral. 400-1100 meters	Low. Nearest occurrence to Study Area is historical. Suitable habitat not present in Study Area.
Pentachaeta bellidiflora white-rayed pentachaeta	-/-/1B.1	Open dry rocky slopes and grassy areas, often on soils derived from serpentine bedrock. 35-610 meters	Low. Suitable habitat not present in Study Area.

TABLE C-1
SPECIAL-STATUS PLANTS AND ANIMALS DOCUMENTED IN THE PROJECT REGION

Scientific and Common Names	Status Federal/State/ CRPR	Habitat Requirements	Potential Occurrence in Study Area
OTHER SPECIAL STATUS SPECIES			
Plants (*cont.*)			
Phacelia phacelioides Mt. Diablo phacelia	-/-/1B.2	Chaparral and cismontane woodland in rocky soils. 500-1370 meters.	Low. Suitable habitat not present in Study Area.
Plagiobothrys chorisianus var. *Chorisianus* Choris's popcorn-flower	-/-/1B.2	Mesic sites in chaparral, coastal scrub, and coastal prairie. Blooms March – June	Low. Suitable habitat not present in Study Area.
Plagiobothrys glaber hairless popcorn-flower	-/-/1A	Coastal salt marshes and swamps, alkaline meadows and seeps. 15-180 meters.	Low. Study Area lacks suitable alkaline meadows and seeps and any coastal salt marsh habitats. Species extirpated in vicinity.
Sanicula saxatilis rock sanicle	-/-/1B.2	Bedrock outcrops and talus slopes in chaparral or oak woodland habitat. 670-1250 meters	Low. Suitable habitat not present in Study Area.
Streptanthus albidus ssp. *albidus* Metcalf Canyon jewelflower	-/-/1B.1	Relatively open areas in dry grassy meadows on serpentine soils. 45-800 meters	Low. Suitable habitat not present in Study Area.
Streptanthus albidus ssp. *permoenus* most beautiful jewelflower	-/-/1B.2	Serpentine outcrops on ridges and slopes in chaparral, grassland, and cismontane woodland. 95-1000 meters	Low. New Almaden is nearest occurrence to Study Area; however, no suitable habitat present in Study Area.
Invertebrates			
Adela oplerella Opler's longhorn moth	-/-	Requires serpentine grassland, except in Santa Cruz.	Low. Nearest occurrence is less than 6 miles from Study Area, near Tulare Hill. No suitable habitat present in Study Area.
Bombus califinosus Obscure bumble bee	-/-	Coastal areas from Santa Barbara county to north to Washington state. Food plant genera include Baccharis, Cirsium, Lupinus, Lotus, Grindelia and Phacelia.	Low. Suitable habitat not present in Study Area.
Bombus cotchii Crotch bumble bee	-/-	Coastal California east to the Sierra-Cascade crest and south into Mexico. Food plant genera include Antirrhinum, Phacelia, Clarkia, Dendromecon, Eschscholzia, and Eriogonum.	Low. Local occurrence is historical.
Microcina homi Hom's micro-blind harvestman	-/-	Known only from Santa Clara County in xeric habitats under serpentine rocks in grassland habitats.	Low. Suitable habitat not present in Study Area.

TABLE C-1
SPECIAL-STATUS PLANTS AND ANIMALS DOCUMENTED IN THE PROJECT REGION

Scientific and Common Names	Status Federal/State/ CRPR	Habitat Requirements	Potential Occurrence in Study Area
OTHER SPECIAL STATUS SPECIES			
Amphibians			
Rana boyii foothill yellow-legged frog	-/SSC	Partly-shaded, shallow streams and riffles with rocky substrate in a variety of habitats. Need at least some cobble-sized substrate for egg-laying.	Moderate. Nearest occurrence is downstream of Guadalupe Reservoir, less than 2.5 miles from Study Area. Marginal habitat is present within Study Area.
Dicamptodon ensatus California giant salamander	-/-	Known from wet coastal forests near streams and seeps from Mendocino Co. south to Monterey Co. and east to Napa Co. Aquatic larvae found in cold, clear streams, occasionally in lakes and ponds. Adults known from wet forests under rocks and logs near streams and lakes.	Low. Local occurrence is historical.
Aneides flavipunctatus niger Santa Crux black salamander	-/SSC	Occurs in mixed deciduous woodland, coniferous forests, coastal grasslands. Found under rocks near streams, in talus, under damp logs, and other objects.	Low. Local occurrence within 1/3 mile of the southern end of the Study Area in 1993 prior to construction of golf course in this area. All other recent regional occurrences located within Santa Cruz hills.
Reptiles			
Emys marmorata Western pond turtle	-/SSC	The western pond turtle is uncommon to common in suitable aquatic habitat throughout California, west of the Sierra-Cascade crest and absent from desert regions, except in the Mojave Desert along the Mojave River and its tributaries. Occupies ponds, marshes, rivers, streams, and irrigation canals with muddy or rocky bottoms and with watercress, cattails, water lilies, or other aquatic vegetation in woodlands, grasslands, and open forests. Nests are typically constructed in upland habitat within 0.25 mile of aquatic habitat.	High. Suitable habitat present in Almaden Lake and the lake island. Species is known to occur in the Study Area.
Phrynosoma blainvillii coast horned lizard	-/SSC/-	Patchy open areas with sandy soils and available ant food sources. Common in lowlands along sandy washes with low bushes.	Low. Nearest occurrence located in Calero County Park, near reservoir, approximately 5 miles south of Study Area. Suitable habitat not present in Study Area.
Mammals			
Antrozous pallidus pallid bat	-/SSC/WBWG High	Deserts, grasslands, shrublands, woodlands & forests. Most common in open, dry habitats with rocky areas for roosting. Roosts must protect bats from high temperatures. Very sensitive to disturbance of roosting sites.	Low. Only historical occurrences documented. Suitable habitat not present in Study Area.
Corynorhinus townsendii Townsend's big-eared bat	-/SSC (State Candidate Threatened)/ WBWG High	Throughout California in a wide variety of habitats. Most common in mesic sites. Roosts in the open, hanging from walls and ceilings. Roosting sites limited and extremely sensitive to human disturbance.	Low. Study Area in public setting therefore existing disturbance does not present suitable habitat for species.

TABLE C-1
SPECIAL-STATUS PLANTS AND ANIMALS DOCUMENTED IN THE PROJECT REGION

Scientific and Common Names	Status Federal/State/ CRPR	Habitat Requirements	Potential Occurrence in Study Area
OTHER SPECIAL STATUS SPECIES			
Mammals (*cont.*)			
Dipodomys venustus venustus Santa Cruz kangaroo rat	-/-	Requires well-drained, deep soils, such as the Zayante sand hills of Santa Cruz County, in chaparral or foothill woodland habitats. Diet is almost completely comprised of seeds from annual plants.	Low. Study Area soils not suitable to support species.
Lasthenia conjugens hoary bat	-/-/WBWG Medium	Prefers open habitats or habitat mosaics, with access to trees for cover & open areas or habitat edges for feeding. Roosts in dense foliage of medium to large trees. Feeds primarily on moths. Requires water.	Moderate. Nearest occurrence of hoary bat is at an undocumented location in San Jose; although, hoary bats could seek roost in dense foliage found along Alamitos Creek.
Myotis evotis long-eared myotis	-/-/WBWG Medium	Found in all brush, woodland & forest habitats from sea level to about 9000 ft. Prefers coniferous woodlands and forests. Nursery colonies in buildings, crevices, spaces under bark.	Low. Suitable habitat not present in Study Area.
Myotis yumanensis Yuma myotis	-/-/WBWG Low-Medium	Distribution is closely tied to bodies of water. Optimal habitats are found in open forests and woodlands with sources of water for feeding. Maternity colonies in caves, mines, buildings, or crevices.	Moderate. Only occurrence is south of New Almaden, approximately six miles south of the Study Area; although, abundance of water features in the Study Area could provide suitable habitat.
Neotoma fuscipes annectens San Francisco dusky-footed woodrat	-/SSC	Forest habitats of moderate canopy and moderate to dense understory. Constructions nests of sticks, leaves, shredded grass, and other materials, and presence may be limited by availability of nest-building materials.	Low. Although nearest occurrence of San Francisco dusky-footed woodrat midden is approximately 10 miles east of the Study Area; Study Area not suitable to support species.
Taxidea taxus American badger	-/SSC	Occupies a diversity of habitats throughout the state; principal habitat requirements include sufficient prey base, friable soils, and relatively open, uncultivated ground.	Low. Much of the Study Area is disturbed. Habitat patches exist in the Study, but are highly fragmented and subject to disturbance from human activity.
Birds			
Accipiter cooperii Cooper's hawk (nesting)	-/WL	Present in open woodlands, often nesting in deciduous riparian trees.	Moderate. May occur in the Study Area riparian areas on a transient basis. Mature sycamore and oak and other riparian vegetation in Alamitos Creek provide nesting and foraging habitat for this species.
Agelaius tricolor tricolored blackbird	-/SSC (Federal and State Candidate Threatened)	Breeds at scattered coastal locations from Marin County south to San Diego County; and at scattered locations in Lake, Sonoma, and Solano Counties. Nests in dense colonies in emergent marsh vegetation, such as tules and cattails, or upland sites with blackberries, nettles, thistles, and grainfields. Habitat must be large enough to support 50 pairs. Likely requires water at or near the nesting colony.	Moderate (foraging only). May occur over the Study Area on a transient basis. Limited suitable nesting habitat in Study Area.

TABLE C-1
SPECIAL-STATUS PLANTS AND ANIMALS DOCUMENTED IN THE PROJECT REGION

Scientific and Common Names	Status Federal/State/ CRPR	Habitat Requirements	Potential Occurrence in Study Area
OTHER SPECIAL STATUS SPECIES			
Birds (*cont.*)			
Ardea alba great egret (nesting colony)	-/§3503	Nest colonially in groves of trees. Rookery sites located near marshes, tide-flats, irrigated pastures, and margins of rivers and lakes.	Moderate. Documented as historically nesting on Almaden Lake island and east portion of lake (SCVAS, 2014).
Ardea herodias great blue heron (nesting colony)	-/§3503	Nests in suitable habitat throughout California except at higher elevations in Sierra Nevada and Cascade mountain ranges. Widely distributed in freshwater and calm-water intertidal habitats.	High. Nesting colonies known to occur on lake island.
Athene cunicularia western burrowing owl	-/SSC/BCC	Present in open annual grasslands with abundance of small mammal burrows for nesting.	Low. Suitable habitat not present.
Chaetura vauxi Vaux's swift	-/SSC	Open sky over forest, lakes, and rivers. Often feeds low over water, especially in morning and evening or during unsettled weather. Nests in coniferous and mixed forest, mainly old-growth forest, including redwood, Douglas-fir, grand fir.	Low. Lack of dense coniferous habitat likely precludes breeding within Study Area; however, migratory occurrence recorded in 2005 (SCVAS, 2005).
Cypseloides niger black swift	-/SSC	Coastal belt of Santa Cruz and Monterey Co.; central & southern Sierra Nevada; San Bernardino & San Jacinto Mountains. Breeds in small colonies on cliffs behind or adjacent to waterfalls in deep canyons and sea-bluffs above the surf; forages widely.	Low. Nearest occurrence in New Almaden, less than 5 miles south of Study Area. No suitable habitat present in Study Area.
Egretta thula snowy egret (nesting colony)	-/§3503	Colonial nester, with nest sites situated in protected beds of dense tules. Rookery sites situated close to foraging areas: marshes, tidal-flats, streams, wet meadows, and borders of lakes.	Moderate. Documented as historically nesting on Almaden Lake island (SCVAS, 2014).
Panidon haliaetus osprey	-/WL	Ocean shore, bays, freshwater lakes, and larger streams or other areas near good fish-producing water bodies.	Low. No suitable habitat present in Study Area.
Progne subis purple martin	-/SSC	Inhabits woodlands, low elevation coniferous forest of Douglas-fir, ponderosa pine, & Monterey pine. Nests in old woodpecker cavities mostly, also in human-made structures. Nest often located in tall, isolated tree/snag.	Low. Nearest occurrence to Study Area is over 5 miles south near Mt. Umunhum. No suitable habitat present in Study Area.
Phalacrocorax auritus double-crested cormorant	-/WL	Rookery breeder in coastal areas and inland lakes in fresh, saline, and estuarine waters.	Moderate. Marginal habitat present in the Study Area.
Nycticorax nycticorax black-crowned night heron	-/§3503	Lowland and foothill areas. Nests in dense emergent wetlands and dense-foliaged trees.	Moderate. Documented as historically nesting on Almaden Lake island (SCVAS, 2014).

TABLE C-1
SPECIAL-STATUS PLANTS AND ANIMALS DOCUMENTED IN THE PROJECT REGION

Notes:
Potential Occurrence in the Project region:
High = Species is expected to occur and habitat meets species requirements.
Moderate = Habitat is only marginally suitable or is suitable but not within species geographic range.
Low = Habitat does not meet species requirements as currently understood in the scientific community.

California Rare Plant Rank (CRPR):
Rank 1A = Plants presumed extirpated in California and either rare or extinct elsewhere.
Rank 1B = Plants rare, threatened, or endangered in California and elsewhere.
Rank 2A = Plants presumed extirpated in California, but more common elsewhere.
Rank 2B = Plants rare, threatened, or endangered in California, but more common elsewhere.
Rank 3 = Plants about which we need more information – a review list
Rank 4 = Plants of limited distribution – a watch list

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

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

Status Codes:
Federal
E = listed as endangered under the ESA
T = listed as threatened under the ESA
BCC = United States Fish and Wildlife designated “birds of conservation concern”
DL = delisted
– = no listing
State
E = listed as endangered under CESA
T = listed as threatened under CESA
SSC = California Department of Fish and Wildlife designated “species of special concern”
DL = delisted
CFP = California Department of Fish and Wildlife designated “fully protected”
– = no listing

C.2 California Department of Fish and Wildlife: California Natural Diversity Database

Query Criteria: Quad IS (Laurel (3712118) OR Lick Observatory (3712136) OR Loma Prieta (3712117) OR Los Gatos (3712128) OR Morgan Hill (3712126) OR Mt. Madonna (3712116) OR San Jose East (3712137) OR San Jose West (3712138) OR Santa Teresa Hills (3712127))

Name (Scientific/Common)	CNDDB Ranks	Listing Status (Fed/State)	Other Lists	Elev. Range (ft.)	Total EO's	Element Occ. Ranks: A	B	C	D	X	U	Population Status: Historic > 20 yr	Recent <= 20 yr	Presence: Extant	Poss. Extirp.	Extirp.
Accipiter cooperii Cooper's hawk	G5 S4	None None	CDFW_WL-Watch List IUCN_LC-Least Concern	175 175	117 S:1	0	0	1	0	0	0	0	1	1	0	0
Adela oplerella Opler's longhorn moth	G2 S2	None None		450 725	14 S:9	0	5	1	0	0	3	8	1	9	0	0
Agelaius tricolor tricolored blackbird	G2G3 S1S2	None Threatened	BLM_S-Sensitive CDFW_SSC-Species of Special Concern IUCN_EN-Endangered NABCI_RWL-Red Watch List USFWS_BCC-Birds of Conservation Concern	127 1,584	955 S:5	0	0	0	1	0	4	4	1	5	0	0
Ambystoma californiense California tiger salamander	G2G3 S2S3	Threatened Threatened	CDFW_WL-Watch List IUCN_VU-Vulnerable	85 3,500	1196 S:91	22	22	14	1	17	15	30	61	74	4	13
Ammodramus savannarum grasshopper sparrow	G5 S3	None None	CDFW_SSC-Species of Special Concern IUCN_LC-Least Concern	454 454	27 S:1	0	0	0	0	0	1	0	1	1	0	0
Amsinckia lunaris bent-flowered fiddleneck	G3 S3	None None	Rare Plant Rank - 1B.2 BLM_S-Sensitive	750 2,600	93 S:3	0	1	0	0	0	2	2	1	3	0	0
Aneides flavipunctatus niger Santa Cruz black salamander	G3 S3	None None	CDFW_SSC-Species of Special Concern	255 2,200	78 S:31	3	0	0	0	0	28	18	13	31	0	0
Anniella pulchra northern California legless lizard	G3 S3	None None	CDFW_SSC-Species of Special Concern USFS_S-Sensitive	90 90	375 S:1	0	0	0	0	1	0	1	0	0	1	0
Anodonta californiensis California floater	G3Q S2?	None None	USFS_S-Sensitive	251 251	6 S:1	0	0	0	0	0	1	1	0	1	0	0

Name (Scientific/Common)	CNDDB Ranks	Listing Status (Fed/State)	Other Lists	Elev. Range (ft.)	Total EO's	Element Occ. Ranks A	B	C	D	X	U	Population Status Historic > 20 yr	Recent <= 20 yr	Presence Extant	Poss. Extirp.	Extirp.
Antrozous pallidus pallid bat	G5 S3	None None	BLM_S-Sensitive CDFW_SSC-Species of Special Concern IUCN_LC-Least Concern USFS_S-Sensitive WBWG_H-High Priority	90 950	419 S:9	1	3	1	0	1	3	2	7	8	1	0
Aquila chrysaetos golden eagle	G5 S3	None None	BLM_S-Sensitive CDF_S-Sensitive CDFW_FP-Fully Protected CDFW_WL-Watch List IUCN_LC-Least Concern USFWS_BCC-Birds of Conservation Concern	460 2,744	321 S:6	1	0	0	0	0	5	3	3	6	0	0
Arctostaphylos andersonii Anderson's manzanita	G2 S2	None None	Rare Plant Rank - 1B.2 SB_RSABG-Rancho Santa Ana Botanic Garden	314 2,200	64 S:17	0	3	5	2	1	6	4	13	16	1	0
Arctostaphylos silvicola Bonny Doon manzanita	G1 S1	None None	Rare Plant Rank - 1B.2	800 800	16 S:2	0	0	0	0	0	2	2	0	2	0	0
Ardea alba great egret	G5 S4	None None	CDF_S-Sensitive IUCN_LC-Least Concern	190 190	43 S:1	0	0	0	0	0	1	0	1	1	0	0
Ardea herodias great blue heron	G5 S4	None None	CDF_S-Sensitive IUCN_LC-Least Concern	190 537	155 S:4	0	0	1	0	0	3	2	2	4	0	0
Athene cunicularia burrowing owl	G4 S3	None None	BLM_S-Sensitive CDFW_SSC-Species of Special Concern IUCN_LC-Least Concern USFWS_BCC-Birds of Conservation Concern	40 1,279	1984 S:29	3	7	5	3	3	8	11	18	26	3	0
Balsamorhiza macrolepis big-scale balsamroot	G2 S2	None None	Rare Plant Rank - 1B.2 BLM_S-Sensitive USFS_S-Sensitive	300 300	51 S:1	0	0	0	0	0	1	0	1	1	0	0
Bombus caliginosus obscure bumble bee	G4? S1S2	None None	IUCN_VU-Vulnerable	100 3,000	181 S:7	0	0	0	0	0	7	7	0	7	0	0

Summary Table Report

California Department of Fish and Wildlife

California Natural Diversity Database

Name (Scientific/Common)	CNDDB Ranks	Listing Status (Fed/State)	Other Lists	Elev. Range (ft.)	Total EO's	Element Occ. Ranks						Population Status		Presence		
						A	B	C	D	X	U	Historic > 20 yr	Recent <= 20 yr	Extant	Poss. Extirp.	Extirp.
Bombus crotchii Crotch bumble bee	G3G4 S1S2	None None		100 4,000	234 S:2	0	0	0	0	0	2	2	0	2	0	0
Bombus occidentalis western bumble bee	G2G3 S1	None None	USFS_S-Sensitive XERCES_IM-Imperiled	100 500	282 S:4	0	0	0	0	0	4	4	0	4	0	0
Buteo swainsoni Swainson's hawk	G5 S3	None Threatened	BLM_S-Sensitive IUCN_LC-Least Concern USFWS_BCC-Birds of Conservation Concern	50 272	2475 S:2	0	1	0	0	1	0	1	1	1	1	0
Calasellus californicus An isopod	G2 S2	None None		730 730	3 S:1	0	0	0	0	0	1	1	0	1	0	0
Calyptridium parryi var. hesseae Santa Cruz Mountains pussypaws	G3G4T2 S2	None None	Rare Plant Rank - 1B.1 BLM_S-Sensitive	2,800 3,500	11 S:2	0	0	0	0	0	2	2	0	2	0	0
Campanula exigua chaparral harebell	G2 S2	None None	Rare Plant Rank - 1B.2 BLM_S-Sensitive SB_RSABG-Rancho Santa Ana Botanic Garden	2,022 4,100	50 S:3	0	0	1	0	0	2	2	1	3	0	0
Carex comosa bristly sedge	G5 S2	None None	Rare Plant Rank - 2B.1	1,420 1,420	29 S:1	0	0	0	0	0	1	1	0	1	0	0
Castilleja affinis var. neglecta Tiburon paintbrush	G4G5T1T2 S1S2	Endangered Threatened	Rare Plant Rank - 1B.2 SB_UCBBG-UC Berkeley Botanical Garden	965 1,300	7 S:2	1	1	0	0	0	0	0	2	2	0	0
Castilleja rubicundula var. rubicundula pink creamsacs	G5T2 S2	None None	Rare Plant Rank - 1B.2 BLM_S-Sensitive	540 540	38 S:1	0	0	0	0	0	1	1	0	1	0	0
Ceanothus ferrisiae Coyote ceanothus	G1 S1	Endangered None	Rare Plant Rank - 1B.1 SB_RSABG-Rancho Santa Ana Botanic Garden	500 1,500	4 S:4	1	1	0	1	0	1	1	3	4	0	0
Centromadia parryi ssp. congdonii Congdon's tarplant	G3T1T2 S1S2	None None	Rare Plant Rank - 1B.1 BLM_S-Sensitive SB_RSABG-Rancho Santa Ana Botanic Garden	100 100	98 S:1	0	0	0	0	1	0	1	0	0	0	1

Name (Scientific/Common)	CNDDB Ranks	Listing Status (Fed/State)	Other Lists	Elev. Range (ft.)	Total EO's	Element Occ. Ranks A	B	C	D	X	U	Population Status Historic > 20 yr	Recent <= 20 yr	Presence Extant	Poss. Extirp.	Extirp.
Chlorogalum pomeridianum var. minus dwarf soaproot	G5T3 S3	None None	Rare Plant Rank - 1B.2 BLM_S-Sensitive SB_SBBG-Santa Barbara Botanic Garden USFS_S-Sensitive		31 S:1	0	0	0	0	0	1	1	0	1	0	0
Chorizanthe pungens var. hartwegiana Ben Lomond spineflower	G2T1 S1	Endangered None	Rare Plant Rank - 1B.1	350 1,000	18 S:3	0	0	1	0	1	1	3	0	2	1	0
Chorizanthe pungens var. pungens Monterey spineflower	G2T2 S2	Threatened None	Rare Plant Rank - 1B.2 SB_UCBBG-UC Berkeley Botanical Garden	550 875	51 S:3	0	0	2	0	0	1	1	2	3	0	0
Chorizanthe robusta var. hartwegii Scotts Valley spineflower	G2T1 S1	Endangered None	Rare Plant Rank - 1B.1	750 750	4 S:2	0	2	0	0	0	0	0	2	2	0	0
Chorizanthe robusta var. robusta robust spineflower	G2T1 S1	Endangered None	Rare Plant Rank - 1B.1 BLM_S-Sensitive	350 500	20 S:4	0	0	0	0	2	2	3	1	2	2	0
Cicindela ohlone Ohlone tiger beetle	G1 S1	Endangered None		715 715	6 S:1	0	0	0	0	0	1	0	1	1	0	0
Cirsium fontinale var. campylon Mt. Hamilton fountain thistle	G2T2 S2	None None	Rare Plant Rank - 1B.2 BLM_S-Sensitive	250 2,800	36 S:28	6	13	3	0	0	6	7	21	28	0	0
Clarkia concinna ssp. automixa Santa Clara red ribbons	G5?T3 S3	None None	Rare Plant Rank - 4.3	300 3,000	20 S:6	0	1	0	0	0	5	6	0	6	0	0
Collinsia multicolor San Francisco collinsia	G2 S2	None None	Rare Plant Rank - 1B.2 SB_RSABG-Rancho Santa Ana Botanic Garden	200 200	36 S:2	0	0	0	0	0	2	2	0	2	0	0
Corynorhinus townsendii Townsend's big-eared bat	G3G4 S2	None None	BLM_S-Sensitive CDFW_SSC-Species of Special Concern IUCN_LC-Least Concern USFS_S-Sensitive WBWG_H-High Priority	90 1,040	629 S:7	0	2	1	0	0	4	3	4	7	0	0

Name (Scientific/Common)	CNDDB Ranks	Listing Status (Fed/State)	Other Lists	Elev. Range (ft.)	Total EO's	Element Occ. Ranks A	B	C	D	X	U	Population Status Historic > 20 yr	Recent <= 20 yr	Presence Extant	Poss. Extirp.	Extirp.
Coturnicops noveboracensis yellow rail	G4 S1S2	None None	CDFW_SSC-Species of Special Concern IUCN_LC-Least Concern NABCI_RWL-Red Watch List USFS_S-Sensitive USFWS_BCC-Birds of Conservation Concern	85 100	45 S:2	0	0	0	1	0	1	2	0	2	0	0
Cypseloides niger black swift	G4 S2	None None	CDFW_SSC-Species of Special Concern IUCN_LC-Least Concern NABCI_YWL-Yellow Watch List USFWS_BCC-Birds of Conservation Concern	520 520	46 S:1	0	0	0	0	0	1	1	0	1	0	0
Dicamptodon ensatus California giant salamander	G3 S2S3	None None	CDFW_SSC-Species of Special Concern IUCN_NT-Near Threatened	100 2,200	234 S:27	1	5	0	0	0	21	11	16	27	0	0
Dipodomys venustus venustus Santa Cruz kangaroo rat	G4T1 S1	None None		853 2,170	29 S:5	0	0	0	0	2	3	5	0	3	2	0
Dudleya abramsii ssp. setchellii Santa Clara Valley dudleya	G4T2 S2	Endangered None	Rare Plant Rank - 1B.1 SB_RSABG-Rancho Santa Ana Botanic Garden	250 1,700	58 S:52	15	19	7	3	0	8	6	46	52	0	0
Egretta thula snowy egret	G5 S4	None None	IUCN_LC-Least Concern	190 190	20 S:1	0	0	0	0	0	1	0	1	1	0	0
Elanus leucurus white-tailed kite	G5 S3S4	None None	BLM_S-Sensitive CDFW_FP-Fully Protected IUCN_LC-Least Concern	274 1,009	180 S:8	2	0	0	0	0	6	0	8	8	0	0
Emys marmorata western pond turtle	G3G4 S3	None None	BLM_S-Sensitive CDFW_SSC-Species of Special Concern IUCN_VU-Vulnerable USFS_S-Sensitive	100 2,000	1369 S:53	9	14	11	1	0	18	16	37	53	0	0
Eriogonum nudum var. decurrens Ben Lomond buckwheat	G5T1 S1	None None	Rare Plant Rank - 1B.1		9 S:1	0	0	0	0	0	1	1	0	1	0	0

Name (Scientific/Common)	CNDDB Ranks	Listing Status (Fed/State)	Other Lists	Elev. Range (ft.)	Total EO's	Element Occ. Ranks A	B	C	D	X	U	Population Status Historic > 20 yr	Recent <= 20 yr	Presence Extant	Poss. Extirp.	Extirp.
Eryngium aristulatum var. hooveri Hoover's button-celery	G5T1 S1	None None	Rare Plant Rank - 1B.1 SB_RSABG-Rancho Santa Ana Botanic Garden		16 S:1	0	0	0	0	0	1	0	1	1	0	0
Erysimum teretifolium Santa Cruz wallflower	G1 S1	Endangered Endangered	Rare Plant Rank - 1B.1	950 1,000	15 S:2	0	0	0	0	2	0	2	0	0	1	1
Euphilotes enoptes smithi Smith's blue butterfly	G5T1T2 S1S2	Endangered None	XERCES_CI-Critically Imperiled	2,976 2,976	68 S:1	0	0	0	0	0	1	0	1	1	0	0
Euphydryas editha bayensis Bay checkerspot butterfly	G5T1 S1	Threatened None	XERCES_CI-Critically Imperiled	450 1,322	30 S:16	0	7	1	0	1	7	5	11	15	1	0
Falco peregrinus anatum American peregrine falcon	G4T4 S3S4	Delisted Delisted	CDF_S-Sensitive CDFW_FP-Fully Protected USFWS_BCC-Birds of Conservation Concern	85 85	56 S:1	0	0	0	0	0	1	0	1	1	0	0
Fissidens pauperculus minute pocket moss	G3? S2	None None	Rare Plant Rank - 1B.2 USFS_S-Sensitive	360 360	22 S:1	0	0	0	0	0	1	0	1	1	0	0
Fritillaria liliacea fragrant fritillary	G2 S2	None None	Rare Plant Rank - 1B.2 USFS_S-Sensitive	340 1,260	82 S:10	1	0	5	1	0	3	4	6	10	0	0
Hoita strobilina Loma Prieta hoita	G2? S2?	None None	Rare Plant Rank - 1B.1	400 3,200	34 S:29	9	10	9	0	0	1	1	28	29	0	0
Holocarpha macradenia Santa Cruz tarplant	G1 S1	Threatened Endangered	Rare Plant Rank - 1B.1 SB_RSABG-Rancho Santa Ana Botanic Garden	330 400	37 S:2	1	0	0	1	0	0	2	0	2	0	0
Horkelia cuneata var. sericea Kellogg's horkelia	G4T1? S1?	None None	Rare Plant Rank - 1B.1 USFS_S-Sensitive		58 S:1	0	0	0	0	0	1	1	0	1	0	0
Icteria virens yellow-breasted chat	G5 S3	None None	CDFW_SSC-Species of Special Concern IUCN_LC-Least Concern	247 247	99 S:1	0	0	0	0	0	1	0	1	1	0	0
Lanius ludovicianus loggerhead shrike	G4 S4	None None	CDFW_SSC-Species of Special Concern IUCN_LC-Least Concern USFWS_BCC-Birds of Conservation Concern	258 258	110 S:1	0	0	0	0	0	1	0	1	1	0	0

Name (Scientific/Common)	CNDDB Ranks	Listing Status (Fed/State)	Other Lists	Elev. Range (ft.)	Total EO's	Element Occ. Ranks A	B	C	D	X	U	Population Status Historic > 20 yr	Recent <= 20 yr	Presence Extant	Poss. Extirp.	Extirp.
Lasiurus cinereus hoary bat	G5 S4	None None	IUCN_LC-Least Concern WBWG_M-Medium Priority		238 S:3	0	0	0	0	0	3	3	0	3	0	0
Lasthenia conjugens Contra Costa goldfields	G1 S1	Endangered None	Rare Plant Rank - 1B.1 SB_UCBBG-UC Berkeley Botanical Garden	50 110	36 S:2	0	0	0	0	2	0	2	0	0	0	2
Lavinia symmetricus subditus Monterey roach	G4T2T3 S2S3	None None	CDFW_SSC-Species of Special Concern	570 570	6 S:1	0	0	1	0	0	0	0	1	1	0	0
Leptosyne hamiltonii Mt. Hamilton coreopsis	G2 S2	None None	Rare Plant Rank - 1B.2 BLM_S-Sensitive	4,200 4,200	21 S:1	0	1	0	0	0	0	1	0	1	0	0
Lessingia micradenia var. glabrata smooth lessingia	G2T2 S2	None None	Rare Plant Rank - 1B.2	300 1,600	44 S:42	12	16	4	0	0	10	6	36	42	0	0
Lomatium observatorium Mt. Hamilton lomatium	G1 S1	None None	Rare Plant Rank - 1B.2	4,000 4,000	4 S:2	0	0	0	0	0	2	2	0	2	0	0
Malacothamnus arcuatus arcuate bush-mallow	G2Q S2	None None	Rare Plant Rank - 1B.2	270 2,170	30 S:12	2	1	4	0	0	5	7	5	12	0	0
Malacothamnus hallii Hall's bush-mallow	G2 S2	None None	Rare Plant Rank - 1B.2 BLM_S-Sensitive	40 1,100	36 S:17	0	6	4	2	1	4	2	15	16	1	0
Microcina homi Hom's micro-blind harvestman	G1 S1	None None		236 860	5 S:5	0	0	0	0	0	5	5	0	5	0	0
Microcina jungi Jung's micro-blind harvestman	G1 S1	None None		700 700	1 S:1	0	0	0	0	0	1	1	0	1	0	0
Monardella sinuata ssp. nigrescens northern curly-leaved monardella	G3T2 S2	None None	Rare Plant Rank - 1B.2		25 S:1	0	0	0	0	0	1	1	0	1	0	0
Monolopia gracilens woodland woollythreads	G3 S3	None None	Rare Plant Rank - 1B.2	450 3,200	68 S:27	3	9	1	0	1	13	9	18	26	1	0
Myotis evotis long-eared myotis	G5 S3	None None	BLM_S-Sensitive IUCN_LC-Least Concern WBWG_M-Medium Priority	570 570	139 S:1	0	0	1	0	0	0	0	1	1	0	0

C.2 California Department of Fish and Wildlife: California Natural Diversity Database C.2-7

Name (Scientific/Common)	CNDDB Ranks	Listing Status (Fed/State)	Other Lists	Elev. Range (ft.)	Total EO's	Element Occ. Ranks A	B	C	D	X	U	Population Status Historic > 20 yr	Recent <= 20 yr	Presence Extant	Poss. Extirp.	Extirp.
Myotis yumanensis Yuma myotis	G5 S4	None None	BLM_S-Sensitive IUCN_LC-Least Concern WBWG_LM-Low-Medium Priority	1,100 1,100	265 S:1	0	0	0	0	0	1	0	1	1	0	0
Neotoma fuscipes annectens San Francisco dusky-footed woodrat	G5T2T3 S2S3	None None	CDFW_SSC-Species of Special Concern	190 1,135	38 S:17	2	4	6	2	0	3	0	17	17	0	0
North Central Coast Drainage Sacramento Sucker/Roach River North Central Coast Drainage Sacramento Sucker/Roach River	GNR SNR	None None		400 400	4 S:1	0	1	0	0	0	0	1	0	1	0	0
Northern Maritime Chaparral Northern Maritime Chaparral	G1 S1.2	None None		900 900	17 S:1	0	0	0	0	0	1	1	0	1	0	0
Nycticorax nycticorax black-crowned night heron	G5 S4	None None	IUCN_LC-Least Concern	190 190	37 S:1	0	0	0	0	0	1	0	1	1	0	0
Oncorhynchus kisutch pop. 4 coho salmon - central California coast ESU	G4 S2?	Endangered Endangered	AFS_EN-Endangered	400 400	23 S:1	0	0	0	1	0	0	1	0	1	0	0
Oncorhynchus mykiss irideus pop. 8 steelhead - central California coast DPS	G5T2T3Q S2S3	Threatened None	AFS_TH-Threatened	40 400	44 S:5	0	1	0	1	0	3	2	3	5	0	0
Oncorhynchus mykiss irideus pop. 9 steelhead - south-central California coast DPS	G5T2Q S2	Threatened None	AFS_TH-Threatened	240 400	32 S:3	0	0	0	0	0	3	3	0	3	0	0
Pandion haliaetus osprey	G5 S4	None None	CDF_S-Sensitive CDFW_WL-Watch List IUCN_LC-Least Concern	1,020 1,270	500 S:3	0	3	0	0	0	0	0	3	3	0	0
Penstemon rattanii var. kleei Santa Cruz Mountains beardtongue	G4T2 S2	None None	Rare Plant Rank - 1B.2	1,500 3,000	6 S:3	0	0	0	0	0	3	3	0	3	0	0
Pentachaeta bellidiflora white-rayed pentachaeta	G1 S1	Endangered Endangered	Rare Plant Rank - 1B.1 SB_UCBBG-UC Berkeley Botanical Garden		14 S:1	0	0	0	0	1	0	1	0	0	1	0
Phacelia phacelioides Mt. Diablo phacelia	G2 S2	None None	Rare Plant Rank - 1B.2 BLM_S-Sensitive	4,200 4,200	16 S:1	0	0	0	0	0	1	1	0	1	0	0

Summary Table Report

California Department of Fish and Wildlife

California Natural Diversity Database

Name (Scientific/Common)	CNDDB Ranks	Listing Status (Fed/State)	Other Lists	Elev. Range (ft.)	Total EO's	Element Occ. Ranks A	B	C	D	X	U	Population Status Historic > 20 yr	Recent <= 20 yr	Presence Extant	Poss. Extirp.	Extirp.
Phrynosoma blainvillii coast horned lizard	G3G4 S3S4	None None	BLM_S-Sensitive CDFW_SSC-Species of Special Concern IUCN_LC-Least Concern	350 4,240	780 S:5	0	2	2	0	0	1	2	3	5	0	0
Plagiobothrys chorisianus var. chorisianus Choris' popcornflower	G3T1Q S1	None None	Rare Plant Rank - 1B.2	700 700	42 S:1	0	0	0	0	0	1	0	1	1	0	0
Plagiobothrys diffusus San Francisco popcornflower	G1Q S1	None Endangered	Rare Plant Rank - 1B.1	400 750	17 S:2	0	1	1	0	0	0	2	0	2	0	0
Plagiobothrys glaber hairless popcornflower	GH SH	None None	Rare Plant Rank - 1A	50 400	9 S:3	0	0	0	0	3	0	3	0	0	3	0
Polygonum hickmanii Scotts Valley polygonum	G1 S1	Endangered Endangered	Rare Plant Rank - 1B.1	750 750	2 S:1	0	1	0	0	0	0	0	1	1	0	0
Progne subis purple martin	G5 S3	None None	CDFW_SSC-Species of Special Concern IUCN_LC-Least Concern	3,486 3,486	71 S:1	0	0	0	0	0	1	0	1	1	0	0
Rana boylii foothill yellow-legged frog	G3 S3	None Candidate Threatened	BLM_S-Sensitive CDFW_SSC-Species of Special Concern IUCN_NT-Near Threatened USFS_S-Sensitive	100 2,500	2381 S:32	4	6	1	0	4	17	16	16	28	0	4
Rana draytonii California red-legged frog	G2G3 S2S3	Threatened None	CDFW_SSC-Species of Special Concern IUCN_VU-Vulnerable	222 2,585	1527 S:66	14	19	6	1	2	24	20	46	64	2	0
Sanicula saxatilis rock sanicle	G2 S2	None Rare	Rare Plant Rank - 1B.2 BLM_S-Sensitive	2,800 4,100	9 S:3	2	1	0	0	0	0	1	2	3	0	0
Senecio aphanactis chaparral ragwort	G3 S2	None None	Rare Plant Rank - 2B.2		82 S:1	0	0	0	0	0	1	1	0	1	0	0
Serpentine Bunchgrass Serpentine Bunchgrass	G2 S2.2	None None		480 900	22 S:4	0	1	0	1	0	2	4	0	4	0	0
Streptanthus albidus ssp. albidus Metcalf Canyon jewelflower	G2T1 S1	Endangered None	Rare Plant Rank - 1B.1 BLM_S-Sensitive SB_RSABG-Rancho Santa Ana Botanic Garden	170 900	13 S:13	0	7	2	2	1	1	2	11	12	0	1

Name (Scientific/Common)	CNDDB Ranks	Listing Status (Fed/State)	Other Lists	Elev. Range (ft.)	Total EO's	Element Occ. Ranks A	B	C	D	X	U	Population Status Historic > 20 yr	Recent <= 20 yr	Presence Extant	Poss. Extirp.	Extirp.
Streptanthus albidus ssp. peramoenus most beautiful jewelflower	G2T2 S2	None None	Rare Plant Rank - 1B.2 SB_RSABG-Rancho Santa Ana Botanic Garden USFS_S-Sensitive	400 3,400	103 S:42	7	17	3	1	0	14	3	39	42	0	0
Sycamore Alluvial Woodland Sycamore Alluvial Woodland	G1 S1.1	None None		320 320	17 S:1	0	0	1	0	0	0	1	0	1	0	0
Taxidea taxus American badger	G5 S3	None None	CDFW_SSC-Species of Special Concern IUCN_LC-Least Concern	216 891	590 S:16	1	4	0	1	0	10	0	16	16	0	0
Trifolium buckwestiorum Santa Cruz clover	G2 S2	None None	Rare Plant Rank - 1B.1 BLM_S-Sensitive SB_USDA-US Dept of Agriculture	1,890 2,325	58 S:2	0	0	1	1	0	0	1	1	2	0	0
Trifolium hydrophilum saline clover	G2 S2	None None	Rare Plant Rank - 1B.2		49 S:1	0	0	0	0	0	1	1	0	1	0	0
Trifolium polyodon Pacific Grove clover	G1 S1	None Rare	Rare Plant Rank - 1B.1 BLM_S-Sensitive SB_USDA-US Dept of Agriculture	695 695	21 S:1	0	0	0	0	0	1	0	1	1	0	0
Trimerotropis infantilis Zayante band-winged grasshopper	G1 S1	Endangered None	IUCN_EN-Endangered	100 800	6 S:2	0	0	0	0	1	1	2	0	1	0	1
Vulpes macrotis mutica San Joaquin kit fox	G4T2 S2	Endangered Threatened		1,220 1,220	1018 S:1	0	0	0	0	0	1	1	0	1	0	0

C.3 California Native Plant Society: Rare Plant Program Inventory of Rare and Endangered Plants

California Native Plant Society (CNPS), CNPS, 2019. Rare Plant Program Inventory of Rare and Endangered Plants of California (online edition, v8-03 0.45) for 7.5 minute Topographic Quadrangles Laurel, Lick Observatory, Loma Prieta, Morgan Hill, Mt. Madonna, San José East, San José West, Santa Teresa Hills, and Los Gatos. Website http://www.rareplants.cnps.org [accessed 2 February 2019].

Scientific Name	Common Name	Family	Lifeform	CRPR	CESA	FESA	Blooming Period	Habitat	Micro Habitat	Elevation Low (ft)	Elevation High (ft)
Acanthomintha lanceolata	Santa Clara thorn-mint	Lamiaceae	annual herb	4.2	None	None	Mar-Jun	Chaparral (often serpentinite), Cismontane woodland, Coastal scrub	rocky	260	3935
Amsinckia lunaris	bent-flowered fiddleneck	Boraginaceae	annual herb	1B.2	None	None	Mar-Jun	Coastal bluff scrub, Cismontane woodland, Valley and foothill grassland		5	1640
Androsace elongata ssp. acuta	California androsace	Primulaceae	annual herb	4.2	None	None	Mar-Jun	Chaparral, Cismontane woodland, Coastal scrub, Meadows and seeps, Pinyon and juniper woodland, Valley and foothill grassland		490	4280
Arctostaphylos andersonii	Anderson's manzanita	Ericaceae	perennial evergreen shrub	1B.2	None	None	Nov-May	Broadleafed upland forest, Chaparral, North Coast coniferous forest	openings, edges	195	2495
Arctostaphylos silvicola	Bonny Doon manzanita	Ericaceae	perennial evergreen shrub	1B.2	None	None	Jan-Mar	Closed-cone coniferous forest, Chaparral, Lower montane coniferous forest	inland marine sands	390	1970
Balsamorhiza macrolepis	big-scale balsamroot	Asteraceae	perennial herb	1B.2	None	None	Mar-Jun	Chaparral, Cismontane woodland, Valley and foothill grassland	sometimes serpentinite	145	5100
Calandrinia breweri	Brewer's calandrinia	Montiaceae	annual herb	4.2	None	None	(Jan)Mar-Jun	Chaparral, Coastal scrub	sandy or loamy, disturbed sites and burns	30	4005
Calochortus umbellatus	Oakland star-tulip	Liliaceae	perennial bulbiferous herb	4.2	None	None	Mar-May	Broadleafed upland forest, Chaparral, Cismontane woodland, Lower montane coniferous forest, Valley and foothill grassland	often serpentinite	325	2295
Calyptridium parryi var. hesseae	Santa Cruz Mountains pussypaws	Montiaceae	annual herb	1B.1	None	None	May-Aug	Chaparral, Cismontane woodland	sandy or gravelly, openings	1000	5020
Calystegia collina ssp. venusta	South Coast Range morning-glory	Convolvulaceae	perennial rhizomatous herb	4.3	None	None	Apr-Jun	Chaparral, Cismontane woodland, Valley and foothill grassland	serpentinite or sedimentary	1390	4890
Campanula exigua	chaparral harebell	Campanulaceae	annual herb	1B.2	None	None	May-Jun	Chaparral (rocky, usually serpentinite)		900	4100
Carex comosa	bristly sedge	Cyperaceae	perennial rhizomatous herb	2B.1	None	None	May-Sep	Coastal prairie, Marshes and swamps (lake margins), Valley and foothill grassland		0	2050

Carex saliniformis	deceiving sedge	Cyperaceae	perennial rhizomatous herb	1B.2	None	None	Jun(Jul)	Coastal prairie, Coastal scrub, Meadows and seeps, Marshes and swamps (coastal salt)	mesic	5	755
Castilleja affinis var. neglecta	Tiburon paintbrush	Orobanchaceae	perennial herb (hemiparasitic)	1B.2	CT	FE	Apr-Jun	Valley and foothill grassland (serpentinite)		195	1310
Castilleja rubicundula var. rubicundula	pink creamsacs	Orobanchaceae	annual herb (hemiparasitic)	1B.2	None	None	Apr-Jun	Chaparral (openings), Cismontane woodland, Meadows and seeps, Valley and foothill grassland	serpentinite	65	2985
Ceanothus ferrisiae	Coyote ceanothus	Rhamnaceae	perennial evergreen shrub	1B.1	None	FE	Jan-May	Chaparral, Coastal scrub, Valley and foothill grassland	serpentinite	390	1510
Centromadia parryi ssp. congdonii	Congdon's tarplant	Asteraceae	annual herb	1B.1	None	None	May-Oct(Nov)	Valley and foothill grassland (alkaline)		0	755
Chlorogalum pomeridianum var. minus	dwarf soaproot	Agavaceae	perennial bulbiferous herb	1B.2	None	None	May-Aug	Chaparral (serpentinite)		1000	3280
Chorizanthe douglasii	Douglas' spineflower	Polygonaceae	annual herb	4.3	None	None	Apr-Jul	Chaparral, Cismontane woodland, Coastal scrub, Lower montane coniferous forest, Valley and foothill grassland	sandy or gravelly	180	5250
Chorizanthe pungens var. hartwegiana	Ben Lomond spineflower	Polygonaceae	annual herb	1B.1	None	FE	Apr-Jul	Lower montane coniferous forest (maritime ponderosa pine sandhills)		295	2000
Chorizanthe pungens var. pungens	Monterey spineflower	Polygonaceae	annual herb	1B.2	None	FT	Apr-Jun(Jul-Aug)	Chaparral (maritime), Cismontane woodland, Coastal dunes, Coastal scrub, Valley and foothill grassland	sandy	5	1475
Chorizanthe robusta var. hartwegii	Scotts Valley spineflower	Polygonaceae	annual herb	1B.1	None	FE	Apr-Jul	Meadows and seeps (sandy), Valley and foothill grassland (mudstone and Purisima outcrops)		750	805
Chorizanthe robusta var. robusta	robust spineflower	Polygonaceae	annual herb	1B.1	None	FE	Apr-Sep	Chaparral (maritime), Cismontane woodland (openings), Coastal dunes, Coastal scrub	sandy or gravelly	5	985
Cirsium fontinale var. campylon	Mt. Hamilton fountain thistle	Asteraceae	perennial herb	1B.2	None	None	(Feb)Apr-Oct	Chaparral, Cismontane woodland, Valley and foothill grassland	serpentinite seeps	325	2920

Clarkia breweri	Brewer's clarkia	Onagraceae	annual herb	4.2	None	None	Apr-Jun	Chaparral, Cismontane woodland, Coastal scrub	often serpentinite	705	3660
Clarkia concinna ssp. automixa	Santa Clara red ribbons	Onagraceae	annual herb	4.3	None	None	(Apr)May-Jun(Jul)	Chaparral, Cismontane woodland		295	4920
Clarkia lewisii	Lewis' clarkia	Onagraceae	annual herb	4.3	None	None	May-Jul	Broadleafed upland forest, Closed-cone coniferous forest, Chaparral, Cismontane woodland, Coastal scrub		95	3920
Collinsia multicolor	San Francisco collinsia	Plantaginaceae	annual herb	1B.2	None	None	(Feb)Mar-May	Closed-cone coniferous forest, Coastal scrub	sometimes serpentinite	95	820
Cypripedium fasciculatum	clustered lady's-slipper	Orchidaceae	perennial rhizomatous herb	4.2	None	None	Mar-Aug	Lower montane coniferous forest, North Coast coniferous forest	usually serpentinite seeps and streambanks	325	7990
Cypripedium montanum	mountain lady's-slipper	Orchidaceae	perennial rhizomatous herb	4.2	None	None	Mar-Aug	Broadleafed upland forest, Cismontane woodland, Lower montane coniferous forest, North Coast coniferous forest		605	7300
Dudleya abramsii ssp. setchellii	Santa Clara Valley dudleya	Crassulaceae	perennial herb	1B.1	None	FE	Apr-Oct	Cismontane woodland, Valley and foothill grassland	serpentinite, rocky	195	1495
Elymus californicus	California bottle-brush grass	Poaceae	perennial herb	4.3	None	None	May-Aug(Nov)	Broadleafed upland forest, Cismontane woodland, North Coast coniferous forest, Riparian woodland		45	1540
Eriogonum nudum var. decurrens	Ben Lomond buckwheat	Polygonaceae	perennial herb	1B.1	None	None	Jun-Oct	Chaparral, Cismontane woodland, Lower montane coniferous forest (maritime ponderosa pine sandhills)	sandy	160	2625
Eryngium aristulatum var. hooveri	Hoover's button-celery	Apiaceae	annual / perennial herb	1B.1	None	None	(Jun)Jul(Aug)	Vernal pools		5	150
Erysimum teretifolium	Santa Cruz wallflower	Brassicaceae	perennial herb	1B.1	CE	FE	Mar-Jul	Chaparral, Lower montane coniferous forest	inland marine sands	390	2000
Fissidens pauperculus	minute pocket moss	Fissidentaceae	moss	1B.2	None	None		North Coast coniferous forest (damp coastal soil)		30	3360

Fritillaria liliacea	fragrant fritillary	Liliaceae	perennial bulbiferous herb	1B.2	None	None	Feb-Apr	Cismontane woodland, Coastal prairie, Coastal scrub, Valley and foothill grassland	Often serpentinite	5	1345
Galium andrewsii ssp. gatense	phlox-leaf serpentine bedstraw	Rubiaceae	perennial herb	4.2	None	None	Apr-Jul	Chaparral, Cismontane woodland, Lower montane coniferous forest	serpentinite, rocky	490	4755
Hoita strobilina	Loma Prieta hoita	Fabaceae	perennial herb	1B.1	None	None	May-Jul(Aug-Oct)	Chaparral, Cismontane woodland, Riparian woodland	usually serpentinite, mesic	95	2820
Holocarpha macradenia	Santa Cruz tarplant	Asteraceae	annual herb	1B.1	CE	FT	Jun-Oct	Coastal prairie, Coastal scrub, Valley and foothill grassland	often clay, sandy	30	720
Iris longipetala	coast iris	Iridaceae	perennial rhizomatous herb	4.2	None	None	Mar-May	Coastal prairie, Lower montane coniferous forest, Meadows and seeps	mesic	0	1970
Lasthenia conjugens	Contra Costa goldfields	Asteraceae	annual herb	1B.1	None	FE	Mar-Jun	Cismontane woodland, Playas (alkaline), Valley and foothill grassland, Vernal pools	mesic	0	1540
Leptosiphon acicularis	bristly leptosiphon	Polemoniaceae	annual herb	4.2	None	None	Apr-Jul	Chaparral, Cismontane woodland, Coastal prairie, Valley and foothill grassland		180	4920
Leptosiphon ambiguus	serpentine leptosiphon	Polemoniaceae	annual herb	4.2	None	None	Mar-Jun	Cismontane woodland, Coastal scrub, Valley and foothill grassland	usually serpentinite	390	3705
Leptosiphon grandiflorus	large-flowered leptosiphon	Polemoniaceae	annual herb	4.2	None	None	Apr-Aug	Coastal bluff scrub, Closed-cone coniferous forest, Cismontane woodland, Coastal dunes, Coastal prairie, Coastal scrub, Valley and foothill grassland	usually sandy	15	4005
Leptosyne hamiltonii	Mt. Hamilton coreopsis	Asteraceae	annual herb	1B.2	None	None	Mar-May	Cismontane woodland (rocky)		1800	4265
Lessingia hololeuca	woolly-headed lessingia	Asteraceae	annual herb	3	None	None	Jun-Oct	Broadleafed upland forest, Coastal scrub, Lower montane coniferous forest, Valley and foothill grassland	clay, serpentinite	45	1000
Lessingia micradenia var. glabrata	smooth lessingia	Asteraceae	annual herb	1B.2	None	None	(Apr-Jun)Jul-Nov	Chaparral, Cismontane woodland, Valley and foothill grassland	serpentinite, often roadsides	390	1380

Lomatium observatorium	Mt. Hamilton lomatium	Apiaceae	perennial herb	1B.2	None	None	Mar-May	Cismontane woodland		3995	4365
Malacothamnus arcuatus	arcuate bush-mallow	Malvaceae	perennial evergreen shrub	1B.2	None	None	Apr-Sep	Chaparral, Cismontane woodland		45	1165
Malacothamnus hallii	Hall's bush-mallow	Malvaceae	perennial evergreen shrub	1B.2	None	None	(Apr)May-Sep(Oct)	Chaparral, Coastal scrub		30	2495
Micropus amphibolus	Mt. Diablo cottonweed	Asteraceae	annual herb	3.2	None	None	Mar-May	Broadleafed upland forest, Chaparral, Cismontane woodland, Valley and foothill grassland	rocky	145	2705
Monolopia gracilens	woodland woolythreads	Asteraceae	annual herb	1B.2	None	None	(Feb)Mar-Jul	Broadleafed upland forest (openings), Chaparral (openings), Cismontane woodland, North Coast coniferous forest (openings), Valley and foothill grassland	Serpentine	325	3935
Penstemon rattanii var. kleei	Santa Cruz Mountains beardtongue	Plantaginaceae	perennial herb	1B.2	None	None	May-Jun	Chaparral, Lower montane coniferous forest, North Coast coniferous forest		1310	3610
Phacelia phacelioides	Mt. Diablo phacelia	Hydrophyllaceae	annual herb	1B.2	None	None	Apr-May	Chaparral, Cismontane woodland	rocky	1640	4495
Plagiobothrys chorisianus var. chorisianus	Choris' popcornflower	Boraginaceae	annual herb	1B.2	None	None	Mar-Jun	Chaparral, Coastal prairie, Coastal scrub	mesic	5	525
Plagiobothrys chorisianus var. hickmanii	Hickman's popcornflower	Boraginaceae	annual herb	4.2	None	None	Apr-Jun	Closed-cone coniferous forest, Chaparral, Coastal scrub, Marshes and swamps, Vernal pools		45	605
Plagiobothrys diffusus	San Francisco popcornflower	Boraginaceae	annual herb	1B.1	CE	None	Mar-Jun	Coastal prairie, Valley and foothill grassland		195	1180
Plagiobothrys glaber	hairless popcornflower	Boraginaceae	annual herb	1A	None	None	Mar-May	Meadows and seeps (alkaline), Marshes and swamps (coastal salt)		45	590
Polygonum hickmanii	Scotts Valley polygonum	Polygonaceae	annual herb	1B.1	CE	FE	May-Aug	Valley and foothill grassland (mudstone and sandstone)		685	820

Ranunculus lobbii	Lobb's aquatic buttercup	Ranunculaceae	annual herb (aquatic)	4.2	None	None	Feb-May	Cismontane woodland, North Coast coniferous forest, Valley and foothill grassland, Vernal pools	mesic	45	1540
Sanicula saxatilis	rock sanicle	Apiaceae	perennial herb	1B.2	CR	None	Apr-May	Broadleafed upland forest, Chaparral, Valley and foothill grassland	rocky, scree, talus	2030	3855
Senecio aphanactis	chaparral ragwort	Asteraceae	annual herb	2B.2	None	None	Jan-Apr(May)	Chaparral, Cismontane woodland, Coastal scrub	sometimes alkaline	45	2625
Sidalcea malachroides	maple-leaved checkerbloom	Malvaceae	perennial herb	4.2	None	None	(Mar)Apr-Aug	Broadleafed upland forest, Coastal prairie, Coastal scrub, North Coast coniferous forest, Riparian woodland	Often in disturbed areas	0	2395
Streptanthus albidus ssp. albidus	Metcalf Canyon jewelflower	Brassicaceae	annual herb	1B.1	None	FE	Apr-Jul	Valley and foothill grassland (serpentinite)		145	2625
Streptanthus albidus ssp. peramoenus	most beautiful jewelflower	Brassicaceae	annual herb	1B.2	None	None	(Mar)Apr-Sep(Oct)	Chaparral, Cismontane woodland, Valley and foothill grassland	serpentinite	310	3280
Trifolium buckwestiorum	Santa Cruz clover	Fabaceae	annual herb	1B.1	None	None	Apr-Oct	Broadleafed upland forest, Cismontane woodland, Coastal prairie	gravelly, margins	340	2000
Trifolium hydrophilum	saline clover	Fabaceae	annual herb	1B.2	None	None	Apr-Jun	Marshes and swamps, Valley and foothill grassland (mesic, alkaline), Vernal pools		0	985

C.4 United States Fish and Wildlife: List of Threatened and Endangered Species that May Occur in the Proposed Project Location

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Sacramento Fish And Wildlife Office
Federal Building
2800 Cottage Way, Room W-2605
Sacramento, CA 95825-1846
Phone: (916) 414-6600 Fax: (916) 414-6713

In Reply Refer To: February 04, 2019
Consultation Code: 08ESMF00-2016-SLI-2284
Event Code: 08ESMF00-2019-E-02639
Project Name: Almaden Lake Improvement Project

Subject: Updated list of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, under the jurisdiction of the U.S. Fish and Wildlife Service (Service) that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the Service under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

Please follow the link below to see if your proposed project has the potential to affect other species or their habitats under the jurisdiction of the National Marine Fisheries Service:

http://www.nwr.noaa.gov/protected_species/species_list/species_lists.html

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 *et seq.*), and projects affecting these species may require development of an eagle conservation plan (http://www.fws.gov/windenergy/eagle_guidance.html). Additionally, wind energy projects should follow the wind energy guidelines (http://www.fws.gov/windenergy/) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm; http://www.towerkill.com; and http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Sacramento Fish And Wildlife Office
Federal Building
2800 Cottage Way, Room W-2605
Sacramento, CA 95825-1846
(916) 414-6600

Project Summary

Consultation Code: 08ESMF00-2016-SLI-2284

Event Code: 08ESMF00-2019-E-02639

Project Name: Almaden Lake Improvement Project

Project Type: STREAM / WATERBODY / CANALS / LEVEES / DIKES

Project Description: San Jose, CA

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/place/37.23856239513955N121.87165411395027W

Counties: Santa Clara, CA

Endangered Species Act Species

There is a total of 9 threatened, endangered, or candidate species on this 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 fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Mammals

NAME	STATUS
San Joaquin Kit Fox *Vulpes macrotis mutica* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/2873	Endangered

Birds

NAME	STATUS
California Least Tern *Sterna antillarum browni* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/8104	Endangered
Marbled Murrelet *Brachyramphus marmoratus* Population: U.S.A. (CA, OR, WA) There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/4467	Threatened

Amphibians

NAME	STATUS
California Red-legged Frog *Rana draytonii* There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/2891	Threatened
California Tiger Salamander *Ambystoma californiense* Population: U.S.A. (Central CA DPS) There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/2076	Threatened

Fishes

NAME	STATUS
Delta Smelt *Hypomesus transpacificus* There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/321	Threatened

Insects

NAME	STATUS
Bay Checkerspot Butterfly *Euphydryas editha bayensis* There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/2320	Threatened

Flowering Plants

NAME	STATUS
Metcalf Canyon Jewelflower *Streptanthus albidus ssp. albidus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/4186	Endangered
Santa Clara Valley Dudleya *Dudleya setchellii* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/3207	Endangered

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

C.5 Santa Clara Valley Habitat Plan: Conditions on Covered Activities

Chapter 6
Conditions on Covered Activities and Application Process

6.1 Introduction

As required by ESA (Section 10[a][2][A][ii]) and Fish and Game Code Sections 2820 (a)(6) and 2820(f), this Plan includes measures to avoid and minimize take of covered species. These measures to avoid and minimize impacts are described as *conditions on covered activities* and are designed to achieve the objectives listed below.

- Provide avoidance of covered species during implementation of covered activities throughout the study area.
- Prevent take of individuals from covered activities as prohibited by law (e.g., take of fully protected species).
- Minimize adverse effects on natural communities and covered species where conservation actions will take place.
- Avoid and minimize impacts on jurisdictional wetlands and waters throughout the study area.

In the context of effects on covered species, one of the greatest benefits of an HCP/NCCP is that mitigation for individual projects can be implemented systematically on a regional scale. This enables a more comprehensive approach to conservation that concentrates protection where it has the greatest value. The Plan also restricts covered activities in high-value land cover types (e.g., wetlands, serpentine grassland) and for some species (e.g., covered plants and selected covered wildlife species). By protecting high-quality areas in the Reserve System and restricting covered activities in areas of higher biological value, regional avoidance and minimization goals are supported.

This chapter describes conditions on covered activities that help meet regional avoidance and minimization goals. Regional avoidance and minimization reduces the need for individual projects to avoid and minimize impacts at the project scale and allows streamlining of regulatory requirements. This Plan assumes that take will result from individual covered activities and that this take will be mitigated through the conservation strategy (Chapter 5). Most activities covered under this Plan are required to provide limited documentation of field conditions to verify these assumptions (see Section 6.2 *Exemptions from Conditions*).

Avoidance and minimization measures are regulated by federal, state, and local programs. The conditions on covered activities (avoidance and minimization measures), described in this chapter do not supersede requirements by other agencies and are not intended to provide a basis for non-compliance with other applicable design guidelines required by other federal, state, and local agencies.

This chapter also describes the application process for individual projects to request coverage under this Plan. The application process is described in detail at the end of this chapter in Sections 6.7 *Receiving Take Authorization under the Plan* and 6.8 *Habitat Plan Application Package*. The conditions on covered activities and application process are included in this chapter together so that project proponents have one location in this document in which all requirements are described.

The NCCP Act requires that the Permittees get concurrence from the Wildlife Agencies before adopting, amending, or approving any plan or project that is inconsistent with the objectives and requirements of this Plan[1]. The conditions described in this chapter are designed to ensure this consistency and provide standard and predictable requirements for project applicants. However, Permittees may need to adopt or impose additional conditions beyond those described in this chapter for unanticipated projects or effects in order to ensure consistency with the Habitat Plan and compliance with the NCCP Act. The Permittees will evaluate all projects respective to their authorities to ensure that all applicable conditions described in this chapter have been incorporated into the project prior to extending take coverage under the Plan. Chapter 8 describes applicant responsibilities in the application process.

In addition to the conditions described in this chapter to avoid and minimize impacts, covered activities may also require payment of mitigation fees (see Chapter 9), provision of land in lieu of mitigation fees (see Chapter 8), or habitat restoration or creation in lieu of wetland fees.

6.2 Exemptions from Conditions

Many projects within the study area do not disturb the ground or have little or no measurable impact on the covered species or natural communities. Because the probability of take is so low, the need to enforce conditions on the projects and activities specified below would not provide a net benefit for species. Therefore, these covered activities are not subject to the conditions described in this chapter. Quantifiable impacts associated with activities exempt from conditions of the Habitat Plan will be reported in the Application Package (see Section 6.8, below) (impacts that cannot be quantified will not be tracked). Although these covered activities are exempted from the conditions, all of them receive take coverage (**Table 6-1**).

[1] Fish and Game Code Section 2820(b)(3).

Exemptions based on land cover types are based on the mapping for this Plan at the time of permit issuance and the nature of covered activities previously permitted on the site.

Many of the covered activities exempt from the conditions in this chapter may also be exempt from the Habitat Plan fees, as described in Chapter 9, Section 9.4.1 *Habitat Plan Fees*. The association between covered activities exempt from conditions on covered activities and Habitat Plan fees are shown in **Table 6-1**.

The following activities and projects are exempt from all of the conditions in this chapter and are not tracked as impacts by the Implementing Entity (as described above)[2].

- Projects that do not result in ground disturbance do not result in release of potential water quality contaminants, or do not create new wildlife barriers.
- Private-sector, routine-maintenance activities that require a development, grading, or building permit, and that occur inside the urban service area (private-sector activities that do not require a development, grading, or building permit are not covered by the Plan or its conditions or fees).
- Private-sector, routine-maintenance activities that require a development, grading, or building permit; that occur outside of the urban service area; and that occur within 50 feet of all existing structures at the time of Plan commencement or within 50 feet of structures that were permitted for incidental take under the Habitat Plan.
- Any covered activity described in Chapter 2 that occurs in urban-suburban, landfill, reservoir[3], or agriculture developed[4] land cover types as verified in the field, unless the activity may affect a mapped or unmapped stream, riparian, serpentine, pond, or wetland land cover types, or the activity is located in a stream setback (see Condition 11 for a discussion of stream setbacks).
- Routine infrastructure maintenance by public agencies within the planning limit of urban growth that do not affect stream, riparian, serpentine, ponds, or wetland land cover types.
- Routine infrastructure maintenance by public agencies that occurs in urban-suburban, landfill, reservoir, or agriculture developed land cover types that do not affect stream, riparian, serpentine, pond, or wetland land cover types. Examples of such activities include filling pot-holes and resurfacing existing roads without expansion of the paved area.

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[2] Project proponents are still required to comply with survey and avoidance requirements for applicable local, state, and federal laws not addressed by the Habitat Plan (e.g., local tree ordinances, state fully protected species, the federal Migratory Bird Treaty Act).

[3] "Reservoir" does not include the dam face. Exemptions described in this chapter do not apply to projects impacting the face of covered dams.

[4] The land cover type "agriculture developed" (also known as agriculture developed/covered ag) is defined in Chapter 3 as intensive agricultural operations such as nurseries and greenhouses.

The following activities[5] are also exempt from all conditions in this chapter but will be tracked by the Implementing Entity as impacts when they occur on natural land cover types.

- Additions to existing structures or new structures that are within 50 feet of an existing structure (e.g., a new garage) that result in less than less than 5,000 square feet of impervious surface so long as no stream, riparian, wetlands, ponds, or serpentine land cover type are affected. Additions are cumulative and must be calculated based on the footprint of the structure at time of Plan implementation to determine whether this threshold has been crossed.
- A covered activity on a parcel of less than 0.5 acre or less as long as no serpentine, stream, riparian, pond, or wetland land cover type is within the parcel.

A project proponent of a covered activity in the Plan will not be required to comply with the conditions in this chapter or pay any Habitat Plan fees if the proponent of the activity provides written confirmation to the Implementing Entity that the CDFG and USFWS have determined that the activity is not subject to CESA and ESA, respectively; or has already received the necessary take authorizations under CESA and ESA; or has otherwise complied with CESA and ESA. An activity will be deemed to be in compliance with CESA and ESA by the Implementing Entity and thus be exempt from the conditions in this chapter and otherwise comply with the Habitat Plan if the proponent provides the following:

1. Letters from both USFWS and CDFG that specifically refers to the activity and states that the activity is not likely to result in take of any federally or state listed species and will not preclude successful implementation of the conservation strategy for all covered species, or
2. A copy of an incidental take permit issued by CDFG for the activity, and copies of incidental take statements or incidental take permits issued by USFWS that authorize the incidental take associated with the proposed activity.

Additional covered activities are exempt from species surveys, as described in Section 6.8.5 *Item 5: Results of Applicable Species Surveys and Monitoring*, below.

Activities or projects listed in Chapter 2, Section 2.4 *Projects and Activities Not Covered by this Plan*, are specifically excluded from coverage under this Plan and therefore cannot receive take authorization, are not subject to the conditions in this chapter, and do not pay Habitat Plan fees (see Section 2.4 for additional information on these excluded activities and projects). These projects are listed below.

[5] Although private development that does not meet the criteria described in Section 2.3.2 *Urban Development* subheading *Private Development Coverage Area* and additions of less than 5,000 square feet of new impervious surface (regardless of parcel size) are not subject to the Plan, project proponents may choose to opt into the Plan. If project proponents seek to have these activities covered, the bulleted exemptions apply.

- Private sector activities that do not obtain a development, grading, building, or other construction permit involving land disturbance for the purposes of making land improvements, such as the construction of buildings, roads, and driveways ("building permits" referenced herein do not include plumbing, electrical, or mechanical permits). Activities that do not obtain these development permits are not covered by the Plan.
- SCVWD Stream Maintenance Program activities.
- City of Gilroy expansion beyond the Plan's planning limit of urban growth.
- Bay Area to Central Valley high-speed train.
- New highway between I-5 and U.S. 101.
- Routine and ongoing agricultural activities or expansion of cultivated agriculture into natural land cover types, including vineyard development, that does not seek discretionary approval or permitting by the local jurisdiction.
- Timber harvest operations.
- Quarries and other mining other than expansion of Freeman Quarry (except as otherwise noted).
- New and expanded landfills other than Kirby Canyon, Pacheco Pass Landfill expansions, and landfills occurring inside the planning limit of urban growth of the three cities.
- Mercury removal/remediation (unless described in Chapter 2 as a covered activity).
- Corps led projects.
- Pacheco dam reconstruction and reservoir enlargement.
- Pesticide/ herbicide application for the federal permit.
- Installation and operation of groundwater wells (except as otherwise noted).
- Increased development due to incorporation of San Martin.
- Dam removal and/or construction of new dams.
- Wind farm development.
- Water importation from outside the SCVWD service area.
- Emergency activities.

6.3 Conditions on All Covered Activities

The conditions below are categorized and described in several ways: by activity type, by natural community, and by species. Collectively they provide for regional and site-specific avoidance and minimization of impacts on covered species and sensitive land cover types. It is the responsibility of project proponents to design and implement their projects in compliance with these conditions. For private projects, the applicable local jurisdictions will review project compliance with the conditions in this chapter. The Local Partners will determine best adherence to conditions where discretion exists. If a project applicant proposes to use a less preferable design option (e.g., a culvert instead of a free-span bridge), the project applicant must demonstrate why a preferred option is infeasible. For private applicants, local jurisdictions will determine if this rationale is sufficient under these circumstances.

Conditions on covered activities, including avoidance and minimization measures identified for certain covered activities and species-specific measures, may be revised over the course of the permit term based on results of implementation through the adaptive management process. Proposed revisions will be reviewed by the Wildlife Agencies upon submission of each annual report to ensure the successful implementation of the conservation strategy. Agencies will review and respond within 30 days. Revisions to conditions will be approved by the Wildlife Agencies prior to the Permittees adopting revised conditions. Allowing such revisions will ensure that out-of-date or unsuccessful management techniques do not persist and that best available science can be incorporated into the conditions as appropriate for the Plan.

Compliance with the Habitat Plan does not preclude compliance with all other applicable state and federal laws. It is the project proponent's responsibility to ensure compliance with all applicable laws and regulations.

All projects that discharge dredged or fill material into waters of the United States, including federal jurisdictional wetlands, are required to obtain applicable permits (e.g., Clean Water Act Section 404 and Section 401) from the Corps and the Regional Board. Projects that place fill, alter the bed bank or channel, or divert the flow of streams, alter portions of streams above the ordinary high water mark, alter streams that lack a nexus to navigable waters, wetlands, or lakes under the jurisdiction of the state only are required to obtain a waste discharge requirement from the Regional Board and enter into a streambed alteration agreement with CDFG[6]. Any project that requires a permit from the Corps, Regional Board, or CDFG for impacts on streams and other aquatic areas may be subject to avoidance and minimization requirements. Those requirements may differ from the avoidance and minimization requirements in this Plan.

Condition 1, described below, pertains to all covered activities. Other conditions specifically pertain to certain types of activities, certain species, or certain natural communities and are enumerated in subsequent sections.

[6] Activities covered by this Plan that need a streambed alteration agreement are expected to fully meet the standards of the streambed alteration agreement through compliance with this Plan for species covered by the Plan.

Condition 1. Avoid Direct Impacts on Legally Protected Plant and Wildlife Species

Contra Costa Goldfields

Contra Costa goldfields is a federally endangered and CNPS 1B plant species whose extreme rarity precludes coverage under the Habitat Plan. Because the Habitat Plan does not cover the species, compliance is required on an individual basis.

The likelihood of discovery of new occurrences is very low. If a new occurrence of this species is found, its avoidance would be of the highest importance to the species' viability. If an applicant encounters Contra Costa goldfields on their site, they will contact the USFWS for written concurrence of avoidance to ensure that the project does not jeopardize the continued existence of the species.

Wildlife Species Protected Under Other Laws

Several wildlife species that occur in the study area are listed as fully protected, as defined under Sections 3511 and 4700 of the California Fish and Game Code. As described in Chapter 1, CDFG cannot issue permits for take[7] of these species. Fully protected species that are known or likely to occur in the study area are listed below.

- Golden eagle.
- Bald eagle.
- American peregrine falcon.
- Southern bald eagle.
- White-tailed kite.
- California condor.
- Ring-tailed cat (= ringtail).

Three of the fully protected raptor species—white-tailed kite, peregrine falcon, and golden eagle—forage widely throughout the study area but nest in discrete locations. Bald eagles are rare winter migrants to Santa Clara County but have been known to breed in the San Francisco Bay Area. A California condor population has been established in San Benito County (Pinnacles National Monument) and birds forage occasionally in Santa Clara County. Additionally, ringtails may be found in some riparian woodlands in the study area.

Further, all migratory bird species and their nests are protected under the Migratory Bird Treaty Act (MBTA). All birds listed above and those covered by

[7] Take is defined more narrowly in the California Fish and Game Code than in the ESA; see Chapter 1, *Introduction*, for details.

the Plan (western burrowing owl, least Bell's vireo, and tricolored blackbird) are considered migratory birds and subject to the prohibitions of the MBTA. Actions conducted under the Plan must comply with the provisions of the MBTA and avoid killing or possessing covered migratory birds, their young, nests, feathers, or eggs. As described in Chapter 1, the ESA incidental take permit, once issued by USFWS, will automatically function as an MBTA Special Purpose Permit, as specified under 50 CFR Sec. 21.27, for least Bell's vireo (the only migratory bird listed as threatened or endangered under the ESA) for a 3-year term subject to renewal by the Permittees (see Appendix 5 in U.S. Fish and Wildlife Service and National Marine Fisheries Service 1996). Should any other of the covered migratory birds become listed under the ESA during the permit term, the ESA permit would also constitute a Special Purpose Permit under the MBTA for that species for a 3-year term subject to renewal by the Permittees.

Golden eagle and bald eagle are also protected under the Bald and Golden Eagle Protection Act. Take of golden eagle or bald eagle includes "impacts that result from human-caused alterations initiated around a previously used nest site during a time when eagles are not present, if, upon the eagle's return, such alterations agitate or bother an eagle to a degree that injures an eagle or substantially interferes with normal breeding, feeding, or sheltering habits and causes, or is likely to cause, a loss of productivity or nest abandonment" (72 FR 31133).

6.4 Conditions on Specific Covered Activities

Conditions 2–10 pertain to seven specific categories of covered activities: urban development, in-stream capital projects, in-stream operations and maintenance, rural capital projects, rural operations and maintenance, rural residential development, and Plan implementation.

6.4.1 Urban Development

Urban development is defined as development occurring inside the urban service area of the three Local Partner cities. Although urban development is assumed in the impact analysis to occur throughout the planning limit of urban growth of each city over the 50-year Habitat Plan permit term, the density of development is not assumed to be urban unless the area is also inside of the urban service area.

There are two conditions on new urban development required by the Plan. Conditions on urban development are limited because of the generally low biological value of resources within urban areas[8]. The two general exceptions are the urban fringe and stream resources. Condition 2 below addresses the edge of new urban development in relationship to the Reserve System; in-stream activities are addressed in subsequent conditions.

[8] See Chapter 3 for the rationale for this assumption and Chapter 5 for identification of selected sites in urban areas with high-value resources.

Condition 2. Incorporate Urban-Reserve System Interface Design Requirements

For the purposes of this Plan, the urban-Reserve System interface is defined as the zone between existing and future urban development and the Reserve System. Because the study area includes three cities, development is anticipated adjacent to the Reserve System in some locations. Because of the influence of urban land uses it is anticipated that some areas generally unsuitable for covered species will border some of the Reserves. Urban buildout adjacent to reserves has the potential to directly or indirectly adversely affect covered species and natural communities within the Reserve System. Sources of such adverse effects may include vandalism, dumping of trash, trampling, unauthorized mountain bike or off-road vehicle use; runoff from adjacent streets and landscaped areas containing lawn fertilizer, pesticides, and vehicle waste (petroleum byproducts); introduction of invasive nonnative species (e.g., pampas grass, French broom, Argentine ants, giant reed); lights and noise from nearby development; unregulated movement of domestic animals; and the potential for covered species to enter developed or urban areas.

Beyond minimizing such direct and immediate impacts, the design of the urban-Reserve System interface will consider indirect and long-term effects, such as runoff from developed areas[9] that can transport harmful substances (e.g., pesticides, automotive fluids, sediment) into reserves; establishment of invasive nonnative species that can disperse from nearby landscaped areas; and structural and biological damage (e.g., soil compaction, creation of unauthorized trails, disturbance of sensitive species) that can result from unmanaged human access and use.

The interface design will address the following key questions, which are based on those proposed by Kelly and Rotenberry (1993) for urban reserves in California.

- What external forces or processes may have a negative impact on covered species and habitats at or near the reserve boundary?
- To what extent are those external forces likely to penetrate the boundary and result directly or indirectly in negative impacts on covered species and habitats? (How permeable is the boundary?)
- Which covered species are likely to exit the reserve and expose themselves to increased risk of injury or death?
- What structures can be built or programs implemented to prevent or mitigate these impacts? For example, how can boundary permeability be altered?

With these questions in mind, site-specific interface design requirements were developed to reduce negative impacts of development on covered species and to

[9] In general, development in the permit area will occur downslope from Habitat Plan reserves, so runoff should flow away from reserves. However, because construction grading often alters local drainage patterns, some runoff could flow into reserves if precautions are not taken.

help reduce conflicts if wildlife moves outside the Reserve System. The following sections (*Design Requirements*) describe requirements and opportunities for reducing impacts on covered species and natural communities on Reserve System lands adjacent to urbanized areas.

Design Requirements

New urban development that occurs adjacent to reserves or areas with moderate or high priorities for land acquisition (see Chapter 5, Section5.3.1 *Land Acquisition and Restoration Activities*) will incorporate design requirements at the urban-Reserve System interface to minimize the indirect impacts of development adjacent to existing reserves. The relevant jurisdiction (city or County) will determine which development projects are subject to this condition, as well as which components may be required for a particular development. The Implementing Entity will provide technical assistance when needed. Design requirements to be incorporated in new development at the urban-Reserve System interface, include those listed below.

- Locate the proposed development as far from the reserve boundary as possible consistent with other onsite conditions and constraints.
- Where new development occurs, roads will be placed on the interior of the development (i.e., away from the reserve boundary) to reduce the incidence of domestic pets entering the reserves and to isolate this hazard for wildlife that might enter urban areas from the reserves.
- Fences adjacent to yards or home sites will be designed to minimize the risk of pets escaping private yards and entering reserves (e.g., fences will be as tall as permitted by city and county codes, with no spaces between slats).
- Fences shared with reserve boundaries will not contain any gates between the private property and reserve to prevent entrance and trampling of sensitive species or illegal dumping (legal access to reserves will be provided at recreation staging areas).
- No private gates into the Reserve System will be allowed unless required by a pre-existing access easement and identified as an exception by the Implementing Entity.
- Public roads adjacent to reserves (e.g., a road that is aligned parallel to a reserve boundary) will be fenced to reduce unauthorized public access. Locked gates will be inspected regularly to identify any unauthorized locks.
- Development will be designed to minimize the length of the shared boundary between urban areas and the reserves (i.e., minimize the urban edge).
- Outdoor lighting will be of low intensity and will utilize full cutoff fixtures to reduce light pollution of the surrounding natural areas.
- Use of high-intensity lighting (e.g., recreation facilities, commercial parking lots) near reserves will be avoided or, if necessary, placed as low to the

ground as possible and directed away from the reserves to minimize long-distance glare.

- Public facilities such as ballparks and fields that require high-intensity night lighting (i.e., floodlights) will be sited at least 0.5 mile from the reserve boundary to minimize light pollution. Facilities may be sited closer to the Reserve System if the Implementing Entity determines that the lighting system will not be intrusive to wildlife within the Reserve System (e.g., hills block the lighting).
- For any landscaping, non-invasive plants will be required and use of native plants is highly encouraged, consistent with County landscaping guidelines (County of Santa Clara 2009).
- Natural or artificial barriers or other access restrictions may be installed around development to protect sensitive land cover types and covered species in the reserves. Barriers will be designed so they are appropriate for site conditions and resources protected. Some barriers should keep undesirable pets outside of the Reserve, other barriers should keep covered species inside the Reserve, while others should do both. Before installation of a barrier, consider if the area is used by covered species for movement, if the barrier would prevent movement critical for species life cycle, or if the barrier would encourage species to use other less favorable crossings.

Any design requirements incorporated into projects at the urban-Reserve System interface will be located within the development (i.e., not on the Reserve System) with the exception of the fuel buffer described in Condition 10 below. These features will be maintained by the property owners. The Implementing Entity will monitor compliance with these conditions along the reserve boundary concurrent with other monitoring activities described in Chapter 7. Violations will be reported to the applicable local jurisdiction for enforcement.

Although they are not under obligation or requirement, existing developments located adjacent to reserves or lands identified as land acquisition targets for Plan reserves are encouraged to adopt and implement as many of these design requirements as practicable. Local jurisdictions are encouraged to notify and involve the Implementing Entity during the design review process for large projects planned adjacent to the Reserve System.

In addition to the requirements identified above, several other requirements and avoidance and minimization measures are applicable to development near reserves. Project proponents will comply with the following conditions as appropriate.

- Condition 3. *Maintain Hydrologic Conditions*.
- Condition 7. *Rural Development Design and Construction Requirements*.
- Condition 10. *Fuel Buffer*.

Condition 3. Maintain Hydrologic Conditions and Protect Water Quality

This condition applies to all projects. The implementation of these projects could result in impacts on watershed health through changes in hydrology and water quality.

Currently, all Permittees have stormwater management plans that regulate new development and redevelopment as part of compliance with regulations under National Pollutant Discharge Elimination System (NPDES) permit requirements. An amendment to the Clean Water Act, the NPDES Program is a compliance permit regulating any point source pollution that is discharged into waters of the United States. The San Francisco Bay Regional Board administers the NPDES program in for the Coyote and Guadalupe watersheds. The Central Coast Regional Board administers the NPDES program for the Pajaro Watershed which includes Uvas, Llagas, and Pacheco subbasins. The purpose of this condition is to identify a consistent approach for applying the most important water quality conditions of each Regional Board across the study area (North and South County).

Site Design and Avoidance and Minimization Measures

Through development of stormwater management plans and complementary guidance manuals (Santa Clara Valley Urban Runoff Pollution Prevention Program 2006; City of Gilroy 2004; City of Morgan Hill 2004, 2008; Santa Clara Valley Water Resources Protection Collaborative 2006; Santa Clara Valley Water District 2008), the Permittees have identified a set of programmatic avoidance and minimization measures, performance standards, and control measures to minimize increases of peak discharge of stormwater and to reduce runoff of pollutants to protect water quality including during project construction. These avoidance and minimization measures originated, in part, from the measures that area typically required by the Regional Boards and CDFG for projects that have the potential to affect aquatic resources. Many of these avoidance and minimization measures also support the biological goals and objectives of this Habitat Plan. Implementation of these avoidance and minimization measures will reduce the potential for adverse impacts on covered species. **Table 6-2** lists avoidance and minimization measures for all water-related covered activities described in Condition 3, 4, and 5 of this Plan. Each local jurisdiction, or the Implementing Entity in the case of projects conducted by the Permittees, will verify that all appropriate measures in **Table 6-2** are implemented to minimize effects to covered species and their aquatic habitat (see Section 6.8.6). **Table 6-2** lists the source control measures and avoidance and minimization measures from the Permittees' existing stormwater management plans and complementary manuals that are most effective in protecting covered aquatic species and aquatic species habitat.

The requirements listed in **Table 6-2** include general, project design, construction, and post-construction avoidance and minimization measures. Project design measures are site design planning approaches that protect water quality by preventing and reducing the adverse impacts of stormwater pollutants and increases in peak runoff rate and volume. They include hydrologic source control measures that focus on the protection of natural resources and the reduction of impervious surfaces. Construction site conditions include source and treatment control measure to prevent pollutants from leaving the construction site and minimizing site erosion and local stream sedimentation during construction. Post-construction conditions include measures for municipal operations, stormwater treatment, and flow control.

In addition to the avoidance and minimization measures identified above, several other avoidance and minimization measures are identified in other conditions that will help reduce potential impacts to water quality in the study area. Project proponents will comply with the following conditions as appropriate.

- Condition 2. *Incorporate Urban Reserve System Interface Design Requirements*.
- Condition 4. *Stream Avoidance and Minimization for In-Stream Projects*.
- Condition 5. *Avoidance and Minimization Measures for In-Stream Operations and Maintenance*.
- Condition 7. *Rural Development Design and Construction Requirements*.
- Condition 8. *Implement Avoidance and Minimization Measures for Rural Road Operations and Maintenance*.
- Condition 11. *Stream and Riparian Setbacks*.
- Condition 12. *Wetland and Pond Avoidance and Minimization*.

6.4.2 In-Stream Projects

In-stream projects—such as flood protection projects, construction of new bridges and repair or rehabilitation of existing bridges or culverts, and water supply capital projects—have the capacity to affect wildlife, aquatic species, and habitats by introducing sediment discharge, disturbing earth and riparian vegetation, and altering hydrologic and hydraulic characteristics of water bodies. Condition 4 is designed to address such impacts.

Several of the in-stream covered activities described in Chapter 2 are also covered activities under the SCVWD proposed Three Creeks HCP. The conditions described below for in-stream projects, as well as for stream and riparian habitat and associated covered species (e.g., Condition 16), are consistent with the Three Creeks HCP.

Condition 4. Avoidance and Minimization for In-Stream Projects

The primary purpose of this condition is to identify design requirements and construction practices for in-stream projects to minimize impacts on riparian and aquatic habitat. The term *in-stream* is defined for the purposes of this Plan as the stream bed and bank and the adjacent riparian corridor. The adjacent riparian corridor encompasses all mapped riparian land cover (i.e., riparian forest and scrub natural community) immediately adjacent to a stream (see **Figure 3-10** for mapped land cover types). All in-stream projects must be designed to minimize adverse impacts on stream morphology, aquatic and riparian habitat, and flow conditions. Projects that may also affect wetlands or pond areas are addressed in Condition 12, *Wetland and Pond Avoidance and Minimization*.

All in-stream projects, including projects occurring in dewatered reservoirs, will adopt design requirement and construction avoidance and minimization measures to minimize impacts on covered species, natural communities, and wildlife movement. SCVWD and other Local Partners, such as County Parks, have developed avoidance and minimization measures for projects occurring in streams. The Fishery Network of Central California Coastal Counties (called "FishNet 4C" for the original four counties involved) developed the *County Road Maintenance Guidelines for Protecting Aquatic Habitat and Salmon Fisheries* (Fishery Network of Central California Coastal Counties 2004). This manual, while focused on road maintenance activities, provides avoidance and minimization measures that are applicable to all types of in-stream construction activities. **Table 6-2** summarizes these collected avoidance and minimization measures that are required conditions of in-stream covered activities. Avoidance and minimization measures in this table are applicable to the covered activities addressed in this condition as well as in Condition 3, *Maintain Hydrologic Conditions and Protect Water Quality* and Condition 5, *Avoidance and Minimization Measures for In-Stream Operations and Maintenance*. The avoidance and minimization measures address construction staging, dewatering, sediment management, vegetation management, bank protection, drainage, trail construction, and ground disturbance.

All avoidance and minimization measures listed in **Table 6-2** are required unless the avoidance and minimization measure is not appropriate for the activity or field data collected at the site or in comparable areas demonstrate that the avoidance and minimization measure would not benefit wildlife or reduce impacts on natural communities. The Implementing Entity will update the avoidance and minimization measures in **Table 6-2** over time so that they are more appropriate for implementing a specific covered activity or more beneficial for the covered species. Therefore, the Implementing Entity will update this list of avoidance and minimization measures over the permit term as appropriate to reflect new science and avoidance and minimization measure monitoring results. Proposed revisions will be reviewed by the Wildlife Agencies upon submission of each annual report to ensure the successful implementation of the conservation strategy. **Table 6-2** also includes additional avoidance and minimization measures drawn from those currently used by the Local Partners that strive to reflect current and forthcoming regulations and guidelines for in-stream project design (e.g., the State Water Board's *Wetland and Riparian Area Protection Policy*, described below).

Types of Projects Subject to Condition

The in-stream projects listed below are subject to the design requirements or construction practices because they are expected to result in impacts on creeks or streams.

- Installation or rehabilitation of flood protection projects and levee reconstruction.
- Bank stabilization projects.
- Geomorphic rehabilitation.
- Gravel enhancement.
- Bridge construction and replacement including vehicular, train, and pedestrian bridges throughout the study area.
- Development of trails in or through the in-stream area (stream bed, banks, and adjacent riparian land cover).
- Culvert installation or replacement.
- Dam repair and seismic retrofit, including dewatering events and development of borrow sites.
- Restoration projects throughout the study area, including creek realignment and erosion management.
- Operation, maintenance and replacement of existing water supply structures such as stream gauges, percolation ponds, and diversions.
- Any other activity that requires construction work within the in-stream area (stream bed, banks, and adjacent riparian land cover).

Design Requirements

Some impacts on stream and riparian land cover types are expected under the Plan (see **Tables 4-2 and 4-3**). All covered activities subject to this condition will implement the measures listed in **Table 6-2** associated with this condition to avoid or minimize impacts of covered activities on streams and riparian woodland/scrub.

- Applicants must also comply with Condition 7 *Rural Development Design and Construction Requirements* where applicable.
- Applicants for projects with streams on site must follow the setback requirements in Condition 11, *Stream and Riparian Setbacks*.

- Applicants for projects with wetlands or ponds on site must comply with Condition 12, *Wetland and Pond Avoidance and Minimization*.
- Applicants for transportation improvements that include stream crossings must comply with Condition 6, *Design Requirements for Covered Transportation Projects*.

Design Criteria for SCVWD Flood Protection Projects

Flood protection projects shall be designed with an objective to protect or enhance natural channel and habitat functions. Designs will be developed and selected to maintain or improve bank stability, minimize bed degradation or aggradation, protect or improve streambed substrate conditions, protect or increase habitat diversity and complexity, and minimize required maintenance. All covered flood control projects will incorporate the following design elements:

1. Flood protection projects will incorporate support for natural stream functions and allow for natural stream processes to occur consistent with the flood protection goals of the project. Approaches for flood protection will generally include excavation of flood benches based on natural geomorphic conditions, off-stream detention, set-back levees or floodwalls, biotechnical bank stabilization methods, and grade control.
2. Project design alternatives will consider habitat connectivity between the stream and the adjacent floodplain as an objective.
3. Project design alternatives will incorporate native riparian vegetation and in-stream habitat enhancement features, where feasible. Potential enhancement features will be evaluated during the project design review process described below.
4. Bypasses that convey all or a portion of flood flows into channels, tunnels, culverts, or other areas that are isolated from the natural stream will be used only when other options have been evaluated and found infeasible to meet flood protection goals. If used, bypasses will be designed considering local geomorphic and flood characteristics and will minimize impacts to in-stream habitat.

Review Process for Covered Flood Control and Levee Reconstruction Projects

1. Flood control and levee reconstruction projects shall be reviewed by the Wildlife Agencies as described in Chapter 8, Section 8.7.3 *Wildlife Agency Responsibilities*.
2. During the 60% project design stage(s), review and input from the Wildlife Agencies shall be solicited.
3. The Wildlife Agencies providing review will return comments within a mutually agreeable timeline to maintain project schedule. As described in Chapter 8, Section 8.7.3 *Wildlife Agency Responsibilities*, the Wildlife Agencies must review and approve flood control projects to ensure that they are consistent with Habitat Plan requirements.

Requirements for SCVWD Dewatering Events

The following conditions apply to the dewatering events conducted at SCVWD covered reservoirs. Dewatering events *are necessary* for seismic safety retrofit and major maintenance (see Chapter 2 for a description of these covered activities). Due to the unique characteristics at each dam site, a reservoir-specific dewatering plan will be submitted to the Wildlife Agencies for review and approval prior to the first dewatering event for each reservoir (see Chapter 8, Section 8.7.3 *Wildlife Agency Responsibilities* for details of this process). Dewatering plans will be reviewed and, if appropriate, updated prior to subsequent dewatering events during the permit term. Dewatering plans will address various issues as requested by the Wildlife Agencies during the covered activity review process or as required by the environmental compliance process and will include the following.

- Timing for the initiation and duration of the dewatering event, including the draining and refilling stages of the dewatering event.
- Average, minimum, and maximum flows expected during draining and refilling (flows will be within the limits described in **Table 2-4**) including the duration of periods in which the maximum reservoir release may be made.
- A schedule for re-operation according to applicable rules curves.
- The ability of SCVWD to bypass water or provide other supplemental sources downstream.
- Documentation of in-channel dryback conditions from the previous 3 years, if feasible, and an evaluation of potential increases in the length and duration of dryback related to the dewatering event.
- A qualitative assessment of total flows that could occur downstream of the dam when taking into account stream inflows other than reservoir releases (e.g., stormwater, urban runoff) based on monitoring done during the previous years to assess the level of potential dryback.
- A description of baseline monitoring conducted for California red-legged frog, foothill yellow-legged frog, and western pond turtle in channels to be affected by the drawdown to establish presence of covered species in the channel.
- A description of anticipated effects of the dewatering event on covered species.

In addition, minimization measures included in a dewatering plan could include, but are not limited to, the following.

- Releases will not result in the overtopping of the channel between May and July when western pond turtles are nesting.
- SCVWD will bypass reservoir inflow around the dam and/or provide other supplemental flows downstream of the reservoir.
- SCVWD will consider installing outlets that provide better control over release volumes (beneficial for subsequent dewaterings).

- SCVWD will ramp increases and decreases in flows during dewatering to avoid washing covered species downstream or drying back the channel faster than covered species can adapt and move to new locations.
- Surveys for covered species as required by this chapter prior to re-filling of the reservoir or other construction activities if the reservoir basin has been undisturbed for a period of time. Surveys may be limited to areas that were not disturbed during construction or that were not inundated before construction but may be after construction.
- As reservoir levels decline, the gravel trap at the upstream end of the reservoir, if present, will be isolated and lined to contain inflow to provide for a relocation site for rescued native fish, amphibians, and/or western pond turtle.
- The lined gravel traps will be designed to allow bypass of inflow through or around the reservoir.

6.4.3 In-Stream Operations and Maintenance

In-stream[10] operations and maintenance activities covered under this Plan—such as sediment removal, bank stabilization, vegetation management, and debris blockage removal to maintain flows—have the potential to affect covered species by introducing sediment and other pollutants into downstream waterways or by disturbing riparian land cover associated with streams. Condition 5 specifies avoidance and minimization measures for covered operations and maintenance activities within and immediately adjacent to the stream channel. Note that SCVWD's Stream Maintenance Program is not a covered activity under this Plan and therefore not subject to the conditions of this chapter of the Plan.

Condition 5. Avoidance and Minimization Measures for In-Stream Operations and Maintenance

The purpose of this condition is to identify avoidance and minimization measures to be applied when conducting in-stream operations and maintenance activities. The measures will help reduce impacts on stream and riparian land cover types and covered species.

Types of Projects Subject to Condition

The following in-stream operations and maintenance activities are subject to the measures or construction practices described below because they are expected to result in impacts on creeks or streams.

[10] *In-stream* is defined for the purposes of the Plan as, "the stream bed and bank and the adjacent riparian corridor."

- Facility maintenance such as trail, bridge, road, and culvert repair and/or replacement in in-stream areas.
- Natural resource protection such as small bank stabilization projects and removal of debris deposited during flooding.
- Operations and maintenance of flood protection facilities (e.g., dams, armored creeks, detention ponds, streams). Activities may include vegetation management, minor sediment removal, or bank stabilization.
- Operations and maintenance of water supply facilities (e.g., flashboard dams, inflatable dams, stream gages, pipelines, and diversions).
- Non-routine stream maintenance activities conducted by SCVWD (i.e., those activities not covered by SCVWD's Stream Maintenance Program) including extensive removal of vegetation in the Lower Llagas flood control channel.
- Removal of debris blockages except in emergency situations.
- Mitigation and/or monitoring in creeks or adjacent riparian corridors.
- Vegetation management for exotic species removal, such as removal of giant reed, and native vegetation plantings.
- Reservoir dewatering events.
- Reservoir filling.

Avoidance and minimization measures listed in **Table 6-2** will apply to all streams in the project areas as well as to open canals, because these canals may provide habitat for covered species.

Stream Operation and Maintenance Activities

Several of SCVWD's Stream Maintenance Program avoidance and minimization measures were adapted for inclusion in **Table 6-2** and will be adopted for this Plan. Additional avoidance and minimization measures are identified below to ensure adequate avoidance and minimization of species covered under this Plan during implementation of stream operations and maintenance covered activities. These avoidance and minimization measures were informed by sources that include the Santa Clara Valley Resources Protection Collaborative *Guidelines and Standards* (Santa Clara Valley Water Resources Protection Collaborative 2006) and the SCVWD *Best Management Practices Handbook* (Santa Clara Valley Water District 2008). Throughout the permit term, avoidance and minimization measures listed in **Table 6-2** will be updated through the adaptive management process to reflect current best practices.

Dam Maintenance Program

All applicable measures in **Table 6-2** will apply to implementation of activities associated with the Dam Maintenance Program (see Chapter 2). In addition, activities requiring reservoir dewatering will comply with the requirements for dewatering reservoirs described above under Condition 4 *Stream Avoidance and Minimization for In-Stream Projects* and in Chapter 2.

Pipeline Maintenance Program

While SCVWD's Pipeline Maintenance Program is described in Chapter 2 under Section 2.3.6 *Rural Operations and Maintenance*, some activities have the potential to affect aquatic resources, particularly at blow-off sites. The following avoidance and minimization measures are from SCVWD's Pipeline Maintenance Program Final Program EIR (MHA Environmental Consulting 2007) and will be applied to Pipeline Maintenance Program covered activities in addition to other applicable avoidance measures described in this chapter.

- The discharge location and receiving water will be observed for signs of erosion by a trained individual. If erosion is evident, flow rates will be reduced. If erosion continues to occur, discharges will be terminated until appropriate erosion control measures are installed. Monitoring will be conducted just prior to the start of the discharge and regularly (i.e., every hour, every four hours, every eight hours) during the discharge. Monitoring frequency will depend on the nature of the discharge and the erosion in the area.
- An environmental monitor will walk along each discharge drainage to the termination of the drainage or 500 feet downstream to inspect for erosion after a draining is complete. If erosion is detected, reclamation measures will be taken to correct the erosion. Correction measures shall include recontouring the land to its previous state and revegetating with the appropriate native grass species in the area, if necessary.
- Discharge rates will be ramped up slowly such that the increase in flow rate in the receiving water is gradual and scouring of the channel bed and banks does not occur.
- Flows will be diverted around sensitive, actively eroding, or extremely steep areas to prevent erosion. Flow diversion methods might include use of flexible piping and/or placement of sandbags to alter flow direction, or equivalent measures. The new flow path and discharge point will be monitored for signs of erosion.
- Pipeline discharge for maintenance work would preferentially be performed during winter months, when storm events are more common and when water is naturally highest. Discharge flows are then a minimal portion of overall stream or river flow. If draining must occur during summer or fall, a slow release is mandatory to ensure receiving waters do not experience a substantial temperature change (greater than 2 degrees Fahrenheit).

6.4.4 Rural Projects

Rural projects include transportation projects, the South County Airport expansion, the Kirby Landfill expansion, construction of large new recreation facilities (e.g., golf course, sports fields, and extensive picnic areas), capital water supply projects, and private rural residential and commercial development. These rural projects have the potential to affect covered species by removing substantial areas of habitat, disrupting hydrologic patterns, contributing to habitat fragmentation, discharging sediment into water bodies, and resulting in direct mortality of covered species. Conditions 6 and 7 are designed to reduce the severity of such impacts for rural projects.

Condition 6. Design and Construction Requirements for Covered Transportation Projects

This condition identifies design requirements to minimize the impacts of transportation projects on wildlife movement, occurrences of certain covered species, and important habitat for covered species. All road and rail transportation projects (including the BART extension), or portions thereof, outside streams and within the planning limit of urban growth are exempt from this condition. Road projects in these areas are either within participating cities (i.e., urban areas) or within adjacent County jurisdiction, both of which support relatively dense suburban development. Road projects in these areas are not expected to significantly affect wildlife linkages, occurrences of covered species, or habitat for covered species. All covered transportation projects that cross streams or creeks, including bridges, are subject to Condition 4 above.

Four new road extensions/connections/realignments are proposed outside the planning limit of urban growth during the permit term of this Plan. However, many road improvements, including road widenings, are covered by the Plan (see **Table 2-6**). One new mass transit project is covered by the Plan: the double tracking of the Caltrain line from San José to Gilroy along the existing corridor.

Exempt Transportation Projects

The following projects are not subject to the design requirements or construction practices specified in this condition because they are not expected to result in new ground disturbance and are not expected to create new wildlife movement barriers or augment existing barriers.

- Installing traffic signals, signs, pavement markings, flashing beacons, or other safety warnings.
- Painting new lane striping.
- Installing “rumble” strips, channelizers, or other safety markers.
- Installing guardrails or similar structures that are permeable to wildlife.

- Installing ramp metering.
- Regrading existing shoulders (this activity is considered maintenance; see Condition 8).
- Implementing other road safety improvements on less than 1,000 feet of roadway.

All transportation projects that cross creeks are subject to Condition 4 above.

The following projects are also exempt from this condition, due to their small footprint, if the project does not include installation of median barriers or other impermeable safety barriers, and if no mapped or unmapped stream, riparian, serpentine, pond, or wetland land cover types are present, and if the activity is not located in a stream setback. Project lengths must be calculated based on the all new adjacent projects constructed since the time of Plan implementation to determine whether the below thresholds have been crossed.

- Widening roads to add lanes where the project is less than or equal to 1,000 feet in length.
- Realigning roads for safety or operational purposes where the project is less than or equal to 1,000 feet in length.
- Constructing new turn lanes less than or equal to 1,000 feet in length.
- Constructing a new road shoulder less than or equal to 1,000 feet in length.

Outside the planning limit of urban growth transportation projects will adopt design requirements and construction practices to minimize impacts on covered species, natural communities, and wildlife movement (see below). Depending on the type of project, these design requirements and construction practices would be *required* or *possible* (**Table 6-3**).

- **Required** (R). Design element or construction practice is required.
- **Possible** (P). Design element or construction practice is required unless field data collected at the site or in comparable areas demonstrate that the element or practice would not benefit wildlife, and CDFG and USFWS concur with the findings.

Types of Projects Subject to Condition

The following projects are subject to the design requirements or construction practices because they are expected to result in new ground disturbance, or they may create new wildlife movement barriers or augment existing barriers. Each project category is subject to a specific combination of requirements listed below and in **Table 6-3**.

Highway Projects

Highway projects are those VTA projects identified in **Table 2-6** as highway projects that call for the expansion of existing highways within the study area.

Mass Transit Projects

The single mass transit project identified for coverage in this Plan is the VTA project identified in **Table 2-6** as *Caltrain South County* which calls for the double tracking of the existing Caltrain corridor.

Roadway Projects and Interchange Upgrades

Major roadway projects and interchange upgrade projects (major roadway projects) are those projects identified in **Table 2-6**. All non-exempt Santa Clara County roadway projects and VTA interchange upgrades identified in **Table 2-6** are subject to the conditions identified **Table 6-3**.

Road Safety and Operational Improvements

These projects include the road projects described in Section 2.3.5 *Rural Capital Projects* that are not listed in **Table 2-6**. Road safety and operational improvements are expected to involve ground-disturbing activities but are not expected to impede or substantially worsen wildlife linkage. However, there may be opportunities for some projects to improve wildlife linkages. These projects are subject to construction and post-construction practices but not to project design requirements (**Table 6-3**).

Dirt Road Construction

Dirt roads may be constructed by the Permittees or private landowners to access their property. These projects are subject to construction and post-construction practices but not to project design requirements (**Table 6-3**).

Pre-Design Data Collection for Wildlife Movement

For transportation projects with the greatest potential to affect wildlife movement (see **Table 6-3** and lists above), it will be important to incorporate requirements that minimize the projects' adverse impacts on wildlife movement. In some cases, transportation projects may present opportunities to upgrade existing structures to improve wildlife movement. For these upgrades to be most effective, they will be supported by data describing movement of wildlife at or near the project site and the likelihood of vehicle collisions based on traffic patterns.

To facilitate better project design and to avoid delays in project construction due to the data collection process, the Implementing Entity will establish a long-term data collection program on wildlife movement in the study area. The primary goal of this program will be to determine the movement patterns of key covered species and other native wildlife throughout the study area. Data collection stations will be established at points along covered transportation projects that are most likely to affect wildlife movement. Wildlife movement will be studied at key sites to determine which species move through the area, when they move and, most importantly, which landscape features are most often used. Techniques used for data collection will vary by site and target species but may include remote cameras, wildlife track pads, and roadkill observations. This program is described in greater detail in Chapter 5. It is expected that several years (or decades) of data will be available to inform project design by the time that many of these projects reach the design stage. (This monitoring program is in addition to the wildlife corridor feasibility study discussed in Chapter 5.)

Data collection will be required on wildlife movement along the applicable project corridor for at least 1 year prior to project design. These data will be used to select the design requirements most appropriate for the species and conditions particular to the site (see below). If the Implementing Entity has not collected data in the project vicinity and the project timeline does not permit new data collection, then the applicant must apply all the design guidelines on the basis of the best available information for the region and appropriate to the conditions at the project site.

Transportation project applicants will coordinate with the Implementing Entity and Wildlife Agencies on applicable projects as indicated in **Table 6-3** during the conceptual design phase to ensure that as the project moves from conceptual to final design, the project meets the terms of this Plan.

When multiple road expansions are planned for a roadway during the permit term, wildlife crossing needs will be considered for each roadway as a whole, not by road segment. Further, design requirements will be considered for each wildlife species likely to cross the facility (Barnum 2003). These data will inform the design of wildlife movement structures suitable for the site and the species that use the area. In addition, after each project component is installed, wildlife activity along the road will be monitored to assess how wildlife responded to the project, if behavior has changed, and if additional design considerations will be utilized as future projects are implemented along the roadway.

Transportation Project Design Requirements

To reduce the impacts of construction activities on natural communities and native species within the study area, the design requirements listed below will be implemented for applicable transportation projects (**Table 6-3**). Design requirements are based on the latest techniques for minimizing impacts of transportation projects (Forman et al. 2002; Irwin et al. 2003; Finch 2004; Hilty et al. 2006). Some design requirements may be updated by the Implementing Entity if the best available science indicates that such updates would be more effective at facilitating safe wildlife movement across transportation corridors. Because the effectiveness of road crossings designed for wildlife is an active area of research, frequent advances in design are expected throughout the permit term.

- **Enhance existing undercrossings.** When road expansion projects span an undercrossing, such as a culvert, existing undercrossing structures will be enhanced within safety or engineering limitations to allow for fish and wildlife movement. Existing culverts or other potential crossing points will be enhanced if results of data collection indicate that the existing structure is inadequate. The design requirements of replacement structures will be determined by the species that have been documented using or attempting to use the site. Wildlife crossings that can serve multiple species will be used whenever possible.

- **Crossing enhancements.** Crossing enhancements must incorporate design requirements identified for culverts in Condition 4, *Stream Avoidance and Minimization for In-Stream Projects*.
- **Minimum sizing of culverts.** Culverts must be the minimum length, height, and width necessary to provide safe passage under the road for the target species present at the site (based on data collected as described above). Culvert designs will be based on the best available data at the time. Current recommendations are that culverts designed for medium-size mammals (e.g., San Joaquin kit fox, coyote, raccoon) be 5–8 feet in diameter (although culverts larger than 8 feet in diameter may be needed for longer crossings). Culverts designed for small mammals or amphibians are recommended at 18–48 inches in diameter. Culverts will provide a natural substrate on which wildlife can travel (e.g., open bottom box culvert) when such designs are compatible with the hydrologic needs of the culvert.
- **Install grating to allow ambient light to penetrate undercrossing.** Culverts will include grating on the inactive part of the roadbed (e.g., road shoulders or median) to allow filtration of ambient light and moisture but minimize noise intrusion. Artificial lighting inside tunnels or culverts will not be used; these devices have not been shown to be effective and may deter nocturnal wildlife. Such devices may also be vandalized.
- **Fencing design.** Fencing will be required in areas where high mortality rates of species attempting to cross the road occur. Fencing will be used along the perimeter of the roadway to direct animals to undercrossings and minimize their access to the road. Fencing designs will be tailored to the species expected to use the undercrossing and will be based on the best available data on species use and best fencing designs available at the time. For example, fencing for amphibians will be high enough to prevent amphibian crossing but low enough to allow movement of other species (e.g., deer, badgers, etc.). Fencing will extend out from the undercrossing along the road to an appropriate distance that will serve as a barrier to wildlife attempting to cross the road. The distance that fencing extends from the undercrossing will be determined on a case-by-case basis and will consider locations of known collisions in the area. Right-of-way fencing could be designed to serve this purpose. Fencing must be attached to the undercrossing to prevent wildlife from passing through a gap between the undercrossing and the beginning of the fence.

  Fencing must be monitored regularly by the facility owner and repairs made promptly to ensure effectiveness. Vegetation must be managed along small mammal and amphibian fencing to reduce the opportunity for these species to climb the fence. Fencing designed for small mammal or amphibian exclusion must be installed at least 8 inches into the soil to prevent small mammals from tunneling under the fence.

Where low-traffic side roads (e.g., ranch roads) cross the wildlife fences along the main roadway, gates will be used whenever possible to avoid creating a gap in the fence that wildlife could move through. The gate will be designed to minimize the gap between the gate and the roadbed. If gates are not feasible, an in-roadway barrier (e.g., wildlife grates) or device that channels species away must be installed to deter wildlife from moving around fences and into the road.

- **Passage placement.** New passages will only be placed or located in areas that connect two viable habitats so that wildlife is not directed into urbanized areas.
- **Road or rail barrier designs.** When compatible with vehicle and train safety, road and rail median barriers or shoulder barriers will allow wildlife to cross under or over the barrier in the event they become trapped in the right-of-way. For example, one-way gates could be used to allow movement out of the hazardous zone but not into it.

Construction Practices

The following construction practices apply to categories of transportation projects listed in **Table 6-3**.

Avoidance and Minimization Measures for Transportation Projects

- Minimize ground disturbance to the smallest area feasible.
- For construction of new dirt roads, prevent rills (a narrow groove or crack in the road resulting from erosion by overland flow) by breaking large or long bare areas up into smaller patches that can be effectively drained before rills can develop (Fishery Network of Central California Coastal Counties 2004).
- For construction of new dirt roads, disconnect and disperse runoff flow paths, including roadside ditches, which might otherwise deliver fine sediment to stream channels (Fishery Network of Central California Coastal Counties 2004).
- For construction of new dirt roads, prevent gullies by dispersing runoff from road surfaces, ditches and construction sites, by correctly designing, installing and maintaining drainage structures (e.g., road shape, rolling dips, out-sloped roads, culverts, etc.) and by keeping streams in their natural channels. No single point of discharge from a road or other disturbed area should carry sufficient flow to create gullies. If gullies continue to develop, additional drainage structures are needed to further disperse the runoff (Fishery Network of Central California Coastal Counties 2004).
- When constructing or reconstructing a ditch, utilize designs for outlet locations that avoid directly dumping ditch water into surface waters, when practical. If not practical, implement sediment management avoidance and minimization measures to trap sediment before it reaches a stream. Avoidance and minimization measures described in Condition 3 and

Condition 4 will be applied as appropriate (Fishery Network of Central California Coastal Counties 2004).

- When designing or redesigning roads, look for opportunities to restore natural drainage patterns. Install culverts or rolling dips to retain water in its drainage of origin, which will decrease the potential for erosion downstream. On problem roads, look for opportunities to reconstruct the road segment to improve and maintain natural drainage patterns; for example, add rolling dips, emergency water bars and additional cross drains (Fishery Network of Central California Coastal Counties 2004).
- When constructing dirt roads, install road surface and ditch drainage structures frequently enough so that gullies do not form at drainage points and so that the road and drainage system are generally dry (Fishery Network of Central California Coastal Counties 2004).
- Equipment storage, fueling, and staging areas will be sited on disturbed areas or on non-sensitive nonnative grassland land cover types, when these sites are available, to minimize risk of direct discharge into riparian areas or other sensitive land cover types. When such sites are not available, staging will occur on the road used to access the site.
- All species survey requirements of this Plan will be followed within the construction zone (i.e., the limit of project construction plus equipment staging areas and access roads) and the entire road right-of-way. Expanding the survey area beyond the project footprint will help identify covered species and their habitats so that impacts on covered species that occur adjacent to the construction zone can be minimized.
- No erodible materials will be deposited into watercourses. Brush, loose soils, or other debris material will not be stockpiled within stream channels or on adjacent banks.
- Silt fencing or other sediment trapping methods will be installed below the grade of new road construction or road widening activities to minimize the transport of sediment off site.
- Temporary barriers will be constructed to keep wildlife out of construction sites, as appropriate.
- Onsite monitoring will be conducted by a qualified biologist throughout the construction period to ensure that disturbance limits, avoidance and minimization measures, and Plan restrictions are being implemented properly.
- Use existing roads for access and disturbed area for staging as site constraints allow. Off-road travel will avoid sensitive communities such as wetlands and known occurrences of covered plants.
- Active construction areas will be watered regularly to minimize the impact of dust on adjacent vegetation and wildlife habitats, if warranted.
- Portions of the project that occur in streams (e.g., bridge or culvert construction) will comply with Condition 4.

Post-construction Practices

Following construction, the areas beyond road shoulders and inside the right-of-way will be returned to a pre-project or ecologically improved condition. These actions will likely be applied differently to each road project and will decrease the potential for the spread of nonnative species.

- Invasive plants within the project area and any construction staging areas will be removed to prevent the spread of these species into nearby or adjacent reserves.
- All disturbed soils will be revegetated with native plants and/or grasses or sterile nonnative species suitable for the altered soil conditions upon completion of construction. Local watershed native plants will be used if available. If sterile nonnative species are used for temporary erosion control, native seed mixtures must be used in subsequent treatments to provide long-term erosion control and slow colonization by invasive nonnatives. All disturbed areas that have been compacted shall be de-compacted prior to planting or seeding.
- Vegetation and debris will be managed in and near culverts and under and near bridges to ensure that entryways remain open and visible to wildlife and that the passage through the culvert or under the bridge remains clear.

All structures constructed for wildlife movement (tunnels, culverts, underpasses, fences) will be monitored at regular intervals by the Local Partner facility owner and repairs made promptly to ensure that the structure is in proper condition. For facilities owned by entities not participating in the Habitat Plan (e.g., California Department of Transportation [Caltrans]), the Implementing Entity will secure access and data collection agreements with these entities to allow the Implementing Entity to conduct this monitoring.

Condition 7. Rural Development Design and Construction Requirements

For this Plan, rural development is defined as any new development that occurs outside of the urban service area at the time the development is permitted under the Plan, or those areas within the urban service area that are only covered for development consistent with rural land uses. The rural development covered activities listed below are subject to this condition and to the applicable permitting process of the local jurisdiction.

- Residential development (e.g., single family homes, subdivisions) consistent with the County General Plan (County of Santa Clara 1994). Ancillary improvements may include privately owned bridges, driveways, access roads, vineyards or orchards, and other accessory structures associated with rural dwelling units.
- Non-residential development consistent with the County General Plan (County of Santa Clara 1994). This includes new commercial facilities

(institutional, industrial) agricultural facilities (mushroom farms, commercial stables, and equestrian event facilities) or similar uses that obtain building, grading and/or other development permits, consistent with local general plans, such.

- Vineyard, orchard, or other farming activity that obtains a building, grading, or development permit from the County or City.
- Residential or non-residential development on the non-urban hillsides of eastern San José (outside the planning limit of urban growth) and in the Coyote Valley Urban Reserve and South Almaden Valley Urban Reserve consistent with the San José General Plan.
- Residential or non-residential development in the Morgan Hill Southeast Quadrant consistent with the Morgan Hill General Plan.
- Residential or non-residential development in the Hecker Pass Specific Plan area consistent with the Gilroy General Plan.
- Projects, including capital projects, implemented by Permittees outside the urban service area.

As described in Chapter 4, rural development in hillside and natural areas that will remain rural has a greater potential for direct and indirect impacts on sensitive habitat and more covered species than urban development in already developed areas for a number of reasons. First, rural development tends to occur on larger parcels or in less constrained sites, affecting larger areas. Second, the existing landscape in hillside and natural areas is generally less disturbed prior to project construction on rural development sites than on urban sites. Third, rural development tends to occur near or in areas with native vegetation and higher biological values, including areas near or adjacent to the Reserve System. Rural development in natural areas tends to increase habitat fragmentation, which degrades or disrupts landscape connectivity. New driveways and roads associated with rural development may create new hazards or barriers to species dispersal. Indirect impacts also occur at both the development site and the landscape level, as rural development can introduce new sources of noise, light and glare, air pollution, and vehicle traffic in more remote areas. Despite the potential for these adverse effects on natural communities and covered species, rural development projects often have greater flexibility to modify designs to reduce or minimize impacts on covered species and natural communities than projects in urban areas.

As described in Chapter 4, existing land use restrictions and requirements also substantially limit the footprint and extent of rural development. For example, almost all of the areas intended to be incorporated into the Reserve System (see Chapter 5) are large land holdings designated as Hillside or Ranchland land uses under the County General Plan. In these areas, the maximum development density allowed is one residence per 20 to 160 acres, based on the average slope of a parcel. Subdivision of sites designated Hillside or Ranchland seldom occurs and this pattern is not expected to change during the permit term due to the physical challenges of development in most of the study area. Under County policies, most subdivision proposals for Hillside parcels are required to cluster future development and preserve a minimum of 90% of the site as open space. If suitable, these large set-asides could be incorporated into the Reserve System. County policies and regulations also require that grading be minimized in Hillside and Ranchland areas through the site design process, which emphasizes compact development. These land-use restrictions help to minimize the effects of rural development on covered species and natural communities.

The primary goal of this condition is to minimize the potential direct and indirect impacts of rural development in areas that will remain primarily rural on covered species and natural communities most likely to be affected by rural development (see Chapter 4, including **Table 4-1**, for an accounting of which species could be affected by rural development). Additional goals of this condition are listed below.

- Minimize habitat fragmentation and degradation of landscape linkages (e.g., wildlife corridors), including maintaining connectivity between aquatic, riparian, and upland habitats.
- Minimize loss of sensitive land cover types and natural communities including but not limited to riparian woodlands, seasonal wetlands, freshwater marsh, ponds, serpentine grassland, valley oak woodland, knobcone pine woodland, and ponderosa pine woodland.
- Reduce the extent of new roads in remote rural areas in order to reduce negative impacts on species.
- Minimize degradation of streams and maintain the hydrograph to the baseline (defined as the existing conditions at the time of Plan approval), or adjust the hydrograph toward predevelopment conditions[11].
- Minimize construction-related impacts, including noise; air emissions; erosion and sedimentation; disturbance of native vegetation; and introduction of nonnative, invasive species.
- When designing or retrofitting County facilities, evaluate whether the project can be designed to reduce impervious surfaces to less than pre-project conditions.

This condition integrates existing County requirements with additional avoidance and minimization measures that are intended to reinforce current regulations and support the goals of this condition. The design requirements and conditions for all rural development covered by the Plan are listed below and will be applied as applicable.

Design and Construction Requirements

Projects subject to this condition are required to follow the following measures.

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[11] The hydrograph will be monitored using existing stream gages within the study area, new gages proposed under the plan, and could be monitored at large developments occurring during the Permit Term, as deemed appropriate by the Implementing Entity.

- Plans presented to local jurisdiction planning staff by private applicants for discretionary approval or a building permit process must identify the proposed impact area and general location of site design features (e.g., residence, access road, leach field, wells, vineyards, accessory structures, etc.). The site plan will show all improvements that will result in permanent land cover impacts (e.g., home, driveway, barn, pool, patio, landscaping, and utilities, etc.), including a 50-foot buffer around all proposed site improvements. The project area plus the 50-foot buffer is called the *development area*. This site plan will also show all site improvements that will result in temporary land cover impacts during construction but that will be returned to the pre-project land cover type within 1 year of completing construction (e.g., leach fields, well pipelines that do not result in permanent habitat disturbance), including a 10-foot buffer around the proposed footprint of the site improvements. Plans do not need to show buffer areas (50 feet for permanent improvements and 10 feet for temporary improvements) that cross property boundaries (e.g., a house 30 feet from a property line only needs to show the buffer area up to the property line). **Figure 6-1** provides an example map of the information required on the site plan. (**Figure 6-1** also defines the development area for the purposes of determining survey areas [see Section 6.8.5 *Item 5: Results of Applicable Species Surveys and Monitoring*] and calculating development fees [see Chapter 9, Section 9.4.1 *Habitat Plan Fees*]).
- Minimize ground disturbance to the smallest area feasible.
- Build close to, and utilize to the extent practicable, existing infrastructure (e.g., existing driveways, utility lines).
- Use existing roads for access and disturbed areas for staging as site constraints allow. Off-road travel will avoid sensitive communities such as wetlands and known occurrences of covered plants.
- Adhere to Condition 10, *Fuel Buffer*.

Site Hydrology

- Develop only the minimum number of stream crossings necessary to access the property.
- At project sites that are adjacent to any drainage, natural or manmade, exposed soils must be stabilized or otherwise contained on site to prevent excessive sediment from entering a waterway.
- Use of impermeable surfaces surrounding structures must be minimized to the greatest extent possible through the use of alternative design treatments, such as low impact development methods, including but not limited to, permeable pavers, green roofs, and rainwater catchments so that natural infiltration is facilitated and runoff is reduced.
- Consistent with State and Regional Water Quality Control Board regulations, runoff from impermeable surfaces must be directed to natural or landscaped areas, or to designed swales or detention/retention basins to encourage

natural filtration and infiltration. Diversion to a cistern or other onsite stormwater management technique is also allowed and encouraged.

- Avoid and minimize impacts associated with altering natural drainages and contours on the project site. If the site is graded, blend grading into the existing landform as much as possible.
- Leach fields must be sited away from creeks in accordance with the County septic ordinances, as well as at least 100 feet from the reserve boundary. Leach field installation may result in localized soil moisture content and groundwater levels that may have adverse effects on sensitive plants or plant communities in the Reserve System. Leach fields may be sited within the 100-foot setback if site-specific conditions (i.e., topography) adequately minimize effects, or adequate space is not available to site the field elsewhere (i.e., the parcel is too small).
- Adhere to Condition 3, *Maintain Hydrologic Conditions and Protect Water Quality*.
- Adhere to Condition 4, *Stream Avoidance and Minimization for In-Stream Projects*.
- Adhere to Condition 5, *Avoidance and Minimization Measures for In-Stream Operations and Maintenance*.
- Adhere to Condition 11, *Stream and Riparian Setbacks*.

Vineyards

The following conditions apply to new vineyards that are covered by the Habitat Plan (i.e., those requiring a permit from the County or other local jurisdiction) and are encouraged for new and existing vineyards that do not require a development permit.

- During construction, use cover crops, straw mulch, straw wattles/fiber rolls, coconut husks, or other equivalent erosion control mechanism to prevent sediment from being blown or washed from the project site.
- All disturbed areas will be protected during the rainy season (October 15–April 15). Permanent or temporary measures to prevent erosion must be utilized during vineyard planting. Permanent measures must be utilized once planting is completed. Erosion control measures must be in place by October 15.
- Plant vine rows along existing contours to slow runoff and reduce erosion on hillsides (California Sustainable Wine Growing Alliance 2002a).
- A stormwater management system designed for an average storm recurrence interval of not less than 25 years will be installed on the vineyard site. The system will allow excess stormwater runoff to be carried through the vineyard site with minimum erosion and consistent with the overall drainage patterns present in the area. This requirement may be met by either temporary or permanent measures while vineyard planting work is being

carried out, but shall be met by permanent measures by the time vineyard planting work is completed.

- A sediment control system designed to minimize the discharge of sediment from the vineyard site will be installed on the vineyard site. This requirement may be met by either temporary or permanent measures while vineyard planting work is being carried out, but will be met by permanent measures by the time vineyard planting work is completed.
- If open conduits are used as part of the stormwater management system, plant conduits with grasses and other vegetation to filter sediment, pesticides, and fertilizers from runoff and to reduce the potential that the stormwater conduit itself will erode.
- As part of the stormwater and sediment management systems, install vegetated swales, detention basins, extended vegetated buffer, or other similar feature on the downslope edge of the planted area to capture and treat runoff before it enters local streams. This will minimize the amount of sediment, fertilizers, and pesticides that enter local streams.
- Heavy equipment will not be utilized on dirt access roads immediately after rain to prevent roads from turning to mud and sediment from running off the roads (California Sustainable Wine Growing Alliance 2002a).
- Use of natural pest management approaches in place of pesticides is highly encouraged.
- Maintain a buffer of natural vegetation, including grasses, shrubs, or mature trees, around the perimeter of the vineyard to reduce topsoil erosion and provide habitat for birds that will prey on rodents (California Sustainable Wine Growing Alliance 2006).

Private Rural Roads

- Minimize to the maximum extent possible the amount of ground disturbance when constructing roads.
- Ground-disturbing activities associated with road construction should be timed to occur during dry weather months to reduce the possibility of landslides or other sediment being transported to local streams during wet weather.
- If construction extends into wet weather, the road bed will be surfaced with appropriate surfacing material to prevent erosion of the exposed roadbed (Pacific Watershed Associates 1994).
- Avoid, to the extent possible, constructing roads on steep slopes (over 25%) or on unstable slopes.
- If construction on steep slopes is required, construction will be timed for dry weather months to reduce the potential for landslides.
- Adhere to the avoidance and minimization measures for dirt road construction in Condition 6 under *Avoidance and Minimization Measures for Transportation Projects* (see first three bullets under heading).

Other Requirements

- Maintain as much natural vegetation as possible, consistent with fuel management standards, on the project site.
- Maintain County-mandated fuel buffer (variable width by slope conditions).
- On sites adjacent to reserves, locate the proposed development as far from the reserve boundary as possible consistent with other onsite conditions and constraints and adhere to Condition 2, *Incorporate Urban-Wildland Interface Design Elements*.
- All temporarily disturbed soils will be revegetated with native plants and/or grasses or sterile nonnative species suitable for the altered soil conditions upon completion of construction. Local watershed native plants will be used if available. If sterile nonnative species are used for temporary erosion control, native seed mixtures must be used in subsequent treatments to provide long-term erosion control and slow colonization by invasive nonnatives. All disturbed areas that have been compacted shall be de-compacted prior to planting or seeding.
- All temporarily disturbed areas, such as staging areas, will be returned to pre-project or ecologically improved conditions within 1 year of completing construction or the impact will be considered permanent.
- No plants identified by the California Invasive Plant Council as invasive[12] will be planted on the project site. Planting with watershed local native and/or drought-resistant plants is highly encouraged. This reduces the need for watering as well as the need for fertilizers and pesticides.
- Outdoor lighting will be of low intensity and will utilize full cutoff fixtures to reduce light pollution of the surrounding natural areas.

Project proponents must continue to adhere to all applicable local planning ordinances including: noise ordinances, zoning ordinances, fuel management guidelines for fire buffers, NPDES permit requirements, Water Collaborative guidelines and standards, Santa Clara County grading ordinance, and drainage manual.

6.4.5 Rural Operations and Maintenance

Rural operations and maintenance activities—such as operations and maintenance of utility lines and facilities, road maintenance, vegetation management, and mitigation monitoring—have the potential to affect covered species by disturbing nesting covered bird species, leading to sediment discharge, and spreading of nonnative invasive species. Condition 8 would reduce the severity of such impacts.

[12] See <www.cal-ipc.org/ip/inventory> for the latest list of invasive species.

Condition 8. Implement Avoidance and Minimization Measures for Rural Road Maintenance

Road maintenance activities have the potential to directly affect covered species through management activities such as mowing, and may indirectly affect covered species by introducing sediment and other pollutants into downstream waterways and by spreading invasive weeds. Effects on covered species may be greatest on unpaved roads due to their erosion potential. The County maintains an extensive network of paved and unpaved roads. All roads maintained by the County Roads and Airports Department in the study area are paved, except for a portion of one road[13]. County Parks maintains an extensive network of unpaved maintenance and emergency access roads within their parks that often serve primarily as recreational trails. SCVWD maintains a small network of paved and unpaved roads, mostly on levees and along pipelines. Gilroy and Morgan Hill do not maintain any dirt roads outside of the planning limit of urban growth.

To avoid and minimize these impacts, avoidance and minimization measures were developed to address potential impacts associated with road operation and maintenance activities. The avoidance and minimization measures in this condition are based largely on the guidelines in *County Road Maintenance Guidelines for Protecting Aquatic Habitat and Salmon Fisheries* (Fishery Network of Central California Coastal Counties 2004). This manual, also called FishNet 4C, was developed by six central California counties (Mendocino, Sonoma, Marin, San Mateo, Santa Cruz and Monterey counties) and included input from cities, local Resource Conservation Districts, and water agencies. This manual identifies best management practices to protect water quality and aquatic habitat when implementing routine and emergency road maintenance activities. These guidelines incorporate avoidance and minimization measures from other road maintenance programs (e.g., the Oregon State Department of Transportation's *Road Maintenance Manual*, and the Northern Five Counties Salmon Conservation Group's *A Water Quality and Stream Habitat Protection Manual for County Road Maintenance in Northwestern California Watersheds*) (Fishery Network of Central California Coastal Counties 2004). Avoidance and minimization measures identified in the FishNet 4C guidelines are included in **Table 6-4** as part of this condition. In addition to the avoidance and minimization measures in **Table 6-4**, project proponents will comply with the avoidance and minimization measures listed below. Avoidance and minimization measures identified in this condition will be used for all covered road operation and maintenance activities.

- Projects occurring in streams or riparian setback zone will also comply with Condition 4 and Condition 5 as appropriate.
- Minimize ground disturbance to the smallest area feasible.
- Within the riparian setback zone (see Condition 11), silt fencing or other sediment control device will be installed downslope from maintenance

[13] The one unpaved road maintained by County Roads and Airports in the study area is 1.75 miles of Mount Madonna Road between Redwood Retreat Road and Summit Road (the county line).

activities that disturb soil (e.g., blading of fire or access roads within Parks or the Reserve System) to minimize the transport of sediment off site.

- In the course of rural road maintenance, no erodible materials will be deposited into watercourses. Brush, loose soils, or other debris material will not be stockpiled within stream channels or on adjacent banks where it could be washed into the channel.
- Alternatives such as mechanical control will be considered to substantially lessen any significant impact on the environment before using pesticides. Integrated pest management avoidance and minimization measures will be used for all vegetation control. Limitations may occur due to fire management requirements and local integrated pest management ordinances.
- The effects of herbicide and pesticide application will not be covered under the federal permits for this Plan. Herbicides and pesticides will be used only when necessary and will be applied in strict compliance with label requirements and state, federal, and local regulations. Herbicides and pesticides will only be applied when weather conditions will minimize drift and impacts on non-target sites.
- Maintenance activities on rural roads adjacent to natural land cover types will be seasonally timed, when safety permits and regulatory restrictions allow, to avoid or minimize adverse effects on active nests of resident and migratory birds, including covered bird species (western burrowing owl, least Bell's vireo, and tricolored blackbird). This measure is particularly relevant for right-of-way mowing[14], brush clearing, prevention of disease spread (i.e., sudden oak disease), and tree trimming. Project proponents will coordinate with the Implementing Entity to develop work schedules that optimize logistic, safety, and financial needs while minimizing potential impacts on nesting birds.
- Mowing equipment will be thoroughly cleaned before use in rural areas so they are free of noxious weeds (e.g., yellow star-thistle) and do not introduce such weeds to new areas.
- Maintenance or repair of road medians or shoulder barriers in areas that support natural land cover types (e.g., annual grassland, oak savanna, oak woodland) will not reduce the ability of wildlife of all types to move through or over them, within safety limits. Replacement or repair of road medians will be designed or installed to allow wildlife to move past these structures. Exceptions may be made by the Permittee if significant safety concerns or financial constraints arise.
- All disturbed soils will be revegetated with native plants and/or grasses or sterile nonnative species suitable for the altered soil conditions upon completion of construction. Local watershed native plants will be used if available. If sterile nonnative species are used for temporary erosion control, native seed mixtures must be used in subsequent treatments to provide long-

[14] For example, County Parks has a Memorandum of Understanding with the California Department of Forestry and Fire Protection (Cal-Fire) that limits mowing to November to April to minimize fire hazards. There may be other public safety restrictions that limit the ability to achieve this guideline.

term erosion control and slow colonization by invasive nonnatives. All disturbed areas that have been compacted shall be de-compacted prior to planting or seeding.

- Ground-disturbing road maintenance activities, such as regrading, will be timed so that the moisture content of the soil will support recompaction of the soil and reduce the need for an imported water source to achieve soil compaction. Similarly, activities will be timed so that use of heavy equipment will not result in the creation of mud puddles and ruts.
- Regularly scheduled visual inspections of all roads will be conducted to identify sites where erosion is contributing sediment to local streams. Appropriate actions will be taken within the road right-of-way to manage the erosion.
- Flow lines (e.g., culverts and ditches) will be cleared annually to maintain flow lines free of debris.
- Use existing roads for access and disturbed area for staging as site constraints allow. Off-road travel will avoid sensitive communities such as wetlands and known occurrences of covered plants.
- All new public roads that are accessible to general public vehicular use will be paved (this does not include fire roads that may also serve recreational needs).

6.4.6 Reserve System Implementation

Reserve System implementation—which includes activities associated with recreation, construction, infrastructure design, and maintenance of the reserves—could result in localized effects on covered species and their habitats. All relevant conditions will be applied to construction and maintenance activities within the Reserve System.

Condition 9. Prepare and Implement a Recreation Plan

Public access, consistent with the Habitat Plan conservation strategy, will be provided on all reserves owned in fee title by a public agency. Public access to privately owned land under conservation easement will only be permitted with the landowner's consent. See Chapter 10 *Assurances* for more details.

All public access to reserves will be managed according to a recreation plan that will be developed by the landowner (e.g., County Parks, Open Space Authority) and/or the Implementing Entity consistent with the requirements of this condition. Recreation plans will be reviewed by the Implementing Entity for consistency with this condition and integrated into the applicable reserve unit management plan which will be reviewed and approved by the Permittees and the Wildlife Agencies. Wildlife Agency approval of reserve unit management plans will follow the timelines established in Chapter 5, Section 5.2.5 *Land Management* subheading *Land Management on Reserves*.

The recreation plan will address lands that are acquired for or incorporated into a reserve unit where the Implementing Entity and the land owner determine that recreational and educational uses are compatible with the conservation strategy of this Plan. Each recreation plan will apply to the portion of the reserve unit for which the recreation plan was developed, including existing open space that is incorporated into the unit (existing open space selected for the Reserve System was chosen, in part, for its recreational uses that are compatible with the biological goals and objectives of the Plan).

At a minimum, each recreation plan will contain the requirements listed below.

- Identification of sites within reserves where recreational use is compatible with the goals and objectives of the Plan.
- Identification of acceptable forms of recreation if different from those forms identified in this condition.
- Identification of sites within reserves that contain sensitive land cover types or suitable or occupied habitat for covered species.
- Maps of existing and proposed recreational trails, staging areas, and facilities and of habitat types affected.
- Site-specific methods of recreational use controls.
- Trail and use monitoring methods, schedules, and responsibilities.
- Trail operation and maintenance guidelines and responsibilities. This includes control of active off-trail recreational activities determined inappropriate by Implementing Entity and Wildlife Agencies.
- A framework for enforcement of recreational restrictions and permitting process for restricted recreational uses.
- An evaluation determining if the impact of planned recreational use is within the limits established in the Plan and EIS/EIR, and if planned recreation is compatible with the biological goals and objectives of the Plan.
- Clear triggers for use restrictions or closure based on sensitive biological indicators (e.g., seasonal closures of some trails on the basis of activity periods of covered or sensitive species).

Land acquired for reserves will be closed to all recreational uses until a recreation plan is developed and approved as part of a reserve unit management plan. Existing recreational uses on land incorporated into the Reserve System from existing open space (e.g., County Parks) will continue until the reserve unit management plan and associated recreation plan is completed. Existing open space selected for the Reserve System was chosen, in part, because of its compatible recreation uses with the conservation strategy (see **Table 5-5** and **Figure 5-4**). Until the reserve unit management plan is completed, no additional recreational uses beyond what is currently allowed will occur on that existing open space incorporated into the Reserve System.

Recreational uses in the Reserve System will be designed to minimize impacts on biological resources and must adhere to the requirements and guidelines listed below.

- Recreation will only be allowed where it is compatible with the biological goals and objectives of the Plan and has less-than-significant impacts on biological resources after implementation of necessary mitigation measures, as described in the EIR/EIS.
- Recreational use and impacts will be monitored by the landowner and the Implementing Entity to ensure that uses do not substantially and adversely affect covered species. If any use is found to be substantially adversely affecting covered species, that use will be discontinued until adjustments in the use can be made to reduce or eliminate impacts (see Chapter 7 for details on monitoring). The Implementing Entity will make decisions about discontinuing or modifying recreational uses in close consultation with the landowner or other applicable reserve management agency or organization, and through a public process.
- Recreational uses allowed in reserves include pedestrian use (walking, hiking, running), dogs on leash, backpacking, nonmotorized bicycle riding on designated trails, horseback riding, wildlife observation and photography, and environmental education and interpretation on designated trails at appropriate sites. Other uses may be allowed by the Implementing Entity as long as they are compatible with the biological goals and objectives of the Plan and users obtain appropriate permissions for conducting activities if needed (e.g., County Parks requires a permit for professional photography).
- Allowable recreational uses will be controlled and restricted by area and time to minimize impacts on natural communities and covered species and to ensure that the biological goals and objectives of the Plan are met. For example, trails will be closed during and immediately following heavy rains and annually winterized to minimize erosion and sedimentation. Additional types of recreational uses (e.g., horse carts on trails) may be allowed if the Implementing Entity determines that they are consistent with the biological goals and objectives of the Plan, CDFG and USFWS concur, and users obtain appropriate permissions for conducting activities if needed (e.g., County Parks requires a permit for use of horse carts).
- Activities will be allowed in keeping with the ecological needs of the given habitat. Any off trail activities and other active recreation not listed above (e.g., outdoor sports, geocaching) unless otherwise authorized by the Implementing Entity are prohibited. Recreational uses will be allowed only during daylight hours and designated times of the year (i.e., limited seasonal closures to protect sensitive covered species; see below for specific examples) unless authorized through a use permit (i.e., backpacking). Exceptions may be made for educational groups and events that are guided by an Implementing Entity staff person or docent approved by the Implementing Entity.

- New staging areas will be developed to the extent possible in areas within reserves that are already disturbed and not suitable for habitat restoration, and that do not contribute to the conservation biological objectives for covered species habitats and/or natural communities. Sites at the edges of reserves will be chosen over sites on the interior of reserves.
- No motorized vehicles or boats will be allowed in reserves, except for use by the reserve manager staff or with the prior approval of the reserve manager (e.g., contractors implementing Plan conservation actions such as habitat restoration and monitoring, grazing tenants, fire-suppression personnel, and maintenance contractors). For reserves under conservation easements, vehicle use will be allowed as part of the regular use of the land (e.g., agricultural operations, permanent residents, utilities, police and fire departments, other easement holders), as specified in the easement.
- When compatible with Plan biological goals and objectives, dogs may be allowed in daylight hours in designated reserves or in designated areas of reserves, but only on leash. Leash law restrictions will be strictly enforced by reserve managers and staff because of the potential impact of dogs on covered species such as San Joaquin kit fox, western burrowing owl, California red-legged frog, and California tiger salamander. Leash enforcement may include citations and fines. Dogs used for herding purposes by grazing lessees must be under verbal control and have proof of vaccination.
- Recreational hunting or fishing within reserves will be prohibited except in limited circumstances. Landowners who have hunted large game (e.g., deer, elk, turkey, or pigs) on their property that becomes part of the Reserve System through a conservation easement will be allowed to continue this use as long as it is consistent with the biological goals and objectives of the Plan. Similarly, hunting for management purposes (e.g., feral pigs) is encouraged where it will contribute to achieving the goals and objectives of the Plan. The Implementing Entity will develop management hunting protocols on new reserve lands in coordination with other agencies who utilize hunting for management purposes (e.g., CDFG). Fishing is currently allowed in some County parks that will be added to the Reserve System. To be consistent with this condition, lakes or ponds in which fishing will continue will not be included in the Reserve System.
- Picnic areas shall be operated during daylight hours only. No irrigated turf or landscaping shall be allowed in picnic areas. To the extent feasible, picnic areas will be located on the perimeter of preserve areas and will be sited in already disturbed areas. No private vehicles shall be allowed in picnic areas, unless the picnic area is at a staging area and except for limited special events approved by the Implementing Entity. Maintenance and emergency vehicles shall be permitted access to picnic areas.
- Backpack camps shall be limited to use by no more than 25 people at each site. With the exception of Americans with Disabilities Act (ADA) service animals, dogs shall only be allowed in backpack camps on-leash. In coordination with the reserve manager, the Implementing Entity will monitor

use and maintenance of backpack camps and may implement a reservation and permitting process for use of backpack camps.

- Public collecting of native species will be prohibited within reserves.
- Introduction of domestic or feral animals, including cats, ducks, fish, reptiles, and any exotic non-naturalized species, is prohibited within the reserves to prevent interference with and mortality of native species, except by the reserve manager for management purposes (e.g., livestock for grazing or dogs for livestock control or protection).
- Trails will be established on existing roads or trails wherever possible to minimize the need for new ground-disturbing activities and to reduce new and ongoing maintenance costs. However, this will be balanced with the need to reroute some poorly designed existing ranch roads that are difficult and expensive to maintain. In some cases, rerouting access roads may have net benefits on biological resources.
- New trails will be designed and operated to be compatible with natural resources protection. New trails will be sited to minimize impacts on sensitive species (including covered species) and natural communities as well as disturbance to adjacent landowners and land uses. Wetlands will be avoided except for educational trails, and trails through woodland or riparian habitat will avoid tree removal or substantial pruning to the extent possible. If tree removal is required, unhealthy, exotic tree species, or trees unlikely to reach maturity due to site conditions (e.g., being shaded out by larger trees) will be targeted for removal.
- Trails built across streams or through riparian corridors will be sited and designed with the smallest footprint necessary to cross the in-stream area. Stream crossings will be perpendicular to the channel and be designed to avoid any potential for future erosion. Trails that follow a stream course will be sited outside the riparian corridor to the maximum extent feasible.
- Trails will not be paved, except as required by law, and will be sited and designed so that they do not contribute to erosion and bank failure. To provide trail access for a range of user capabilities and needs (including persons with physical limitations) in a manner consistent with state and federal regulations, the landowner would site and design new, paved trails in areas within reserves that are already disturbed and do not have the potential to affect sensitive habitat. As common practice, these types of whole-access trails would be sited near staging areas.
- Recreational uses will be controlled using a variety of techniques including fences, gates, clearly signed trails, educational kiosks, trail maps and brochures, interpretive programs, and patrol by land management staff.
- Construction of recreational facilities within reserves will be limited to those structures necessary to directly support the authorized recreational use of the reserve. Existing facilities will be used where possible. Facilities that support recreation and that may be compatible with the reserve include parking lots (e.g., small gravel or paved lots), trails (unpaved or paved as required by law), educational and informational kiosks, up to one visitor

center located in a disturbed or non-sensitive area, and restroom facilities located and designed to have minimal impacts on habitat. Playgrounds, irrigated turf, off-highway vehicle trails, and other facilities that are incompatible with the goals and objectives of this Plan will not be constructed.

- Signs and informational kiosks will be installed to inform recreational users of the sensitivity of the resources in the reserve, the need to stay on designated trails, and the danger to biological resources of introducing wildlife or plants into the reserve.
- New trails will be prohibited within 100 feet of wetlands and streams that provide suitable habitat for covered amphibians and aquatic reptiles or tricolored blackbird, unless topography or other landscape characteristics shield these trails from the covered species habitat or a lack of effect of the trail on the species can be otherwise demonstrated.
- New trails will be prohibited within 250 feet of active western burrowing owl nests. If an owl pair nests within 250 feet of an active trail, Implementing Entity staff will consult with the Wildlife Agencies to determine the appropriate action to take. Actions may include prohibiting trail use until young have fledged and are no longer dependant on the nest.
- When compatible with Plan biological goals and objectives, recreation plans for reserves adjacent to existing public lands will try to ensure consistency in recreational uses across open space boundaries to minimize confusion in the public. Reserves adjacent to non-Plan public lands with different recreational uses will provide clear signage to explain these differences to users that cross boundary lines. The Implementing Entity will be responsible for securing and signing reserve boundaries.

Rare exceptions to the guidelines listed above will be considered and approved by the Implementing Entity and the Wildlife Agencies on a case-by-case basis. Exceptions will be approved only if they are consistent with the biological goals and objectives of the Plan. Any exceptions will be clearly identified in the recreation plan.

Condition 10. Fuel Buffer

In accordance with state law[15], all applicable covered activities will remove all brush, flammable vegetation, or combustible growth within at least 30 feet and up to 100 feet of occupied dwellings or structures. The amount of fuel modification necessary shall take into account the flammability of the structure as affected by building material, building standards, location, slope, and type of vegetation. Fuels will be maintained in a condition so that a wildfire burning under average weather conditions would be unlikely to ignite the structure. The intensity of fuels management may vary within the 100-foot buffer of the structure, the most intense being within the first 30 feet around the structure.

[15] California Government Code Section 51182 and Public Resources Code 4291.

Consistent with fuels management objectives, steps will be taken to minimize erosion consistent with Condition 7.

Applicable covered activities include construction of new structures in the Diablo Range or Santa Cruz Mountains, or new structures built in grassland, chaparral, oak woodland, or conifer woodland land cover types. This condition also applies to structures built in areas designated by the County as a very high fire hazard severity zone pursuant to Section 51179 of the California Government Code.

If the property line is less than 30 feet from the occupied structure, then the brush and vegetation will be cleared up to the property line in order to maintain compliance with Public Resources Code 4291. Additional brush and vegetation clearing may be required by local or other state laws. To ensure that erosion is minimized, grass and other vegetation within 30 feet of structures will be maintained within this fuel buffer to a height of 18 inches or less. The cost of establishing and maintaining this fuel buffer will be borne by the project proponent. This condition does not apply to single trees or other vegetation that is well-pruned and maintained so as to effectively manage fuels and not form a means of rapidly transmitting fire from other nearby vegetation to a dwelling or structure.

The vast majority of properties adjacent to the Reserve System are expected to be able to create sufficient defensible space within their property to meet this condition. If an additional buffer is deemed necessary by the responsible fire agency, then the private landowner may seek an encroachment permit from the Implementing Entity to meet fire code. In these limited instances, the Implementing Entity may decide to allow a fuel buffer on the reserve side of a property boundary to provide additional protection against wildland fire. The Implementing Entity or land manager would define the allowable activities in encroachment permit to ensure compliance with HCP goals. If this is applied, the fuel management buffer within the reserve will not be credited to the land acquisition requirements in Chapter 5 because this area will be maintained in a disturbed state.

In areas within the Reserve System where management of fuel loads is necessary, the Implementing Entity will trim, mow, conduct prescribed burns, utilize grazing, or otherwise clear vegetation to minimize fuel loads and fire hazards. Various land uses are allowable within the fuel management buffer as long as they reduce fire hazards. Uses such as trails, fire-resistant landscaping, and livestock grazing are compatible with the fuel buffer. Allowable uses must comply with the urban-Reserve System interface guidelines described above.

Creating and maintaining the fuel management buffer within the Reserve System may have impacts on covered species. For example, plants such as Santa Clara Valley dudleya and smooth lessingia may occur in grasslands within fuel buffers. Any impacts on covered plants from fuel buffer management will be counted by the Implementing Entity as an adverse effect that must be offset by conservation of covered plants in the Reserve System (see Chapter 5). In some cases, maintenance of the fuel buffer may improve habitat for covered plants by reducing cover of nonnative plants.

6.5 Conditions to Minimize Impacts on Natural Communities

Conditions 11–14, described below, are designed to minimize impacts on natural communities identified as representing important ecosystems in the Plan area.

Condition 11. Stream and Riparian Setbacks

This condition applies to all covered activities that may impact streams. This includes all development inside the urban service area where a stream or the stream setback overlaps any portion of the parcel on which a covered activity is being implemented. Outside the urban service area, this includes all covered activities where a stream or stream setback overlaps any portion of the development area or project footprint. Exemptions and exceptions may apply as described below in this condition.

Background

The management of stream corridors and associated riparian habitat through the implementation of setbacks has become an increasingly important tool for conserving aquatic and semi-aquatic populations and riparian vegetation and improving water quality. There is strong evidence that riparian buffers of sufficient width protect and improve water quality by intercepting non-point source pollutants in surface and shallow subsurface water flow (e.g., Lowrance et al. 1984; Castelle et al. 1994).

Healthy riparian buffers are also widely recognized for their ability to perform a variety of physical and biological functions other than improving water quality. These functions include stabilizing stream channels; controlling erosion by regulating sediment storage, transport, and distribution; providing organic matter (e.g., leaves and large woody debris) that is critical for aquatic organisms; storing nutrients for the surrounding watershed; reducing water temperature through shading; minimizing flood peaks; and serving as key recharge points for renewing groundwater supplies (DeBano and Schmidt 1989; O'Laughlin and Belt 1995). Riparian buffers also provide habitat for a large variety of plant and animal species. Riparian buffers have been proposed, and in some cases proven, to be landscape components that promote wildlife movement, enhance gene flow, increase connectivity of isolated habitat patches, and provide breeding and foraging habitats for animals (Hilty et al. 2006; Rosenberg et al. 1997).

Within the study area, streams provide important breeding, foraging, and movement habitat for California red-legged frog, foothill yellow-legged frog, and western pond turtle. Riparian woodland, which is found next to many of the study area's streams, provides breeding sites for tricolored blackbird and least Bell's vireo. Riparian woodland habitat also protects water quality by filtering inflow, thus reducing pollutant input and sediment load. Finally, stream and riparian areas provide key linkages connecting conservation areas targeted under the Habitat Plan (see **Table 5-9** and **Figure 5-6**).

Because of the importance of streams and associated riparian woodland for the benefit of covered species and as sensitive land cover types addressed by this Plan, this condition was developed to be as protective as feasible within the land-use constraints of the local jurisdictions and financial constraints of the Habitat Plan. The following principles were developed to guide the stream and riparian setback condition for this Plan.

- Stream habitat and functions are very difficult to replace once lost; in some cases they cannot be replaced.
- Stream setbacks will be required for all covered activities occurring near streams and riparian areas to minimize effects on covered species as required under the ESA and NCCPA. Additional protections adjacent to streams may also be required for urban redevelopment projects.
- Each of the cities participating in the Habitat Plan, as well as the County, has either setback regulations (Morgan Hill) or policies (San José, Gilroy, County of Santa Clara) currently in place. However, these regulations and policies are not consistent among the jurisdictions. A condition is needed that will make regulatory guidance consistent for all covered activities across all jurisdictions. All covered activities must adhere to both the applicable existing local regulations and the requirements of the Plan.
- The main goal of the stream setback requirement is to minimize further degradation of stream and riparian communities from implementation of covered activities and to maintain basic biological and physical functions of stream and riparian systems.
- The purpose of the stream setback requirement within the urban service area is to, at a minimum, protect stream and riparian communities that provide habitat for covered species because these habitats are unique and cannot be conserved elsewhere within the study area.

Protection of streams and adjacent riparian vegetation under this condition would conserve habitat for California red-legged frog, foothill yellow-legged frog, western pond turtle, and least Bell's vireo. All of these species use stream and riparian habitats as either primary or secondary habitat, as described in Chapter 3, *Physical and Biological Resources*.

An analysis was performed to determine the overall value of the setback for protecting covered species' habitat. Modeled habitat protected by the setback was quantified and compared to the level of protection provided by the Reserve System alone. In GIS the habitat models for four covered species (California red-legged frog, foothill yellow-legged frog, western pond turtle, and least Bell's vireo) were overlaid with the expected locations and widths of riparian setbacks outside of the planning limit of urban growth (setback avoidance is not required inside the urban service area and so those areas were not included in this analysis) for all covered activities except rural residential development (exact location of rural residential development is not known at this time and thus could not be included in the analysis). Assuming all of these covered activities occur, an additional 2,855 acres (28%) of modeled breeding (primary) habitat for California red-legged frog and an additional 348 miles (50%) of modeled habitat (primary and secondary) for foothill yellow-legged frog would be avoided. Also, implementation of the stream setback would avoid an additional 837 acres (55%) of modeled habitat for least Bell's vireo. Setback benefits to these species and western pond turtle are summarized in **Table 6-5**. Stream habitat for covered species will likely overlap (i.e., miles and acres referenced in the table and above are not additive).

Definitions

The following terms are defined for this condition. These definitions are also found in the glossary (**Appendix A**).

Riparian habitat or riparian vegetation: Riparian vegetation is associated with river, stream, or lake banks and floodplains. Riparian vegetation is also defined by USFWS (2009) as plant communities contiguous to and affected by surface and subsurface hydrologic features of perennial or intermittent lotic and lentic water bodies (i.e., rivers, streams, lakes, or other watercourses). Riparian areas have one or both of the following characteristics: 1) distinctively different vegetation than adjacent areas, 2) species similar to adjacent areas but exhibiting more vigorous or robust growth forms due to the greater availability of surface and subsurface water.

Stream: A watercourse that flows at least periodically or intermittently through a bed or channel having banks. This may include watercourses having a surface or subsurface flow that supports or has supported riparian vegetation, fish or other aquatic life. In the context of the Habitat Plan, a watercourse must meet SCVWD "*Criteria to Verify or Identify a Watercourse as a Stream*" discussed below under *Framework* (Santa Clara Valley Water Resources Protection Collaborative 2006) to qualify as a stream.

Reach: A section of a stream. Reaches are defined based on a specific need (e.g., monitoring) and do not necessarily reflect a standard set of characteristics.

Perennial stream: A stream with year-round surface flow that is supplied by both rainfall runoff and groundwater, as well as by substantial dry-season inputs (e.g., runoff).

Intermittent stream: A stream that is supplied by both rainfall runoff and groundwater. Intermittent streams tend to be seasonal, with flow during the rainy season and into the late spring or early summer.

Ephemeral stream: A stream that flows only in response to rain events and receives no groundwater input. As defined in the Habitat Plan, ephemeral streams will not include irrigation ditches, underground streams, or drainages and swales that have neither defined bed and bank nor evidence of scour or sediment transport. All other ephemeral drainages that qualify as streams will be considered under the Habitat Plan.

Framework

This condition will apply to all covered activities, including those within the Reserve System. This condition also has exemptions and exceptions as described in subsequent sections below.

The width of the setback is driven by the following criteria:

- stream community,
- slope, and
- location of the covered activity in relation to the urban service area of each local jurisdiction.

Each of these criteria is described below.

Stream Community

Stream communities are grouped into two simplified categories for the purposes of this condition. These categories are based on broad definitions of the biological characteristics of those communities and correspond to the level of habitat quality for covered species and sensitive riparian communities within the study area. Categories for the stream setback requirement are provided below.

- **Category 1**. This stream type has sufficient flow to support covered species and riparian habitat. These streams include perennial streams and some intermittent streams. These streams are typically larger than ephemeral drainages and support movement of covered species along the length of the stream. The ability of these streams to also support healthy riparian habitats bolsters the ecological value of the stream. This category also includes all in-channel ponds downstream of reservoirs. These streams are shown in **Figure 6-2**[16]**.**
- **Category 2**. This stream type may not have sufficient flow to support covered species and riparian habitat. These streams include all ephemeral streams and some intermittent stream reaches. These reaches provide minimum support of water-quality functions and primary breeding habitat for

[16] **Figure 6-2** may be periodically updated by the Implementing Entity in consultation with the Wildlife Agencies as new data becomes available.

covered species. Category 2 streams are not specifically mapped as part of the Habitat Plan. They include both identified streams (named creeks and USGS blueline creeks) that are not classified as Category 1 streams (as shown in **Figure 6-2**) and other unmapped streams that meet the "Criteria to Verify or Identify a Watercourse as a Stream" as defined below.

Categories are applied to reaches of streams as opposed to entire streams. This is because almost all streams begin in the uppermost portions of their watersheds as ephemeral streams and gradually become intermittent or perennial and they move downslope and accumulate flows from the watershed and, sometimes, the groundwater basin. As such, a single stream may contain both Category 1 and Category 2 reaches.

The mapped stream network for the Habitat Plan does not differentiate between perennial, intermittent, and ephemeral drainages. However, SCVWD developed a map of all fish-bearing streams in the study area. While fish are not covered by this Plan, presence of fish is a good indicator of the stream type. For example, ephemeral streams do not generally support fish. As such, the stream categories are identified using fish-bearing or non-fish bearing streams as a proxy for Category 1 and Category 2 streams, respectively. Reaches for which fish data are unknown are assumed not to support fish and are included in Category 2. Category 2 reaches cannot occur downstream of a Category 1 reach.

Criteria to Verify or Identify a Watercourse as a Stream

While all Category 1 streams are mapped by the Plan, not all Category 2 streams are mapped. If a watercourse is not mapped by the Plan, but does meet the following criteria, it will be classified as a Category 2 stream. The following is based on the *Santa Clara Valley Water Resources Protection Collaborative* (2006).

A watercourse which does not appear to fit into one of the two described stream categories may be considered a stream if the director of the planning department of the local jurisdiction determines that the watercourse complies with all of the following three criteria:

1. the watercourse is hydrologically connected to a waterway above and below the site or is connected to a spring, headwaters, lake, and/or bay based on satisfying at least one of the conditions identified in paragraph (A) below; and
2. the watercourse is within a defined channel which includes a bed, bank, and exhibits features that indicate actual or potential sediment movement based on satisfying at least one of the conditions identified in paragraph (B) below; and
3. the watercourse occupies a specific topographic position based on satisfying at least one of the conditions identified in paragraph (C) below.

In determining whether the subject watercourse possesses these three features, the following criteria will be examined by the Local Partner with jurisdiction over the covered activity. If necessary, this determination may require the technical expertise and recommendations of a qualified biologist, hydrologist, or other qualified professional. In addition, the Local Partner with jurisdiction over the covered activity may require the project proponent to provide additional information as deemed necessary to determine if the watercourse satisfies the three criteria listed below.

This process will not be used to determine if a CDFG Streambed Alteration Agreement will be required pursuant to Section 1600 et seq. of the California Fish and Game Code or to determine if a Corps Section 404 Clean Water Act permit will be required.

A. **Hydrologic Connectivity**—Criterion #1 above will be considered met if any of the following conditions are present:

   1. Stream headwaters, springs, in-channel culverts, underground seepage, or groundwater flow are present and capable of providing hydrologic connectivity to recognized watercourses. Sections of stream placed underground by manmade infrastructure (e.g., culverts) are not considered streams for the purpose of this condition except as noted in paragraph B item 4 below.

   2. Streams may become connected across or over manmade improvements such as roads (e.g., a temporary connection during a storm event). Except for stream channel improvements, water flowing across or over such improvements within the public right-of-way is not considered a stream. Sections above and/or below this connectivity are streams if they meet the other required features.

   3. Springs are present and are considered part of a stream if located above (uphill from) stream initiation.

B. **Channel Form—**Criterion #2 above will be considered met if any of the following conditions are present:

   1. The watercourse has a stream channel, beginning at the point of bed and bank initiation, which may be natural, altered, or engineered.

   2. The stream channel must have enough flow under present-day conditions to maintain channel form and to move sediment. A non-engineered stream channel bed and bank are created and maintained by erosion and sedimentation, thus the presence of a channel with bed and bank is itself evidence of sufficient flow. Flow volume or timing is not criteria for stream determination.

   3. The stream channel has evidence of scour, sedimentation, sediment sorting, undercut banks and/or other erosion, deposition, or transport features —all of which support sediment movement.

      Engineered or altered channels exist and are partially or wholly made of earth, concrete, rip rap, or other materials. The hardened nature of these channels bed and banks, and a lack of available sediment along the channel reach, may prevent signs of sediment movement or scour. Such channels need not have explicit evidence of sediment transport.

4. A currently underground stream was filled without appropriate permits from all applicable regulatory agencies (federal, state, and local) or is underground due to a landslide.

C. Topographic Position—Criterion #3 above will be considered met if any of the following conditions are present:

1. The watercourse is either a ‘U’ or ‘V’ shaped channel typically located at the low point of a macro-topographic feature.
2. The watercourse consists of bowl, ‘U’, or ‘V’ shaped topography with high points draining to valley or ravine as part of a large drainage network leading to large streams, lakes and/or a bay.
3. The watercourse located on flatland consists of shallow bowl or ‘U’ shaped topography. Generally these streams flow from the hills toward a bay following the slope of the land.

Stream topography can be indicated on a topography map by a ‘U’ or ‘V’ shape pointed in the uphill direction.

Slope

Slope is an important determinant of soil stability and therefore erosion and sedimentation rates into streams. Steeper slopes erode faster and are more susceptible to disturbance by the covered activities. To account for these factors, stream setback requirements are greater on steeper slopes. The slope categories developed for the Habitat Plan were based on slope-stability categories in local codes and guidelines. Two slope categories were created. Slope categories are as follows.

- **0%–30% Slopes**. Generally stable slopes. This category does not require additional setbacks beyond those identified above.
- **>30% Slopes**. Increasingly unstable slopes. This category requires increase protection and greater stream setbacks.

If the development area as described in Condition 7 is located within 200 feet of a Category 1 stream, the project proponent will include site topography on the development area map (see Section 6.8.2 *Item 2: Project Description and Map*) in 5-foot intervals in elevation. The project proponent will also calculate the average slope of the development area to determine how this criterion is applied. Slope is defined as the average natural slope of the land within the proposed development area based on an engineered site plan. The average slope is determined by the formula:

$S = (I*L/ A)*100$, where

S is the average slope of the area in percent; *I* is the contour interval in feet; *L* is the combined length of contour lines in feet; and A is the area of the development area. Average site slope will be calculated by a registered civil engineer or licensed land surveyor. **Figure 6-3a** illustrates an example setback based on slope.

Urban Service Area

Different setback distances will be applied depending on whether the covered activity occurs within the urban service area[17] (as adopted and mapped by LAFCO and defined by each city's General Plan at the time of adoption of the Habitat Plan) or outside the urban service area. Within the urban service area of San José, Morgan Hill, and Gilroy, there is typically extensive existing urban development. Due to past land-use policies, this development may have limited or no setbacks from streams. As such, these areas tend to be developed or highly altered from a natural state and the overall habitat value for covered species is less than in the rural areas. The stream setback requirement for covered activities within the urban service area is therefore modest and consistent with existing land uses. This setback also recognizes the limited potential for new development within the urban service area to provide stream protections.

Outside of the urban service area, stream setbacks are greater to maximize protection of existing stream functions and values and to provide additional opportunities for stream and riparian protection and restoration (see Chapter 5). Stream setbacks outside the urban service area take into account the opportunity to establish protective setbacks and to pro-actively prevent degradation seen within the urban service area from past development. The difference between setbacks inside and outside of the urban service area reflects the fact that lands within the urban service area provide a minimum amount of habitat in support of basic ecological functions including connectivity for covered species, while stream and riparian habitat outside of the urban service area will be instrumental in successful implementation of the conservation strategy.

Required Setbacks

Stream setback requirements have been developed on the basis of an extensive literature review of applicable research from both local and national sources (**Table 6-6**) and in consultation with the Wildlife Agencies. Scientific studies to determine minimum setbacks typically recommend relatively modest setbacks (an average of 58 feet) to protect water quality (e.g., sediment and nutrient loading). Recommended setbacks to enhance stream ecology were greater and ranged from 85 to 220 feet with an average of 132 feet. Setbacks intended to provide protection for plants and wildlife were the greatest and ranged from 30 to 1,600 feet, with an average range of 335 to 410 feet (**Table 6-6**).

Working from scientifically rigorous definitions of appropriate setbacks, further refinement of setbacks was coordinated with the Local Partners to determine setback widths that, while consistent with the literature, limited the number of situations in which the setback would create undue hardship upon property owners or be infeasible to implement on a consistent basis (the setback would

[17] The urban service area was used instead of the planning limit of urban growth because the urban service area represents the current boundary of urban development, not the future boundary after implementation of all covered activities. The Local Partners felt strongly that stricter riparian setbacks should be applied outside the urban service area to maximize protection of stream and riparian areas prior to urbanization of these areas.

create a large number of property exemptions). As such, the setbacks identified for this Plan (35 to 250 feet) balance the need to protect ecological functions with surrounding land uses and private property constraints.

A stream setback, measured from top of the stream bank, will be applied to all covered activities as shown in **Table 6-7**. To facilitate implementation of this condition, required setbacks are described below based on project location. **Figures 6-3a through 6-3d** illustrate different applications of the setback.

Inside the Urban Service Area

Inside the urban service area at the time of Plan adoption, the setback for Category 1 streams is 100 feet (**Figure 6-3b**). The setback is increased by 50 feet for parcels with slopes greater than 30% to compensate for increased slope instability and higher anticipated rates of erosion. In addition, if the site supports riparian vegetation the setback is equal to either the riparian edge plus a 35 foot buffer or the setback as defined above, whichever is greater.

The setback for all Category 2 streams is 35 feet regardless of location or slope (see **Figure 6-3c**). In addition, if the site supports riparian vegetation, the setback is extended to include the riparian edge plus a 35-foot buffer. The 35-foot buffer is based on a minimum setback distance of 33 feet suggested for sediment and nutrient reduction (Corley et al. 1999). Ephemeral streams, while constituting the majority of streams affected by this condition, are not commonly mapped due to inherent difficulties in mapping ephemeral tributaries in the study area. Unmapped ephemeral streams will only be subject to the required setback if the criteria for defining a watercourse discussed under *Framework* are met for hydrologic connectivity, channel form, and topographic position (Santa Clara Valley Water Resources Protection Collaborative 2006). The applicable local jurisdiction is responsible for making determinations of whether a watercourse qualifies as a Category 2 stream and for implementing setbacks. Each local jurisdiction may also choose to extend the setback beyond 35 feet in cases where site-specific slope and geological characteristics warrant increased protection.

If the project proponent complies with the stream setback when implementing covered activities (i.e., the project avoids the setback), the area of the setback will be excluded from the development fee calculation for the project. The project will be tracked as the parcel or development area excluding the avoided setback so that local jurisdictions are able to identify new impacts in future project applications.

Outside the Urban Service Area

Outside of the urban service area, setback requirements are greater. For Category 1 streams the setback distance is 150 feet (see **Figure 6-3d**). The setback is increased by 50 feet for slopes greater than 30% to compensate for increased slope instability and higher anticipated rates of erosion (**Figure 6-3a**). In addition, if the site supports riparian vegetation, the setback is either the riparian edge plus a 35-foot buffer or the setback described above, whichever is greater.

As described above for required setbacks "*Inside the Urban Service Area*," the setback for all Category 2 streams is 35 feet regardless of location or slope (**Figure 6-3c**). If the site supports riparian vegetation, the setback will extend from the riparian edge plus a 35-foot buffer.

Unless a covered activity meets the "Exemption" criteria or is granted a stream setback exception, as described below, implementation of covered activities is prohibited within the stream setback.

Project proponents of projects located outside the urban service area must ensure that the development area does not encroach into the stream setback unless an exemption or an exception is applied. Projects or portions of projects that qualify for an exemption or exception are described below.

If a project proponent chooses to offer a conservation easement onstream setback areas, and the Implementing Entity and Wildlife Agencies approve, the contribution of the area placed under conservation easement may offset development fees as described below under *Fees and Conservation Easements*, and the land will become part of the Reserve System and contribute to the Plan's requirements for riparian preservation (**Table 5-13**).

Exemptions

The exemptions below apply regardless of location. If a covered activity qualifies for an exemption, a stream setback is not applied and the project proponent is not required to comply with this condition. However, other conditions may still apply and the project is still required to pay all applicable fees (e.g., land cover fee, wetland fee) as described in Chapter 9. Exemptions from the stream setback include the following.

1. Any activity that is not a covered activity and not subject to the Habitat Plan or its conditions.
2. Activities listed as exempt in Section 6.2.
3. Development on parcels less than 0.5 acre.
4. Covered activities that require work within or adjacent to streams such as bridges, levee maintenance and repair, flood-protection projects, stream maintenance, outfall installation and maintenance, flood-protection capital projects, dam-related capital projects.
5. Recreational trails (see Condition 4 and 9 for details on trail siting).
6. Replacement of utilities that result in no new permanent disturbance to the riparian corridor during construction and operation and generate only temporary loss of habitat. (This exemption does not apply for utility projects that result in new permanent riparian impacts.)
7. Stream crossings essential to provide a means of access to parcel or facility.

Exceptions

Stream setback policies that apply to a large number of parcels with varying characteristics require a clear and practical set of exceptions. The term exception means an allowance for reductions in mandated setback distances necessary to allow reasonable use and development of a property based on the variety of constraints and factors that may affect the property. In situations where exceptions are granted, portions of this stream setback condition may still apply. Exceptions will be used in a minority of cases with special circumstances that limit or restrict the ability of a landowner to fully apply the stream setback. For example, geologic and seismic hazards, unusual lot size or configurations, unusual slope, or grading and access issues may present site constraints that require exceptions to the stream setback condition in order to allow reasonable development of a site consistent with local land use regulations.

For all proposed exceptions to the stream setbacks (inside or outside the urban service area), exceptions will be considered based on the following factors:

1. The existence of legal uses within the setback.
2. The extent to which meeting the required setback would result in a demonstrable hardship (i.e., denies an owner any economically viable use of his land or adversely affects recognized real property interests) for the applicant.
3. The extent to which meeting the required setback would require deviation from, exceptions to, or variances from other established policies, ordinances or standards regarding grading, access, water supply, wastewater treatment, disposal systems, geologic hazards, zoning, or other established code standards.
4. The stream setback exception does not preclude achieving the biological goals and objectives of the Habitat Plan or conflict with other applicable requirements of the Habitat Plan and local policies.

Regardless of project location, stream setback exceptions may not reduce a Category 1 stream setback to less than a distance of 50 feet for new development or 35 feet for existing or previously developed sites with legal buildings and uses (**Figure 6-3b**). All applicable fees must be paid for areas granted an exception.

Exceptions may be requested through the standard application process described in Section 6.8, or through a separate request process. Applicants must apply for a stream-setback exception through their local jurisdiction. All private applications for stream-setback exceptions must be reviewed and approved by the local jurisdiction. For projects implemented by a local jurisdiction, exception requests must be made to the Implementing Entity. The findings required to approve the stream setback exception must be supported by factual information and judgments in the record.

As part of the review process, the local jurisdiction or the Implementing Entity must consider the implications of a reduced setback on the riparian system and covered species, progress toward the biological goals and objective of the Plan, and potential effects on adjacent properties. The local jurisdiction or the Implementing Entity must make written findings that document these considerations and the rationale for the stream-setback exception (see below for specific required findings). The local jurisdiction or the Implementing Entity may require technical reports from qualified professionals or consultants to support the application or request. For example, for any significant proposed reduction, a report by a qualified biologist, stream hydrologist, registered engineer, or other professional may be required as a basis for making necessary findings. Please see Section 6.8.5 for definition of a "qualified biologist."

If the stream setback exception is granted at an administrative level (Zoning Administrator) or by a designated decision-making authority (Planning Commission), local agencies must include provisions that allow appeal of this decision to the elected legislative body of the applicable agency. Applicable fees may be imposed by the legislative body for processing such appeals, as well as for the original exception requests.

Prior to granting the exception, the local jurisdiction will provide the exception request and proposed decision to both the Implementing Entity and the Wildlife Agencies for review and comment. The Implementing Entity and Wildlife Agencies will have 30 days to review the request and provide a written response. A local agency cannot take an action until after that 30 day-period. The Implementing Entity will compile a list of all exceptions granted each calendar year for inclusion in the annual report to the Wildlife Agencies.

Fees and Conservation Easements

If the stream setback is precluded from future development by a permanent conservation easement offered voluntarily by the landowner, and the easement is acceptable to the Implementing Entity and Wildlife Agencies and consistent with the Plan Reserve System (as described in Chapter 8, Section 8.6.3), a portion of the land cover fee for the covered activity (i.e., the fee for impacts to land cover types outside of the setback) may be waived by the Implementing Entity. If the value of the easement, in terms of area and resource value, exceeds the fee, credit cannot be "banked" for other projects (i.e., the Implementing Entity will not compensate for excess credit). Partial fee waivers for setbacks will be determined on a case-by-case basis by the Implementing Entity according to the criteria in Chapter 9, Section 9.4.1, subheading *Land Provided in Lieu of Development Fee*.

Each local jurisdiction may also consider imposing a conservation easement as a requirement for development approval when there is a direct nexus between the effects or impacts of a project and the need for an easement. The Implementing Entity will provide technical assistance to the local jurisdiction to determine whether a conservation easement is warranted. An easement must also demonstrate rough proportionality with the impact of the project.

Condition 12. Wetland and Pond Avoidance and Minimization

The purpose of this condition is to minimize direct and indirect impacts to wetlands and ponds and in some cases, avoid direct and indirect impacts to high quality wetlands and ponds. Direct impacts are those that directly affect a wetland or a pond within its mapped boundary (see Section 6.8.4 *Item 4: Map of Wetlands and Waters* for a description of mapping direct impacts to wetlands). Project proponents are required to pay a wetland fee for impacts to wetlands and ponds to cover the cost of restoration or creation of aquatic land cover types required by this Plan (see Chapter 9 for details on this wetland fee). Covered activities can avoid paying the wetland fee if they avoid impacts to the wetland.

All project proponents will implement the following actions to avoid and minimize impacts of covered activities on wetlands and ponds.

Planning Actions

- Projects must be designed to avoid and minimize impacts to wetlands to the maximum extent practicable.
- Applicants with streams on site must follow the stream setback requirements in Condition 11.
- Applicants for coverage under the Plan must follow the requirements and guidelines in Condition 3 to minimize the effects of development on downstream hydrology, streams, and wetlands.

Design

- Locate septic facilities, if used, at least 100 feet from the edge of a wetland or pond if space allows.
- If the runoff from the development will flow within 100 feet of a wetland or pond, install vegetated stormwater filtration features, such as rain gardens, grass swales, tree box filters, or infiltration basins, to capture and treat flows.
- Plant native vegetation (shrubs and small trees) between the wetland or pond and the development such that the line of sight between the wetland or pond and the development is shielded.
- If during the environmental review process it is shown that a project has adverse indirect impacts to the wetland's function (change in hydrological functions, etc.), the project will be required to avoid these indirect effects, as determined on a case-by-case approach by the local jurisdiction, in consultation with the Implementing Entity. If a Local Partner is carrying out the activity, it will coordinate avoidance measures with the Implementing Entity. Wetlands that are not completely avoided, including indirect effects, will be considered permanently impacted and will count towards the impact

caps described in **Table 4-2** and will be assessed fees as described in Chapter 9. If however, the local jurisdiction demonstrates to the Wildlife Agencies that the wetlands to be indirectly affected are highly degraded prior to project impacts, and the Wildlife Agencies agree, impacts will not be counted toward the impact caps described in **Table 4-2** and fees will not be assessed. "Highly degraded" wetlands could include, but are not limited to, those that are indirectly affected by surrounding development or agriculture to the extent that hydrology, water quality, or habitat for covered species is adversely affected.

Construction Actions

- Personnel conducting ground-disturbing activities in or adjacent to wetlands and ponds will be trained by a qualified biologist in these avoidance and minimization measures and the permit obligations of project proponents working under this Plan.
- All wetlands and ponds to be avoided by covered activities will be temporarily staked in the field by a qualified biologist to ensure that construction equipment and personnel avoid these features.
- Fencing will be erected along the outer edge of the project area, between the project area and a wetland or pond. The type of fencing will match the activity and impact types. For example, projects that have the potential to cause erosion will require erosion control barriers (see below), and projects that may bring more household pets to a site will be fenced to exclude pets. The temporal requirements for fencing also depend on the activity and impact type. For example, fencing for permanent impacts will be permanent, and fencing for short-term impacts will be removed after the activity is completed.
- Appropriate erosion control measures (e.g., fiber rolls, filter fences, vegetative buffer strips) will be used on site to reduce siltation and runoff of contaminants into wetlands, ponds, streams, or riparian woodland/scrub. Filter fences and mesh will be of material that will not entrap reptiles and amphibians. Erosion control blankets will be used as a last resort because of their tendency to biodegrade slowly and trap reptiles and amphibians.
- Erosion-control measures will be placed between the wetland or pond and the outer edge of the project site.
- Fiber rolls used for erosion control will be certified as free of noxious weed seed.
- Seed mixtures applied for erosion control will not contain invasive nonnative species, but will rather be composed of native species appropriate for the site or sterile nonnative species. If sterile nonnative species are used for temporary erosion control, native seed mixtures must be used in subsequent treatments to provide long-term erosion control and slow colonization by invasive nonnatives.

- Vehicles and equipment will be parked on pavement, existing roads, and previously disturbed areas.
- Trash generated by covered activities will be promptly and properly removed from the site.
- No construction or maintenance vehicles will be refueled within 200 feet of avoided wetlands and ponds unless a bermed and lined refueling area is constructed and hazardous material absorbent pads are available in the event of a spill.
- All management of pest species will be conducted in compliance with the County integrated pest management (IPM) ordinance. In addition, other requirements identified in this chapter that exceed the requirements of the IPM ordinance will be implemented.
- Where appropriate to control serious invasive plants, herbicides that have been approved by EPA for use in or adjacent to aquatic habitats may be used as long as label instructions are followed and applications avoid or minimize impacts on covered species and their habitats. In wetland environments, appropriate herbicides may be applied during the dry season to control nonnative invasive species (e.g., yellow star-thistle). Herbicide drift will be minimized by applying the herbicide as close to the target area as possible. Herbicides will only be applied by certified personnel in accordance with label instructions.
- All organic matter should be removed from nets, traps, boots, vehicle tires and all other surfaces that have come into contact with ponds, wetlands, or potentially contaminated sediments. Items should be rinsed with clean water before leaving each study site (U.S. Fish and Wildlife Service 2005).
- Implement measures to minimize the spread of disease and non-native species based on current Wildlife Agency protocols (e.g., *Revised Guidance on Site Assessments and Field Surveys for the California Red-legged Frog: Appendix B, Recommended Equipment Decontamination Procedures* [U.S. Fish and Wildlife Service 2005]) and other best available science.
- Used cleaning materials (liquids, etc.) should be disposed of safely, and if necessary, taken off site for proper disposal. Used disposable gloves should be retained for safe disposal in sealed bags (U.S. Fish and Wildlife Service 2005).
- Portions of the project that occur in streams will comply with Condition 4.

Condition 13. Serpentine and Associated Covered Species Avoidance and Minimization

Serpentine soils comprise four land cover types in the study area: serpentine bunchgrass grassland, serpentine rock outcrops, serpentine seeps, and serpentine chaparral. These land cover types are estimated to encompass 14,314 acres in the study area. Additional unmapped areas of serpentine may be discovered during implementation because it often occurs in small patches that could not be discerned at the scale of the mapping and available data.

Most of the serpentine areas in the study area are expected to be acquired as part of the Reserve System (see Chapter 5 for specific targets). However, some impacts on these land cover types may still occur (e.g., allowable impacts to serpentine bunchgrass grassland are limited to 550 acres [**Table 4-2]**). Because of the high importance and rarity of serpentine soils and their habitats, these areas will be avoided whenever feasible during project planning.

In cases where serpentine areas are part of a project site in a developed area, the project will be designed to preserve larger patches of serpentine outside the development area and limit impacts to the smallest patches feasible and to the edges of serpentine patches regardless of their size. The length of the edge of the serpentine patch that is directly adjacent to the developed area will be minimized and will include as large a buffer as possible between the serpentine edge and the developed area. Landscaping will not be planted on serpentine areas except as needed to reduce fire hazards adjacent to structures consistent with County fire hazard reduction regulations (see also Condition 10). Plantings will not include species that are known or suspected to invade serpentine habitats or cross-pollinate with endemic serpentine plant species or other native plants.

On undeveloped sites, the project area and construction staging area must be located to avoid or minimize impacts to any serpentine on site. The guidelines described above for developed areas will also be followed for project sites in undeveloped areas.

Where mapped serpentine cannot be avoided, the minimization measures listed below will be implemented.

- Conduct surveys of the serpentine vegetation to inventory for covered species and evaluate habitat quality for covered species.
- For portions of the development area that are in Bay checkerspot butterfly habitat units identified in Appendix D, survey the site for the presence of larval host plants of Bay checkerspot butterfly. If larval host plants are found, conduct reconnaissance level surveys for adult butterflies during the peak of the flight period to determine species presence or absence.
- Locate the project footprint as far from the covered species or the highest-quality serpentine habitat as is feasible. Utilize applicable buffers as identified in this chapter.
- If covered plants occur on the site and cannot be avoided, notify the Implementing Entity of the construction schedule so that plant salvage can be considered and potentially implemented (see Condition 19).

Condition 14. Valley Oak and Blue Oak Woodland Avoidance and Minimization

Valley oak woodland and blue oak woodland are considered by CDFG to be sensitive biotic communities (California Department of Fish and Game 2003). There is evidence that valley oak woodland was once one of the dominant land cover types on the floor of the Santa Clara Valley, but it has been largely removed by urban and agricultural development (San Francisco Estuary Institute 2006, 2008). These communities can provide important foraging or movement habitat for species covered by the Plan—California red-legged frog, and California tiger salamander—as well as for many other native species. For these reasons, these two oak woodland land cover types would benefit from some avoidance and minimization associated with covered activities.

All covered activities will implement the following actions to avoid or minimize impacts on valley and blue oak woodland.

Project Planning

- Projects on sites supporting substantial stands of valley oak woodland or blue oak woodland will minimize their impacts on these communities and preserve these stands on site when to do so would further the biological goals and objectives of the Plan. For example, projects should preserve oak woodland communities that are adjacent to existing stands of protected oak woodlands to avoid habitat fragmentation and degradation of wildlife linkages.
- Projects will avoid to the maximum extent feasible irrigating in and around valley oak woodland and will avoid altering hydrology of the site, including location of septic leach fields, such that valley oak woodland receives more water than under pre-project conditions.
- Large and healthy trees will be maintained on site whenever feasible. Local jurisdictions may set tree size thresholds for preservation that are consistent with local tree ordinances. Large valley oak trees still healthy today are clearly visible on air photos from as far back as 1939 (San Francisco Estuary Institute 2006), even though they are surrounded by agricultural fields or urban development. Preserved trees can provide habitat value for many decades; they also provide a significant community amenity.
- If trees are maintained on a site, buffer zones will be established between preserved valley oak or blue oak trees and development at a distance equal to or greater than the root protection zone, which is defined as a buffer zone determined by calculating one foot for each inch of trunk diameter measured at 4.5 feet above ground surface (Matheny and Clark 1998).

Project Construction

- Temporary project access points will be constructed as close as possible to the work area to minimize necessity for tree removal.
- Roads and pathways will be aligned outside of the tree's root protection zone (as defined above) whenever possible.
- Roads and pathways designed beneath or within 25 feet of the dripline of oak trees will be graded using hand-held equipment and will use permeable surfacing (e.g., grass pavers that allow runoff to infiltrate the ground).
- Alteration of natural grade through fill or other means within the root protection zone of oak trees will be minimized.
- Trenching for utility lines and other purposes will be minimized within root protection zones. Utilities may be installed in these areas by boring below the root zone.
- If extensive pruning of blue oaks and valley oaks is necessary, pruning will be conducted during the winter dormant period for these species and under the supervision of an arborist certified to International Society of Arboriculture or similar standards.

6.6 Conditions to Minimize Impacts on Specific Covered Species

Species-specific conditions are presented below. The timing of species habitat surveys, preconstruction surveys, and construction monitoring relative to impacts are described below and summarized in **Table 6-8**. For long term projects and projects that are phased[18], the frequency and timing of surveys relative to impacts will be determined by the local jurisdiction or Implementing Entity in coordination with the Wildlife Agencies on a case-by-case basis. At a minimum, surveys and monitoring (if required) will be done prior to each construction phase if the entire project area is not continuously disturbed between phases.

The Implementing Entity will maintain and update modeled habitat maps based on guidance provided in Chapter 7, *Monitoring and Adaptive Management Program.* For species that require surveys based on modeled habitat[19], qualified biologists will utilize the most current modeled habitat maps available from the Implementing Entity to guide where surveys must be conducted. Surveys will be conducted based on modeled habitat maps that are updated throughout Plan implementation. Similarly, the Implementing Entity will track impacts to modeled habitat based on modeled habitat maps updated during Plan implementation.

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[18] Phasing may include planned phasing of construction (e.g., multi-year phasing of a road construction project), or unplanned gaps in construction activity.
[19] San Joaquin kit fox, western burrowing owl, and Bay checkerspot butterfly.

6.6.1 Selected Covered Wildlife Species

Conditions 15–18 identify conditions on covered activities that are specific to some of the covered species. Activities that may affect these covered species must also adhere to other applicable conditions in this chapter, including Condition 1, *Avoid Direct Impacts on Legally Protected Plant and Wildlife Species*. A summary of species surveys, preconstruction surveys, and construction monitoring requirements is provided in **Table 6-8**.

Condition 15. Western Burrowing Owl

To avoid or minimize direct impacts of covered activities on western burrowing owls, the procedures described below will be implemented. This condition incorporates survey, avoidance, and minimization guidelines from the following western burrowing owl conservation plans and other sources pertaining to the study area. The avoidance and minimization process for western burrowing owl as required in this condition is illustrated in **Figure 6-4**.

- CDFG *Staff Report on Burrowing Owl Mitigation* (California Department of Fish and Game 1995).
- CDFG *Staff Report on Burrowing Owl Mitigation* (California Department of Fish and Game 2012).
- *Draft Burrowing Owl Habitat Conservation Strategy and Implementation Plan* (City of San José 2000).
- *City of Morgan Hill—Citywide Burrowing Owl Habitat Mitigation Plan* (City of Morgan Hill 2003).
- Personal communication with Jack Barclay regarding ongoing monitoring efforts in the study area including annual monitoring at San José International Airport.
- Various unpublished reports from survey efforts in the study area.
- Guidance from CDFG.

Western Burrowing Owl Habitat Survey

Western burrowing owl habitat surveys will be required in the study area in all modeled occupied nesting habitat (see **Figure 5-11**). Surveys are not required in sites that are mapped as potential burrowing owl nesting or only overwintering habitat. Modeled habitat types may change throughout the permit term based on the best available scientific data. For example, the Implementing Entity will be conducting annual surveys or collecting annual survey data of other organizations in occupied nesting habitat throughout the permitarea to determine the annual status of known nesting areas the number of adult breeding owls present. The Implementing Entity will also coordinate with other South Bay local governments, special districts, and non-profit organizations every 3 years to assess status of the burrowing owl population in the entire study area and the expanded study area for burrowing owl conservation, outside areas of modeled occupied habitat.

Habitat surveys in occupied nesting habitat are required in both breeding and non-breeding seasons. If the project site falls within occupied nesting habitat, a qualified biologist will map areas with burrows (i.e., areas of highest likelihood of burrowing owl activity) and all burrows that may be occupied (as indicated by tracks, feathers, egg shell fragments, pellets, prey remains, or excrement) on the project site. This mapping will be conducted while walking transects throughout the entire project footprint, plus all accessible areas within a 250-foot radius from the project footprint. The centerline of these transects will be no more than 50 feet apart and will vary in width to account for changes in terrain and vegetation that can preclude complete visual coverage of the area. For example, in hilly terrain with patches of tall grass, transects will be closer together, while in open areas with little vegetation they can be 50 feet apart.

This methodology is consistent with other accepted survey protocols for this species (California Burrowing Owl Consortium 1993). The Implementing Entity may update this protocol during the permit term based on changes to the accepted protocol with the concurrence of the Wildlife Agencies. Adjacent parcels under different land ownership will be surveyed only if access is granted or if the parcels are visible from authorized areas.

If suitable habitat is identified during the habitat survey, and if the project does not fully avoid impacts to the suitable habitat, preconstruction surveys will be required. Suitable habitat is fully avoided if the project footprint does not impinge on a 250-foot buffer around the suitable burrow.

Preconstruction Survey

Prior to any ground disturbance related to covered activities, a qualified biologist will conduct preconstruction surveys in all suitable habitat areas as identified during habitat surveys. The purpose of the preconstruction surveys is to document the presence or absence of burrowing owls on the project site, particularly in areas within 250 feet of construction activity.

To maximize the likelihood of detecting owls, the preconstruction survey will last a minimum of three hours. The survey will begin 1 hour before sunrise and continue until 2 hours after sunrise (3 hours total) or begin 2 hours before sunset and continue until 1 hour after sunset. Additional time may be required for large project sites. A minimum of two surveys will be conducted (if owls are detected on the first survey, a second survey is not needed). All owls observed will be counted and their location will be mapped.

Surveys will conclude no more than 2 calendar days prior to construction. Therefore, the project proponent must begin surveys no more than 4 days prior to construction (2 days of surveying plus up to 2 days between surveys and construction). To avoid last minute changes in schedule or contracting that may occur if burrowing owls are found, the project proponent may also conduct a preliminary survey up to 14 days before construction. This preliminary survey may count as the first of the two required surveys as long as the second survey concludes no more than 2 calendar days in advance of construction.

Implementation of Covered Activities in Burrowing Owl Habitat

In order to allow covered activities to go forward in burrowing owl habitat prior to the formal take authorization of individuals described above, project applicants will employ avoidance measures described below to ensure that direct take does not occur. Application of these measures is illustrated in **Figure 6-4**. The below avoidance measures apply to all projects that affect any burrowing owl habitat, regardless of whether surveys are required by this condition. In other words, if a project is occurring outside of modeled occupied nesting habitat, the project proponent is obligated to ensure avoidance and minimization of impact to burrowing owls according to the measures described below.

Avoidance Measures

Breeding Season

If evidence of western burrowing owls is found during the breeding season (February 1–August 31), the project proponent will avoid all nest sites that could be disturbed by project construction during the remainder of the breeding season or while the nest is occupied by adults or young (occupation includes individuals or family groups foraging on or near the site following fledging). Avoidance will include establishment of a 250-foot non-disturbance buffer zone around nests. Construction may occur outside of the 250-foot non-disturbance buffer zone. Construction may occur inside of the 250-foot non-disturbance buffer during the breeding season if:

- the nest is not disturbed, and
- the project proponent develops an avoidance, minimization, and monitoring plan that will be reviewed by the Implementing Entity and the Wildlife Agencies prior to project construction based on the following criteria.
  - The Implementing Entity and the Wildlife Agencies approves of the avoidance and minimization plan provided by the project applicant.
  - A qualified biologist monitors the owls for at least 3 days prior to construction to determine baseline nesting and foraging behavior (i.e., behavior without construction).
  - The same qualified biologist monitors the owls during construction and finds no change in owl nesting and foraging behavior in response to construction activities.

- If there is any change in owl nesting and foraging behavior as a result of construction activities, these activities will cease within the 250-foot buffer. Construction cannot resume within the 250-foot buffer until the adults and juveniles from the occupied burrows have moved out of the project site.
- If monitoring indicates that the nest is abandoned prior to the end of nesting season and the burrow is no longer in use by owls, the non-disturbance buffer zone may be removed. The biologist will excavate the burrow to prevent reoccupation after receiving approval from the Wildlife Agencies.

The Implementing Entity and the Wildlife Agencies have 21 calendar days to respond to a request from the project proponent to review the proposed construction monitoring plan. If these parties do not respond within 21 calendar days, it will be presumed that they concur with the proposal and work can commence.

Non-Breeding Season

During the non-breeding season (September 1–January 31), the project proponent will establish a 250-foot non-disturbance buffer around occupied burrows as determined by a qualified biologist. Construction activities outside of this 250-foot buffer are allowed. Construction activities within the non-disturbance buffer are allowed if the following criteria are met in order to prevent owls from abandoning important overwintering sites.

- A qualified biologist monitors the owls for at least 3 days prior to construction to determine baseline foraging behavior (i.e., behavior without construction).
- The same qualified biologist monitors the owls during construction and finds no change in owl foraging behavior in response to construction activities.
- If there is any change in owl nesting and foraging behavior as a result of construction activities, these activities will cease within the 250-foot buffer.
- If the owls are gone for at least one week, the project proponent may request approval from the Implementing Entity that a qualified biologist excavate usable burrows to prevent owls from re-occupying the site. After all usable burrows are excavated, the buffer zone will be removed and construction may continue.

Monitoring must continue as described above for the non-breeding season as long as the burrow remains active.

Construction Monitoring

Based on the avoidance, minimization, and monitoring plan developed (as required in the above section), during construction, the non-disturbance buffer zones will be established and maintained if applicable. A qualified biologist will monitor the site consistent with the requirements described above to ensure that buffers are enforced and owls are not disturbed. The biological monitor will also conduct training of construction personnel on the avoidance procedures, buffer zones, and protocols in the event that a burrowing owl flies into an active construction zone.

Passive Relocation

Passive relocation would not be allowed under the Plan until the positive growth trend described in Section 5.4.6 is achieved. Once this occurs, passive owl relocation may be allowed, with the approval of the Wildlife Agencies, on project sites in the non-breeding season (September 1–January 31) if the other measures described in this condition do not allow work to continue. Passive relocation would only be proposed if the burrow needed to be removed, or had the potential of collapsing (e.g., from construction activities), as a result of the covered activity.

If passive relocation is eventually allowed, a qualified biologist can passively exclude birds from their burrows during non-breeding season only by installing one-way doors in burrow entrances. These doors will be in place for 48 hours to ensure owls have left the burrow, and then the biologist will excavate the burrow to prevent reoccupation. Burrows will be excavated using hand tools. During excavation an escape route will be maintained at all times. This may include inserting an artificial structure into the burrow to avoid having the overburden collapse into the burrow and trapping owls inside. Other methods of passive relocation, based on best available science, may be approved by the Wildlife Agencies during Plan implementation.

Exceptions to Passive Relocation Prohibition

Due to the relatively low numbers of burrowing owls in the study area, it is not expected that the prohibition of passive relocation will result in project delays. However, it is possible that a covered activity could not proceed due to avoidance measures for burrowing owl in this condition if owls continually persist on a site where avoidance is not feasible. In such cases, a project proponent may apply for an exception based on the following process. For this condition, the term exception means an allowance to conduct passive relocation of burrowing owls during the non-breeding season only when this activity is not otherwise allowed. This exception process is necessary to allow reasonable use and development of a property based on the variety of constraints and factors that may affect the property. In situations where exceptions are granted, other portions of this condition may still apply. Exceptions will be used in a minority of cases with special circumstances that limit or restrict the ability of a landowner to fully apply the condition.

Exceptions may be requested through the standard application process described in Section 6.8, or through a separate request process. Private applicants must apply for a passive relocation exception through their local jurisdiction. Project proponents must develop and submit with the request for exception a passive relocation plan. The passive relocation plan must document the following.

1. That owls have occupied the site for a full year without relocating voluntarily. Surveys documenting presence must be completed by a qualified biologist and results must be provided in a written report. The report should confirm that one or more individuals (i.e., unique owl[s]) were monitored for a year and that the owl(s) had used the site for a full year[20].
2. The proposed process for relocation, including schedule for the proposed passive relocation and name of the qualified biologist.

The local jurisdiction, the Implementing Entity, and the Wildlife Agencies will meet to discuss the proposed passive relocation plan. Exceptions will be considered based on, but not limited to, the following factors:

1. The parcel is equal to or less than 3 acres and is more than 1,000 feet from other suitable nesting or foraging habitat such that it is unlikely the site can sustain burrowing owls into the future.
2. If the site has historically been used for nesting (within the last 3 years).
3. If the site is a target for a burrowing owl temporary or permanent management agreement.

As part of the review process, the Implementing Entity and Wildlife Agencies will consider the implications of an exception on the burrowing owl population and progress toward the biological goals and objective of the Plan. A passive relocation exception will not be granted if the Implementing Entity and Wildlife Agencies determine that such an exception, as mitigated, would preclude implementation of the conservation strategy of the Habitat Plan or conflict with other applicable requirements of the Habitat Plan and local policies. The local jurisdiction or the Implementing Entity must make written findings that document these considerations and the rationale for the exception.

Additional mitigation may be required as part of an approval to implement passive relocation that is otherwise prohibited by the Plan. The need for and form of additional mitigation will be determined and approved by the Implementing Entity and Wildlife Agencies. Additional mitigation could include payment of additional fees, or contribution of occupied lands to the Reserve System. Applicable fees may be imposed by the local jurisdiction for processing exception requests. Mitigation will be proportional to the impact occurring as a result of a specific eviction and will fully mitigate such evictions.

The Implementing Entity will compile a list of all exceptions granted each calendar year for inclusion in the annual report to the Wildlife Agencies.

[20] If monitoring reveals that an owl(s) has vacated the site for 10 consecutive days or more, the project applicant may assume that the owl has voluntarily relocated and a qualified biologist may take measures to collapse suitable habitat to discourage new owls from occupying the site.

Condition 16. Least Bell's Vireo

To avoid and minimize direct impacts of covered activities on least Bell's vireos, the following procedures will be implemented. These survey requirements provide compliance with the Plan and the MBTA (least Bell's vireo is a listed species, so the HCP permit also serves as a Special Purpose Permit under MBTA; see Chapter 1 for details).

Habitat Survey

Least Bell's vireo surveys will only be required for projects occurring within potential breeding habitat. The Implementing Entity will provide maps showing the geographic regions where surveys may be required. These maps will be updated during the permit term to incorporate best available science on where this species may be found. At the time of Plan adoption, the area of required surveys is limited to the Pajaro watershed, including Uvas, Llagas, and Pacheco sub-watersheds.

Projects occurring within the mapped area require surveys if the project-specific verified land cover map (see Section 6.8.3 *Item 3: Land Cover Types on Site*) shows that the project area is within 250 feet of riparian land cover types. If a project meets this criterion, a qualified biologist will conduct a field investigation to identify and map early successional riparian vegetation (typically dominated by willow shrubs and other thick understory vegetation) which may be used for nesting. If early successional riparian vegetation is found, the project proponent may revise the proposed project to avoid all areas within a 250-foot buffer around the potential nesting habitat and surveys will be concluded.

Preconstruction Survey

If the project proponent chooses not to avoid the potential nesting site and the 250-foot buffer, additional nesting surveys are required. Prior to any ground disturbance related to covered activities, a qualified biologist will:

1. Make his/her best effort to determine if there has been nesting at the site in the past 3 years. This includes checking the CNDDB, contacting local experts, and looking for evidence of historical nesting (i.e., old nests).
2. If no nesting in the past 3 years is evident, conduct a preconstruction survey in areas identified in the habitat survey as supporting potential least Bell's vireo nesting habitat. Surveys will be made at the appropriate times of year when nesting use is expected to occur. The surveys will document the presence or absence of nesting pairs of least Bell's vireo. Protocol-level surveys will be used (USFWS's 2001 least Bell's vireo survey guidelines or latest protocol). Surveys will conclude no more than two calendar days prior to construction.

To avoid last minute changes in schedule or contracting that may occur if an active nest is found, the project proponent may also conduct a preliminary survey up to 14 days before construction. If one or more least Bell's vireo nests are found present (through step 1 or 2 above), the nest site(s) plus a 250-foot buffer will be avoided (see below for additional avoidance and minimization details). The Wildlife Agencies will be notified immediately of nest locations.

Avoidance and Minimization

Covered activities must avoid active least Bell's vireo nests during the breeding season (March 15–July 31) by maintaining at least a 250-foot no-activity buffer around all active nests. As long as the nest remains active, no activity will occur within the established buffer. Disturbance to previous nesting sites (for up to 3 years) will also be avoided during the breeding season unless the disturbance is required for the conservation strategy or to maintain public safety. Least Bell's vireos use previous nesting sites, and disturbance during the breeding season may preclude birds from using existing nests.

The required buffer may be reduced in areas where there are sufficient barriers or topographic relief to protect the nest from excessive noise or other disturbance. Implementing Entity technical staff will coordinate with the Wildlife Agencies and evaluate exceptions to the minimum no-activity buffer distance on a case-by-case basis.

Construction Monitoring

If occupied nests are identified, a qualified biologist will monitor construction to ensure that the 250-foot no-activity buffer around all active least Bell's vireo nests is maintained to ensure that covered activities do not affect nest success. If monitoring indicates that construction outside of the buffer is affecting breeding, the buffer will be increased if space allows (e.g., move staging areas farther away). If space does not allow, construction will cease until the young have fledged from the nest or until the end of the breeding season, whichever occurs first. The biological monitor will also conduct training of construction personnel on the avoidance procedures, buffer zones, and protocols in the event that a least Bell's vireo flies into an active construction zone (i.e., outside the buffer zone).

Condition 17. Tricolored Blackbird

To avoid direct impacts of covered activities on nesting tricolored blackbird colonies, the following procedures will be implemented.

Habitat Survey

Projects require surveys if the project-specific verified land cover map (see Section 6.8.3 *Item 3: Land Cover Types on Site*) shows that the project area is within 250 feet of any riparian, coastal and valley freshwater marsh (perennial wetlands), or pond land cover types. If a project meets this criterion, a qualified biologist will conduct a field investigation to identify and map potential nesting substrate. Nesting substrate generally includes flooded, thorny, or spiny vegetation (e.g., cattails, bulrushes, willows, blackberries, thistles, or nettles). If potential nesting substrate is found, the project proponent may revise the proposed project to avoid all areas within a 250-foot buffer around the potential nesting habitat and surveys will be concluded.

Preconstruction Survey

If the project proponent chooses not to avoid the potential nesting habitat and the 250-foot buffer, additional nesting surveys are required. Prior to any ground disturbance related to covered activities, a qualified biologist will:

1. Make his/her best effort to determine if there has been nesting at the site in the past 5 years. This includes checking the CNDDB, contacting local experts, and looking for evidence of historical nesting (i.e., old nests).
2. If no nesting in the past 5 years is evident, conduct a preconstruction survey in areas identified in the habitat survey as supporting potential tricolored blackbird nesting habitat. Surveys will be made at the appropriate times of year when nesting use is expected to occur. The surveys will document the presence or absence of nesting colonies of tricolored blackbird. Surveys will conclude no more than two calendar days prior to construction.

To avoid last minute changes in schedule or contracting that may occur if an active nest is found, the project proponent may also conduct a preliminary survey up to 14 days before construction. If a tricolored blackbird nesting colony is present (through step 1 or 2 above), a 250-foot buffer will be applied from the outer edge of all hydric vegetation associated with the site and the site plus buffer will be avoided (see below for additional avoidance and minimization details). The Wildlife Agencies will be notified immediately of nest locations.

Avoidance and Minimization

Covered activities must avoid tricolored blackbird nesting habitat that is currently occupied or have been used in the past 5 years. If tricolored blackbird colonies are identified during the breeding season, covered activities will be prohibited within a 250-foot no-activity buffer zone around the outer edge of all hydric vegetation associated with the colony. This buffer may be reduced in areas with dense forest, buildings, or other habitat features between the construction activities and the active nest colony, or where there is sufficient topographic relief to protect the colony from excessive noise or visual disturbance.

Depending on site characteristics, the sensitivity of the colony, and surrounding land uses, the buffer zone may be increased. Land uses potentially affecting a colony will be observed by a qualified biologist to verify that the activity is not disrupting the colony. If it is, the buffer will be increased. Implementing Entity technical staff will coordinate with the Wildlife Agencies and evaluate exceptions to the minimum no-activity buffer distance on a case-by-case basis.

Construction Monitoring

If construction takes place during the breeding season when an active colony is present, a qualified biologist will monitor construction to ensure that the 250-foot buffer zone is enforced. If monitoring indicates that construction outside of the buffer is affecting a breeding colony, the buffer will be increased if space allows (e.g., move staging areas farther away). If space does not allow, construction will cease until the colony abandons the site or until the end of the breeding season, whichever occurs first. The biological monitor will also conduct training of construction personnel on the avoidance procedures, buffer zones, and protocols in the event that tricolored blackbirds fly into an active construction zone (i.e., outside the buffer zone).

Condition 18. San Joaquin Kit Fox

Disturbance of all San Joaquin kit fox dens will be avoided to the maximum extent possible. To avoid or minimize direct impacts of covered activities on San Joaquin kit fox, the following procedures will be implemented. This program was based on USFWS's *Standardized Recommendations for Protection of the Endangered San Joaquin Kit Fox prior to or during Ground Disturbance* (U.S. Fish and Wildlife Service 2011).

Habitat Survey

San Joaquin kit fox surveys will only be required for projects occurring within modeled habitat (**Appendix D**). (This model will be updated as needed based on best available scientific information.) The Implementing Entity will provide updated modeled habitat maps to the County (the only jurisdiction in which these areas occur). A qualified biologist will conduct a field evaluation of suitable breeding or denning habitat for kit fox for all covered activities that occur within modeled habitat and map potential den sites. If the project does not fully avoid impacts on suitable dens, preconstruction surveys will be required. Suitable breeding habitat is fully avoided if the project footprint does not overlap with a suitable den or with a 250-foot buffer around the suitable den.

Preconstruction Survey

Prior to any ground disturbance related to covered activities, a qualified biologist will conduct a preconstruction survey for covered activities in areas identified by species surveys as being suitable breeding or denning habitat. The surveys will evaluate use of dens by kit foxes using methods appropriate for the northern edge of the species' range, such as placing a tracking medium in the project area where suitable dens occur. Surveys will conclude no more than two calendar days prior to construction. To avoid last minute changes in schedule or contracting that may occur if a kit fox or active den is found, the project proponent may also conduct a preliminary survey up to 14 days before construction. On the parcel where the activity is proposed, the biologist will survey the proposed disturbance footprint and a 250-foot radius from the perimeter of the proposed footprint to identify San Joaquin kit foxes and/or suitable dens. Adjacent parcels under different land ownership will not be surveyed unless access is granted within the 250-foot radius. The status of all dens will be determined and mapped. Written results of preconstruction surveys will be submitted to USFWS and CDFG within two calendar days after survey completion and before the start of ground disturbance.

If San Joaquin kit foxes and/or suitable dens (i.e., dens greater than 5 inches in diameter) are identified in the survey area, the conditions described below will be implemented.

Avoidance and Minimization

The goal of the avoidance and minimization measures for San Joaquin kit fox are to avoid all injury or death to kit fox in the study area, and to minimize harm or harassment to the species. No take authorization for injury or death to kit fox is provided by this Plan due to the rarity of the species in the study area. The following avoidance and minimization conditions will be applied to projects that do not fully avoid suitable dens or kit fox individuals.

- If a suitable San Joaquin kit fox den is discovered in the proposed development footprint, the den will be monitored for 3 days by a USFWS- and CDFG-approved biologist using a tracking medium or an infrared beam camera to determine if the den is currently being used.
- Unoccupied dens will be destroyed immediately to prevent subsequent use.
- If a natal or pupping den is found, USFWS and CDFG will be notified immediately. The den will not be destroyed until the pups and adults have vacated and then only after further consultation with USFWS and CDFG.
- If kit fox activity is observed at the den during the initial monitoring period, the den will be monitored for an additional 5 consecutive days from the time of the first observation to allow any resident animals to move to another den while den use is actively discouraged. For dens other than natal or pupping dens, use of the den can be discouraged by partially plugging the entrance with soil such that any resident animal can easily escape. Once the den is

determined to be unoccupied it may be excavated under the direction of the biologist. Alternatively, if the animal is still present after 5 or more consecutive days of plugging and monitoring, the den may have to be excavated by hand when, in the judgment of a biologist, it is temporarily vacant (i.e., during the animal's normal foraging activities). If at any point during excavation a kit fox is discovered inside the den, the excavation activity shall cease immediately and monitoring of the den as described above will be resumed. Destruction of the den may be completed when, in the judgment of the biologist, the animal has escaped from the partially destroyed den.

- Construction and on-going operational requirements from *Standardized Recommendations for Protection of the Endangered San Joaquin Kit Fox prior to or during Ground Disturbance* (U.S. Fish and Wildlife Service 2011) or the latest guidelines will be implemented.
- If active or suitable dens are identified within the proposed disturbance footprint or outside the proposed project footprint but within a 250-foot buffer, exclusion zones around each den entrance or cluster of entrances will be demarcated. The configuration of exclusion zones will be circular, with a radius measured outward from the den entrance(s). No covered activities will occur within the exclusion zones. Exclusion zone radii for atypical dens and suitable dens will be at least 50 feet and will be demarcated with four to five flagged stakes. Exclusion zone radii for known dens will be at least 100 feet and will be demarcated with staking and flagging that encircles each den or cluster of dens but does not prevent access to the den by the foxes.

Construction Monitoring

If construction takes place while kit fox dens are occupied, a qualified biologist will be present to ensure compliance with the avoidance and minimization measures listed above. The frequency of monitoring will be approved by USFWS and CDFG and will be based on the frequency and intensity of construction activities and the likelihood of disturbance to the active dens. In most cases, monitoring will occur at least weekly, but in some cases daily monitoring may be appropriate to ensure that disturbance of San Joaquin kit fox is minimized.

6.6.2 Covered Plant Species

Impacts on covered plant occurrences are constrained by limits on the number of occurrences impacted, as described in Chapter 4 (see **Table 4-6**). Accordingly, only two additional conditions on covered activities is needed to meet regulatory requirements for covered plants.

Condition 19. Plant Salvage when Impacts are Unavoidable

Where impacts on covered plant species cannot be avoided and plants will be removed by approved covered activities, the Implementing Entity has the option of salvaging the covered plants. Salvage of covered plants is conducted in addition to mitigation that may be required for impacts on covered plants.

Plant salvage as mitigation is acknowledged as a technique that rarely succeeds; it is opposed by conservation organizations as a primary mitigation tool (Howald 1996; California Native Plant Society 1998). Therefore, the Implementing Entity must carefully weigh the expected costs and potential benefits of the salvage effort before undertaking it. Salvage guidelines are presented below for all covered plants, for perennial species, and for annual species.

All Covered Plants

All salvage operations will be conducted by the Implementing Entity or a third party contractor approved by the Implementing Entity. Translocation activities will be reviewed and approved by the Wildlife Agencies in advance of translocation activities occurring. Translocated plants should be moved during their dormant season in order to minimize impacts to individuals. To ensure enough time to plan salvage operations, project proponents will notify the Implementing Entity of their schedule for removing the covered plant occurrence.

The Implementing Entity may conduct investigations into the efficacy of salvaging seeds from the soil seed bank for both perennial and annual species. The soil seed bank may add to the genetic variability of the occurrence. Covered species may be separated from the soil though garden/greenhouse germination or other appropriate means. Some topsoil taken from impact sites may also be moved to the transplant site in the reserve to introduce soil microorganisms.

The Implementing Entity will transplant new occurrences such that they constitute separate populations and do not become part of an existing population of the species, as measured by the potential for genetic exchange among individuals through pollen or propagule (e.g., seed, fruit) dispersal. Transplanting or seeding *receptor* sites (i.e., habitat suitable for establishing a new population) will be carefully selected on the basis of physical, biological, and logistical considerations (Fiedler and Laven 1996); some examples of these are listed below.

- Historic range of the species.
- Soil type.
- Soil moisture.
- Topographic position, including slope and aspect.

- Site hydrology.
- Mycorrhizal associates.
- Presence or absence of typical associated plant species.
- Presence or absence of herbivores or plant competitors.
- Site accessibility for establishment, monitoring, and protection from trampling by cattle or trail users.

Perennial Covered Plants

Salvage methods for perennial species will be tested for whole individuals, cuttings, and seeds. Salvage measures will include the evaluation of techniques for transplanting as well as germinating seed in garden or greenhouse and then transplanting to suitable habitat sites in the field. Techniques will be tested for each species, and appropriate methods will be identified through research and adaptive management. Where plants are transplanted or seeds distributed to the field, they will be located in reserves in suitable habitat to establish new populations. Field trials will be conducted to evaluate the efficacy of different methods and determine the best methods to establish new populations. Transplanting within the reserves will only minimally disturb existing native vegetation and soils. Supplemental watering may be provided as necessary to increase the chances of successful establishment, but must be removed following initial population establishment. Supplemental watering will include watering throughout first growing season to mimic natural rainfall patterns. During establishment, areas will be fenced off as necessary to prevent trampling or grazing by livestock. These areas will not be selected for controlled burns. Once the population has established itself, as determined by success criteria that may include setting seed, 3-year survival, or other criteria developed in agreement with the Wildlife Agencies, then fencing and irrigation will be removed and the site may be burned for management purposes if that is appropriate for the target plant.

Annual Covered Plants

For annual covered plants, mature seeds will be collected from all individuals for which impacts cannot be avoided (or if the population is large, a representative sample of individuals). If storage is necessary, seed storage studies will be conducted to determine the best storage techniques for each species. A seed storage facility will also be contacted and consulted regarding collecting and storage requirements of the facility. One of the leading seed banks in California is the Rancho Santa Ana Botanic Garden in Claremont, CA (Rancho Santa Ana Botanic Garden 2010). This facility has strict seed collection and storage guidelines available on its website (http://www.rsabg.org).

If needed, studies will be conducted on seeds germinated and plants grown to maturity in garden or greenhouse to propagate larger numbers of seed. Such studies can be contracted with research institutions such as the Rancho Santa Ana Botanic Garden, or carried out by other qualified biologists. Seed propagation methods will ensure that genetic variation is not substantially affected by propagation (i.e., selection for plants best adapted to cultivated conditions). Field studies will be conducted under the Adaptive Management Program to determine the efficacy and best approach for dispersal of seed into suitable habitat. Where seeds are distributed to the field, they will be located in reserves in suitable habitat to establish new populations. If seed collection methods fail (e.g., due to excessive seed predation by insects), alternative propagation techniques will be necessary.

Condition 20. Avoid and Minimize Impacts to Covered Plant Occurrences

Almost all known occurrences of covered plants in the study area are outside the planning limits of urban growth and outside the footprint of covered activities. Many of these occurrences are expected to be included in the Reserve System. However, uncertainty remains regarding impacts on covered plants because of the lack of surveys in many areas, the general nature of some plant occurrence data, and the uncertainty in the location of some covered activities. To account for this uncertainty, impacts on covered plants are tracked by occurrence[21], as described in Chapter 4. To ensure compliance with the requirements in Chapter 5, surveys for covered plants will be conducted in certain areas in order to 1) identify occurrences of covered plants, and 2) assess the condition of these occurrences.

Covered Plant Surveys

To ensure that plants are adequately conserved relative to impacts of covered activities, plant surveys will identify occurrences of covered plants that may be affected by covered activities (see Section 5.3.1 *Land Acquisition and Restoration Actions* subheading *Incorporating Covered Plant Species*). Surveys are required in locations where covered plant occurrences are most likely to occur. Covered plant surveys will be required in the following land cover types and specific habitats. The plant species for which surveys are required are also indicated. These land cover types and habitats were identified because the majority of covered species occur primarily or exclusively in serpentine land cover types.

- Serpentine bunchgrass grassland: Survey for smooth lessingia, fragrant fritillary, Metcalf canyon jewelflower, most beautiful jewelflower, Tiburon paintbrush, and Coyote ceanothus.

[21] Occurrence can be synonymous with population for some species. However, some plant species may have several occurrences in one population. Definitions of plant populations will be developed for covered plants during implementation.

- Serpentine rock outcrop: Survey for Santa Clara Valley dudleya, smooth lessingia, Metcalf canyon jewelflower, most beautiful jewelflower, and Tiburon paintbrush.
- Serpentine seep: Survey for Mount Hamilton thistle.
- Mixed serpentine chaparral: Survey for Coyote ceanothus and most beautiful jewelflower.
- Mixed oak woodland and forest with serpentine soils: Survey for Loma Prieta hoita.
- Coast live oak forest and woodland with serpentine soils: Survey for Loma Prieta hoita.
- Northern coastal scrub and Diablan sage scrub with serpentine soils: Survey for Coyote ceanothus, Metcalf canyon jewelflower, most beautiful jewelflower, and smooth lessingia.

Plant surveys will also be required in suitable habitat within a 0.25 mile (1,320 feet) radius of a known occurrence of a covered plant to ensure that known occurrences are located (in most cases, these survey areas will overlap with the land cover types listed above). The Implementing Entity will maintain a map of known occurrences and the survey radius around each one based on this Plan and updates provided by the CNDDB (every six months) for the study area.

These surveys will be performed according to the current applicable guidelines of CDFG and/or USFWS for plant surveys (if available) except no floristic surveys are required. The appropriate survey period for each covered plant species is described in **Table 6-9**[22]. Surveys must be conducted at the time of year when the species can be identified in the field. In some cases, plants may be identifiable outside of the flowering period (e.g., Mount Hamilton thistle, Coyote ceanothus).

Inside the urban service area, surveys for covered plants will occur in land cover types and habitats listed above within the area on which the land cover fee will be levied and in any other areas where indirect effects could occur. The survey area must include buffers around structure where required vegetation clearing will occur to meet state and local fuel reduction regulations.

If a covered plant occurrence is observed on site, the condition of this occurrence must be described in the application package according to the guidelines in Chapter 5, Section 5.3.1 *Land Acquisition and Restoration Activities* subheading *Incorporating Covered Plant Species*. The condition of each covered plant occurrence must be documented as a baseline to compare future monitoring (if necessary) and to ensure that occurrences are protected within the Reserve System that are in as good or better condition than those lost to covered activities.

[22] These survey periods should be used as a guide only. Some plants can be readily identified by qualified botanists outside of the species' blooming period.

If a covered plant occurrence is found on the project site, the local jurisdiction will obtain the opinion of a qualified biologist regarding the projected long-term viability of a covered plant occurrence given the plant occurrence condition, site conditions, and project-level construction details. The qualified biologist will make this determination based on best available scientific information. In cases where it is difficult to project long-term viability, the qualified biologist will conservatively error in favor of the covered plant and assume that long-term viability will be reduced and the occurrence will be considered lost for tracking purposes. Impacts to covered plants will be avoided or minimized wherever possible by implementing the following conditions.

Avoidance and Minimization

In order to reduce impacts to covered plants, all covered activities will be confined to the minimum area necessary to complete the activity or construction. A setback buffer will be established around covered plant occurrences located on any project site or in an adjacent area that could be affected by construction traffic or activities. The setback buffer will be adequate to prevent or minimize impacts during or after project implementation. The plants and buffer area will be protected from encroachment and damage during construction by installing temporary construction fencing. Fencing will be bright-colored and highly visible. Fencing will be designed to keep construction equipment away from plants and prevent unnecessary damage to or loss of plants on the project site. Fencing will be installed under the supervision of a qualified biologist to ensure proper location and prevent damage to plants during installation. Fencing will be installed before any site preparation or construction work begins and will remain in place for the duration of construction. Construction personnel will be prohibited from entering these areas (the exclusion zone) for the duration of project construction.

Site Monitoring, Assessment, and Management

If a qualified biologist determines that the long-term viability of a covered plant occurrence will be reduced (as described below) by implementation of covered activities, the loss must be offset by protection, management, and monitoring of covered plant occurrences in the Reserve System prior to impacts (**Table 5-16**).

Some covered plant occurrences may only be disturbed or partially affected by covered activities, and viability may be maintained. It is important to monitor and, if possible, maintain these occurrences of covered plants where they occur, even if they are not protected within the Reserve System. Covered plant occurrences that are determined to be partially permanently affected by a qualified biologist (i.e., only a portion of the occurrence is impacted) by covered activities will be monitored by the Implementing Entity. The purpose of the monitoring will be 1) to assess whether the impact reduces the long-term viability of the occurrence and whether supplemental management actions are feasible and warranted, and 2) to determine whether the Implementing Entity must protect and enhance or create[23] occurrences in the Reserve System according to **Table 5-16**. If the impact occurs to less than 5% of the total occurrence as measured by the number of individuals at the time of impact, then the impact is assumed not to affect long-term viability and will not require monitoring nor will it count as a permanent impact (**Table 4-6**). This allowance does not apply to Coyote ceanothus.

When determining viability for the purpose of assessing a partial or permanent impact, the Implementing Entity will consider the following factors.

1. Results of monitoring plant occurrences affected by covered activities (e.g., correlation between pre-project observations and actual viability post-project).
2. Impacts to date to the covered plant species and how close total impacts are to the allowable impact cap in the Plan (e.g., extra care taken when near cap not to exceed the cap).

Specific monitoring protocols and success criteria will be developed during implementation as appropriate for each covered species, according to the guidelines discussed here. Monitoring protocols can draw on those developed for other HCP/NCCPs. It is possible that only a portion of the occurrence will be located on the covered activity project site. In such instances, the monitoring protocol will address this issue. Three possible approaches include the following.

1. If the landowner agrees, the Implementing Entity will obtain access to the adjacent sites on which the rest of the plant occurrence is located, and surveys will include the entire occurrence.
2. If access to adjacent site(s) is not possible, or if for some other reason it is not feasible to survey the entire occurrence, then an alternative will be developed to estimate the extent and condition of the adjacent portion of the occurrence.
3. If only a small portion of the occurrence is on adjacent properties, then only the portion of the occurrence on the project site will be monitored and assessed for viability. The determination whether this is a full impact will be made based on the results for this portion of the occurrence only.

Population monitoring will be conducted by the Implementing Entity before the covered activity is implemented to document the baseline condition. For annual species, the minimum post-construction monitoring period will be 5 years. If extreme or unusual climate conditions affect the species, then monitoring will be extended 1 or 2 years, as appropriate to assess impacts and success. Monitoring will include estimates of percent cover and number of individuals. An occurrence will be assumed to retain long-term viability and will not require replacement in the Reserve System if the decline in occurrence size and percent cover from pre-project conditions is less than 25% over the monitoring period,

[23] Creation is only allowed to mitigate effects for Coyote ceanothus. All other plant occurrence creation would contribute to recovery (**Table 5-16**).

unless site-specific conditions otherwise suggest substantial declines in occurrence viability.

For perennial species, the minimum post-construction monitoring period will be 3 years. Monitoring will include estimates of density (percent cover), recruitment of seedlings if impacts included removing individuals, and measurements of adult plant health (e.g., signs of disease, herbivory, nutrient deficiencies, etc.). An occurrence of a perennial covered species will be assumed to retain long-term viability and will not require replacement in the reserve system if the decline in seedling recruitment and density from pre-project conditions is less than 25% over the monitoring period, unless site-specific conditions otherwise suggest substantial declines in occurrence viability.

The Implementing Entity will implement conservation actions on the site that would help to maintain or improve the condition of the occurrence, as long as an agreement can be reached with the landowner to conduct these measures. Possible conservation measures are described in Chapter 5. If plant occurrences are determined to not be viable based on post-project monitoring, the Implementing Entity must assess the loss as a full permanent impact and implement conservation actions accordingly. In these cases, mitigation would occur after the impact. However, the potential for mitigation to occur after impacts is unlikely given that the qualified biologist and Implementing Entity will make conservative determinations regarding projected impacts on long-term viability.

6.7 Receiving Take Authorization under the Plan

Take authorization will be provided by the Plan to three broad categories of covered activities: public projects proposed by the Permittees, private projects under the jurisdiction of the Permittees, and public projects by non-Permittees in the study area that are approved for inclusion by the Implementing Entity. Each of these situations is explained below.

6.7.1 Evaluation Process for Permittee Projects

The Plan permits provide the Permittees with take authorization along with the authority to approve covered activities complying with the terms of the Plan. If a Permittee undertakes a covered activity (see Chapter 2), the Permittee must document compliance with the Habitat Plan and provide a copy of this documentation to the Implementing Entity for tracking purposes (i.e., to track the amount of take coverage granted) before the Permittee take authorization may be used. As described in Chapter 8, the Permittees will develop a template Habitat Plan application package for use by private applicants and Permittees that includes all items described in this section prior to permit issuance. It is expected that the documentation will be similar to the *Habitat Plan application package* required of private project proponents[24] applying to local jurisdictions for coverage (this application package is described in detail in Section 6.8 *Habitat Plan Application Package*, below).

Review and CEQA for Permittee Projects

Many covered activities are expected to be subject to CEQA[25]. When Permittees initiate projects that are also subject to CEQA, the terms of the Habitat Plan should generally be integrated into the CEQA environmental review process. To facilitate CEQA coordination, the Permittee should begin preparation of the Habitat Plan application package (or equivalent material) when the CEQA project description and alternatives for the project are developed such that requirements of the Habitat Plan can be used to inform site design and selection of the preferred alternative. The completed Habitat Plan documentation should be evaluated and approved by the appropriate CEQA lead agency of the Permittee concurrently with the lead agency's review of the associated CEQA documents. Projects exempt from CEQA may still be covered activities under this Plan and require compliance with the conditions of this Plan as described in this chapter.

Receiving Take Authorization for Permittee Projects

Incidental take associated with covered activities carried out by the Permittees is authorized under the permits issued for the Habitat Plan. These projects are therefore "pre-approved" for take authorization by the Wildlife Agencies as long as their effects were adequately analyzed, they meet the conditions of the Plan, and they pay the appropriate fees, if applicable. Each Permittee is responsible for ensuring that its covered activity is compliant with the conditions of approval described in this chapter. Take authorization will be in effect once the Permittee documents consistency with the Habitat Plan. The form developed by the Implementing Entity to document the consistency of private development with the Plan may also be used by Permittees for their own projects. Documentation of Plan consistency and a complete Habitat Plan application package must be submitted to the Implementing Entity for tracking purposes. The process for receiving take authorization under the Plan for public projects of the Permittees is shown in **Figure 6-5**.

[24] The term *project proponent* is used interchangeably with the term *applicant* or *project applicant* in this and subsequent chapters.
[25] Permittee covered activities that may not be subject to CEQA include operations and maintenance activities and projects that only require ministerial approval within local jurisdictions such as single family home construction.

6.7.2 Application Process for Private Projects

Private applicants seeking coverage under the Habitat Plan, including applicants that wish to opt in to the Plan[26], will apply to their local jurisdiction by submitting a *Habitat Plan application package* described in Section 6.8 *Habitat Plan Application Package*. A checklist for evaluating these applications will be developed by the Implementing Entity prior to the first ordinance implementing the Plan taking effect. The local jurisdiction will review the Habitat Plan application package for completeness in accordance with the checklist. For requests to opt in, the local jurisdiction will also evaluate the amount of take requested (i.e., acres of impacts) and whether or not take coverage is available for the project. If the application package is not complete, it will be returned to the project proponent with an explanation of why it is incomplete. If the application package is complete, the local jurisdiction will calculate the required fees on the basis of the requirements described in Chapter 9 and consistent with the local ordinance implementing the Plan. The determination of completeness of the application package rests with the local jurisdiction. If they choose, local jurisdictions may request technical assistance from the Implementing Entity staff in their review.

All applicable conditions will be identified and fees paid at (or before) the time of issuance of the first authorization of ground disturbance (typically a grading permit or building permit). In cases where there is no grading or other ground disturbance permit, the fees will be due upon issuance of the first permit that authorizes construction. If the project proponent requests to contribute land in lieu of fees or requests special project conditions, such requests must be reviewed and approved by the Implementing Entity. See Chapter 8, Section 8.2.1 *Permittees* for Permittees that may grant take authorization and Section 8.7 *Roles and responsibilities in Reviewing Applications for Take Authorization* for additional detail on application review.

The process for receiving take authorization for private projects is shown in **Figure 6-6**. Local agencies reviewing the Plan application package will be subject to the processing time and other requirements of the Permit Streamlining Act (Section 65920 et seq.) which requires public agencies to follow standardized time limits and procedures when making specific types of land use decisions.

Application Review and CEQA for Private Projects

Many private covered activities will require a land use approval and be subject to CEQA. For such covered activities, review of applications for take authorization should generally be undertaken concurrently with the CEQA environmental review. To facilitate this approach, the local jurisdiction should generally request

[26] Private parties that are not subject to the Plan (see **Figure 2-5**) have the option to request coverage under the Plan from the applicable local jurisdiction.

that project proponents submit initial Habitat Plan application package information as part of the land use approval application and CEQA process.

There are many benefits to drafting the Habitat Plan application early in the planning process. First, submitting initial Plan application package information during the land use approval / CEQA process will illustrate the various requirements of the Habitat Plan on the proposed project, and provide time for the project proponent to change the project description or to identify alternatives for CEQA analysis. Second, it will enable the CEQA document to refer to the project-specific requirements as identified in the draft Plan application. Finally, it will enable the local jurisdiction to provide early review of the Plan application for completeness. Based on a review of this initial information and a determination of the Habitat Plan requirements, the local jurisdiction can establish conditions of approval specifying the Habitat Plan conditions and fee requirements. Habitat Plan fees will need to be paid prior to the issuance of construction permits (grading / building permits).

Each local jurisdiction is responsible for ensuring that covered activities, upon issuance of take, fully comply with the terms of the Habitat Plan.

Granting Take Authorization for Private Projects

Proponents of private projects that are covered by the Plan and not exempt (see Section 6.2 *Exemptions from Conditions*) must have their projects conditioned by the local jurisdiction obligating compliance with all terms and conditions of the Implementing Agreement, the Plan, and the state and federal permits that apply to the project prior to the local jurisdiction issuing take authorization. Such terms and conditions include, but are not limited to, those listed below.

- Compliance with all relevant avoidance, minimization, surveys, monitoring, and conservation measures determined by the local jurisdiction to apply to the project as required by the Plan.
- The right for the Permittee to monitor the applicant's compliance with all applicable conditions of this Plan.
- Imposition of a fee or dedication of land in lieu of the fee as described in Chapter 9 and in the local Implementing Ordinance.

Before take authorization is granted, Permittees must prepare a written determination of the project's consistency with the Plan. A template form for private applicants that documents this determination of consistency will be developed by the Implementing Entity prior to the first local ordinance taking effect (this consistency determination will be made based on the application checklist described above).

Once the Habitat Plan application package is deemed complete, the conditions of approval have been established and imposed, and the required fees (if applicable) have been paid, the project proponent will be granted take authorization by the appropriate Permittee (see Chapter 9 for required fees and payment times). At this point, the project proponent will be allowed to proceed with the project consistent with other applicable local, state, and federal laws and local entitlements. Take authorization for impacts on covered species will be provided by the applicable Permittee consistent with the state and federal permits issued to all Permittees. Each local jurisdiction, working with the Implementing Entity will develop a process to document projects that receive take authorization but do not proceed with the project to have the take authorization removed from the Implementing Entity's records.

When Habitat Plan application packages are completed, each Permittee must provide a copy of the application material to the Implementing Entity for entry into the Habitat Plan database (described in Chapter 8 *Plan Implementation*).

6.7.3 Application Process for Non-Permittee Public Projects

Because the list and evaluation of covered activities in Chapter 2 is meant to be comprehensive, the Plan has included some projects that will be proposed by public entities that are not Permittees. For example, a special district or local school district may propose to build a project in one of the three participating cities or the unincorporated County. Although the special district or school district is not subject to the land use jurisdiction of the participating jurisdictions, the impacts of its project have been covered by the Plan and evaluated as part of the planned urban development within the jurisdiction. To receive coverage under the Plan, projects proposed by an entity that is neither a Permittee nor subject to the land use authority of a Permittee, the project proponent must apply directly to the Implementing Entity as a *Participating Special Entity*. The entity will provide the same Habitat Plan application package as private entities seeking coverage. See Chapter 8, Section 8.4 *Participating Special Entities*, for more details on the process by which Participating Special Entities receive take authorization under the Plan.

6.8 Habitat Plan Application Package

Private projects that are covered by the Plan must submit a *Habitat Plan application package* to the local jurisdiction for review and approval in order to receive coverage under the Habitat Plan. For their own projects, Permittees must submit an application package to the Implementing Entity for tracking purposes and pay the appropriate fees if applicable. The project proponent is responsible for preparing the application package and paying for any necessary field surveys, if required. The application package must contain the following items, if applicable, each of which is described in detail in this section.

- Item 1: An application form for coverage under the Plan.

- Item 2: A brief description and map of the project.
- Item 3: Documentation of land cover types on site.
- Item 4: Map of wetlands and waters, if applicable.
- Item 5: Results of applicable surveys for selected covered species.
- Item 6: Documentation of any additional and applicable avoidance and minimization requirements that will be implemented.

Each item in the application package builds on the previous item. For example, surveys for certain covered wildlife and plants (Item 5) are required only if specific land cover types are documented on the site (Items 3 and 4). Many covered activities will be able to comply with the Habitat Plan by only completing Items 1, 2, and 3 of the application package. For others, field surveys are limited to only the highest-value biological resources.

Most components of the application package can be prepared by the applicant, with the assistance of local planning staff. In some cases, the Plan requires that components be prepared or surveys or monitoring be conducted by *qualified biologist*. Please see *Qualified Biologists* below for details on the qualification process.

Templates for all these application components will be provided by the Implementing Entity to each local jurisdiction prior to the first local ordinance taking effect. These templates will also be posted on the Habitat Plan web site for use by private applicants and their consultants. Use of the templates will streamline the review and approval process by local jurisdictions. The Permittees may adjust the required components of the application package over time, consistent with the requirements of the Plan. To recover the costs of reviewing and processing these application packages, local jurisdictions may charge a fee associated with the application (see Chapter 9 for details).

The Habitat Plan application package, survey requirements, and conditions of approval were designed with the following principles in mind.

- Provide the necessary data to track impacts of all covered activities to allow the Implementing Entity to meet Plan requirements (e.g., land acquisition, Stay-Ahead provisions, wetland restoration).
- Simplify and reduce pre-project survey requirements relative to current and future environmental regulations throughout the Habitat Plan.
- Avoid and minimize impacts on covered species and natural land cover types to the maximum extent practicable on a regional scale, in compliance with federal and state endangered species laws.
- Ensure that survey requirements are proportional to impacts—the survey burden is lower on low-quality habitat than on high-quality habitat.
- When possible, limit survey requirements under the Plan to those required for other local, state, or federal environmental compliance (e.g., CEQA or

NEPA), and redirect resources previously spent on biological surveys to improve regional conservation.

Each of the required application components is described below.

6.8.1 Item 1: Project Application Form

The project application form will contain basic information about the project. The Implementing Entity will develop a form prior to issuance of the state and federal Plan permits that will be made available to the Permittees. Required forms will be available through the local jurisdictions and on the Habitat Plan website.

6.8.2 Item 2: Project Description and Map

The application package will include a brief project description including the location, assessor's parcel number, construction activity or maintenance methods, a description of the nature of the impacts (permanent or temporary), and timing (including duration) of the project or activity. The project description will be sufficient to document that it is a covered activity in the Plan (see Chapter 2). A legible vicinity map of the project site will also be provided to document that the project is within the Habitat Plan study area. A vicinity map will include any streams or water bodies that fall within the mapped area. If the project is located in Fee Zone A or B, but the project applicant believes that the project qualifies for Fee Zone C, the project applicant must demonstrate compliance with the criteria provided in Chapter 9, Section 9.4.1 *Habitat Plan Development Fees*, subheading *Land Cover Fee Zones*. A project detail map will be included that shows the area on which fees will be levied, as well as the full project parcel if inside the urban service area or the full development area if outside the urban service area, and any relevant landforms, roads, water bodies, and existing and proposed structures that will be affected by the proposed project.

6.8.3 Item 3: Land Cover Types on Site

As described in Chapter 3 *Physical and Biological Resources* a detailed land cover map was developed for the study area for this Plan. This land cover map was essential in estimating impacts of the covered activities (Chapter 4) and developing the conservation strategy (Chapter 5). However, due to limitations in the land cover mapping (see **Table 3-4**) and the potential for land cover to change over time, land cover types must be verified at the time applications are submitted. This step is also critical because almost all impacts under the Plan are tracked by land cover type.

Proponents of all projects and activities with quantifiable impacts, including approved Participating Special Entities, will specify the amount and type of land cover that will be permanently and temporarily impacted. All fees are paid on the development area (see **Figure 6-1**) except for land inside the urban service area designated with a land use of Urban Development or Rural Residential (see **Figure 2-2**) that is less than 10 acres, where fees are assessed on the parcel. In addition, all public corridor projects (e.g., stream and utility) pay fees based on the project footprint, regardless of parcel size. As described in Condition 12, projects that do not completely avoid indirect effects to wetlands (including wetlands on parcels adjacent to the covered activity development area) will be considered permanently impacted and will count towards the impact caps described in **Table 4-2** and will be assessed fees as described in Chapter 9.

Project proponents of activities that have temporary impacts are required to provide photographs that document the condition of the project site before the activity is implemented. These photographs will be compared to those required for post-project conditions (see Item 6) to determine if impacts were temporary and that appropriate fees were paid.

All calculations and other information provided in application packages will be verified by the local jurisdiction or Implementing Entity so that all impacts to land cover types can be tracked appropriately and fees paid. This exercise can be performed through air-photo analysis or field verification. Project proponents may request assistance from local planning staff in this analysis (for exempt projects, local jurisdictions will document land cover types present). For sites outside urban or suburban areas that support natural land cover types, land cover verification may need to be performed by a qualified biologist. Land cover type classification will be done in accordance with the descriptions provided in Section 3.3.5 *Natural Communities and Land Cover Types*. If the project site supports or may support any wetland or stream land cover types that would be affected by the proposed project, a qualified biologist must be retained (see Item 4 below).

All land cover determinations provided by private applicants will be verified by local planning staff. All land cover determinations provided by a Permittee will be verified by Implementing Entity staff. A private applicant or Permittee may retain Implementing Entity staff (at cost) to conduct this land cover mapping. Local jurisdiction staff may also be available to provide this service to private applicants as part of the application review process.

Land cover mapping of sites with the following land cover types, as mapped by the Plan, can be conducted by the applicant or local planning staff.

- California annual grassland[27];
- reservoirs;

[27] See definition of annual grassland in Chapter 3. When trees are present in annual grassland at low density, the land cover may instead be oak woodland. In these cases, a qualified professional is needed to make the determination.

- all agricultural land cover types; and
- all development land cover types.

Additions to existing development encompassing an area of 10,000 square feet (approximately 0.2 acre) or less on any land cover type, other than stream, riparian, serpentine, pond, or wetland land cover types, do not require land cover mapping by a qualified biologist or other professional. These projects may be mapped based on aerial photos by planners or applicants.

All other land cover types must be mapped by a qualified biologist. Forest land cover types can also be mapped by a professional forester or arborist. Accurate mapping of the remaining land cover types is necessary because of the Implementing Entity's obligation to stay ahead of impacts by land cover type and to ensure the appropriate species surveys are conducted. The Implementing Entity will provide a list of qualified biologists to conduct land cover mapping and other surveys required by the Habitat Plan. The Implementing Entity may also provide a list of qualified professionals (e.g., non-biologists such as foresters and arborists) to conduct land cover mapping. Biologists and other professionals qualified to conduct land cover mapping will have demonstrated experience conducting vegetation mapping in the field or from air photos at the scale of the proposed project and in vegetation types similar to those on the project site. This list will be updated regularly and made available to project proponents and the Permittees. Biologists conducting species surveys that could result in take must also be pre-approved by USFWS and CDFG (see Item 5 below).

Land cover mapping is not required for operations and maintenance activities conducted by Permittees except where serpentine land cover will be impacted (land cover mapping is required for all private applicants and Participating Special Entity projects). However, Permittees must still implement all applicable conditions including plant surveys. As such, some projects with operations and maintenance covered activities may require land cover mapping to determine applicable conditions. If no land cover mapping is conducted, Permittees will rely on the most recent land cover map developed by the Implementing Entity to quantify impacts.

For covered activities that result in temporary impacts, in lieu of aerial photo or field-verified land cover mapping, applicants have the option of assuming that the entire footprint of the covered activity permanently affects natural land cover types based on the Plan's most recent land cover map (and therefore pays a fee on these impacts as described in Chapter 9). This option is available for temporary impacts because the footprint of many of these activities is expected to be relatively small. If the land cover types assumed to be permanently impacted include those land cover types that trigger covered species surveys, then covered species surveys must be conducted.

The application package must include a map showing all land cover types on the project parcel(s) if the project is located inside the urban service area or within the development area if the project is outside the urban service area, and a table showing the amount of each land cover type to the nearest 0.1 acre for all non-stream land covers or linear foot for streams (blank tables will be provided in the template application package). These final values will be used to calculate any required fees (Chapter 9).

Table 6-8 describes land cover types and habitat elements that, when present, trigger the need for preconstruction surveys for five covered wildlife species. For example, if a project is located within occupied nesting habitat modeled for burrowing owls, a qualified biologist would need to conduct a habitat survey and possibly a pre-construction survey to map any burrows within 250 feet of the activity footprint. In some cases, presence of the habitat feature itself, regardless of land cover, may trigger additional survey requirements (**Table 6-8**).

The presence of certain land cover types on site may also trigger the need to survey for specific covered plants, as described in Item 5 below.

6.8.4 Item 4: Map of Wetlands, Ponds, Streams, and Riparian Woodlands

A map of all coastal and valley freshwater marsh, seasonal wetlands, ponds, riparian woodland, and streams is required for any project subject to the Habitat Plan that may directly or indirectly affect these aquatic land cover types.

Although Section 404 Clean Water Act wetland delineations are a tool that can be employed, jurisdictional delineations completed to meet the requirements of Section 404 do not necessarily account for all aquatic habitat for species proposed for coverage under this Plan (e.g., they do not address waters of the state that are not also waters of the U.S.). The Implementing Entity will use the wetland and waters map[28] developed for Item 4 of the application package to track impacts to coastal and valley freshwater marsh, seasonal wetlands, ponds, riparian woodland, and streams and to determine the wetland fee owed (see Chapter 9, Section 9.4.1, subheading *Wetland Mitigation Fee* and **Table 9-6**). Fees on wetlands, ponds, and riparian woodland will be determined by the acres of impact (see Condition 12 above and Chapter 9). Stream fees and impacts will be determined by the linear feet of stream affected, measured at the stream centerline.

Project proponents will not need to provide Item 4 of the application package if the Implementing Entity or permitting local jurisdiction determines that aquatic features will not be directly or indirectly affected by covered activities.

Formal delineations are typically required to identify waters of the U.S. and support compliance with Section 404 of the Clean Water Act. Maps of non-jurisdictional aquatic features are typically required to identify waters of the state

[28] Although delineations can be conducted any time of the year, they will be based on an evaluation of multiple factors by a qualified biologist, including but not limited to, hydrology, vegetation, and soils. Wetland features do not need to be holding water at the time of the field investigation to be delineated.

and support compliance with the Porter-Cologne Water Quality Control Act and Section 1602 of the California Fish and Game Code.

Project proponents are encouraged to produce maps for Item 4 that support other necessary state or federal permitting needs, but maps do not need to be verified by the Corps or Regional Boards prior to submission of the application package. If the Habitat Plan application will also meet the application requirements of the Habitat Plan RGP, once such a permit is in place, the delineation method must be consistent with Corps's delineation protocol. Such delineations may be verified by the Corps prior to application submittal, or delineations may be verified by the Corps as part of application processing once the application is submitted.

If a process for permitting projects affecting waters of the U.S. and/or waters of the state is not provided by local jurisdictions or the Implementing Entity in conjunction with the Plan, proponents of projects that could affect such resources must seek such permits on their own. In such cases, this Plan does provide the framework for CESA and ESA compliance for covered activities that would result in impacts on state or federal wetlands and waters.

6.8.5 Item 5: Results of Applicable Species Surveys and Monitoring

As described in Item 3, the presence of certain land cover types on the project site triggers an evaluation of whether specific habitat elements for selected wildlife species or for occurrences of covered plants. **Figure 6-7** summarizes these triggers and survey process. Survey requirements for these selected wildlife species are based on avoiding take of individual species—particularly animals with lower reproductive outputs (e.g., western burrowing owl) than other species (e.g., fish and amphibians). If suitable breeding habitat of these selected wildlife species is found, preconstruction surveys are triggered (see Conditions 15–18). If the preconstruction survey identifies occupied breeding habitat, project proponents must implement defined avoidance and minimization measures to avoid the resource during breeding seasons. Compliance during construction will be monitored by a qualified biologist.

As described below in this section under *Surveys for Covered Plants*, covered plant surveys will be required for specified land cover types. If an occurrence of a covered plant is present on the site, additional field assessment is required to document the occurrence's condition.

The purpose of these surveys is to comply with the avoidance and minimization requirements of ESA and CESA. If surveys are planned far enough in advance (typically 6–8 months), it is expected that in most cases identification of selected occupied habitat will not change the project design or schedule. These survey requirements and avoidance measures are designed to avoid or minimize take of individuals (as required by law), to document key resources for tracking purposes, and to ensure that impacts on plant occurrences are properly mitigated by the Implementing Entity.

Although surveys are required in specific cases, overall, impacts on covered species are assumed to occur on all project sites. However, if the results of the preconstruction survey documents a large or important population of a covered species other than those acknowledged in the Plan, the local agency reviewing or proposing the project must consult the Implementing Entity for advice on species avoidance and minimization measures[29]. The Implementing Entity will also contact the Wildlife Agencies for technical advice. Protocol-level surveys to document species presence or absence are not required for the Habitat Plan, with the exception of the least Bell's vireo (Condition 16).

Species surveys are required for all covered activities, including some operations and maintenance activities, subject to the conditions on covered activities except as noted in the following section. Species survey requirements and exemptions are described in greater detail below.

Exemptions from Species Surveys, Preconstruction Surveys, and Construction Monitoring

The following types of covered activities are exempt from species survey and construction monitoring requirements for target covered wildlife species and covered plants. A summary of the types of exemptions available is described in **Table 6-1**. Activities exempt from species surveys must still submit an application package as described above.

- Covered operations or maintenance activities, including those on the Reserve System, that do not result in any ground disturbance or removal of natural land cover types not identified in the following exemptions.
- Covered operations or maintenance activities that occur more than once annually within the same location, as long as applicable surveys are conducted once before initiating the activity in the appropriate season (i.e., wildlife and plant surveys must be conducted during the appropriate time of year) and there are negative survey results. Such activities are likely to result in repeated disturbance that will preclude establishment or persistence of the covered species targeted by these surveys. If species surveys identify wildlife covered species, preconstruction surveys and construction monitoring must be conducted according to the conditions in this chapter. Unavoidable impacts to covered plant species will be tracked toward the Plan's impact limits (**Table 5-16**). All applicable wildlife and plant surveys must be conducted prior to implementation of the covered operations or maintenance activity until the covered species has not been detected at the site for three consecutive years. Applicable surveys will once again be

[29] If new information is found through surveys or other data that greatly changes the understanding of covered species distribution or habitat requirements from that described in this Plan, the Plan would need to be re-evaluated and an amendment may be necessary (see Chapter 10 for the amendment process).

required if operations and maintenance activities cease for three or more consecutive years.

- Covered activities that occur entirely on one or more of the following land cover types[30].
  - Coyote brush scrub.
  - Reservoir.
  - Stream (i.e., riverine) where no riparian or wetland vegetation occurs.
  - Agricultural developed[31].
  - Urban-suburban.
  - Rural-residential.
  - Ornamental woodland.

In addition to the exemptions listed above, covered activities occurring on the land cover types listed below, while subject to the wildlife species surveys, preconstruction surveys, and construction monitoring requirements, will not trigger any covered plant surveys[32].

- Willow riparian forest and scrub.
- Redwood forest.
- Coastal and valley freshwater marsh.
- Pond.
- Orchard.
- Vineyard.
- Grain, row crop, hay and pasture, disked/short-term fallowed.
- Golf courses/urban parks.
- Barren.

Qualified Biologists

Several types of monitoring will be conducted for this Plan including species surveys, preconstruction surveys, construction monitoring, and effectiveness monitoring conducted on the Reserve System. This requirement applies to all monitoring described in this Plan including conditions on covered activities described in this chapter and effectiveness monitoring described in Chapter 7.

[30] These land cover types do not support any of the covered species for which surveys are required.
[31] The land cover type "agriculture developed" (also known as agriculture developed/covered ag) is defined in Chapter 3 as intensive agricultural operations such as nurseries and greenhouses.
[32] Focused surveys for selected covered wildlife may still be required; consult **Table 6-8** and Conditions 13 and 15–18.

Qualified biologists are those biologists who have the experience, education, and training necessary to perform the tasks described in this Plan accurately and in an unbiased fashion. The term "qualified biologist" is used generically to mean a biologist who is trained to perform the given task; such a person is, more specifically, a fisheries biologist, wildlife biologist, or botanist. Training must be in the field to which the task is related. For example, a wildlife biologist may not perform a covered plant survey or delineate land covers for a project application unless the individual is also competent in those fields.

If the task does not have the potential to result in take of covered species (e.g., land cover mapping, establishing perimeters around an active nest or burrows, or monitoring the compliance of construction crews), applicants (or Permittees) may choose their own biologists to conduct these specialized tasks. Applicants will provide the local jurisdiction with a brief resume of the biologist so that the local jurisdiction (or in the case of a Permittee project, the Implementing Entity) can verify the qualifications of the biologist. The local jurisdictions will review these qualifications with the application package. If the local jurisdiction finds the qualifications lacking, they may ask the applicant for additional information or for another survey by a more qualified biologist.

If the task has the potential to result in take of covered species (e.g., discouraging use of a den by a San Joaquin kit fox, handling a California tiger salamander, or conducting effectiveness monitoring described in Chapter 7), the biologist must be approved by the Implementing Entity and Wildlife Agencies prior to conducting such tasks. Biologists conducting this work may be Implementing Entity staff or consultants hired by the Implementing Entity.

To be approved, these biologists must provide the Implementing Entity with credentials demonstrating that he or she has an understanding of the monitoring protocols, data collection techniques, and handling procedures for the covered species. If the Implementing Entity deems the biologist qualified, then the Implementing Entity will forward the recommendation to the Wildlife Agencies for approval. The names, contact information, and written certification of training and qualifications for these biologists will be provided to the appropriate Wildlife Agencies for approval. This documentation will also be on file with the Implementing Entity.

Upon Implementing Entity and Wildlife Agency approval, the Implementing Entity will maintain a list of *pre-approved* qualified biologists who may conduct monitoring work for a 5-year period. This approval process will reduce the need for 2081(a) and/or 10(a)(1)(b) permits as well as the need for the Wildlife Agencies to review qualifications on a case-by-case basis during implementation.

Individuals who are not pre-approved by the Implementing Entity and Wildlife Agencies to conduct monitoring with the potential for take may conduct monitoring if they have a valid recovery permit for the species that they are monitoring. In either case, the biologist will possess all of the qualifications that would otherwise be required under a recovery permit.

Surveys for Breeding Habitat of Select Covered Wildlife Species

While take of covered species and impacts to their known and suitable habitat is assumed and mitigated under the regional approach to mitigation and conservation described above, avoidance of breeding habitat for selected covered wildlife species is required. The selected species have the greatest potential to benefit from avoidance measures and are generally species with lower reproductive rates, such as birds and mammals, which suffer greater consequences from take of individuals, particularly when breeding. Survey requirements for these species are triggered by the presence of specific land cover types and habitat features as described in **Table 6-8**. These species and their habitat features are listed below.

- Western burrowing owl (occupied and nesting habitat, see **Figure 5-11**).
- Least Bell's vireo (breeding habitat in South County[33], see species habitat distribution model in **Appendix D**).
- Tricolored blackbird (breeding habitat, see species habitat distribution model in **Appendix D**).
- San Joaquin kit fox in the Pacheco corridor (denning habitat; see species habitat distribution model in **Appendix D**).
- Bay checkerspot butterfly in serpentine bunchgrass grassland inBay checkerspot butterfly habitat units (see **Appendix D**).

If suitable breeding habitat[34] for these species as defined in **Table 6-8** and in Conditions 13 and 15–18 is identified on site, and if the proposed project could affect this habitat, additional preconstruction surveys are required for the San Joaquin kit fox, western burrowing owl, tricolored blackbird, and least Bell's vireo. Specific survey requirements for these species are detailed in Conditions 13 and 15–18. Surveys for these species will occur on all areas on which the land cover fee will be levied and within any areas that may be encroaching within a required species buffer.

If applicable land cover types or habitat features are present on site, the application package must describe the methods used for the required surveys and the results of these surveys. As indicated in **Table 6-8**, a map of habitat features (e.g., suitable kit fox dens, suitable burrowing owl burrows) is required. If a covered species is observed on site, details of this observation will also be included in the application. CNDDB California Native Species Field Survey Forms will be included for all covered species encountered on the site. Copies of these forms will also be submitted to the CNDDB.

[33] The least Bell's vireo range may expand to the northern portion of the study area during the permit term. The Implementing Entity will periodically monitor outside of the vireo's modeled habitat in the study area to determine if the species' range is expanding (see Section 7.3.3 of Chapter 7, *Species-Level Actions*).
[34] Suitable breeding habitat is defined as habitat identified in the field as suitable for breeding by the target species. Suitable breeding habitat may be different from modeled habitat.

Preconstruction Surveys for Select Covered Wildlife

If the appropriate land cover type and habitat feature listed in **Table 6-8** are present on site, then a preconstruction survey is required for one or more of the five covered wildlife species listed above (**Figures 6-5 and 6-6**). Preconstruction surveys will be required to establish presence or absence of occupied breeding habitat for the applicable species. For example, if a freshwater wetland that could provide suitable breeding habitat for tricolored blackbird is present on site, a preconstruction survey on the site would need to be conducted prior to construction to determine if the site is occupied. If results indicate that breeding tricolored blackbirds are present, then avoidance and minimization measures and construction monitoring must occur, as described in **Table 6-8** and Condition 17.

The Habitat Plan application package will be prepared before project construction in order to receive project approvals from the local agency (or if by a Permittee, to ensure compliance with the Habitat Plan). To ensure compliance with preconstruction survey requirements, project proponents must describe in the application package which surveys are required, when they will be performed, and how they will be applied to the project. This description will follow the requirements in **Table 6-8** and Conditions 15–18 and will be incorporated into the conditions of project approval.

Construction Monitoring for Certain Covered Wildlife

Identification of occupied breeding habitat as defined above will trigger the specified avoidance and minimization requirements described in **Table 6-8** and Conditions 15–18. Construction monitoring will be carried out by a qualified biologist to ensure that these avoidance and minimization requirements are being implemented properly and that they are adequately protecting the target species (**Figures 6-4, 6-5, and 6-6**). Because the selected wildlife species are rare in the study area, it is expected that few projects will require construction monitoring. If required, the construction monitoring frequency and protocols are described for the appropriate species in Conditions 15–18.

Like preconstruction surveys, construction monitoring will occur well after the Habitat Plan application package is prepared. To ensure compliance with the Plan, the application package must describe which construction monitoring and avoidance and minimization requirements may be required and how they will be applied to the project if preconstruction surveys identify occupied breeding habitat. This description will follow the requirements in **Table 6-8** and Conditions 15–18 and will be incorporated into the conditions of project approval. The application will include a description of monitoring frequency and duration (including the time when monitoring will be initiated relative to impacts) and specific construction activities to be monitored. The application will also include a description of the authority of the onsite construction monitor to modify or temporarily stop implementation of the activity if necessary to ensure compliance with the Plan.

Construction monitoring is necessary to ensure that avoidance and minimization measures are implemented in accordance with permit requirements and is the responsibility of the project proponent.

Covered Plant Surveys

Project proponents wishing to affect occurrences of covered plants must notify the Implementing Entity of their construction schedule to allow the Implementing Entity the opportunity to salvage the occurrence (see Condition 19).

The application package must describe the methods used for the required plant surveys and the results of these surveys. If a covered plant occurrence is observed on site, the condition of this occurrence must be described in the application package according to the guidelines in Chapter 5, Section 5.3.1 *Land Acquisition and Restoration Activities* subheading *Incorporating Covered Plant Species*. The condition of each covered plant occurrence must be documented to ensure that occurrences are protected within the Reserve System that are in as good or better condition than those lost to covered activities. CNDDB California Native Species Field Survey Forms will be included in the application package for all covered plants encountered on the site. Copies of these forms will be submitted to the CNDDB.

6.8.6 Item 6: Compliance Documentation

The final component of the Habitat Plan application package is documentation of how any remaining applicable conditions (Conditions 1–14) have been incorporated into the proposed project. If appropriate, a map will be provided to document this compliance.

Verification that conditions have been implemented is primarily the responsibility of the local jurisdiction conducting or approving the covered activity. Participating local jurisdictions will be responsible for reporting the relevant details of approved projects to the Implementing Entity (for entry into the Habitat Plan database and for required reporting to the Wildlife Agencies). The Implementing Entity may contact the local jurisdiction to verify and ensure that the conditions are appropriately implemented.

If the project includes activities for which temporary fees are paid, the project applicant is required to file compliance information at the conclusion of the project. The compliance information will include documentation that the area for which temporary fees were paid was disturbed by covered activities for less than one year. The project proponent must also provide photographs that document the condition of the site before project initiation and (or less) after completion of the covered activity. Based on this information, the local jurisdiction or Implementing Entity will make a determination that the site was recovered to pre-project or ecologically improved conditions within one year of completing construction, that the impacts were actually temporary, and that the fees paid were adequate.

6.9 Confirming Exemption from the Plan

Project proponents seeking permits from a local jurisdiction for activities that would otherwise be covered will need to demonstrate that the project is not a covered activity per the criteria in Chapter 2. Project proponents will need to:

1. demonstrate the size of the project;
2. show that the project is located in an area in **Figure 6-8** where private development is not subject to the Plan;
3. provide a map consistent with the requirements in Section 6.8.3 *Item 3: Land Cover Types on Site* showing that no serpentine, wetland, stream, riparian, or pond land cover types are present on the site;
4. demonstrate that no adverse indirect impacts to wetlands were identified through the applicable environmental review process; and
5. demonstrate that the project is not located in occupied nesting habitat for western burrowing owl based on the most recent western burrowing owl occupied nesting habitat map provided by the Implementing Entity.

Table 6-1. Covered Activities Exempt from Plan Conditions and/or Plan Fees

	Exemptions from Conditions (✓ = exempt)					
Covered Activity	All Chapter 6 Conditions	Wildlife Species Surveys (Conditions 15–18)	Preconstruction Surveys (Conditions 15–18)	Construction Monitoring (Conditions 15–18)	Covered Plant Surveys (Condition 20)	Development Fees[1]
Public Activities						
Routine infrastructure maintenance by public agencies within the planning limit of urban growth that do not affect stream, riparian, serpentine, ponds, or wetland land cover types.	✓	✓	✓	✓	✓	
Routine infrastructure maintenance by public agencies that occurs in urban-suburban, landfill, reservoir, or agriculture developed land cover types that do not affect stream, riparian, serpentine, pond, or wetland cover types. Examples of such activities include filling pot-holes and resurfacing existing roads without expansion of the paved area.	✓	✓	✓	✓	✓	
Private Activities						
Projects that do not result in ground disturbance, do not result in release of potential water quality contaminants, or do not create new wildlife barriers.	✓	✓	✓	✓	✓	
Private-sector, routine-maintenance activities that require a development, grading, or building permit, and that occur inside the Urban Service Area[2].	✓	✓	✓	✓	✓	
Private-sector, routine-maintenance activities that require a development, grading, or building permit; that occur outside of the Urban Service Area; and that occur within 50 feet of all existing structures at the time of Plan commencement or within 50 feet of structures that are permitted for incidental take under the Habitat Plan.	✓	✓	✓	✓	✓	
Additions to existing structures, or new structures that are within 50 feet of an existing structure (e.g., a new garage) that result in less than 5,000 square feet of impervious surface as long as no stream, riparian woodland, wetlands, ponds, or serpentine land cover type are affected[3].	✓	✓	✓	✓	✓	✓

Covered Activity	All Chapter 6 Conditions	Wildlife Species Surveys (Conditions 15–18)	Preconstruction Surveys (Conditions 15–18)	Construction Monitoring (Conditions 15–18)	Covered Plant Surveys (Condition 20)	Development Fees[1]
	Exemptions from Conditions (✓ = exempt)					
Any covered activity described in Chapter 2 that occurs in urban-suburban, landfill, reservoir, or agriculture developed land cover types as verified in the field, unless the activity may affect a mapped or unmapped stream, riparian, serpentine, ponds, or wetland land cover types, or the activity is located in a stream setback.	✓	✓	✓	✓	✓	
A covered activity on a parcel of less than 0.5 acre or less as long as no serpentine, stream, riparian woodland, pond, or wetland land cover type is within the parcel.	✓	✓	✓	✓	✓	
Covered operations or maintenance activities, including those on the Reserve System, that do not result in any ground disturbance or removal of natural land cover types.		✓	✓	✓		
Covered operations or maintenance activities that occur more than once annually within the same location, as long as applicable surveys are conducted once before initiating the activity and there are negative survey results[4, 5].		✓	✓	✓		
Covered activities that occur entirely on one or more of the following land cover types: coyote brush scrub, reservoir, stream (i.e., riverine) where no riparian or wetland vegetation occurs, agricultural developed[6], urban-suburban, rural-residential, or ornamental woodland.		✓	✓	✓		
Covered activities that occur entirely on one or more of the following land cover types: willow riparian forest and scrub, redwood forest, coastal and valley freshwater marsh, pond, orchard, vineyard, grain, row crop, hay and pasture, disked/short-term fallowed, golf courses/urban parks or barren.					✓	
Urban development covered activities (see Section 2.3.2 *Urban Development* in Chapter 2) in Zones A, B, or C on parcels less than 0.5 acre as long as the parcel does not contain or is not adjacent to a stream, riparian woodland or forest, wetland, pond, or serpentine land cover type[8].						✓

Covered Activity	Exemptions from Conditions (✓ = exempt) All Chapter 6 Conditions	Wildlife Species Surveys (Conditions 15–18)	Preconstruction Surveys (Conditions 15–18)	Construction Monitoring (Conditions 15–18)	Covered Plant Surveys (Condition 20)	Development Fees[1]
All development that occurs on land mapped by the Habitat Plan as “urban-suburban”, “landfill”, “reservoir”, or “agriculture developed” land cover types if it is not located in or adjacent to a parcel that contains a stream, riparian woodland or forest, wetland, or serpentine land cover type[9, 10].						✓
Construction of recreational facilities within the Reserve System[11].						✓

Notes:

[1] Does not include the Nitrogen Fee. See Chapter 9 for a complete discussion of all Development Fees.

[2] Private-sector activities that do not require a development, grading, or building permit are not subject to the Plan or its conditions or fees.

[3] Additions are cumulative and must be calculated based on the footprint of the structure at time of Plan implementation to determine whether this threshold has been crossed.

[4] Such activities are likely to result in repeated disturbance that will preclude establishment or persistence of the covered wildlife species targeted by these surveys.

[5] If surveys identify covered species, subsequent surveys must be conducted.

[6] The land cover type “agriculture developed” (also known as agriculture developed/covered ag) is defined in Chapter 3 as intensive agricultural operations such as nurseries and greenhouses.

[7] These land cover types do not support any of the covered species for which surveys are required.

[8] If new vehicle trips are generated, the nitrogen deposition fee may be assessed.

[9] The category “reservoir” excludes dams, which are subject to Habitat Plan fees.

[10] Barns, corrals, ranch homes, and other small patches of existing development were not mapped as these four exempt land cover types because they fell below the 10-acre minimum mapping unit. These sites would also be exempt from the same development fees as long as project proponents demonstrate that they were existing at the time of Plan adoption through air photos or other documentation.

[11] Instead of paying a fee for construction of infrastructure within the Reserve System, new disturbance for infrastructure does not count toward land cover type land acquisition requirements in Chapter 5, but it does count toward the total Reserve System size requirements.

Table 6-2. Aquatic Avoidance and Minimization Measures [**Modified January 30, 2018**]

ID	Avoidance and Minimization Measure	Covered Activity Application	Measure Covered by NPDES Requirements? *
1	Minimize the potential impacts on covered species most likely to be affected by changes in hydrology and water quality.	All	No
2	Reduce stream pollution by removing pollutants from surface runoff before the polluted surface runoff reaches local streams.	All	Yes
3.1	Maintain the current hydrograph.	All	Yes
3.2	To the extent possible, restore the hydrograph to more closely resemble predevelopment conditions.	All	No
5	Invasive plant species removed during maintenance will be handled and disposed of in such a manner as to prevent further spread of the invasive species.	All	No
7	Personnel shall prevent the accidental release of chemicals, fuels, lubricants, and non-storm drainage water into channels.	All	Yes
8	Spill prevention kits shall always be in close proximity when using hazardous materials (e.g., crew trucks and other logical locations).	All	Yes
11	Vehicles shall be washed only at approved facilities. No washing of vehicles shall occur at job sites.	All	Yes
14	If high levels of groundwater in a work area are encountered, the water is pumped out of the work site. If necessary to protect water quality, the water shall be directed into specifically constructed infiltration basins, into holding ponds, or onto areas with vegetation to remove sediment prior to the water re-entering a creek.	All	Yes
34	Use the minimum amount of impermeable surface (building footprint, paved driveway, etc.) as practicable.	All	Yes
35	Use pervious materials, such as gravel or turf pavers, in place of asphalt or concrete to the extent practicable.	All	Yes
36	Use flow control structures such as swales, retention/detention areas, and/or cisterns to maintain the existing (pre-project) peak runoff.	All	Yes
37	Direct downspouts to swales or gardens instead of storm drain inlets.	All	Yes
39	Minimize alterations to existing contours and slopes, including grading the minimum area necessary.	All	Yes
40	Maintain native shrubs, trees and groundcover whenever possible and revegetate disturbed areas with local native or non-invasive plants.	All	Yes
41	Combine flow-control with flood control and/or treatment facilities in the form of detention/retention basins, ponds, and/or constructed wetlands.	All	Yes
42	Use flow control structures, permeable pavement, cisterns, and other runoff management methods to ensure no change in post-construction peak runoff volume from pre-project conditions for all covered activities with more than 5,000 square feet of impervious surface.	All	Yes
51	All projects will be conducted in conformance with applicable County and/or city drainage policies.	All	Yes

* Measures covered by NPDES will be reviewed each time the applicable NPDES permit is renewed. This table will be revised whenever coverage changes.

ID	Avoidance and Minimization Measure	Covered Activity Application	Measure Covered by NPDES Requirements? *
53	When possible, maintain a vegetated buffer strip between staging/excavation areas and receiving waters.	All	No
61	Minimize ground disturbance to the smallest area feasible.	All	Yes
62	Use existing roads for access and disturbed area for staging as site constraints allow. Off-road travel will avoid sensitive communities such as wetlands and known occurrences of covered plants.	All	No
63	Prepare and implement sediment erosion control plans.	All	Yes
64	No winter grading unless approved by the local jurisdiction and specific erosion control measures are incorporated.	All	Yes
65	Control exposed soil by stabilizing slopes (e.g., with erosion control blankets) and protecting channels (e.g., using silt fences or straw wattles).	All	Yes
66	Control sediment runoff using sandbag barriers or straw wattles.	All	Yes
67	No stockpiling or placement of erodible materials in waterways or along areas of natural stormwater flow where materials could be washed into waterways.	All	Yes
68	Stabilize stockpiled soil with geotextile or plastic covers. Materials that may entrap reptiles and amphibians, such as mono-filament erosion control materials, shall be avoided.	All	Yes
69	Maintain construction activities within a defined project area to reduce the amount of disturbed area.	All	Yes
70	Only clear/prepare land which will be actively under construction in the near term.	All	No
71	Preserve existing vegetation to the extent possible.	All	Yes
72	Equipment storage, fueling and staging areas will be sited on disturbed areas or non-sensitive habitat outside of a stream channel.	All	Yes
73	When possible, avoid wet season construction.	All	No
74	Stabilize site ingress/egress locations.	All	Yes
75	Dispose of all construction waste in designated areas and prevent stormwater from flowing onto or off of these areas.	All	Yes
76	Prevent spills and clean up spilled materials.	All	Yes
77	Sweep nearby streets at least once a day.	All	Yes
83	Sediments will be stored and transported in a manner that minimizes water quality impacts. If soil is stockpiled, no runoff will be allowed to flow back to the channel.	All	Yes
84.1	Appropriate erosion control measures (e.g., fiber rolls, filter fences, vegetative buffer strips) will be used on site to reduce siltation and runoff of contaminants into wetlands, ponds, streams, or riparian vegetation. Erosion control measures will be placed between the outer edge of the buffer and the project site.	All	Yes
84.2	Fiber rolls used for erosion control will be certified as free of noxious weed seed.	All	No
84.3	Filter fences and mesh will be of material that will not entrap reptiles and amphibians.	All	No

* Measures covered by NPDES will be reviewed each time the applicable NPDES permit is renewed. This table will be revised whenever coverage changes.

ID	Avoidance and Minimization Measure	Covered Activity Application	Measure Covered by NPDES Requirements? *
86	Topsoil removed during soil excavation will be preserved and used as topsoil during revegetation when it is necessary to conserve the natural seed bank and aid in revegetation of the site.	All	No
88	To the extent feasible, vehicles and equipment will be parked on pavement, existing roads, and previously disturbed areas.	All	No
89	The potential for traffic impacts on terrestrial animal species will be minimized by adopting traffic speed limits.	All	No
90	All trash will be removed from the site daily to avoid attracting potential predators to the site. Personnel will clean the work site before leaving each day by removing all litter and construction-related materials.	All	No
93	When accessing upland areas adjacent to riparian areas or streams, access routes on slopes of greater than 20% should generally be avoided. Subsequent to access, any sloped area should be examined for evidence of instability and either revegetated or filled as necessary to prevent future landslide or erosion.	All	No
94	Personnel shall use existing access ramps and roads if available. If temporary access points are necessary, they shall be constructed in a manner that minimizes impacts to streams.	All	Yes
95	To minimize entrapment of animals on job sites, the project biologist will survey the work area at the close daily activities to identify and remediate any potential areas or conditions that might trap animals. Examples of such include pits, trenches or pipes that animals can fall into or perforated pipes or netting that can cause entanglement. The biologist shall consider the animals expected to enter the site during the calendar period work will be occurring, and shall use his or her best judgment to remove entrapment conditions, allow for escape (such as a ramp not exceeding a 30-degree slope leading out of a trench) or develop a site-specific protocol (such as daily post-dawn surveys) to eliminate or minimize entrapment. If no project biologist is required on-site the job foreman or property owner will designate an individual to carry out these activities. Only individuals that hold permits or that have been approved by the Habitat Agency as a qualified biologist may handle listed species.	All	No
97	Erosion control measures shall be in place at all times during construction. Do not start construction until all temporary control devices (straw bales, silt fences, etc.) are in place downstream of project site.	All	Yes
99	Conduct street cleaning on a regular basis.	All	Yes
100	Potential contaminating materials must be stored in covered storage areas or secondary containment that is impervious to leaks and spills	All	Yes
101	Runoff pathways shall be free of trash containers or trash storage areas. Trash storage areas shall be screened or walled	All	Yes

* Measures covered by NPDES will be reviewed each time the applicable NPDES permit is renewed. This table will be revised whenever coverage changes.

ID	Avoidance and Minimization Measure	Covered Activity Application	Measure Covered by NPDES Requirements? *
103	Unless otherwise indicated in an Executive Directive issued by the Habitat Agency, for example a directive to address plant pathogens, (103.1) all disturbed soils will be revegetated with native plants, grasses, seed mixtures, or sterile nonnative species suitable for the altered soil conditions upon completion of construction. (103.2) Local watershed native plants will be used if available. If sterile nonnative species are used for temporary erosion control, native seed mixtures must be used in subsequent treatments to provide long-term erosion control and slow colonization by invasive nonnatives. (103.3) All disturbed areas that have been compacted shall be de-compacted prior to planting or seeding. (103.4) Cut-and-fill slopes will be planted with local native or non-invasive plants suitable for the altered soil conditions.	All	No
104	Measures will be utilized on site to prevent erosion along streams (e.g., from road cuts or other grading), including in streams that cross or are adjacent to the project proponent's property. Erosion control measures will utilize natural methods such as erosion control mats or fabric, contour wattling, brush mattresses, or brush layers. For more approaches and detail, please see the *Bank Protection/ Erosion Repair Design Guide* in the Santa Clara Valley Water Resources Protection Collaborative's *User Manual: Guidelines & Standards for Land Use Near Streams* (Santa Clara Valley Water Resources Protection Collaborative 2006).	All	Yes
112	Pumps and generators shall be maintained and operated in a manner that minimizes impacts to water quality and aquatic species.	All	Yes
114	Erosion control methods shall be used as appropriate during all phases of routine maintenance projects to control sediment and minimize water quality impacts.	All	Yes
105	Vegetation and debris must be managed in and near culverts and under and near bridges to ensure that entryways remain open and visible to wildlife and that passage through the culvert or bridge remains clear.	Culverts and Bridges	No
52	Adhere to the siting criteria described for the borrow site covered activity (see Chapter 2 for details).	Dams (seismic retrofit)	No
4	Reduce the potential for scour at stormwater outlets to streams by controlling the rate of flow into the streams.	In-stream (in water)	No
6	Activities in the active (i.e., flowing) channel will be avoided whenever possible. If activities must be conducted in the active channel, applicable avoidance and minimization measures identified in this table will be enforced.	In-stream (in water)	No

* Measures covered by NPDES will be reviewed each time the applicable NPDES permit is renewed. This table will be revised whenever coverage changes.

ID	Avoidance and Minimization Measure	Covered Activity Application	Measure Covered by NPDES Requirements? *
10	(10.1) If ground disturbing activities are planned for a stream channel that is known or suspected to contain elevated levels of mercury, the following steps shall be taken. (10.2) 1. Avoid disturbing soils in streams known or suspected to contain high levels of mercury. (10.3) 2. Soils that are likely to be disturbed or excavated shall be tested for mercury. Soils shall be remediated if: (10.4) a. disturbed or excavated soils exposed to flood flows below the 2.33-year channel flow level exceed 1 ppm Hg, or (10.5) b. disturbed or excavated soils above the 2.33-year flow level exceed 20 ppm Hg. (10.5) 3. The channel must be dewatered prior to commencement of the activity. (10.6) 4. Personnel shall implement measures to ensure that hazardous materials are properly handled and disposed of. (10.7) 5. If tested soils indicate an elevated level of mercury, the frequency of wetting and drying sediments during project activities will be minimized.	In-stream (in water)	No
12	Unless allowed by other regulatory permits, no equipment servicing shall be done in the stream channel or immediate flood plain.	In-stream (in water)	No
13	Personnel shall use the appropriate equipment for the job that minimizes disturbance to the channel bed and banks. Appropriately-tired vehicles, either tracked or wheeled, shall be used depending on the situation	In-stream (in water)	No

* Measures covered by NPDES will be reviewed each time the applicable NPDES permit is renewed. This table will be revised whenever coverage changes.

ID	Avoidance and Minimization Measure	Covered Activity Application	Measure Covered by NPDES Requirements? *
15	If native fish or non-covered, native aquatic vertebrates are present when cofferdams, water bypass structures, and silt barriers are to be installed, a native fish and aquatic vertebrate relocation plan shall be implemented when ecologically appropriate as determined by a qualified biologist to ensure that significant numbers of native fish and aquatic vertebrates are not stranded. Prior to the start of work or during the installation of water diversion structures, native aquatic vertebrates shall be captured in the work area and transferred to another reach as determined by a qualified biologist. Timing of work in streams that supports a significant number of amphibians will be delayed until metamorphosis occurs to minimize impacts to the resource. Capture and relocation of aquatic native vertebrates is not required at individual project sites when site conditions preclude reasonably effective operation of capture gear and equipment, or when the safety of biologist conducting the capture may be compromised. Listed species not covered by the Habitat Plan will not be relocated without the appropriate permits and authorizations from the correct agencies. Relocation of native fish or aquatic vertebrates may not always be ecologically appropriate. Prior to capturing native fish and/or vertebrates, the qualified biologist will use a number of factors, including site conditions, system carrying capacity for potential relocated fish, and flow regimes (e.g., if flows are managed) to determine whether a relocation effort is ecologically appropriate. If so, the following factors will be considered when selecting release site(s): 1. similar water temperature as capture location; 2. ample habitat availability prior to release of captured individuals; 3. presence of other same species so that relocation of new individuals will not upset the existing prey/predation function; 4. carrying capacity of the relocation location; 5. potential for relocated individual to transport disease; and 6. low likelihood of fish reentering work site or becoming impinged on exclusion net or screen; 7. Presence of aquatic predators Proposals to translocate any covered species will be reviewed and approved by the Wildlife Agencies.	In-stream (in water)	No
17	When work in a flowing stream is unavoidable, the work area will be isolated from the stream. This may be achieved by diverting entire streamflow around the work area by a pipe or open channel. Coffer dams shall be installed both upstream and downstream not more than 100 feet from the extent of the work areas. Coffer dam construction shall be adequate to prevent seepage into or from the work area. Where feasible, water diversion techniques shall allow stream flows to gravity flow around or through the work site. If gravity flow is not feasible, stream flows may be pumped around the work site using pumps and screened intake hoses. If a pump is used, it shall be operated at the rate of flow that passed through the site; pumping rates shall not be dewater nor impound water on the upstream side of the coffer dam. Sumps or basins may also be used to collect water, where appropriate (e.g., in channels with low flows). The work area will remain isolated from flowing water until any necessary erosion protection is in place. All water shall be discharged in a non-erosive manner (e.g., gravel or vegetated bars, on hay bales, on plastic, on concrete, or in storm drains when equipped with filtering devices, etc.).	In-stream (in water)	No

* Measures covered by NPDES will be reviewed each time the applicable NPDES permit is renewed. This table will be revised whenever coverage changes.

ID	Avoidance and Minimization Measure	Covered Activity Application	Measure Covered by NPDES Requirements? *
18	If a bypass will be of open channel design the berm confining the channel may be constructed of material from the channel.	In-stream (in water)	No
20	Diversions shall maintain ambient flows below the diversion, and waters discharged below the project site shall not be diminished or degraded by the diversion. All materials placed in the channel to dewater the channel shall be removed when the work is completed. Dirt, dust, or other potential discharge material in the work area will be contained and prevented from entering the flowing channel. Normal flows shall be restored to the affected stream as soon as is feasible and safe after completion of work at that location.	In-stream (in water)	No
21	To the extent that stream bed design changes are not part of the project, the stream bed, including the low-flow channel, will be returned to as close to pre-project condition as possible unless the pre-existing condition was detrimental to channel condition as determined by a qualified biologist or hydrologist.	In-stream (in water)	No
22	, Unless there is an extenuating circumstance as agreed to by the Habitat Agency or Wildlife Agencies, all temporary diversion structures and the supportive material shall be removed no more than 48 hours after work is completed.	In-stream (in water)	No
23	Temporary fills, such as for access ramps, diversion structures, or cofferdams, shall be completely removed upon finishing the work.	In-stream (in water)	No
24	To prevent increases in temperature and decreases in dissolved oxygen (DO), if bypass pipes are used, they shall be properly sized (i.e., larger diameter pipes to better pass the flows). Use of bypass pipes may be avoided by creating a low-flow channel or using other methods to isolate the work area.	In-stream (in water)	No
25	Diversions shall maintain fish passage when the project meets the following conditions: 1) the length of the area dewatered exceeds 500 feet, and/or 2) the length of time the stream is dewatered exceeds two weeks in length. Conditions for fish passage shall be met as long as the diversion 1) maintains contiguous flows through a low flow channel in the channel bed or an artificial open channel, 2) presents no vertical drops exceeding six (6) inches and follows the natural grade of the site, 3) is conducted such that water at the downstream end does not scour the channel bed or banks; and 4) maintains water depths in the bypass channel that exceed average depths in the 150 feet of stream upstream of the beginning of the bypass channel. A qualified biologist may make adjustments on a site-specific basis if determined to be beneficial to the fish. An artificial channel used for fish passage shall be made of impervious material to prevent loss of flows and lined with cobble/gravel. A closed conduit pipe shall not be used for fish passage. The inlets of diversions shall be checked daily to prevent accumulation of debris. If block nets are being used to keep leaf litter/debris out of the diversion, they should be checked at least twice per day.	In-stream (in water)	No
26	Any sediment removed from a project site shall be stored and transported in a manner that minimizes water quality impacts.	In-stream (in water)	No
27	Unless otherwise indicated in an Executive Directive issued by the Habitat Agency, sediment from the San Francisco Bay Watershed, including that for reuse, will not be removed to areas any farther south than Metcalf Road in south San Jose.	In-stream (in water)	No
30	Vegetation control and removal in channels, on stream banks, and along levees and maintenance roads shall be limited to removal necessary for facility inspection purposes, or to meet regulatory requirements or guidelines.	In-stream (in water)	No

* Measures covered by NPDES will be reviewed each time the applicable NPDES permit is renewed. This table will be revised whenever coverage changes.

ID	Avoidance and Minimization Measure	Covered Activity Application	Measure Covered by NPDES Requirements? *
31	(31.1) When conducting vegetation management, retain as much understory brush and as many trees as feasible, emphasizing shade-producing and bank-stabilizing vegetation. Carry out the activity in such a manner as to minimize impacts to the natural community present and encourage regrowth of the community structure appropriate to the site. (31.2) If riparian vegetation is to be removed with chainsaws, consider using saws currently available that operate with vegetable-based bar oil.	In-stream (in water)	No
32	In-channel vegetation removal may result in increased local erosion due to increased flow velocity. To minimize the effect, the top of the bank shall be protected by leaving vegetation in place to the maximum extent possible.	In-stream (in water)	No
33	Regional Board objectives for temperature change in receiving waters (measured 100 feet downstream of discharge point) shall not be exceeded. Receiving water and discharge water may be monitored for temperature changes after a comparison of ambient temperature to pipeline water temperature suggests the potential for change.	In-stream (in water)	No
43	Site characteristics will be evaluated in advance of project design to determine if non-traditional designs, such as bioengineered bank treatments that incorporate live vegetation, can be successfully utilized while meeting the requirements of the project.	In-stream (in water)	No
44	Maintenance of natural stream characteristics consistent with the stream section, such as riffle-pool sequences, riparian canopy, sinuosity, floodplain, and a natural channel bed, will be incorporated into the project design.	In-stream (in water)	No
45	Stream crossings shall incorporate a free-span bridge unless infeasible due to engineering or cost constraints or unsuitable based on minimal size of stream (swale without bed and banks or a very small channel). If a bridge design cannot free-span a stream, bridge piers and footings will be designed to have minimum impact on the stream. A hydraulics analysis must be prepared and reviewed by the jurisdictional partner, including SCVWD as appropriate, demonstrating that piers or footings will not cause significant scour or channel erosion. Whenever possible, the span of bridges will also allow for upland habitat beneath the bridge to provide undercrossing areas for wildlife species that will not enter the creek. Native plantings, natural debris, or scattered rocks will be installed under bridges to provide wildlife cover and encourage the use of crossings.	In-stream (in water)	No
47	If a culvert is used, up- and downstream ends of the culvert must be appropriately designed so that the stream cannot flow beneath the culvert or create a plunge pool at the downstream end. Preference will be given to designs that allow a natural bottom (arch culvert) and/or which do not alter natural grade.	In-stream (in water)	No
49	The project or activity must be designed to avoid the removal of native riparian vegetation, where feasible. If the removal native of riparian vegetation is necessary, the amount shall be minimized to the amount necessary to accomplish the required activity and comply with public health and safety directives. Impacts to non-native vegetation that is determined to be providing unique habitat value (such as shading, foraging habitat, or nesting area) shall be avoided and minimized in the same manner as native vegetation.	In-stream (in water)	No
54	Deep pools within stream reaches shall be maintained as refuge for fish and wildlife to the maximum extent practicable by constructing temporary fencing and/or barriers so as to avoid pool destruction and prevent access from the project site.	In-stream (in water)	No

* Measures covered by NPDES will be reviewed each time the applicable NPDES permit is renewed. This table will be revised whenever coverage changes.

ID	Avoidance and Minimization Measure	Covered Activity Application	Measure Covered by NPDES Requirements? *
56	Increased water velocity at bank protection sites may increase erosion downstream. Therefore, bank stabilization site design shall consider hydraulic effects immediately upstream and downstream of the work area. Bank stabilization projects will be designed and implemented to provide similar roughness and characteristics that may affect flows as the surrounding areas just upstream and downstream of the project site.	In-stream (in water)	No
78	In-stream projects occurring while the stream is flowing must use appropriate measures to protect water quality, native fish and covered wildlife species at the project site and downstream of the project site.	In-stream (in water)	No
80	All personnel working within or adjacent to the stream setback (i.e., those people operating ground-disturbing equipment) will be trained by a qualified biologist in these avoidance and minimization measures and the permit obligations of project proponents working under this Plan.	In-stream (in water)	No
87	Vehicles operated within and adjacent to streams will be checked and maintained daily to prevent leaks of fluids and lubricants.	In-stream (in water)	No
91	To prevent the spread of exotic species and reduce the loss of native species, aquatic species will be netted at the drain outlet when draining reservoirs or ponds to surface waters. Captured native fish, native amphibians, and western pond turtles will be relocated if ecologically appropriate. Exotic species will be dispatched.	In-stream (in water)	No
92	To minimize the spread of pathogens all staff working in aquatic systems (i.e., streams, ponds, and wetlands)—including site monitors, construction crews, and surveyors—will adhere to the most current guidance for equipment decontamination provided by the Wildlife Agencies at the time of activity implementation. Guidance may require that all materials that come in contact with water or potentially contaminated sediments, including boot and tire treads, be cleaned of all organic matter and scrubbed with an appropriate cleansing solution, and that disposable gloves be worn and changed between handling equipment or animals. Care should be taken so that all traces of the disinfectant are removed before entering the next aquatic habitat.	In-stream (in water)	No
98	When needed, utilize in-stream grade control structures to control channel scour, sediment routing, and headwall cutting.	In-stream (in water)	No
102	Immediately after project completion and before close of seasonal work window, stabilize all exposed soil with mulch, seeding, and/or placement of erosion control blankets	In-stream (in water)	Yes
106	Prior to undertaking stream maintenance activities, reach conditions will be assessed to identify tasks that are necessary to maintain or enhance the channel for the purposes for which it was designed and/or intended (e.g., habitat values; flood control, groundwater recharge). Only in-stream work that is necessary to maintain the channel will be conducted and potentially conflicting uses will be balanced to the greatest extent practicable.	In-stream (in water)	No

* Measures covered by NPDES will be reviewed each time the applicable NPDES permit is renewed. This table will be revised whenever coverage changes.

ID	Avoidance and Minimization Measure	Covered Activity Application	Measure Covered by NPDES Requirements? *
107	On streams managed for flood control purposes, when stream reaches require extensive vegetation thinning or removal (e.g., when the channel has been fully occluded by willows or other vegetation), removal will be phased so that some riparian land cover remains and provides some habitat value. In addition, vegetation removal will be targeted and focused on removing the least amount of riparian vegetation as possible while still meeting the desired flood control needs. For example, vegetation removal should be focused on shrubby undergrowth at the toe-of-slope that is most likely to increase roughness and create a flooding hazard. Vegetation on the upper banks, particularly mature tree canopy, should be maintained to the extent possible to provide habitat for birds and small mammals and shading for the active channel.	In-stream (in water) and Riparian	No
108	When reaches require sediment removal, approaches will be considered that may reduce the impacts of the activity. Examples of potential approaches include phasing of removal activities or only removing sediment along one half of the channel bed, allowing the other half to remain relatively undisturbed.	In-stream (in water)	No
109	In streams not managed for flood control purposes, woody material (including live leaning trees, dead trees, tree trunks, large limbs, and stumps) will be retained unless it is threatening a structure, or is causing excessive bank failure and increasing sediment loading to the stream.	In-stream (in water)	No
110	If debris blockages threaten bank stability and may increase sedimentation of downstream reaches, debris will be removed. When clearing natural debris blockages (e.g., branches, fallen trees, soil from landslides) from the channel, only remove the minimum amount of debris necessary to maintain flow conveyance (i.e., prevent significant backwatering or pooling). Non-natural debris (e.g., trash, shopping carts, etc.) will be fully removed from the channel.	In-stream (in water)	No
111	Bank repairs will use only compacted soil if site conditions allow and the repair is not likely to fail again. If compacted soil is not sufficient to stabilize the slope, bioengineering techniques must be used. No hardscape (e.g., concrete or any sort of bare riprap) or rock gabions may be utilized in streams not managed for flood control except in cases where infrastructure or human safety is threatened (e.g., undercutting of existing roads). Rock riprap may only be used to stabilize channels experiencing extreme erosion, and boulders must be backfilled with soil and planted with willows or other native riparian species suitable for planning in such a manner.	In-stream (in water)	No
50	If levee reconstruction requires the removal of vegetation that provides habitat value to the adjacent stream (e.g., shading, bank stabilization, food sources, etc.), then the project will include replacement of the vegetation/habitat that was removed during reconstruction unless it is determined to be inappropriate to do so by the relevant resource agencies (e.g., CDFG and USFWS).	Levees	No
29	Existing native vegetation shall be retained by removing only as much vegetation as necessary to accommodate the trail clearing width. Maintenance roads should be used to avoid effects on riparian corridors.	Trails	No
48	Trails will be sited and designed with the smallest footprint necessary to cross through the in-stream area. Trails will be aligned perpendicular to the channel and be designed to avoid any potential for future erosion. New trails that follow stream courses will be sited outside the riparian corridor.	Trails	No

* Measures covered by NPDES will be reviewed each time the applicable NPDES permit is renewed. This table will be revised whenever coverage changes.

ID	Avoidance and Minimization Measure	Covered Activity Application	Measure Covered by NPDES Requirements? *
57	When parallel to a stream or riparian zone and not located on top of a levee, new trails shall be located behind the top of bank or at the outside edge of the riparian zone except where topographic, resource management, or other constraints or management objectives make this not feasible or undesirable.	Trails	No
58	Existing access routes and levee roads shall be used if available to minimize impacts of new construction in special status species habitats and riparian zones.	Trails	No
59	Trails in areas of moderate or difficult terrain and adjacent to a riparian zone shall be composed of natural materials or shall be designed (e.g., a bridge or boardwalk) to minimize disturbance and need for drainage structures, and to protect water quality.	Trails	No
60	Trail crossings of freshwater stream zones and drainages shall be designed to minimize disturbance, through the use of bridges or culverts, whichever is least environmentally damaging. Structures over water courses shall be carefully placed to minimize disturbance. Erosion control measures shall be taken to prevent erosion at the outfalls of drainage structures.	Trails	Yes

* Measures covered by NPDES will be reviewed each time the applicable NPDES permit is renewed. This table will be revised whenever coverage changes.

Table 6-3. Conditions on Covered Transportation Projects

Design Requirements and Construction Practices	Highway Projects	Roadway Projects [1] and Interchange Upgrades	Mass Transit Projects	Road Safety and Operational Improvements	Dirt Road Construction
Transportation Project Design Requirements					
Background data collection by Habitat Plan Implementing Entity	R	R	R	–	–
Design coordination with Wildlife Agencies[2]	R	R	R	–	–
Enhance existing undercrossings	R	R	R	R	–
• Implement minimum sizing of culverts	R	R	R	R	–
• Install grating over tunnels/culverts for light penetration	P	P	P	P	–
• Install fencing around undercrossings to maximize crossing use	R	R	R	R	–
Road or rail barrier and passage designs for wildlife (to direct wildlife to safe crossings)	R	P	R	R	–
Construction Practices					
Avoidance and minimization measures	R	R	R	R	R
Post-Construction Practices					
Control roadside vegetation adjacent to reserves	R	R	R	R	R
Revegetate cut/fill slopes with native vegetation	R	R	R	R	R
Vegetation management around undercrossings	R	R	R	R	R

Notes:

R = Required

P = Possible (required unless data demonstrate action would not benefit wildlife and CDFG and USFWS agree to omit).

[1] Major roadway projects are identified in Table 2-6 and include those projects most likely to adversely affect habitat linkages in the study area.

[2] The scope of this review will be limited to the design, location, and extent of the median barrier.

Table 6-4. Rural Road Maintenance Avoidance and Minimization Measures

		Sediment Management and Erosion Control							Road Maintenance									
Avoidance and Minimization Measures		General Construction	Hillside Activities	Spoils Handling and Disposal	Mass Wasting Repair	Minor Slide Repair	Storm-Proofing	Culverts	General	Shoulder Maintenance	Dirt Road Maintenance	Ditch Maintenance	Drainage Systems	Sidecasting	Water Drafting	Vegetation Management	Dust Control	Concrete Work
1	Incorporate erosion control into the planning, construction and follow up phases for all road activities.	X	X	X		X	X	X	X	X	X	X	X	X		X		
2	If working during times when rain might be possible, always have erosion control measures onsite in case of a storm event.	X	X	X		X	X	X	X	X	X	X	X	X				
3	Plan for projects involving disturbance of soil (earthwork) within the riparian setback to occur during the salmonid avoidance season (June 15–October 15) with the exception of emergency or public safety related projects (e.g., clearing a landslide across a road). If avoidance is not possible, utilize appropriate avoidance and minimization measures as described in Conditions 4 and 5.	X	X	X		X	X	X	X	X	X	X	X	X		X		X
4	Set up the work and staging area to minimize the area of soil that will be disturbed and the tracking of soil out of the work area by vehicles and equipment.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
5	When possible, avoid staging projects in areas where runoff will be concentrated.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
6	Do not stage maintenance equipment in riparian areas or adjacent to streams with the exception of emergency or public safety related projects where no other staging options exist. Avoidance and minimization measures described in Conditions 4 and 5 will be applied as appropriate.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
7	Use appropriate erosion and sediment control avoidance and minimization measures to secure the staging and project area so that sediment runoff is avoided. Avoidance and minimization measures described in Conditions 4 and 5 will be applied as appropriate.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
8	Protect storm drain inlets and watercourses using appropriate avoidance and minimization measures. Avoidance and minimization measures described in Conditions 4 and 5 will be applied as appropriate.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
9	Mulch or revegetate bare soil adjacent to stream channels, or other flow transport paths, to the break-in-slope near those areas.	X	X	X	X	X			X	X		X	X			X		

		Sediment Management and Erosion Control							Road Maintenance									
Avoidance and Minimization Measures		General Construction	Hillside Activities	Spoils Handling and Disposal	Mass Wasting Repair	Minor Slide Repair	Storm-Proofing	Culverts	General	Shoulder Maintenance	Dirt Road Maintenance	Ditch Maintenance	Drainage Systems	Sidecasting	Water Drafting	Vegetation Management	Dust Control	Concrete Work
10	Keep runoff from bare soil well dispersed across a vegetated area to prevent sediment delivery to streams.	X	X	X	X	X			X	X	X	X	X					
11	When possible, direct any concentrated runoff from bare soil areas into natural buffers of vegetation or to gentler sloping areas where sediment can settle out.	X							X		X							
12	Dewater active gullies to prevent their enlargement and to reduce their capacity for sediment transport.	X									X							
13	Dewater old gullies, even if they are not actively eroding, so they no longer carry fine sediment to streams.	X									X							
14	Prevent accelerated landsliding by avoiding, minimizing or eliminating future sidecasting on steep or streamside hillslopes.				X	X					X			X				
15	When possible, divert surface runoff and subsurface drainage to stable sites away from steep, unstable or potentially unstable slopes.				X	X					X							
16	Fit shotgun culvert (culverts with outlets above grade) outlets with downspouts or energy dissipation. When reconstructing culverts, also set the slope of the culvert to match the grade of the streambed.	X						X										
17	Maintain culvert inlets, outlet, and bottom in open and sound condition.							X	X									
18	Identify storm drain inlets, manholes, and watercourses before beginning work. If there is any risk of discharge of sediment or road-related material, protect storm drains with appropriate erosion control and sediment management avoidance and minimization measures. Avoidance and minimization measures described in Conditions 4 and 5 will be applied as appropriate.	X							X									
19	Dispose of all excess materials from paved road maintenance activities at designated sites consistent with spoil disposal and stockpile requirements for various materials. Recycle excess materials.								X									

		Sediment Management and Erosion Control							Road Maintenance									
Avoidance and Minimization Measures		General Construction	Hillside Activities	Spoils Handling and Disposal	Mass Wasting Repair	Minor Slide Repair	Storm-Proofing	Culverts	General	Shoulder Maintenance	Dirt Road Maintenance	Ditch Maintenance	Drainage Systems	Sidecasting	Water Drafting	Vegetation Management	Dust Control	Concrete Work
20	Avoid sidecasting of soil in all cases where it could be delivered into a watercourse, riparian area, roadside ditch or storm drain. Do not sidecast at all if the slope is sparsely vegetated and it appears that sediment will travel with rain runoff into a stream or estuary system.		X		X	X	X							X				
21	Temporary spoils stockpiles should be located in areas that are relatively level; relatively free of vegetation and away from streams and wetlands areas.	X		X		X			X					X				
22	Remove temporary stockpiles to permanent disposal locations before the rainy season.	X		X		X			X					X				
23	Do not leave loose soil piled in berms alongside the road or ditch. Loose or exposed soil berms are erodible and readily flushed into waterways and storm drains.	X		X					X	X	X			X				
24	If any berm is left in place it must be compacted and stabilized with seeding or asphalt. Frequent well placed breaks in the berms are necessary to allow water to drain from road, preserving the natural drainage pattern of the slope.	X		X														
25	Avoid concentrating sidecasting repeatedly in the same place. Never sidecast large amounts of soil from major landslides.										X			X				
26	In general, maintain unpaved roads to obtain a less erosive running surface and to minimize the need for frequent surface grading. Blade and compact a smooth surface and compact loose soils as needed.										X							
27	Do not apply chemical dust palliatives during rain or immediately before anticipated rain. Approved dust control agents are preferred over water drafting and application.																X	
28	Do not apply chemical or petroleum-based palliatives where they may enter a stream or watercourse unless specifically approved for such use.																X	

	Avoidance and Minimization Measures	Sediment Management and Erosion Control: General Construction	Hillside Activities	Spoils Handling and Disposal	Mass Wasting Repair	Minor Slide Repair	Storm-Proofing	Culverts	Road Maintenance: General	Shoulder Maintenance	Dirt Road Maintenance	Ditch Maintenance	Drainage Systems	Sidecasting	Water Drafting	Vegetation Management	Dust Control	Concrete Work
29	Avoid disturbance of vegetation outside the essential shoulder area, especially near ditches, streams or watercourses. These vegetated areas help filter sediment from water run-off into ditches or streams and helps prevent erosion.	X							X							X		
30	Grade ditches only when necessary to keep the ditchline free flowing and restore capacity. Unnecessary mechanical grading can cause excess erosion, undermine banks, and expose the toe of the cutslope to erosion or slope failure.											X	X					
31	To control vegetation (rather than remove it entirely), use methods like mowing or weed-whacking when feasible. Vegetation prevents scour and filters out sediment.		X						X			X				X		
32	Whenever feasible, maintain a buffer of vegetation between the ditch and the road. This helps filter sediment from runoff and can be accomplished by using a steeper angle on the grader blade.	X	X						X			X				X		
33	Avoid harming existing vegetation on the cutbank above the ditch to reduce erosion and prevent slope failure.	X	X				X		X			X						
34	When “pulling” a ditch (mechanically grading and removing fine sediment), when possible, avoid spreading ditch spoils across or into the surface rock of the road or shoulder. Consider incorporating the removed soil into localized infrastructure (e.g., trails) and compact soil in place.											X						
35	The recommended minimum diameter for all new culverts, including cross drains, but exclusive of driveway culverts, is 18 inches. Often, small diameter culverts (12 inches or less) plug with debris, causing significant road damage. They are also difficult to clean out.	X						X	X				X					

	Avoidance and Minimization Measures	Sediment Management and Erosion Control							Road Maintenance									
		General Construction	Hillside Activities	Spoils Handling and Disposal	Mass Wasting Repair	Minor Slide Repair	Storm-Proofing	Culverts	General	Shoulder Maintenance	Dirt Road Maintenance	Ditch Maintenance	Drainage Systems	Sidecasting	Water Drafting	Vegetation Management	Dust Control	Concrete Work
36	New culverts on anadromous fish bearing streams will be sized for the 100-year storm event. When replacing smaller existing culverts on anadromous fish bearing streams, and space does not allow for a 100-year storm event culvert without creating excessive disturbance (e.g., additional excavation) culverts will be sized as close to 100-year storm event as possible given site constraints.	X						X										
37	Implement energy dissipation avoidance and minimization measures at cross drain outlets to prevent erosion. Discharges from cross drains onto road fill or other erosive areas often cause significant erosion and slope failure. Make sure that newly-installed cross drains are properly designed to minimize erosion problems. Where erosion is already occurring, work to halt and reverse it with appropriate erosion control avoidance and minimization measures. Avoidance and minimization measures described in Conditions 4 and 5 will be applied as appropriate.	X						X	X				X					
38	Clean cross drains as needed; including clearing vegetation and sediment immediately upslope or downslope of the drain if needed.							X	X				X					
39	Inspect equipment for leaks or damage prior to performing concrete work. Perform maintenance at designated repair facilities.																	X
40	Prior to concrete work, identify storm drain inlets, manholes, and watercourses. Protect storm drains with appropriate sediment management avoidance and minimization measures. Avoidance and minimization measures described in Conditions 4 and 5 will be applied as appropriate.																	X

		Sediment Management and Erosion Control							Road Maintenance										
Avoidance and Minimization Measures		General Construction	Hillside Activities	Spoils Handling and Disposal	Mass Wasting Repair	Minor Slide Repair	Storm-Proofing	Culverts	General	Shoulder Maintenance	Dirt Road Maintenance	Ditch Maintenance	Drainage Systems	Sidecasting	Water Drafting	Vegetation Management	Dust Control	Concrete Work
41	Designate areas to be used for concrete washout and perform washout only in properly constructed containments. When washing equipment or vehicles to remove cement or concrete residue, use only as much water as is needed so that rinse water can be properly contained. For example, use a positive shutoff on the washout hose.																	X
42	Follow these procedures for concrete mixing on site. - Ensure that contractors who fuel and operate cement mixing operations on site have an adequate spill plan and materials for spill containment. - Avoid mixing excess amounts of fresh concrete or cement on site. - Establish mixing plants outside of riparian corridors or near watercourses. - Dry and wet materials should be stored away from waterways and storm drains and should be covered and contained to prevent runoff from rainfall.																	X
43	Remove concrete grindings, rubble, and debris from the site for proper disposal and do not discharge into drain inlets, the storm water drainage system or watercourses.																	X
44	Contain coolant water from concrete cutting and do not discharge into drain inlets, the storm water drainage system or watercourses.																	X
45	When fresh concrete may be exposed to water, (e.g. rainy weather work), use concrete sealants that are approved by the California Department of Fish and Game for this purpose.																	X
46	Perform all in-stream work in dry conditions, and do not work in flowing waters. If a stream is flowing, use a cofferdam or other dewatering avoidance and minimization measures as needed. See Condition 4 for dewatering avoidance and minimization measures.	X						X	X				X					

	Avoidance and Minimization Measures	Sediment Management and Erosion Control							Road Maintenance									
		General Construction	Hillside Activities	Spoils Handling and Disposal	Mass Wasting Repair	Minor Slide Repair	Storm-Proofing	Culverts	General	Shoulder Maintenance	Dirt Road Maintenance	Ditch Maintenance	Drainage Systems	Sidecasting	Water Drafting	Vegetation Management	Dust Control	Concrete Work
47	Identify and map existing permanent disposal sites that can be used for long-term disposal of materials from routine and emergency maintenance activities and provide this information to maintenance crews. These sites should be in upland areas, such as rock pits, ridges, and benches. Locations should be above the 100-year floodplain of the closest stream and away from any groundwater seeps or wetlands.			X	X				X									
48	Minimize disturbance of ground cover or grass on the shoulder to the extent possible (the shoulder is part of the road right-of-way and may need to be kept clear for safety purposes), near ditches and outside of the road right-of-way. If the ground is bladed clean during mowing, the exposed soil will be vulnerable to erosion and could run-off into a creek. Vegetation can also act as a pollution filter that traps sediment and other runoff before it gets into ditches or streams.															X		
49	General guidelines for working within the road right-of-way: - Do not mow beyond 8 feet from the edge of the pavement unless that vegetation must be removed to retain existing drainage patterns or for safety reasons. - Do not remove brush more than 20 feet on either side of the road at bridge structures, unless additional removal is required to address safety concerns or to control noxious weeds. - Do not remove brush more than 10 feet on either side of a culvert, or 10 feet up and downstream from culverts that are 6-feet in diameter or larger, unless management is required for safety concerns or to control noxious weeds. NOTE: Fire management requirements must be considered when using this avoidance and minimization measure.							X	X	X						X		

		Sediment Management and Erosion Control							Road Maintenance									
Avoidance and Minimization Measures		General Construction	Hillside Activities	Spoils Handling and Disposal	Mass Wasting Repair	Minor Slide Repair	Storm-Proofing	Culverts	General	Shoulder Maintenance	Dirt Road Maintenance	Ditch Maintenance	Drainage Systems	Sidecasting	Water Drafting	Vegetation Management	Dust Control	Concrete Work
50	Small quantities of cut brush and trees may be left in riparian areas, adjacent to streams, when cut vegetation: - Does not cause a safety concern or fire hazard; - Does not disturb existing drainage patterns. - Does not contain noxious weeds (consult with appropriate staff about types and locations of noxious weeds); - Is not stockpiled in concentrated areas that can release leachate to surface water.															X		
51	When removing invasive plants and noxious weeds, use complete and thorough treatments. (*Arundo donax* is particularly difficult and requires at least two treatments to remove all underground root networks.)															X		
52	Dispose of larger amounts of vegetation and debris in approved upland disposal areas. Do not dispose of vegetation directly into waterbodies such as streams or wetlands. Do not permanently dispose of concentrated amounts of vegetation that can generate leachate that could affect surface or groundwater quality, unless disposal is at a location permitted for this purpose.															X		

Table 6-5. Habitat for Covered Species Avoided due to the Stream and Riparian Setback Condition

Species/Modeled Habitat	Total Modeled Habitat in Study Area[1]	Amount in Open Space Types 1, 2, and 3[2]	Commitment to Acquire Modeled Habitat for Reserve System[1]	Additional Modeled Habitat Avoided due to Setbacks[3]	Percent of Modeled Habitat Avoided due to Setbacks
California red-legged frog					
Primary habitat (acres)	10,101	3,230	1,300	2,855	28%
Foothill yellow-legged frog					
Primary habitat (miles)	244	70	30	119	49%
Secondary habitat (miles)	447	1526	50	229	51%
Western pond turtle					
Primary habitat (acres)	82,895	28,568	7,000	13,480	16%
Least Bell's vireo					
Primary habitat (acres)	3,097	330	460	837	55%

Notes:
[1] Source: **Table 5-17**.
[2] Open space Types 1, 2, and 3 are assumed to provide some conservation value for covered species.
[3] Excludes setbacks that could occur within the Reserve System and existing open space. Represents a reasonable estimate of avoidance during the permit term if all covered activities occurred. Estimate does not include setbacks from rural residential development, which are difficult to predict in locations precise enough to estimate setback distances.

Table 6-6. Recommended Setbacks to Preserve Riparian and Stream Function (from studies throughout the United States since 1990)

	Function	Citation	Recommended Setback
Physical Properties	Sediment and Nutrient Reduction	Corley et al. 1999	>33 feet
		Nichols et al. 1998	>60 feet
		Woodward and Rock 1995	>50 feet
		Desbonnet et al. 1994	80 feet
		Petersen et al. 1992	>33 feet
		Castelle et al. 1992	>50 feet
		Schellinger and Clausen 1992	75 feet
		Welsch 1991	>85 feet
	Removal of Fecal Coliform	Johnson and Ryba 1992*	75–300 feet
	Moderation of Stream Temperature/Microclimate	Lynch and Corbett 1990	100 feet
	Channel Complexity	Brosofske et al. 1997	>145 feet
		Chapel et al. 1991	135–220 feet
Biological Properties	Salmonid Habitat	Ligon et al. 1999	>150 feet
		Welsch 1991	>85 feet
	Reptile/Amphibian Habitat	Burbink et al. 1998	>325 feet
		Semlitsch 1998	540 feet
		Buhlmann 1998	440 feet
		Rudolph and Dickson 1990	98 feet
	Bird Habitat/Diversity	RHJV 2000	250 feet
		Whitaker and Montevechi 1999	>160 feet
		Hagar 1999	>130 feet
		Kilgo et al. 1998	>1,600 feet
		Richardson and Miller 1997	>160 feet
		Mitchell 1996	>325 feet
		Hodges and Krementz 1996	>325 feet
		Spackman and Hughes 1995	450 feet for 90% of species diversity
	Mammal Habitat/Diversity	Hilty et al. 2006	>1,000 feet
	Plant Diversity	Spackman and Hughes 1995	30–100 feet for 90% of species
	General Riparian/Ecosystem Function	NH FSSWT 2000	100 feet, 300 feet, 600 feet by stream order
		Spence et al. 1996	98–145 feet
		Johnson and Ryba 1992*	> 98 feet
		Chapel et al. 1991	160–650 feet
		Welsch 1991	>85 feet

* Article does not present new data, but instead is a review of existing data.

Table 6-7. Required Stream Setback Distances[1]

Stream Category	Category 1 Streams		
Slope Class	Inside Existing Urban Service Area[2]	Outside Existing Urban Service Area[2]	Category 2 Streams
0–30%	100 feet	150 feet	35 feet
> 30%	150 feet	200 feet	

[1] All distances measured from top of bank. For Category 1 streams, if the edge of riparian vegetation extends beyond setback, the riparian edge becomes the setback plus a 35-foot buffer from riparian edge inside or outside the Urban Service Area. For Category 2 streams, if the site supports riparian vegetation, the setback will extend from the riparian edge plus a 35-foot buffer.

[2] Urban service areas existing at the time of permit issuance for the Habitat Plan.

Table 6-8. Summary of Habitat Survey Requirements and Preconstruction Survey and Monitoring for Select Covered Wildlife Species

Land Cover Type	Species	Specific Habitat Elements	Requirements			
			Species Habitat Survey[1]	Preconstruction Survey	Avoidance and Minimization Requirements	Construction Monitoring
Any Grassland, Oak Woodland, or Agricultural Land Cover Types	San Joaquin kit fox	• Within the modeled habitat in the study area (see species account in Appendix D for model and parameters)	• Identify and map potential den sites	• Determine status and map all dens (>5 in. diameter) within 250 feet of activity footprint	• Monitor dens • Destroy unoccupied dens • Discourage use of occupied (non-natal) dens	• Establish exclusion zones (>50 feet) for potential dens • Establish exclusion zones (>100 feet) for known dens • Notify USFWS and CDFG of any occupied natal dens • Construction or maintenance personnel must participate in training
	Western burrowing owl	• Within all occupied nesting habitat (**Figure 5-11**). Surveys are not required in sites that are mapped as potential nesting/overwintering or only overwintering habitat	• Identify and map burrows and potential burrows within 250 ft of activity footprint • Document evidence of presence/absence (owls, pellets, whitewash, prey remains) • Species survey in occupied habitat are required in both breeding and non-breeding	• Conduct burrowing owl survey within 2 calendar days of ground disturbance (see Condition 15 for details of required survey methods)	• Avoid occupied nests within a 250-foot buffer during breeding season (Feb 1–Aug 31) or develop a monitoring plan that allows activity within 250-foot buffer (see Condition 15 for requirements) • Avoid occupied burrows during non-breeding season (Sept 1–Jan 31) or meet requirements in Condition 15 if allowing activity within a 250-foot buffer	• Establish buffer zones (250 feet) around active nests if applicable • Establish buffer zones (250 feet) around occupied burrows during non-breeding season if applicable • Implement construction monitoring consistent with monitoring plan or requirements if activities occur within the buffer • Construction or maintenance personnel must participate in training

Land Cover Type	Species	Specific Habitat Elements	Requirements: Species Habitat Survey[1]	Preconstruction Survey	Avoidance and Minimization Requirements	Construction Monitoring
Pond or Coastal/ Valley Freshwater Marsh	Tricolored blackbird	• Within 250 feet of verified riparian land, coastal and valley freshwater marsh, or pond cover types	• Identify and map nesting substrate, and marsh habitat	• Document presence/absence of breeding colony within 2 calendar days of disturbance • Document use of habitat (e.g., breeding, foraging) • Determine if the site has been used for nesting in the past 5 years	• Avoid occupied nests colonies during breeding season (Mar 15–July 31) • Avoid nest sites that were occupied in the past 5 years	• Establish 250-foot buffer around outer edge of all hydric vegetation associated with breeding habitat • Construction or maintenance personnel must participate in training • Notify CDFG and USFWS of nest locations immediately
Any Riparian Forest and Scrub Land Cover Types	Least Bell's vireo	• Within potential breeding habitat, as mapped by the Implementing Entity • Within 250 feet of verified riparian land cover types	• Identify and map early successional riparian forest or scrub	• Document presence/absence of nesting least Bell's vireo within 2 calendar days of disturbance • Document use of habitat (e.g., breeding, foraging) • Determine if the site has been used for nesting in the past 3 years	• Avoid occupied nests during breeding season (Mar 15–July 31) • Avoid nest sites that were occupied in the past 3 years	• Establish a 250-foot buffer around occupied nest site • Construction or maintenance personnel must participate in training • Notify CDFG and USFWS of nest locations immediately
Serpentine bunchgrass grassland	Bay checkerspot butterfly	• In Bay checkerspot butterfly habitat units identified in Appendix D • In mapped serpentine that cannot be avoided	• Identify and map extent of larval host plants • Report results of reconnaissance level surveys for adult butterflies	• None	• Locate the project footprint as far from field-verified occupied Bay checkerspot habitat or the highest-quality serpentine habitat as feasible	• None

[1] Changes to project design that result from planning survey information will help avoid impacts to covered species. If no project design changes are needed and site is relatively simple, species habitat surveys could be combined with preconstruction surveys.

Table 6-9. Survey Periods for Covered Plant Species

Species		Survey Period											
Common Name	Scientific Name	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Covered Species													
Tiburon Indian paintbrush	*Castilleja affinis* ssp. *neglecta*				√	√	√	√					
Coyote ceanothus	*Ceanothus ferrisiae*	√	√	√	√	√							
Mount Hamilton thistle	*Cirsium fontinale* var. *campylon*		(√)	(√)	√	√	√	√	√	√	(√)		
Santa Clara Valley dudleya	*Dudleya abramsii* ssp. *setchellii*				√	√	√						
Fragrant fritillary	*Fritillaria liliacea*		√	√	√								
Loma Prieta hoita	*Hoita strobilina*					(√)	√	√	(√)	(√)	(√)		
Smooth lessingia	*Lessingia micradenia* var. *glabrata*							√	√	√	(√)	(√)	
Metcalf Canyon jewelflower	*Streptanthus albidus* ssp. *albidus*				√	√	√	√					
Most beautiful jewelflower	*Streptanthus albidus* ssp. *peramoenus*			√	√	√	√						

Note: (√) indicates flowering periods which are possible but uncommon for the species.

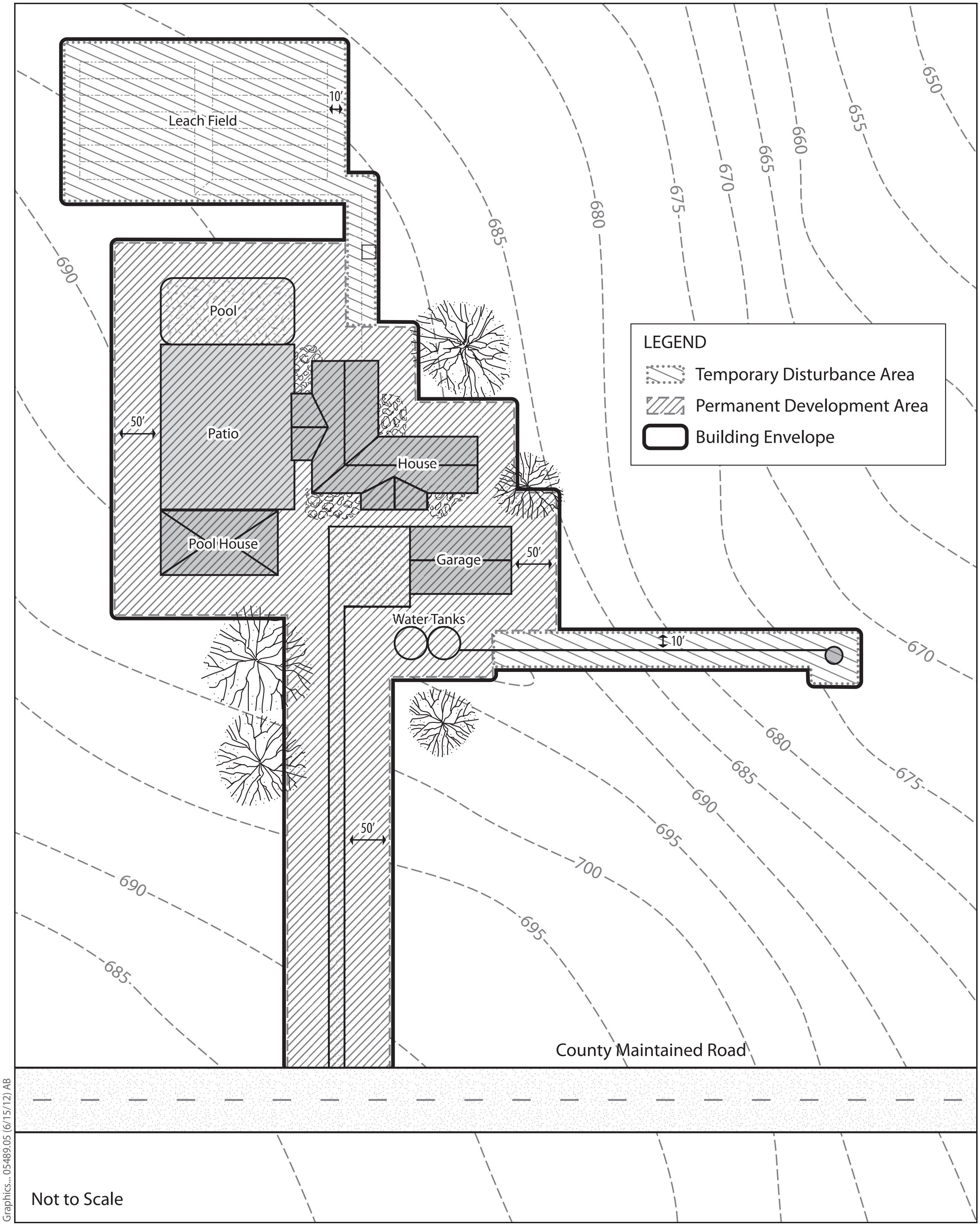


Figure 6-1
Schematic for Calculating Development Area

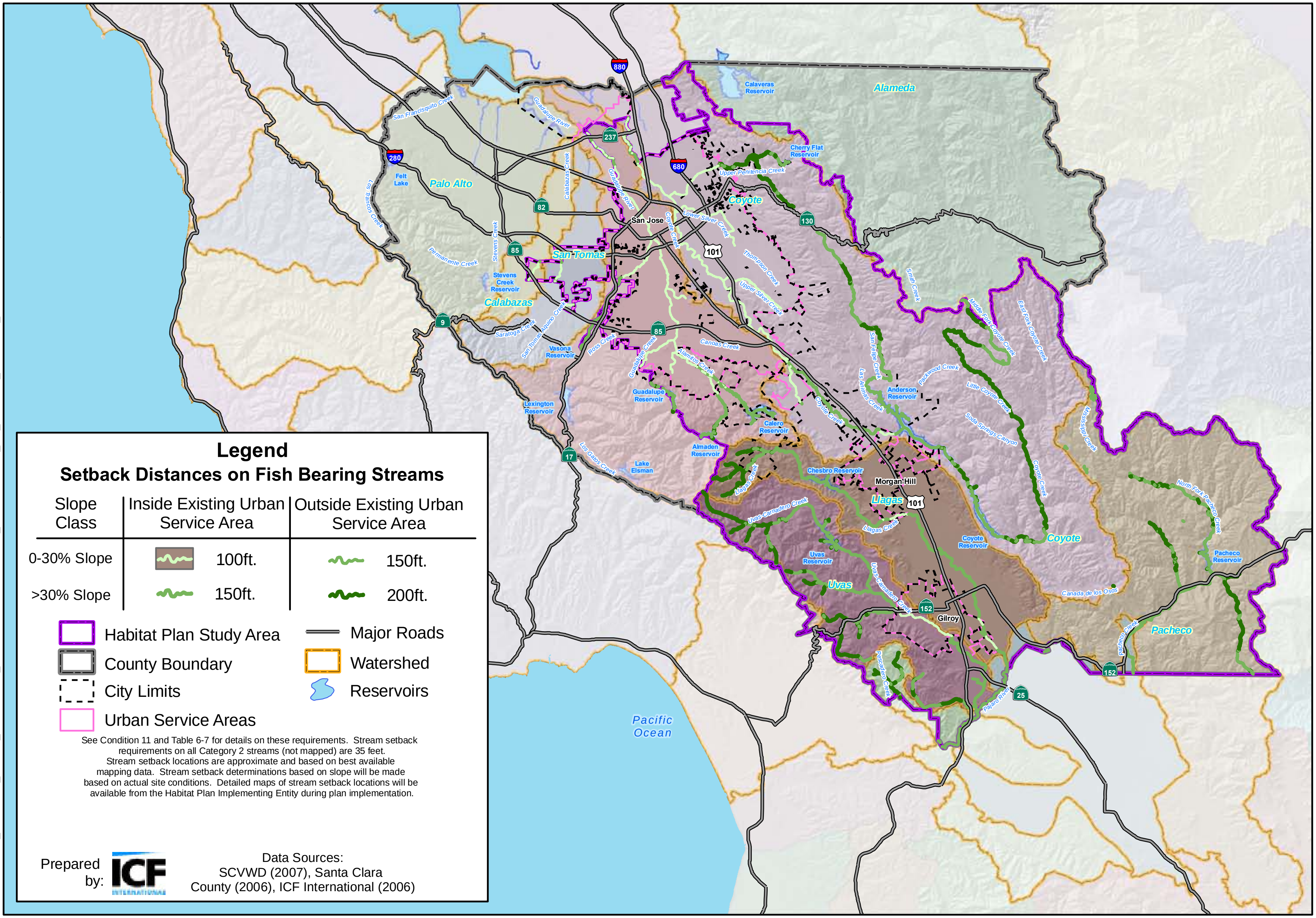
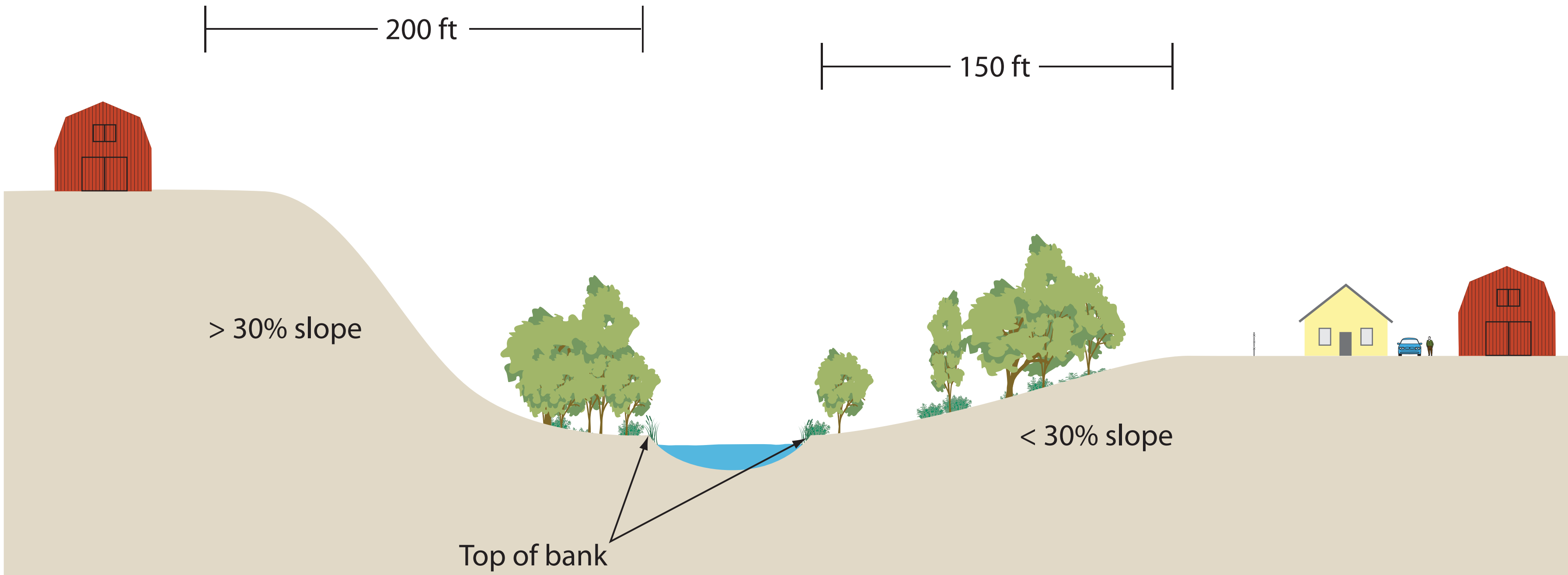


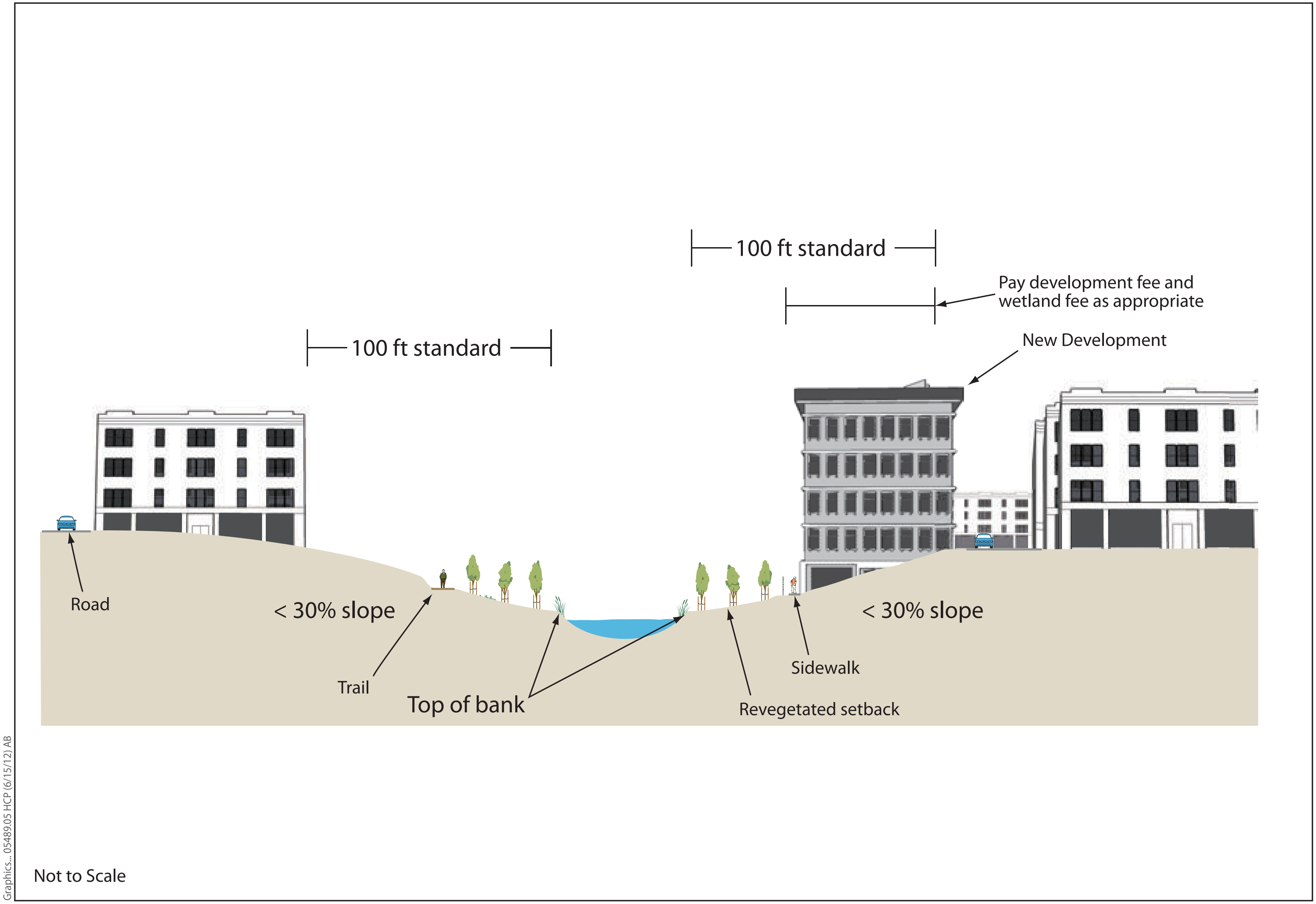
Figure 6-2
Stream Setback Requirements for Category 1 Streams



Graphics... 05489.05 HCP (6/15/12) AB

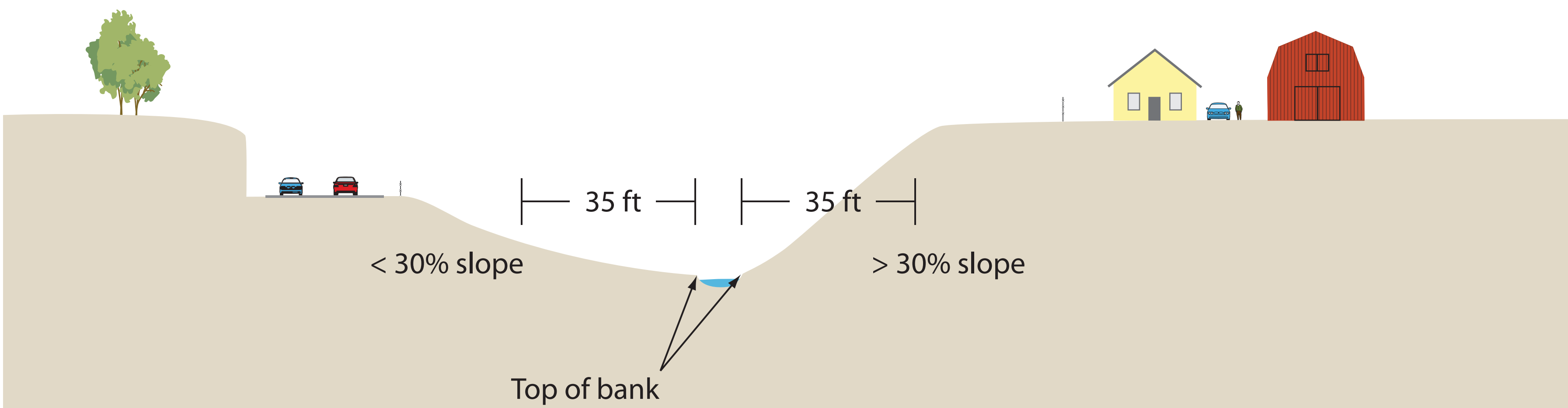
ICF INTERNATIONAL

Figure 6-3a
Stream Setback Condition – Slope Examples
Category 1 Stream Outside Urban Service Area



ICF INTERNATIONAL

Figure 6-3b
Stream Setback Condition
Category 1 Inside Urban Sevice Area



Not to Scale

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Figure 6-3c
Stream Setback Condition – Ephemeral Stream (Category 2) Example

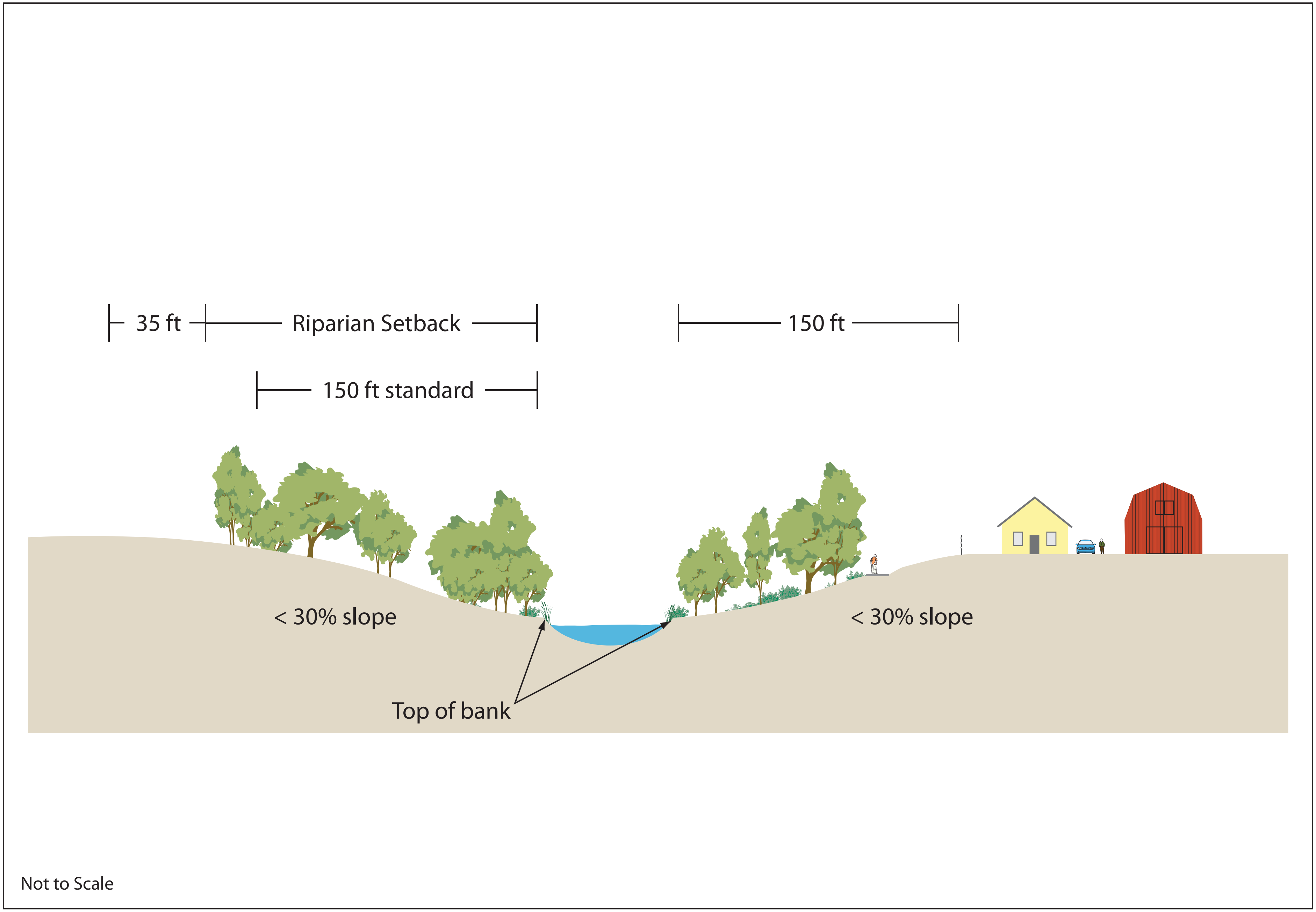

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Figure 6-3d
Stream Setback Condition – Riparian Vegetation Examples
Category 1 Stream Outside Urban Service Area

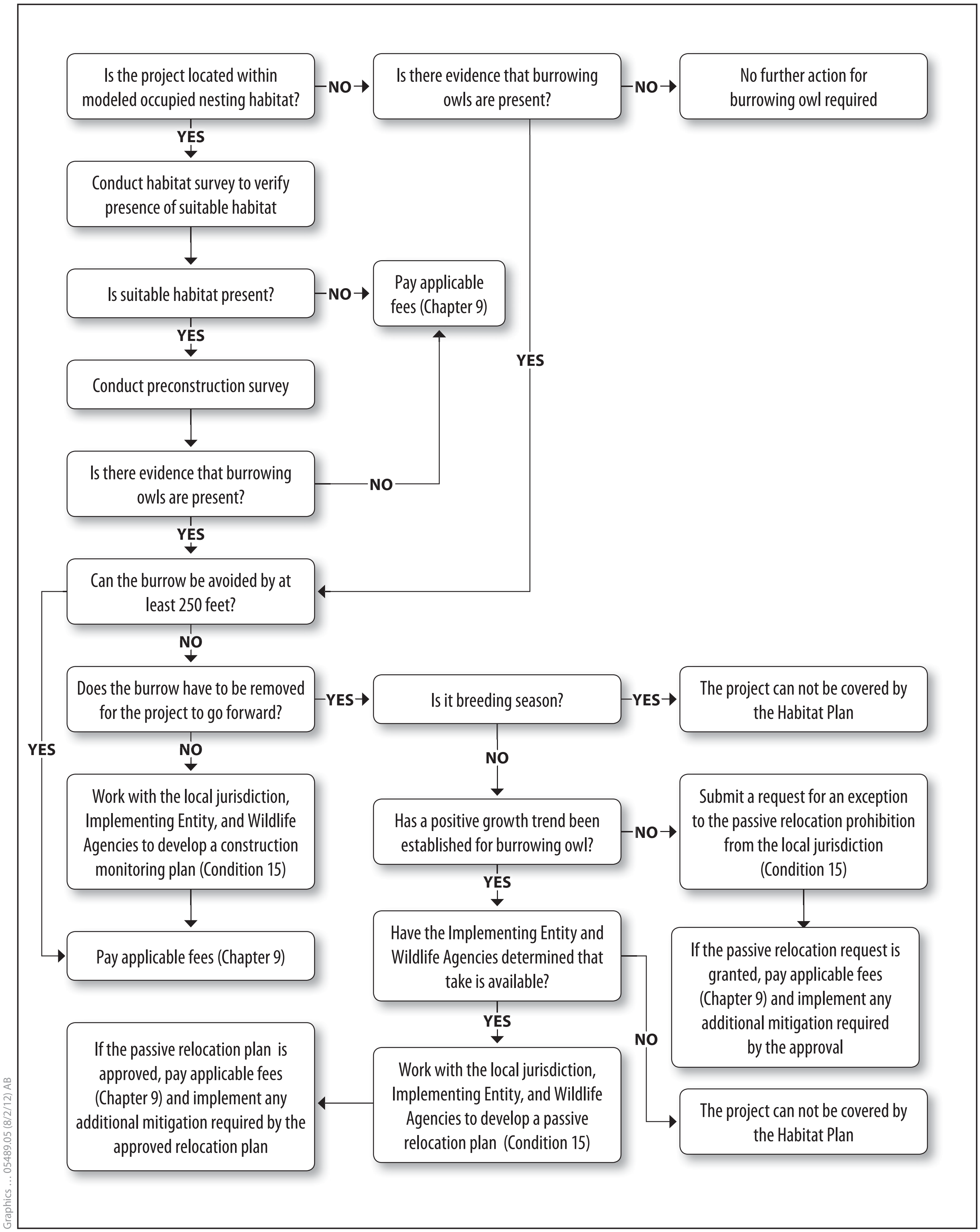

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Figure 6-4
Western Burrowing Owl Survey and Monitoring Requirements Flow Chart

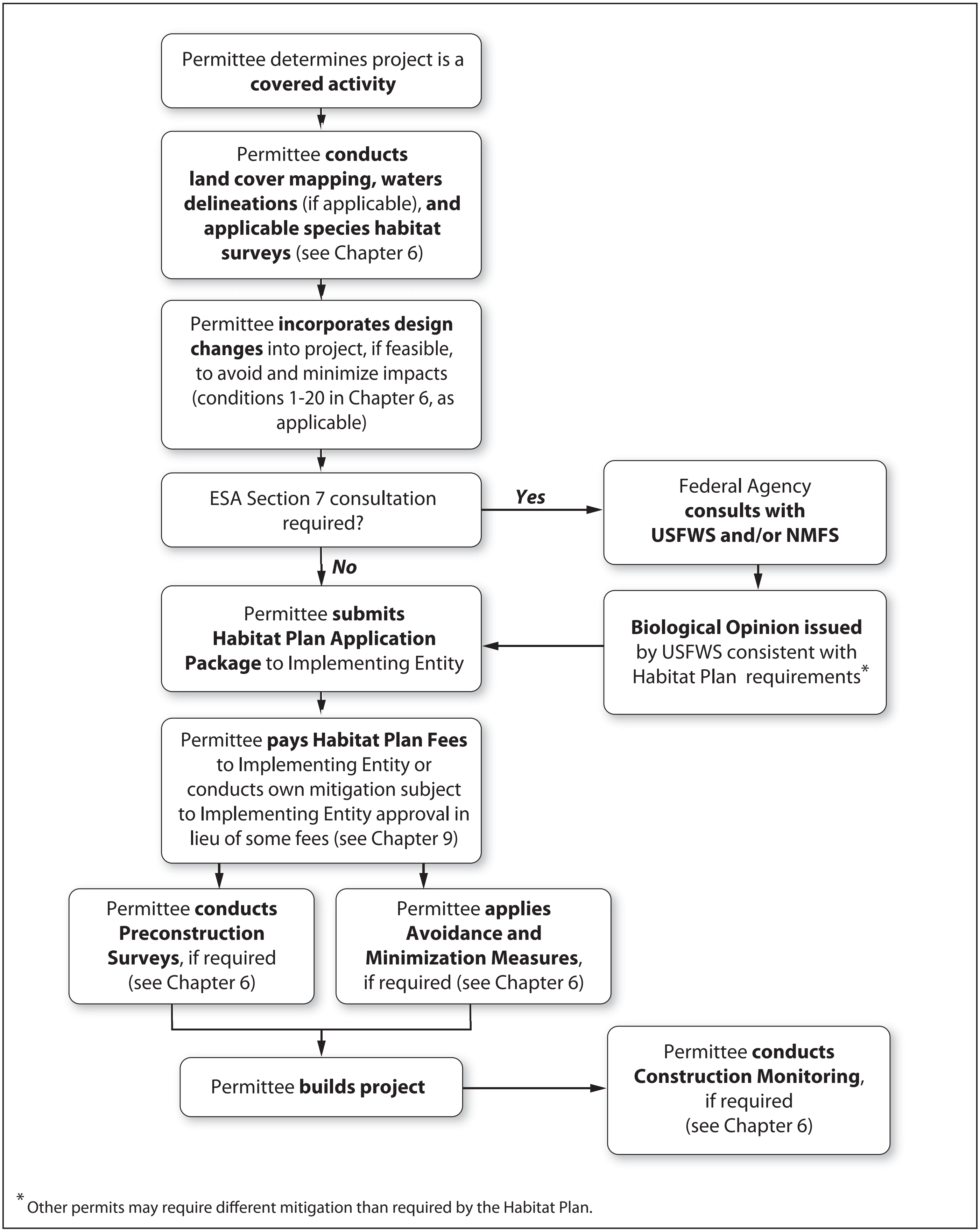

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Figure 6-5
Process for Project Compliance with Habitat Plan for Public Projects (by Permittees)

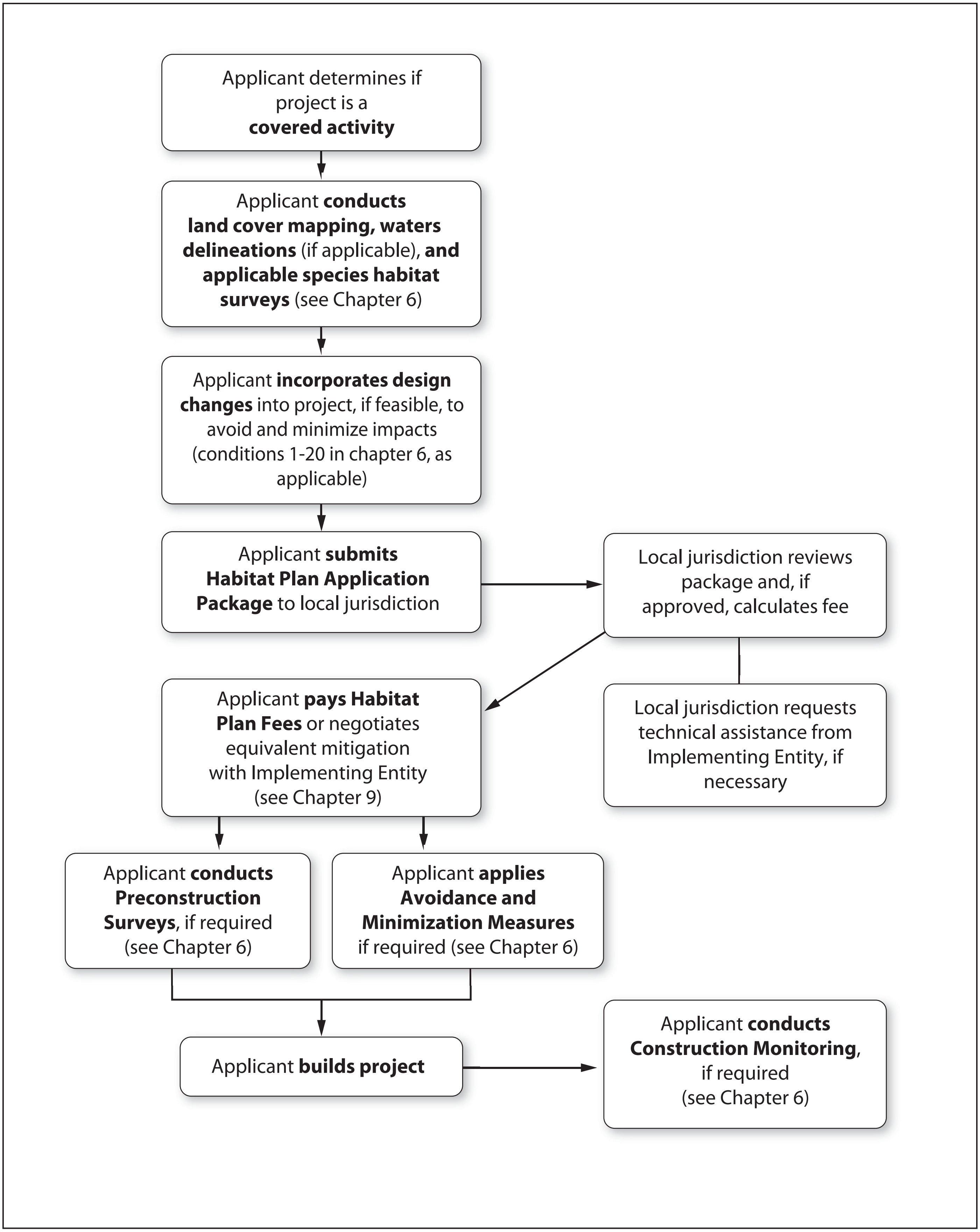

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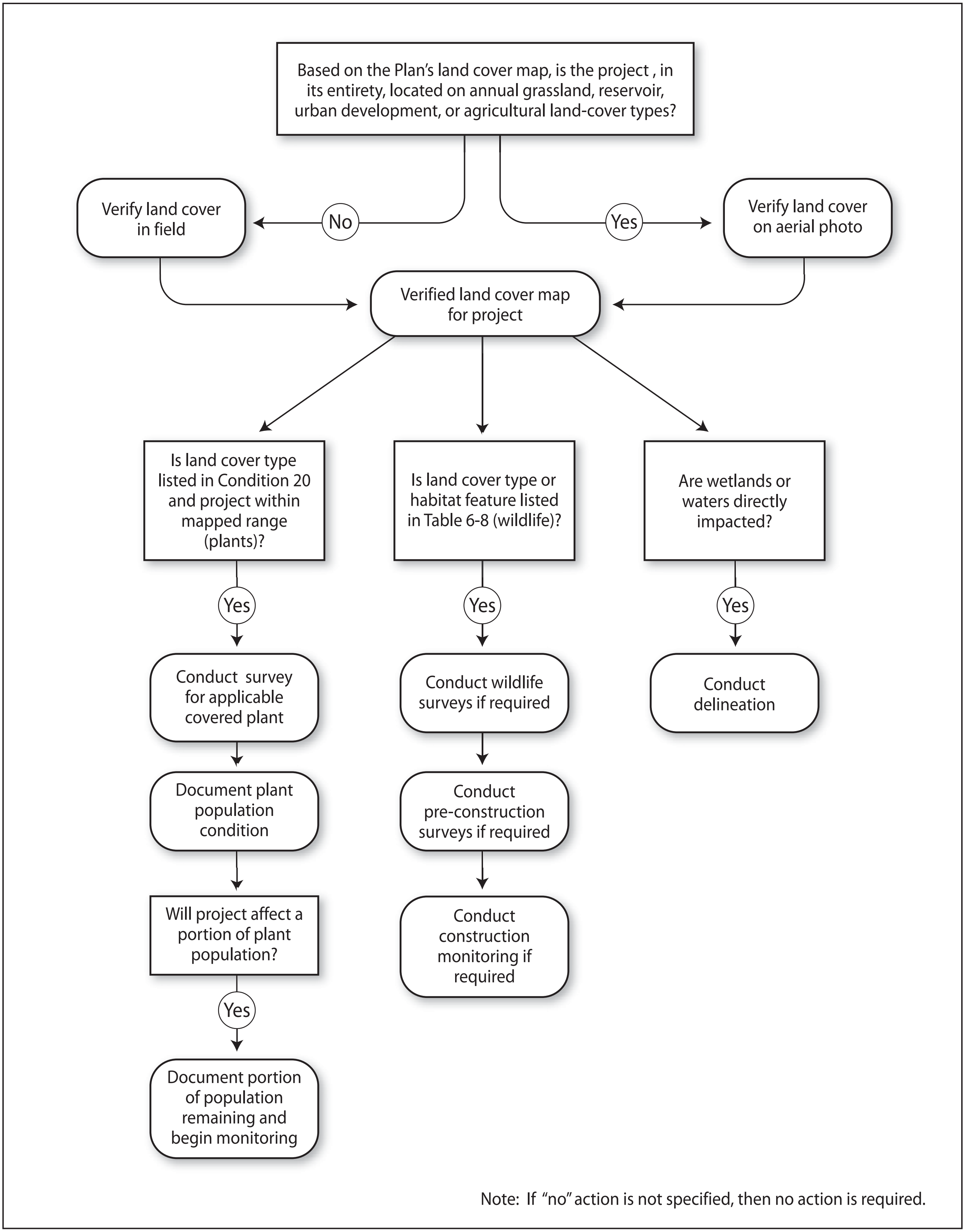
Figure 6-6
Process for Project Approval under Habitat Plan for Private Projects Covered by Plan



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ICF INTERNATIONAL

Figure 6-7
Survey Requirements for Covered Activities

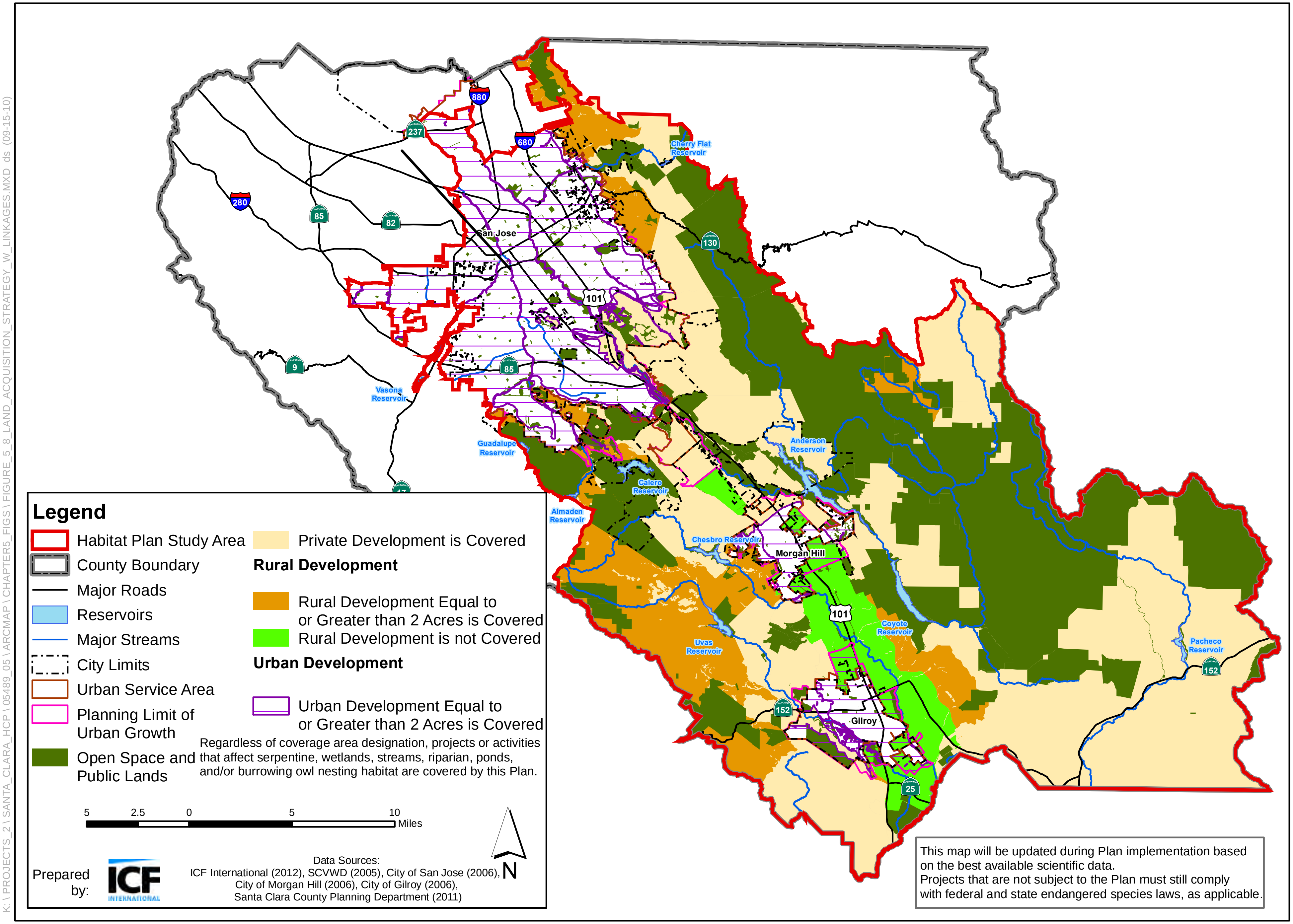

Figure 6-8
Private Development Areas Subject to the Plan

C.6 Almaden Lake Preliminary Delineation of Waters of the United States

ALMADEN LAKE PROJECT

Preliminary Delineation of Waters of the United States, Santa Clara County, California

Prepared for
Santa Clara Valley Water District

July 2016

ALMADEN LAKE PROJECT

Preliminary Delineation of Waters of the United States, Alameda County, California

Prepared for
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ACRONYMS AND ABBREVIATIONS USED IN THIS DOCUMENT

CFR	Code of Federal Regulations
CWA	Clean Water Act
EPA	United States Environmental Protection Agency
FAC	Facultative plant species
FACU	Facultative upland plant species
FACW	Facultative wetland plant species
GIS	Geographic Information System
GPS	Global Positioning System
ISW	Instream Wetland
OBL	Obligate wetland plant species
OHWM	Ordinary high water mark
NI	No wetland indicator assigned (for plants)
NRCS	Natural Resource Conservation Service
NRPW	Non-relatively permanent waters
RPW	Relatively permanent waters
SWANCC	Solid Waste Agency of Northern Cook County
TNW	Traditionally navigable waters
UPL	Upland plant species
USACE	United States Army Corps of Engineers
USDA	United States Department of Agriculture
USGS	United States Geological Survey
USFWS	United States Fish and Wildlife Service

CHAPTER 1
Introduction

1.1 Objective

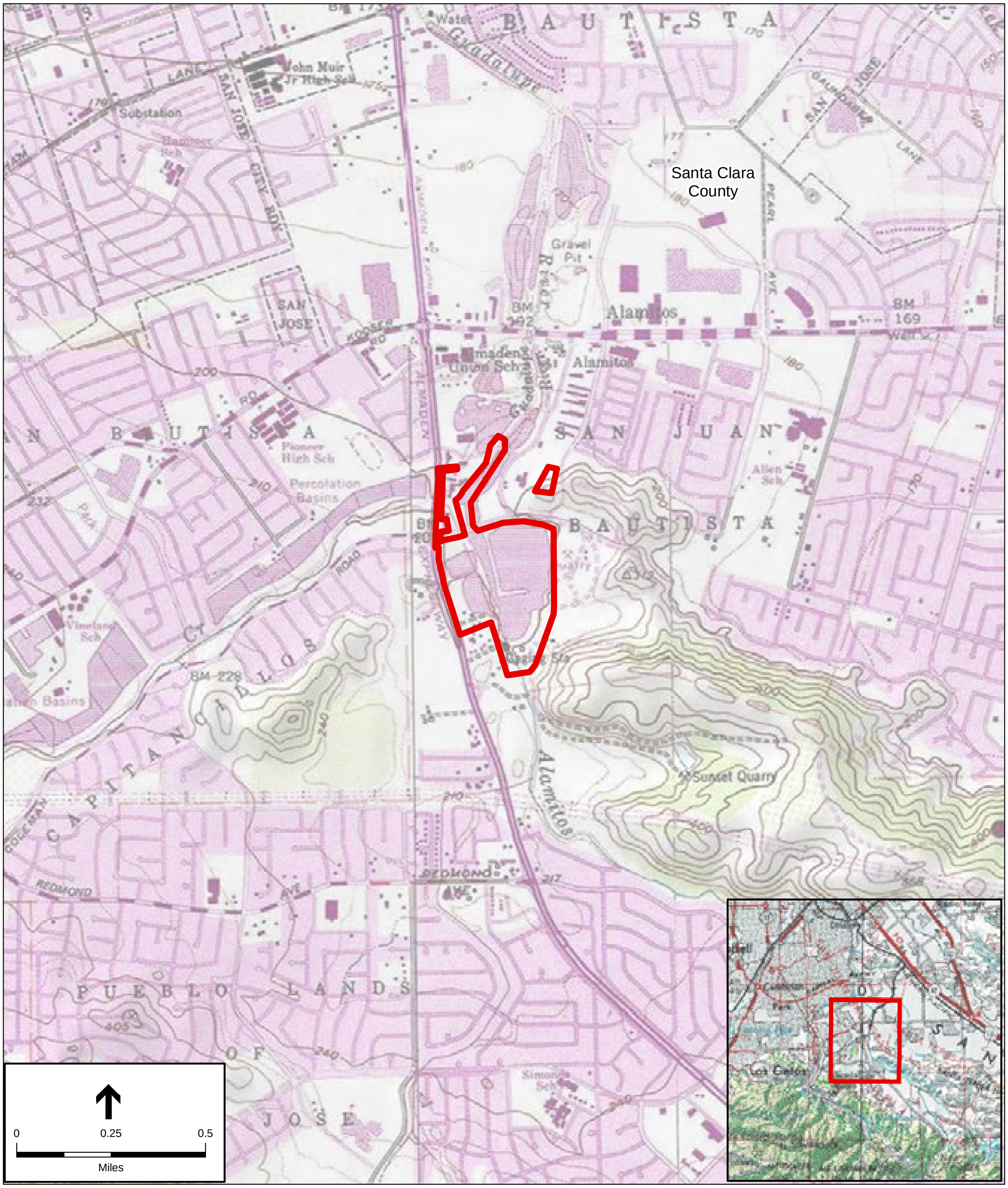
This report documents the extent of potentially jurisdictional waters of the United States, including wetlands and other waters, which occur at the Almaden Lake Project site. The project site is located in Santa Clara County, California, in and adjacent to Almaden Lake, within the City of San Jose (**Figure 1**).

The purpose of this document is to identify features within the project study areas under potential jurisdiction of the U.S. Army Corps of Engineers (USACE), and to provide the background information necessary to support a future permit application under Section 404 and Section 401 of the Clean Water Act for the proposed maintenance activities. This assessment is based on the best professional judgment of ESA investigators. All conclusions presented should be considered preliminary and subject to change pending official review and verification in writing by USACE.

1.2 Summary of Results

ESA conducted a formal wetland delineation of the study area on December 1, 2015 and May 24, 2016. The field delineation identified and documented all potentially jurisdictional wetlands and other waters of the U.S. within the delineation study area. A total of 37.12 acres (1,617,022 square feet) of potentially jurisdictional waters of the U.S. occur within the delineation study area which includes Alamitos Creek, Almaden Lake, Guadalupe Creek, Guadalupe River, and Los Alamitos Percolation Pond. The total area includes: 0.46 acre (20,189 square feet) of freshwater marsh (lake shore), 0.23 acre (9,957 square feet) of willow scrub/freshwater marsh (instream wetlands), 2.11 acres (91,774 square feet) freshwater marsh (instream wetlands), and 34.32 acres (1,495,101 square feet) of other waters. A total of 2,062 linear feet of potentially jurisdictional waters of the U.S. occur within the creek and river segments in the delineation study area.

A detailed summary of jurisdictional features documented within the delineation study area is presented in Table 4-1 (Chapter 4). A delineation map of the study area is presented in **Appendix A**; wetland datasheets are provided in **Appendix B**; a Jurisdictional Determination Analysis map, showing the project site's connection to Traditionally Navigable Waters, is located in **Appendix C**; a soils map for the study area is provided in **Appendix D**; the climate summary (WETS Table) information table for San Jose, CA is provided in **Appendix E**; and representative photographs are provided in **Appendix F**.



SOURCE: USGS Santa Teresa Hills, Calif. 7.5-minute topographic quadrangle

Almaden Lake Project . 130679

Figure 1
Project Location

1.3 Responsible Parties

Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118
Contact: Michael Martin, Environmental Planner
MichaelMartin@valleywater.org
(408) 630-3095

1.4 Project Description

The District proposes two alternatives to address methylmercury production and water quality concerns in Almaden Lake, and to reduce barriers to the passage of anadromous fish within the project area. To restore the creek, both alternatives would isolate approximately 1,600 feet of Alamitos Creek in a channel that would be separated from Almaden Lake by a new 40 feet wide levee. The levee would separate the creek from the lake, and would serve as a maintenance road and public trail. To restore the lake, its bed would be leveled and the existing mercury-laden sediment would be capped with a layer of clay/levee fill material. The high water lake level of 190 feet above msl would be maintained under both alternatives by sourcing either (1) from the available water in Alamitos Creek, or (2) from available recycled water from a future extension of the San Jose Water Company Recycled Water system pipeline along Winfield Boulevard. Other improvements proposed under both alternatives include the expansion of the existing island to 0.75 acre, construction of a new 0.75 acre island, and expansion of open park area by up to 2 acres, into the existing west beach and lake area. After construction, riparian vegetation, would be installed along the sides of the new levee, the west bank of the proposed creek, and the islands.

Under Alternative 1, Alamitos Creek and Almaden Lake would have a water surface of 10 acres and 19 acres, respectively. Within the west shore of the existing lake near Coleman Road, 0.3 acres would be cut/excavated, and 1.1 acres of open water along the existing beach area would be filled to increase the new Park area (SCVWD, 2015c). Under Alternative 2, Alamitos Creek and Almaden Lake would have a water surface of 11 acres and 17 acres, respectively. Within the shore of the existing lake near Coleman Road, little to no Park land would be excavated, and 1.6 acres along the existing beach area would be filled to increase the new Park area (SCVWD, 2015d). Furthermore, both alternatives propose relocating the existing boat facility near Coleman Road to the southern shore of the lake on top of the bank of the proposed levee (SCVWD, 2015f).

If desired, the City may construct a new trail on the west side of the lake in the new Park area in the future (SCVWD, 2015b). Construction activities associated with any future trail would undergo a separate environmental impact review from the proposed project, but would beyond the bank of any water feature.

CHAPTER 2
Setting

2.1 Delineation Study Areas

The study area is located in the ecologically diverse Central California Coast Ecological Section, Santa Clara Valley subsection (Miles and Goudey, 1997). The Santa Clara Valley is characterized by rolling hills, alluvial fans and floodplains. Regional natural plant communities include valley oak savanna and grassland, oak woodland, wet meadow, riparian woodlands, and valley freshwater marsh. The climate is temperate with mean annual precipitation of 16 inches and mean annual temperatures ranging from a high of 71 to a low of 50 degrees Fahrenheit (Western Regional Climate Center, 2016).

Alamitos Creek enters Almaden Lake at the south end of the Project Area. Alamitos Creek continues on for a short while after Almaden Lake before meeting Guadalupe Creek and both creeks flow into the Guadalupe River. The Guadalupe River runs north throughout the City of San Jose. Guadalupe River then discharges into Alviso Slough, which is tidally influenced, which then flows into Coyote Creek for a short while before flowing into the San Francisco Bay.

The study area includes all of Almaden Lake, small portions of Alamitos Creek, Guadalupe Creek, Guadalupe River, and Los Alamitos Percolation Pond, and two upland staging areas. The project site is located at and near Almaden Lake Park within the City of San Jose (**Figure 2**).

Almaden Lake Project . 130679

Figure 2
Study Area

2.2 Soils

The United States Department of Agriculture (USDA) Naturals Resource Conservation Service (NRCS) Web Soil Survey (USDA NRCS, 2016) was consulted to determine the soil types occurring within the delineation study area. A soils map is included in Appendix D. Several soil types occur within the study area, but most of the area is covered by urban land or water. All soil types are described below, all soil types that are within urban land are described under the urban land section.

Urban Land

Several Urban land complexes are mapped within the study area, all of which contain differing proportions of native, disturbed and human transported material.

- Urban land-Campell complex, 0 to 2 percent slopes, protected: 1.1%
- Urban land-Alumrock-Zepplin complex, 9 to 15 percent slopes: 2.0%
- Urban land-Elpaloalto complex, 0 to 2 percent slopes: 5.1 %
- Urban land-Clear Lake complex, 0.2 percent slopes: 4.0%
- Urban land-Landelspark complex, 0 to 2 percent slopes: 29.3%

Cumulic Haploxerolls

Cumulic Haploxerolls cover 5.8% of the project area and is a soil type within stream channels and terraces. The soil contains very gravelly sandy loam throughout the profile from 0 to 45 inches and is not considered a hydric soil. Cumulic Haploxerolls is comprised of moderately well-drained soil formed in alluvium from metamorphic and sedimentary rock or metavolcanic parent material.

Water

Water is a large portion of the project area (52.8%) because of Almaden Lake, Alamitos Creek, Guadalupe Creek, Guadalupe River, and Los Alamitos Percolation Pond.

2.3 Hydrology

Almaden Lake is supplied by Alamitos Creek, which is fed by releases from the Almaden and Calero Reservoirs upstream. Downstream, Almaden Lake discharges Alamitos Creek which quickly meets Guadalupe Creek at the confluence of Guadalupe River. Almaden Lake was created by gravel quarry operations in the 1950's and 1960's. The lake is approximately 40 acres in area, with a maximum depth of 43 feet. Flow and water level in the lake are governed by the water balance of input flows (related to releases from reservoirs) from Alamitos Creek versus discharge out of the lake which is controlled by a flashboard dam across Guadalupe River. The flashboards are usually installed in April and left in place until November or December and during this period, water elevation in the lake rises approximately 5 feet (Horizon, 2013).

Alamitos Creek and the Guadalupe River collect water from within the Guadalupe watershed. The Guadalupe watershed encompasses approximately 170 square miles. The Guadalupe River flows into Alviso Slough which is tidal and ultimately flows to the San Francisco Bay.

A review of aerial photographs (Google Earth, 2016) and a site visit to the study areas in December 2015 indicates that Alamitos Creek and Almaden Lake contains water throughout the year. Late summer and fall flows are driven by reservoir releases, irrigation, and other urban water uses while winter and spring flows are likely driven by stormwater runoff. Water was present in Alamitos Creek and Almaden Lake during the site visit on December 1, 2015. Water levels were clearly low within the Almaden Lake during the site visit due to drought conditions for the last few years. Based on these observations, the stream and lake within the project area is assumed to be a Relatively Permanent Water (RPW).

2.4 Vegetation

Freshwater marsh is the predominant vegetation type within the wetlands in the study area occurring on the fringes of Almaden Lake, Los Alamitos Creek, Guadalupe Creek, and Guadalupe River. It is dominated by herbaceous wetland plants including narrow leaf cattail (*Typha angustifolia*) and hardstem bulrush (*Schoenoplectus acutus*), and woody plants including mule fat (*Baccharis salicifolia*). Uplands also occur directly adjacent to Almaden Lake in some cases or just beyond the freshwater marsh edge. The uplands around Almaden Lake are dominated by non-native mowed grasses including dallis grass (*Paspalum dilatatum*), and contains non-native park trees such as Peruvian pepper tree (*Schinus molle*) and shrubs including coyote brush (*Baccharis pilularis*). Uplands adjacent to Guadalupe River are dominated by wild oat (*Avena fatua*) and other non-native grasses and herbs.

Along Alamitos Creek and Guadalupe Creek, mixed riparian forest occurs from the edge of the creek to the upper banks. The riparian area is dominated by tall trees and some shrubs and herbs including mature California sycamore trees (*Platanus racemosa*), Himalayan blackberry (*Rubus armeniacus*), smilo grass (*Stipa miliacea*), and other non-native and native shrubs, herbs, and grasses. Narrow bands of freshwater emergent wetland/willow scrub also occur along Alamitos Creek and include willow (*Salix* sp.), mugwort (*Artemisia douglasiana*), and fringed willowherb (*Epilobium ciliatum*).

CHAPTER 3
Methods

3.1 Definitions

Many of the terms used throughout this report have specific meanings with respect to the delineation of Waters of the U.S. These terms are defined below:

Waters of the United States: The Code of Federal Regulations (33 CFR § 328.3[a]; 40 CFR § 230.3[s]) defines 'waters of the United States' as:

> (1) All waters which are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide; (2) All interstate waters including interstate wetlands; (3) All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mud flats, sand flats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation, or destruction of which could affect interstate or foreign commerce including any such waters which are or could be used by interstate or foreign travelers for recreational or other purposes; or from which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or which are used or could be used for industrial purposes by industries in interstate commerce; (4) All impoundments of waters otherwise defined as waters of the United States under the definition; (5) Tributaries of waters identified in paragraphs (1) through (4); (6) Territorial seas; and (7) Wetlands adjacent to waters (other than waters that are themselves wetlands) identified in paragraphs (1) through (6).

Wetlands: The USACE and the U.S. Environmental Protection Agency (EPA) define wetlands as, "Those areas that are saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support a prevalence of vegetation typically adapted for the life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas." USACE wetlands must typically exhibit three parameters: 1) wetland hydrology, 2) hydrophytic vegetation, and 3) hydric soils in order to meet the federal definition.

> **Wetland Hydrology:** This term encompasses all hydrologic characteristics of areas that are periodically inundated or have soils saturated to the surface at some time during the growing season. These include both riverine and non-riverine hydrology indicators, such as sediment deposits, drift lines, and oxidized rhizospheres along living roots in the upper 12 inches of the soil. In the Arid West, hydrologic indicators may be absent in any given year due to annual variability in precipitation and in times of drought. The *Arid West Supplement* (USACE, 2008) cites a technical standard that can be used for disturbed or problematic sites that support wetland vegetation and soils but where wetland hydrology is not apparent. 'This standard calls for 14 or more consecutive days of flooding, ponding, or

a water table 12 inches or less below the soil surface during the growing season at a minimum frequency of 5 years in 10.

Hydrophytic Vegetation: Hydrophytic vegetation is defined as plant life that occurs in areas where the frequency and duration of inundation or soil saturation produce permanently or periodically saturated soils of sufficient duration to exert a controlling influence on the plant species present. Emphasis is placed on the assemblage of plant species that exert a controlling influence on the character of the plant community, rather than on a single indicator species, i.e., there must be a prevalence of hydrophytic vegetation present in order to satisfy this wetland parameter.

***Wetland Indicator Status*:** Refers to the probability that a plant will occur in a wetland or not. Indicator status categories are as follows:

- *Obligate (OBL)*: almost always occurs in wetlands
- *Facultative wetland (FACW)*: usually occurs in wetlands, sometimes may occur in uplands
- *Facultative (FAC)*: equally likely to occur in wetlands or uplands
- *Facultative upland (FACU)*: usually occurs in uplands but may occasionally occur in wetlands
- *Obligate upland (UPL)*: almost never occurs in wetlands
- *No indicator (NI)*: no indicator assigned due to lack of information

Hydric Soil: A soil that is saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions in the upper part is considered a hydric soil. Hydric soils are often characterized by redoximorphic features (such as redox concentrations, formerly known as mottles), which form by the reduction, translocation, and/or oxidation of iron and manganese oxides. Hydric soils may lack hydric indicators for a number of reasons. In such cases the same standard used to determine wetland hydrology when indicators are lacking can be used.

Ordinary High Water Mark: Ordinary high water mark (OHWM) is defined in 33 CFR § 328.3[e] as '…that line on the shore established by the fluctuations of water and indicated by physical characteristics, such as a clear, natural line impressed on the bank, shelving, changes in the character of the soil, destruction of terrestrial vegetation, the presence of litter or debris, or other appropriate means that consider the characteristics of the surrounding area'.

Other Waters: The term "other waters of the United States" includes water bodies, such as rivers and streams, that may not meet the full criteria for wetlands designation but that do exhibit evidence of an OHWM and are navigable or hydrologically connected to a navigable water body. Under the latest regulatory guidance, some types of other waters must have a significant nexus to a navigable water body to be considered jurisdictional by the USACE.

Traditionally Navigable Waters: Traditionally navigable waters (TNW) are all waters that are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide.

Relatively Permanent Waters: Relatively permanent waters (RPW) are non-navigable tributaries of traditional navigable waters that are relatively permanent, meaning they typically flow year-round or have continuous flow at least seasonally (e.g., typically three months).

Non-Relatively Permanent Waters: Non-relatively permanent waters (NRPW) include non-navigable tributaries with ephemeral or seasonal flows lasting less than three months.

Significant Nexus: This term refers to the hydrologic and ecologic connection between a TNW and its tributaries. Under recent guidance from the USACE and EPA certain wetlands and waters must have a significant nexus with a TNW in order to be considered jurisdictional.

Growing Season: The growing season is that part of the year when soil temperatures at 19.7 inches below the soil surface are higher than biologic zero (5°C/41° F). Growing season dates should be determined through onsite observations whenever possible. Since onsite data gathering is often not possible growing season dates can be approximated by using WETS tables from the nearest appropriate WETS station. The WETS table 70% probability average beginning and ending dates for 28° F temperatures can be used to represent the "normal" growing season for wetland determinations. According to the San Jose WETS Station data (see Appendix E) the normal growing season for the study area would be 365 days (USDA NRCS, 2015).

3.2 Regulatory Setting

Wetlands and other waters (e.g., rivers, streams, and natural ponds) are subsets of waters of the U.S. and receive protection under Section 404 of the Clean Water Act (CWA). The USACE has primary federal responsibility for administering regulations that concern waters of the U.S. and requires a permit if a project proposes discharges of dredged or fill material into waters of the U.S., including wetlands. The EPA has the ultimate authority under the CWA and can veto the USACE's issuance of a permit to fill jurisdictional waters of the U.S.

In recent years several Supreme Court cases have challenged the scope and extent of the USACE's jurisdiction over waters of the United States and have led to several reinterpretations of that authority. The most recent of these decisions are the case of *Solid Waste Agency of Northern Cook County v. the Army Corps of Engineers (SWANCC)* (January 9, 2001) and the consolidated *Rapanos v. United States* and *Carabell v. United States Army Corps of Engineers* cases (hereafter collectively referred to as the Rapanos case) (June, 2006). The SWANCC decision found that jurisdiction over non-navigable, isolated, intrastate waters could not be based solely on the use of such waters by migratory birds. The reasoning behind the SWANCC decision could be extended to suggest that waters need a demonstrable connection with a 'navigable water' to be protected under the CWA. The introduction of the term isolated has led to the consideration of the relative connectivity between waters and wetlands as a jurisdictionally relevant factor. The more recent Rapanos case further questioned the definition of "waters of the United States" and the scope of federal regulatory jurisdiction over such waters. This case resulted in a split decision which did not provide definitive answers but expanded on the concept that a 'significant nexus' with traditional navigable waters was needed for certain waters to be considered within the jurisdiction of the USACE.

On June 5, 2007 the EPA and the USACE released guidance on CWA jurisdiction in response to the Rapanos decisions, which can be used to support a finding of CWA coverage for a particular water body when either a) there is a significant nexus between the stream or wetland in question and navigable waters in the traditional sense; or b) a relatively permanent water body is hydrologically connected to traditional navigable waters and/or a wetland has a surface connection with that water. According to this guidance the USACE and the EPA will take jurisdiction over the following waters: 1) Traditional navigable waters; 2) Wetlands adjacent to traditional navigable waters, including adjacent wetlands that do not have a continuous surface connection to traditional navigable waters; 3) Non-navigable tributaries of traditional navigable waters that are relatively permanent where the tributaries typically flow year-round or have continuous flow at least seasonally (e.g., typically three months); 4) Wetlands adjacent to non-navigable tributaries, as defined above, that have a continuous surface connection to such tributaries (e.g. they are not separated by uplands, a berm, dike, or similar feature).

The EPA and the USACE will claim jurisdiction over the following waters, based on a fact-specific determination of significant nexus, as defined below, to a traditional navigable water: non-navigable tributaries that are not relatively permanent; wetlands adjacent to non-navigable tributaries that are not relatively permanent; and wetlands adjacent to but that do not directly abut a relatively permanent non-navigable tributary.

The EPA and the USACE generally do not assert jurisdiction over the following features: swales or erosional features (e.g., gullies, small washes characterized by low volume, infrequent, or short duration flow); ditches (including roadside ditches) excavated wholly in and draining only uplands and that do not carry a relatively permanent flow of water.

The EPA and the USACE have defined the significant nexus standard as follows:

> A significant nexus analysis assesses the flow characteristics and functions of the tributary itself and the functions performed by all wetlands adjacent to the tributary to determine if they significantly affect the chemical, physical and biological integrity of downstream traditional navigable waters.

Significant nexus analysis includes consideration of hydrologic and ecologic factors including: volume, duration, and frequency of flow; proximity to a traditional navigable water; size of the watershed; average annual rainfall; average annual winter snow pack; potential of tributaries to carry pollutants and flood waters to traditional navigable waters; provision of aquatic habitat that supports a traditional navigable water; potential of wetlands to trap and filter pollutants or store flood waters; and maintenance of water quality in traditional navigable waters.

3.3 Office Preparation

Literature Review

ESA reviewed the following information relevant to the delineation within the study area:

- Google Earth aerial photographs of the study area for the period 1993-2015 (Google Earth, 2016)
- USDA NRCS, Web Soil Survey online application (USDA NRCS, 2016)
- National Wetland Plant List (Lichvar, et al, 2016)
- National Wetlands Inventory (USFWS, 2015).

3.4 Field Survey Methods

Dates

ESA biologists S. Bishop and D. Rodriguez conducted a routine delineation of waters of the U.S. within the wetland delineation study area on December 1, 2015 and May 24, 2016. No precipitation events occurred for a week prior to the survey at the study area.

Field Delineation Methods

Data Collection

All wetland and drainage signatures on study area aerial photographs were investigated within the delineation study area. The delineation study area was walked such that visual coverage was 100%. All waters of the U.S. within the study area were delineated by comparing the aerial image to the existing site condition and GPS data collection. The delineation used the "Routine Determination Method" as described in the *1987 Corps of Engineers Wetland Delineation Manual* (Environmental Laboratory, 1987), hereafter called the "1987 Manual." The 1987 Manual was used in conjunction with the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0)* (USACE, 2008), hereafter called the "Arid West Supplement." For areas where the 1987 Manual and the Arid West Supplement differ, the Arid West Supplement was followed.

Data was collected at eight sample points from the study area. In accordance with the USACE guidance, sample points were taken at sites representative of the vegetation, hydrology, and physical characteristics across the wetland types. Four paired wetland/upland data points were established with the wetland points occurring within freshwater marsh or willow scrub along lake shore or instream wetlands within the OHWM. Arid West data sheets were used to record information at each data point.

Determination of Hydrophytic Vegetation

At each sample point herbaceous vegetation was analyzed within an approximately three-foot radius. All species noted within the study plots were recorded on the data sheets. The indicator status of each species was confirmed in the field, to the extent feasible, with the *National Wetland Plant List – 2016 Wetland Ratings* (Lichvar, et al, 2016) for the Arid West Region. Dominant species were assessed using the recommended "50/20" rule per the 1987 Manual. Dominance and/or prevalence calculations were generally performed in the field as well. When the vegetation passed either the dominance or prevalence test the point was considered to have hydrophytic vegetation.

Determination of Hydric Soils

Soils were analyzed in accordance with the USACE's *Arid West Manual* (2008). Soil pits were excavated to the depth needed to document the presence or absence of hydric indicators and soil color was matched against a standard color chart (Kollmorgen Instruments Corporation, 1990). Soils were also inspected for redoximorphic features and soil texture was determined. It was then possible to determine if the soils met any of the hydric soils criteria listed on the Arid West data sheets while using the field indicators of hydric soils guide (USDA NRCS, 2010). Where soils did not exhibit hydric soil criteria consideration was given as to whether the sample point in question had the potential to be saturated, ponded or have a water table within 12 inches of the surface for 14 or more consecutive days during the growing season. With the presence of wetland vegetation and hydrology, this technical standard can be used to characterize a soil as hydric (USACE, 2008).

Determination of Wetland Hydrology

Presence of wetland hydrology was determined at each data point by presence of one or more of the following primary and/or secondary indicators, per guidance of the Arid West Supplement; visual observation of inundation, observation of soil saturation within 12 inches of the surface, oxidized root channels, algal matting, sediment deposits, flow or drift accumulations at channel margins, channel flow marks in beds, scouring, surface cracking, water staining, and topography ("wetland drainage patterns"). Evidence of wetland hydrologic characteristics, including OHWM in the creeks and river and around the lake utilized primary visual observation, focusing on drainage patterns, drift lines, sediment deposits, and watermarks.

Mapping and Acreage Calculations

All features, including wetland sample points, approximate wetland boundaries, OHWM intervals, and stream channels were recorded using a Trimble Global Positioning System (GPS) unit.

In the office, GPS data were downloaded and aquatic features mapped using Geographic Information System (GIS) software (ArcGIS 10.1) on an overlay of geo-referenced aerial photography. GPS-determined wetland sample points and OHWM were visually confirmed. Total area of potential wetlands and other waters and linear length of the channel were obtained by ArcGIS.

CHAPTER 4
Results

4.1 Results

A total of 37.12 acres (1,617,022 square feet) of potentially jurisdictional waters of the U.S. occur within the delineation study area which includes Alamitos Creek, Almaden Lake, Guadalupe Creek, Guadalupe River, and Los Alamitos Percolation Pond. The total area includes: 0.46 acre (20,189 square feet) of freshwater marsh (lake shore), 0.23 acre (9,957 square feet) of willow scrub/freshwater marsh (instream wetlands), 2.11 acres (91,774 square feet) freshwater marsh (instream wetlands), and 34.32 acres (1,495,101 square feet) of other waters. A total of 2,062 linear feet of potentially jurisdictional waters of the U.S. occur within the creek and river segments in the delineation study area. **Table 4-1** below presents the delineated features within the delineation study area and summarizes estimated USACE jurisdictional areas for each feature type.

Wetland types within each study area are described in detail in section 4.1.2. Delineation maps and datasheets for the delineation, and other supporting information, such as a Jurisdictional Determination Analysis map, soils map, wetland datasheets, and representative photographs for the delineation study area are presented in Appendices A through F.

TABLE 4-1
POTENTIALLY JURISDICTIONAL WETLANDS AND OTHER WATERS OF THE U.S.

Feature type	Linear ft.	Area (ac)	Area (sq ft)
Alamitos Creek			
Wetlands			
Willow Scrub/Freshwater Marsh (Semipermanently flooded emergent)			
WS-1	NA	0.14	6,052
WS-2	NA	0.01	282
WS-3	NA	0.08	3,623
FWM-5	NA	0.04	1,913
Total Wetlands		***0.27***	***11,870***
Other Waters			
Riverine (Alamitos Creek)			
RIV-1 (Alamitos Creek)	490	0.41	17,679
RIV-2 (Alamitos Creek)	420	0.97	42,269
Total Other Waters	***910***	***1.38***	***59,948***
Almaden Lake			
Wetlands			
Freshwater Marsh (Semipermanently flooded emergent)			
FWM-1	NA	0.13	5,847
FWM-2	NA	0.01	486
FWM-3	NA	0.01	240
FWM-4	NA	0.31	13,616
Total Wetlands		***0.46***	***20,189***
Other Waters			
Lacustrine (Almaden Lake)			
LAC-1 (Almaden Lake)	NA	32.03	1,395,017
Total Other Waters		***32.03***	***1,395,017***
Guadalupe Creek			
Wetlands			
Freshwater Marsh (Semipermanently flooded emergent)			
FWM-6	NA	0.11	4,684
FWM-7	NA	0.20	8,652
Total Wetlands		***0.31***	***13,236***
Other Waters			
Riverine (Guadalupe Creek)			
RIV-3 (Guadalupe Creek)	67	0.09	3,910
RIV-4 (Guadalupe Creek)	180	0.17	7,708
Total Other Waters	***247***	***0.26***	***11,618***
Guadalupe River			
Wetlands			
Freshwater Marsh (Semipermanently flooded emergent)			
FWM-8	NA	1.71	74,472
FWM-9	NA	0.05	2,054
Total Wetlands		***1.76***	***76,526***
Other Waters			
Riverine (Guadalupe River)			
RIV-5 (Guadalupe River)	905	0.40	17,635
Total Other Waters	***905***	***0.40***	***17,635***
Los Alamitos Percolation Pond			
Other Waters			
Pond (Los Alamitos Percolation Pond)			
POND-1 (Los Alamitos Percolation Pond)	NA	0.25	10,884
Total Other Waters		***0.25***	***10,984***
Total Wetlands and Other Waters of the U.S.	***NA***	***37.12***	***1,617,022***

Potentially Jurisdictional Wetlands and Other Waters of the U.S.

Freshwater Marsh (Semipermanently Flooded Emergent Wetland)

Within the study area, freshwater marsh occurs around Almaden Lake, Alamitos Creek, Guadalupe Creek, and Guadalupe River. This community frequently occurs at the edge of the low water line up to the edge of the OHWM around the lake and creeks. Photo A in Appendix F presents the condition of freshwater marsh within the study area during the delineation in December 2015. Photo B in Appendix F presents the condition of freshwater marsh within the study area during the delineation in May 2016. Three soil samples were taken in freshwater marsh sample points at the edge of Almaden Lake, Guadalupe Creek, and Guadalupe River. Paired upland soil samples were also taken on the bank and are described in Section 4.1.2, Non-Jurisdictional Upland, below.

Vegetation

Plant biomass within the freshwater marshes was mostly from both the previous growing season and the current growing season and plant identification and cover estimates were based on both types of plant material. Freshwater marsh around the lake was dominated by wetland species that included cattail (*Typha angustifolia,* OBL), hardstem bulrush (OBL), mule fat (FAC), tall flatsedge (*Cyperus eragrostis*, FACW), hyssop loosestrife (*Lythrum hyssopifolia*, OBL), dotted smartweed (*Persicaria punctata*, OBL), and stinging nettle (*Urtica dioica*, FAC). Freshwater marsh around Alamitos Creek, Guadalupe Creek, and Guadalupe River were dominated by cattail (*Typha* sp. OBL), Himalayan blackberry (FAC), hardstem bulrush (OBL), mule fat (FAC), and fringed willow herb (FACW).

Hydrology

Water was present in the study area at the time of the delineation. In December 2015, due to drought conditions, in some locations the freshwater marsh was well above the current water line. However, in May, 2016 all freshwater marsh areas were inundated and the water levels appeared to be at the highest annual level, though within the normal operational range. Wetland hydrology indicators at the sample points included surface water (A1), high water table (A2), and inundation visible on aerial imagery (B7).

Soils

A high water table or surface water made taking soil samples difficult to assess because texture and saturation made it difficult to get a full profile sample. The soil sample at Almaden Lake was gravelly sand and was a problematic soil for identifying indicators, however the water table was so high and the area was within the OHWM, so the soils were assumed hydric. The soil samples at Guadalupe Creek and Guadalupe River both contained a high percentage of belowground biomass and both qualified as hydric soils as a histosol (A1) or 1 cm muck (A9).

Willow Scrub/Freshwater Marsh (Semipermanently Flooded Emergent Wetland)

Within the study area, willow scrub/freshwater marsh occur on sediment bars on both sides of the channel of Alamitos Creek upstream of Almaden Lake within the OHWM in areas that are saturated for at least 14 consecutive days during the growing season. Photo C in Appendix F shows conditions of willow scrub/freshwater marsh along Alamitos Creek within the study area during the delineation. Over time, these areas have been subject to deposition of sediment (sand) from flood deposition of upstream sediment. One soil sample was taken at willow scrub/freshwater marsh wetlands within the OHWM of the perennial creek. One paired upland soil sample was also taken outside of the OHWM and is described in Section 4.1.2, Non-Jurisdictional Upland, below.

Vegetation

The freshwater marsh/willow scrub vegetation consists mostly of herbaceous plants from the previous growing season. Plant identification and cover estimates were based on this plant material. Willow scrub areas were dominated by willow (*Salix* spp.; FACW), while freshwater wetland areas were dominated by fringed willowherb (FACW), and mugwort (*Artemisia douglasiana*, FAC), and in more open areas included narrow leaf cattail (*Typha angustifolia,* OBL) and hardstem bulrush (OBL).

Hydrology

Water was present in the study area at the time of the delineation and willow scrub/freshwater marsh was found adjacent to Alamitos Creek. Wetland hydrology indicators at this site included riverine drift deposits (B3) and drainage patterns (B10).

Soils

A soil sample was taken at the wetland sample point and the soil was sandy loam in texture. Sandy Redox (S5) was the hydric soil indicator at the sample point.

Other Waters of the U.S.

Alamitos Creek, Guadalupe Creek, and Guadalupe River are all perennial streams (riverine) within the delineation study area, Almaden Lake is a lake (lacustrine) within the delineation study area, and Los Alamitos Percolation Pond is a pond within the delineation study area. Areas within the OHWM consist of creek channels, a lake, a pond, and unvegetated areas below OHWM.

During the December 1, 2015 and May 23, 2016 delineation surveys, water was present within the Alamitos Creek, Almaden Lake, Guadalupe Creek, Guadalupe River, and Los Alamitos Percolation Pond.

Within the study area, upstream of Almaden Lake the OHWM of Alamitos Creek ranged from 45 feet to 70 feet in width, with an average of 56 feet. Downstream of Almaden Lake, only the west side of Alamitos Creek is included in the study area, so an OHWM width was not determined.

The Alamitos Creek reaches within this study area, both upstream and downstream of Almaden Lake, total 910 linear feet and 1.38 acres of other waters.

Guadalupe Creek within the study area covers 247 linear feet and 0.26 acre of other waters. Guadalupe River within the study area covers 905 linear feet and 0.40 acre of other waters. The OHWM within the upstream segment of Guadalupe Creek ranged from 37 feet to 66 feet in width with an average of 58 feet. The downstream segment of Guadalupe Creek and the segment of Guadalupe River do not span the entire width of the OHWM and therefore OHWM widths were not determined.

The OHWM for Almaden Lake and Los Alamitos Percolation Pond were both mapped based on visual observations of shelving, scouring, drainage patterns, drift lines, sediment deposits, and watermarks. The area of other waters associated with Almaden Lake is 32.03 acres. The area of other waters associated with Los Alamitos Percolation Pond is 0.25 acre.

Non-Jurisdictional Upland

Almaden Lake Park contains much of the project area that is above OHWM. Almaden Lake Park above OHWM generally contains bare ground or mowed grasses and herbs with some overstory trees and shrubs. Common upland vegetation around Almaden Lake includes fan palm (*Washingtonia* sp.), pepper tree, gum trees (*Eucalyptus* sp.), coyote brush, and stinkwort (*Dittrichia graveolens*).

Portions of Alamitos Creek banks are also above OHWM. The banks of Alamitos Creek upstream of Almaden Lake is generally populated by non-native herbaceous and grass understory and native riparian tree canopy. Vegetation within the uplands around Alamitos Creek included California sycamore (FAC), blue elderberry (*Sambucus nigra*, FAC), Himalayan blackberry (FAC), and smilo grass (FACU). The upland areas along Alamitos Creek downstream of Almaden Lake are dominated by non-native annual grassland.

Guadalupe Creek uplands are dominated by Himalayan blackberry and wall bedstraw (*Galium parisiense*, UPL) and a sparse tree canopy of riparian tree species. Guadalupe River uplands occur on a steep bank up to a walking trail and are dominated by wild oat (UPL), but also contain some willow trees (*Salix exigua* and *Salix laevigata*, FACW) at the wetland and upland border.

Uplands along the Los Alamitos Percolation Pond were dominated by an overstory of planted Freemont cottonwood trees (*Populus fremontii*, FAC) and an annual grassland understory dominated by wild oat, ripgut brome (*Bromus diandrus*, UPL), smilo grass, and black mustard (*Brassica nigra*, UPL).

Sample point 1B, 2B, 3B, and 4B all represent upland terraces or banks adjacent to Almaden Lake, Alamitos Creek, Guadalupe Creek, and Guadalupe River (see Appendix B for datasheets). The photo for sample point 1B, 2B, and 4B in Appendix F presents conditions at the upland terrace within the study area during the delineation. The terraces at the sample points are located above OHWM and are unlikely to get flooded, even during heavy storms due to the storage capacity of Almaden Lake. No wetland hydrology or soil indicators were present at any upland sample points.

4.2 Clean Water Act Analysis

A Jurisdictional Determination Analysis map, which summarizes the information presented here, can be found in Appendix C. This section provides a brief summary of the Clean Water Act Analysis (CWA Analysis). Information used to support the CWA Analysis presented herein includes the following: review of U.S. Geological Survey (USGS) topographic quadrangles and high resolution aerials covering the study area; and field studies conducted in December 2015 and May 2016. Proposed classification of waters as traditionally navigable waters (TNWs) and relatively permanent waters (RPWs) are based on results of the literature review and field surveys in connection with the delineation. There are a number of potential biological, chemical, and physical processes being performed by Alamitos Creek, Almaden Lake, Guadalupe Creek, Guadalupe River, and Los Alamitos Percolation Pond. These include transport of water and nutrients to downstream waters, processing of organic wastes, attenuation of downstream flooding through interception of surface runoff and water storage onsite, reduction of suspended sediment delivered to downstream waters, groundwater replenishment, and supporting biodiversity at the site and watershed levels through provision of wetland habitat. No specific studies regarding duration of flow, groundwater measurement, or ecological function and values of streams and wetlands covered in this delineation were conducted. The magnitude at which these functions are being performed is also, for the most part, unknown.

The project area contains Alamitos Creek, Almaden Lake, Guadalupe Creek, Guadalupe River, and Los Alamitos Percolation Pond. Based on the site surveys in December 2015 and May 2016 and review of aerial photos from 1993-2015 (Google Earth, 2016), the project site conveys water year round.

Alamitos Creek, a RPW, flows into Almaden Lake, a TNW, before flowing into another short segment of Alamitos Creek. Alamitos Creek then becomes the mainstem of the Guadalupe River, another RPW, at the confluence of Guadalupe Creek, a RPW, and Alamitos Creek. Guadalupe River is connected to Los Alamitos Percolation Pond through a managed culvert. The Guadalupe River then flows into Alviso Slough, a TNW. Alviso Slough then connects to the mouth of Coyote Creek, also a TNW, before ultimately flowing into the San Francisco Bay, a TNW (see Appendix C). The project site is considered a RPW with permanent flow and has a significant nexus with a TNW. Wetland and waters within the project area are therefore likely to be considered jurisdictional by the USACE.

The wetlands within the delineation study area lie within the OHWM of Alamitos Creek, Almaden Lake, Guadalupe Creek, Guadalupe River, and Los Alamitos Percolation Pond and are therefore considered adjacent wetland. The USACE takes jurisdiction over wetlands that are adjacent to a RPW or TNW if those wetlands have a continuous surface connection to the RPW or TNW. The wetlands within the study area are within the OHWM and have a continuous surface connection to a RPW or TNW. The USACE is therefore also likely to take jurisdiction over the adjacent wetlands.

CHAPTER 5
Report Preparation and References

5.1 Report Preparation

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APPENDIX A

Delineation Maps

SOURCE: imagery (ESRI), wetlands & waters (ESA, 2016)

Almaden Lake Project . 130679

Figure A-1
Potentially Jurisdictional Wetlands and Other Waters of the U.S.

APPENDIX B

Wetland Datasheets

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Almaden Lake City/County: San Jose Sampling Date: 12/1/2015

Applicant/Owner: Santa Clara Valley Water District State: CA Sampling Point: 1A

Investigator(s): D. Rodriguez, S. Bishop Section, Township, Range: S16 T8S R1E

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): none Slope (%): 2

Subregion (LRR): C - Mediterranean California Lat: 37°14'18.76"N Long: 121°52'16.48"W Datum: NAD 83

Soil Map Unit Name: Cumulic Haploxerolls, 1 to 5 percent slope NWI classification: Lake

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology X significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____
Hydric Soil Present?	Yes X	No ____
Wetland Hydrology Present?	Yes X	No ____

Is the Sampled Area within a Wetland? **Yes** X **No** ____

Remarks:

Sample point is near where Los Alamitos Creek flows into Lake Almaden. Water levels are lower than normal due to drought conditions. The hydrologic regime is managed. A flashboard dam downstream of the Lake is installed in the spring and removed prior to winter storms.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
= Total Cover			
Sapling/Shrub Stratum (Plot size: 3 ft x 3 ft)			
1. Rubus armeniacus	1	Yes	FAC
2.			
3.			
4.			
5.			
= Total Cover	1		
Herb Stratum (Plot size: 3 ft x 3 ft)			
1. Schoenoplectus acutus	95	Yes	OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
= Total Cover			
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
= Total Cover			

% Bare Ground in Herb Stratum ____ % Cover of Biotic Crust 4

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	2	(A)
Total Number of Dominant Species Across All Strata:	2	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	100	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	95	x 1 = 95
FACW species		x 2 =
FAC species	1	x 3 = 3
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	96 (A)	98 (B)

Prevalence Index = B/A = 1.02

Hydrophytic Vegetation Indicators:

- ___ Dominance Test is >50%
- X Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks:

Highly vegetated area with a lot of aboveground biomass - just within OHWM.

SOIL

Sampling Point: 1A

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-2	10 YR 3/2	100					sandy loam	
2-15	10 YR 3/2	85	7.5 YR 5/8	15	RM	M	sandy loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- X Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes X **No** ______

Remarks:

A lot of biomass present above and below ground from schoenoplectus acutus.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- X Drift Deposits (B3) (**Riverine**)
- X Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ______ No ______ Depth (inches): ______

Water Table Present? Yes ______ No ______ Depth (inches): ______

Saturation Present? (includes capillary fringe) Yes ______ No ______ Depth (inches): ______

Wetland Hydrology Present? Yes X **No** ______

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Almaden Lake City/County: San Jose Sampling Date: 12/1/2015

Applicant/Owner: Santa Clara Valley Water District State: CA Sampling Point: 1B

Investigator(s): D. Rodriguez, S. Bishop Section, Township, Range: S16 T8S R1E

Landform (hillslope, terrace, etc.): upland terrace Local relief (concave, convex, none): none Slope (%): 5

Subregion (LRR): C - Mediterranean California Lat: 37°14'18.71"N Long: 121°52'15.97"W Datum: NAD 83

Soil Map Unit Name: Cumulic Haploxerolls, 1 to 5 percent slope NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?		X
Hydric Soil Present?		X
Wetland Hydrology Present?		X

Is the Sampled Area within a Wetland? **Yes** ___ **No** X

Remarks:

Rip rap placed between wetland and upland. Upland in park with benches. Trees and shrubs in upland area may have been planted.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 3 ft x 3 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. Platanus occidentalis	20	Yes	FAC
2.			
3.			
4.			
	20 = Total Cover		
Sapling/Shrub Stratum (Plot size: 3 ft x 3 ft)			
1. Baccharis pilularis	15	Yes	UPL
2.			
3.			
4.			
5.			
	15 = Total Cover		
Herb Stratum (Plot size: ___)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	___ = Total Cover		
Woody Vine Stratum (Plot size: ___)			
1.			
2.			
	___ = Total Cover		

% Bare Ground in Herb Stratum 100 % Cover of Biotic Crust ___

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species	20	x 3 = 60
FACU species		x 4 =
UPL species	15	x 5 = 75
Column Totals:	35 (A)	135 (B)

Prevalence Index = B/A = 3.86

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks:

US Army Corps of Engineers

SOIL

Sampling Point: 1B

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-15	10 YR 3/4	100					sandy loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR C**)
___ 1 cm Muck (A9) (**LRR D**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR C**)
___ 2 cm Muck (A10) (**LRR B**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ________

Depth (inches): ________

Hydric Soil Present? Yes ____ **No** X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
___ Drift Deposits (B3) (**Nonriverine**)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Marks (B1) (**Riverine**)
___ Sediment Deposits (B2) (**Riverine**)
Drift Deposits (B3) (**Riverine**)
Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ____ No X Depth (inches): ____
Water Table Present? Yes ____ No X Depth (inches): ____
Saturation Present? (includes capillary fringe) Yes ____ No X Depth (inches): ____

Wetland Hydrology Present? Yes ____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Almaden Lake City/County: San Jose Sampling Date: 12/1/2015

Applicant/Owner: Santa Clara Valley Water District State: CA Sampling Point: 2A

Investigator(s): D. Rodriguez, S. Bishop Section, Township, Range: S16 T8S R1E

Landform (hillslope, terrace, etc.): slope at edge of lake Local relief (concave, convex, none): none Slope (%): 5

Subregion (LRR): C - Mediterranean California Lat: 37°14'33.66"N Long: 121°52'10.21"W Datum: NAD 83

Soil Map Unit Name: Water NWI classification: Lake

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology X significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation ___, Soil X, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ___
Hydric Soil Present?	Yes X	No ___
Wetland Hydrology Present?	Yes X	No ___

Is the Sampled Area within a Wetland? **Yes** X **No** ___

Remarks:

At edge of the Lake. Soils problematic, potentially significantly disturbed. Sandy gravelly soil. Hydrology significantly disturbed by flashboard dam that is installed seasonally downstream of the project area.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ___)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
= Total Cover			
Sapling/Shrub Stratum (Plot size: ___)			
1.			
2.			
3.			
4.			
5.			
= Total Cover	1		
Herb Stratum (Plot size: 1.5 ft x 6 ft)			
1. Persicaria punctata	15	Yes	OBL
2. Baccharis salicifolia	15	Yes	FAC
3. Typha angustifolia	5	No	OBL
4. Lythrum hyssopifolia	5	No	OBL
5. Cyperus eragrostis	3	No	FACW
6. Melilotus alba	3	No	UPL
7. Panicum sp. (capillare or hillmanii)	3	No	FACU
8. Rumex sp.	1	No	?
= Total Cover	50		
Woody Vine Stratum (Plot size: ___)			
1.			
2.			
= Total Cover			

% Bare Ground in Herb Stratum 50 % Cover of Biotic Crust ___

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = ___

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks:

About 1.5 feet from waters edge, plant area measured in a long skinny polygon to capture the narrow wetland strip between the lake and uplands. Dittrichia in area just upland of wetlands, area still within OHWM, but not a wetland plant.

SOIL

Sampling Point: 2A

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-3	7.5 YR 3/3	100					gravelly sand	
3-12	GLEY 1 2.5/5 GY	100					gravelly sand	water present in this layer, soils falling apart

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

__ Histosol (A1)
__ Histic Epipedon (A2)
__ Black Histic (A3)
__ Hydrogen Sulfide (A4)
__ Stratified Layers (A5) (**LRR C**)
__ 1 cm Muck (A9) (**LRR D**)
__ Depleted Below Dark Surface (A11)
__ Thick Dark Surface (A12)
__ Sandy Mucky Mineral (S1)
__ Sandy Gleyed Matrix (S4)
Sandy Redox (S5)
__ Stripped Matrix (S6)
__ Loamy Mucky Mineral (F1)
__ Loamy Gleyed Matrix (F2)
__ Depleted Matrix (F3)
__ Redox Dark Surface (F6)
__ Depleted Dark Surface (F7)
__ Redox Depressions (F8)
__ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

__ 1 cm Muck (A9) (**LRR C**)
__ 2 cm Muck (A10) (**LRR B**)
__ Reduced Vertic (F18)
__ Red Parent Material (TF2)
__ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes X **No** ___

Remarks:

Gravelly sandy soils that falls apart. Problematic soil. Assumed hydric because within OHWM, with high water table (during drought) and contains hydrophytic vegetation. Gravel potentially placed here to try and prevent bank erosion.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

__ Surface Water (A1)
X High Water Table (A2)
__ Saturation (A3)
__ Water Marks (B1) (**Nonriverine**)
__ Sediment Deposits (B2) (**Nonriverine**)
__ Drift Deposits (B3) (**Nonriverine**)
__ Surface Soil Cracks (B6)
X Inundation Visible on Aerial Imagery (B7)
__ Water-Stained Leaves (B9)
__ Salt Crust (B11)
__ Biotic Crust (B12)
__ Aquatic Invertebrates (B13)
__ Hydrogen Sulfide Odor (C1)
__ Oxidized Rhizospheres along Living Roots (C3)
__ Presence of Reduced Iron (C4)
__ Recent Iron Reduction in Tilled Soils (C6)
__ Thin Muck Surface (C7)
__ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

__ Water Marks (B1) (**Riverine**)
__ Sediment Deposits (B2) (**Riverine**)
Drift Deposits (B3) (**Riverine**)
Drainage Patterns (B10)
__ Dry-Season Water Table (C2)
__ Crayfish Burrows (C8)
__ Saturation Visible on Aerial Imagery (C9)
__ Shallow Aquitard (D3)
__ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes X	No ___	Depth (inches): 4 in
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? Yes X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Strong algae smell.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Almaden Lake City/County: San Jose Sampling Date: 12/1/2015

Applicant/Owner: Santa Clara Valley Water District State: CA Sampling Point: 2B

Investigator(s): D. Rodriguez, S. Bishop Section, Township, Range: S16 T8S R1E

Landform (hillslope, terrace, etc.): terrace, sloped towards the lake Local relief (concave, convex, none): convex Slope (%): 10

Subregion (LRR): C - Mediterranean California Lat: 37°14'33.60"N Long: 121°52'10.02"W Datum: NAD 83

Soil Map Unit Name: Urbanland-Clear Lake complex, 0 to 2 percent slopes NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?		X
Hydric Soil Present?		X
Wetland Hydrology Present?		X

Is the Sampled Area within a Wetland? Yes ____ No X

Remarks:

Area just above eroded bank, OHWM is at the eroded bank edge. Drought conditions.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
= Total Cover			
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
= Total Cover	1		
Herb Stratum (Plot size: 3 ft x 3 ft)			
1. Hordeum murinum	20	Yes	FACU
2. Dittrichia graveolens	15	Yes	FACU
3. Epilobium branchiumtharum	1	No	UPL
4.			
5.			
6.			
7.			
8.			
= Total Cover	36		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
= Total Cover			

% Bare Ground in Herb Stratum 64 % Cover of Biotic Crust ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- ___ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ____ No X

Remarks:

Little seedlings of Dittrichia graveolens and Hordeum murinum just coming in. Both identified from dead plants from last year.

US Army Corps of Engineers

SOIL

Sampling Point: 2B

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-15	10 YR 4/4	100					sandy loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR C**)
___ 1 cm Muck (A9) (**LRR D**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR C**)
___ 2 cm Muck (A10) (**LRR B**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present? **Yes** ______ **No** X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
___ Drift Deposits (B3) (**Nonriverine**)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Marks (B1) (**Riverine**)
___ Sediment Deposits (B2) (**Riverine**)
Drift Deposits (B3) (**Riverine**)
Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ______ No X Depth (inches): ______
Water Table Present? Yes ______ No X Depth (inches): ______
Saturation Present? (includes capillary fringe) Yes ______ No X Depth (inches): ______

Wetland Hydrology Present? **Yes** ______ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Almaden Lake City/County: San Jose Sampling Date: 5/24/2016

Applicant/Owner: Santa Clara Valley Water District State: CA Sampling Point: 3A

Investigator(s): S. Bishop Section, Township, Range: S9 T8S R1E

Landform (hillslope, terrace, etc.): creek floodplain Local relief (concave, convex, none): none Slope (%): 2

Subregion (LRR): C - Mediterranean California Lat: 37°14'38.53"N Long: 121°52'25.15"W Datum: NAD 83

Soil Map Unit Name: Urbanland-Landelspark complex, 0 to 2 percent slopes NWI classification: riverine

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology X significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____
Hydric Soil Present?	Yes X	No ____
Wetland Hydrology Present?	Yes X	No ____

Is the Sampled Area within a Wetland? **Yes** X **No** ____

Remarks:

hydrology managed by flashboard dam downstream - water levels currently at high level, flashboard installed in the spring

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
= Total Cover			
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
= Total Cover			
Herb Stratum (Plot size: 3 ft x 3 ft)			
1. Typha spp.	100	YES	OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
= Total Cover	100		
Woody Vine Stratum (Plot size: 3 ft x 3 ft)			
1. Rubus armeniacus	50	YES	FAC
2.			
= Total Cover	50		

% Bare Ground in Herb Stratum ____ % Cover of Biotic Crust ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%

__ Prevalence Index is ≤3.0[1]

__ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

__ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks:

Typha cover was from dead material only. Rubus cover was from alive plant material. Plants seen nearby but not within the plot: Baccharis salicifolia, Atriplex prostrata, Schoenoplectus acutus, Rumex crispis, and Epilobium ciliatum However throughout this section of Guadalupe Creek Himalayan blackberry is the dominant plant.

SOIL

Sampling Point: 3A

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-2	10 YR 3/1						clay loam	decomposed plant material, greasy feel
2-12	10 YR 3/2						clay loam	soil falling apart - very wet

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- X 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present? **Yes** X **No** ______

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- X Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes X No ______ Depth (inches): 5 inches

Water Table Present? Yes ______ No X Depth (inches): ______

Saturation Present? (includes capillary fringe) Yes ______ No X Depth (inches): ______

Wetland Hydrology Present? **Yes** X **No** ______

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Water levels are high from flashboard dams being in place downstream.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Almaden Lake City/County: San Jose Sampling Date: 5/24/2016

Applicant/Owner: Santa Clara Valley Water District State: CA Sampling Point: 3B

Investigator(s): S. Bishop Section, Township, Range: S9 T8S R1E

Landform (hillslope, terrace, etc.): slope Local relief (concave, convex, none): none Slope (%): 5

Subregion (LRR): C - Mediterranean California Lat: 37°14'38.73"N Long: 121°52'25.18"W Datum: NAD 83

Soil Map Unit Name: Urbanland-Landelspark complex, 0 to 2 percent slopes NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil X, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation ___, Soil ___, or Hydrology X naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?	X	
Hydric Soil Present?		X
Wetland Hydrology Present?		X
Is the Sampled Area within a Wetland?		X

Remarks:

Rip rap placed here, so couldn't take a soil sample. The flashboard dam downstream was installed during the time of the survey and water levels appeared to be approximately at there highest annual level.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: ___)			
1.			
2.			
3.			
4.			
= Total Cover			
Sapling/Shrub Stratum (Plot size: ___)			
1.			
2.			
3.			
4.			
5.			
= Total Cover			
Herb Stratum (Plot size: ___)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
= Total Cover			
Woody Vine Stratum (Plot size: 3 ft x 3 ft)			
1. Rubus armeniacus	100	YES	FAC
2.			
= Total Cover			

% Bare Ground in Herb Stratum 0 % Cover of Biotic Crust ___

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = ___

Hydrophytic Vegetation Indicators:

- ___ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ___

Remarks:

SOIL

Sampling Point: 3B

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ______ **No** X

Remarks:

Rip rap at this location so couldn't take a soil sample.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ______ No X Depth (inches): ______

Water Table Present? Yes ______ No X Depth (inches): ______

Saturation Present? (includes capillary fringe) Yes ______ No X Depth (inches): ______

Wetland Hydrology Present? Yes ______ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

On slope up to levee. Above the OHWM.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Almaden Lake City/County: San Jose Sampling Date: 5/24/2016

Applicant/Owner: Santa Clara Valley Water District State: CA Sampling Point: 4A

Investigator(s): S. Bishop Section, Township, Range: S9 T8S R1E

Landform (hillslope, terrace, etc.): edge of floodplain, toe of slope Local relief (concave, convex, none): concave Slope (%): 2

Subregion (LRR): C - Mediterranean California Lat: 37°14'43.41"N Long: 121°52'19.92"W Datum: NAD 83

Soil Map Unit Name: Urbanland-Landelspark complex, 0 to 2 percent slopes NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology X significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?	X	
Hydric Soil Present?	X	
Wetland Hydrology Present?	X	

Is the Sampled Area within a Wetland? **Yes** X **No** ____

Remarks:

hydrology managed, flashboard dam currently installed, water levels high

VEGETATION – Use scientific names of plants.

Stratum / Species	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
= Total Cover			
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
= Total Cover			
Herb Stratum (Plot size: 6 ft x 1.5 ft)			
1. Typha sp.	100	Y	OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
= Total Cover	100		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
= Total Cover			

% Bare Ground in Herb Stratum ____ % Cover of Biotic Crust ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- ___ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks:

Typha mostly dead material from the previous growing season, some new Typha just starting to come in, but doesn't yet contain any features to identify to species.

SOIL

Sampling Point: 4A

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-8	10 YR 3/2	100					sandy loam	mostly underground biomass
8-12	10 YR 3.2	10					rock/sandy loam	the rest of the matrix was made up of rock

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

X Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR C**)
___ 1 cm Muck (A9) (**LRR D**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR C**)
___ 2 cm Muck (A10) (**LRR B**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ____________

Depth (inches): ____________

Hydric Soil Present? **Yes** X **No** ______

Remarks:

top 8 inches of soil mostly underground biomass, roots and rhizomes

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

X Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
___ Drift Deposits (B3) (**Nonriverine**)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Marks (B1) (**Riverine**)
___ Sediment Deposits (B2) (**Riverine**)
___ Drift Deposits (B3) (**Riverine**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)

Field Observations:

	Yes	No	Depth (inches)
Surface Water Present?	X		4 inches
Water Table Present?		X	
Saturation Present? (includes capillary fringe)		X	

Wetland Hydrology Present? **Yes** X **No** ______

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

A lot of dead aboveground biomass, once removed then noticed the standing water, steep slope of levee just above the sample point.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Almaden Lake City/County: San Jose Sampling Date: 5/24/2016

Applicant/Owner: Santa Clara Valley Water District State: CA Sampling Point: 4B

Investigator(s): S. Bishop Section, Township, Range: S9 T8S R1E

Landform (hillslope, terrace, etc.): slope Local relief (concave, convex, none): none Slope (%): 10

Subregion (LRR): C - Mediterranean California Lat: 37°14'43.48"N Long: 121°52'20.01"W Datum: NAD 83

Soil Map Unit Name: Urbanland-Landelspark complex, 0 to 2 percent slopes NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?		X
Hydric Soil Present?		X
Wetland Hydrology Present?		X
Is the Sampled Area within a Wetland?		X

Remarks:

on levee slope, near the toe of the levee slope

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ___)

	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
= Total Cover			

Sapling/Shrub Stratum (Plot size: ___)

	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
= Total Cover			

Herb Stratum (Plot size: 1.5 ft x 6 ft)

	Absolute % Cover	Dominant Species?	Indicator Status
1. Avena fatua	50	Y	UPL
2. Cynodon dactylon	5	N	FACU
3. Brassica nigra	2	N	UPL
4. Lactuca serriola	1	N	FACU
5. Stipa miliaceae	1	N	FACU
6.			
7.			
8.			
= Total Cover	59		

Woody Vine Stratum (Plot size: ___)

	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
= Total Cover			

% Bare Ground in Herb Stratum 11 % Cover of Biotic Crust 30 (thatch)

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = ___

Hydrophytic Vegetation Indicators:

- ___ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks:

SOIL

Sampling Point: 4B

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-12	10 YR 3/2	100					sandy loam	lost of small rocks in the soil

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: Rock

Depth (inches): 12 inches

Hydric Soil Present? Yes ______ No X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ______ No X Depth (inches): ____________

Water Table Present? Yes ______ No X Depth (inches): ____________

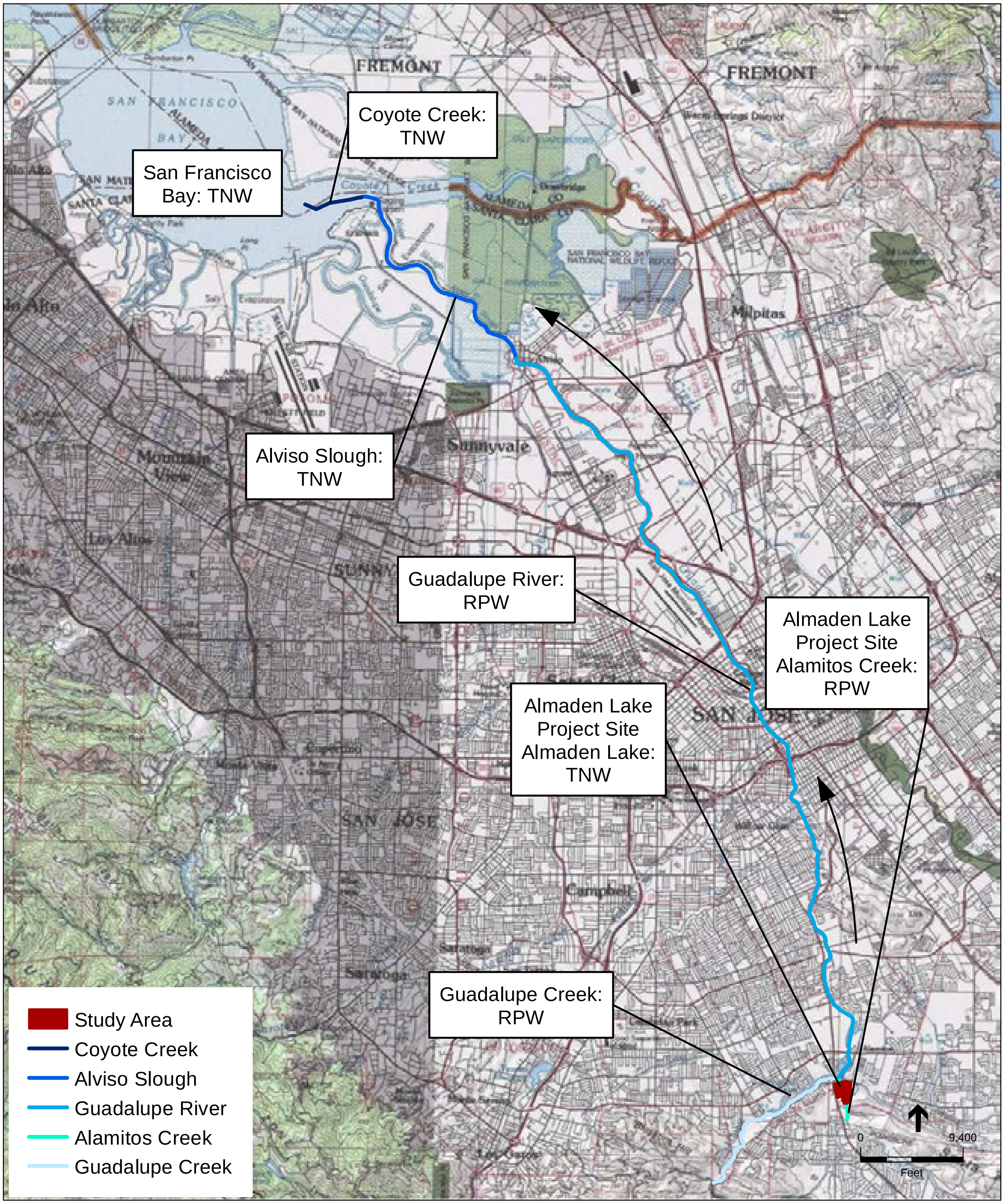
Saturation Present? (includes capillary fringe) Yes ______ No X Depth (inches): ____________

Wetland Hydrology Present? Yes ______ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

APPENDIX C
Jurisdictional Determination Analysis Map



SOURCE: imagery (ESRI)

Almaden Lake Project . 130679

Figure C-1
Jurisdictional Determination Analysis Map

APPENDIX D
Soils Map

Soil Map


121° 52' 37" W
121° 51' 59" W
37° 14' 50" N
37° 14' 10" N
599600
599700
599800
599900
600000
600100
600200
600300
600400
600500
4122900
4122800
4122700
4122600
4122500
4122400
4122300
4122200
4122100
4122000
4121900
4121800
4121700
W
170
131
130
378
160
165
190
Guadalupe Creek
Coleman
Almaden
Winfield Blvd
Porto Alegre Dr
Map Scale: 1:5,970 if printed on A portrait (8.5" x 11") sheet.
Meters
0 50 100 200 300
N
Feet
0 250 500 1000 1500
Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features

- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Santa Clara Area, California, Western Part
Survey Area Data: Version 4, Sep 3, 2015

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jun 6, 2015—Jun 7, 2015

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Santa Clara Area, California, Western Part (CA641)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
130	Urban land-Still complex, 0 to 2 percent slopes	0.0	0.0%
131	Urban land-Elpaloalto complex, 0 to 2 percent slopes	3.4	5.1%
160	Urbanland-Clear Lake complex, 0 to 2 percent slopes	2.6	4.0%
165	Urbanland-Campbell complex, 0 to 2 percent slopes, protected	0.7	1.1%
170	Urbanland-Landelspark complex, 0 to 2 percent slopes	19.4	29.3%
190	Cumulic Haploxerolls, 1 to 5 percent slopes	3.8	5.8%
378	Urbanland-Alumrock-Zeppelin complex, 9 to 15 percent slopes	1.3	2.0%
W	Water	34.9	52.8%
Totals for Area of Interest		**66.1**	**100.0%**

APPENDIX E

WETS Tables for San Jose, Santa Clara County

USDA Field Office Climate Data

WETS Station : SAN JOSE, CA293 Creation Date: 01/14/2016
Latitude: 3722 Longitude: 12155 Elevation: 00051
State FIPS/County(FIPS): 06085 County Name: Santa Clara
Start yr. - 1971 End yr. - 2000

Month	Temperature (Degrees F.) avg daily max	avg daily min	avg	Precipitation (Inches) avg	30% chance will have less than	30% chance will have more than	avg # of days w/.1 or more	avg total snow fall
January	59.3	41.7	50.5	3.03	1.29	3.69	7	0.0
February	63.4	44.6	54.0	2.84	1.19	3.46	6	0.0
March	67.0	46.4	56.7	2.69	1.13	3.27	6	0.0
April	72.1	48.3	60.2	1.02	0.39	1.23	3	0.0
May	76.7	51.8	64.3	0.44	0.00	0.46	1	0.0
June	81.8	55.4	68.6	0.10	0.00	0.08	0	0.0
July	84.3	57.5	70.9	0.06	0.00	0.00	0	0.0
August	84.0	57.7	70.9	0.07	0.00	0.00	0	0.0
September	82.2	56.7	69.5	0.23	0.00	0.22	1	0.0
October	75.9	52.3	64.1	0.87	0.33	1.09	2	0.0
November	65.3	45.6	55.5	1.73	0.54	2.06	4	0.0
December	58.9	41.0	50.0	2.00	0.95	2.45	5	0.0
Annual	-----	-----	-----	------	11.56	17.49	--	----
Average	72.6	49.9	61.3	------	------	------	--	----
Average	-----	-----	-----	15.08	------	------	35	0.0

GROWING SEASON DATES

Probability	Temperature: 24 F or higher	28 F or higher	32 F or higher
	Beginning and Ending Dates Growing Season Length		
50 percent *			1/11 to 12/29 351 days
70 percent *			> 365 days > 365 days

APPENDIX F
Representative Photographs

Almaden Lake Project . 130679

Photo A

Freshwater Marsh at the edge of Almaden Lake

Almaden Lake Project . 130679

Photo B

Freshwater marsh along Guadalupe River, Sample Point 4A

Almaden Lake Project . 130679

Photo C

Alamitos Creek looking downstream toward Almaden Lake showing willow scrub/freshwater marsh adjacent to the channel

Almaden Lake Project . 130679

Sample Point 1B

Uplands, containing coyote brush at sample point 1B

Almaden Lake Project . 130679

Sample Point 2B

Upland sample point showing maintained park area above OHWM

Almaden Lake Project . 130679

Sample Point 4B

Upland sample point showing non-native annual grassland above OHWM

Appendix D
Geotechnical Report

ESA

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Cal Engineering & Geology

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30 April 2015

Karl Neuman, P.E., G.E.
Associate Civil Engineer
Dams & Pipelines Project Delivery Unit
Water Utility Enterprise
Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, California 95118

Subject: FINAL - Geotechnical Investigation Report for Design of Almaden Lake Project, San Jose, California

Dear Mr. Neuman:

Cal Engineering & Geology, Inc. (CE&G) is pleased to submit this geotechnical investigation report for design of the Santa Clara Valley Water District's (District) planned improvements to Almaden Lake in San Jose, California. Our scope of work was developed from our understanding of the project based on our correspondence with you, information available on the District website, and our understanding that Alternatives 6 and 7 have been identified by the District as the preferred alternatives for the project.

The investigation, geotechnical evaluation, and this report were completed by Mr. Dan Peluso (GE 2367), Mr. Elijah Zane (GE 3035), and Mr. Dave Burger (CEG 2553), and reviewed by Mr. Phillip Gregory (GE 2193) of CE&G.

CE&G greatly appreciates the opportunity to submit this geotechnical investigation report for design of the planned improvements to Almaden Lake.

If there are any questions concerning the information provided herein, please do not hesitate to contact us.

Sincerely,

CAL ENGINEERING & GEOLOGY

Dan Peluso, P.E., G.E.
Associate Engineer

REGISTERED PROFESSIONAL ENGINEER
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STATE OF CALIFORNIA

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Appendix A Boring Logs
Appendix B Laboratory Test Results
Appendix C Liquefaction Evaluation
Appendix D Seepage Evaluation
Appendix E Slope Stability Calculations
Appendix F Settlement Calculations
Appendix G Rock Slope Protection Analysis

1. Introduction

Cal Engineering & Geology, Inc. (CE&G) has provided geotechnical engineering services for the Santa Clara Valley Water District's (District) Almaden Lake Improvement Project located in San Jose, California. The work has been completed to develop geotechnical data and recommendations for the District to design improvements to separate Alamitos Creek from the existing lake. The planned improvements will include construction of a new earth levee bisecting the existing lake with a maintenance road across the levee. The levee will separate the lake from Alamitos Creek which will be conveyed in a new terraced channel.

The geotechnical investigation included completion of a subsurface exploration program designed to collect subsurface data at selected locations and laboratory testing of selected soil samples retrieved from the borings to provide information regarding the existing soil conditions to support the project design. Engineering analysis included evaluation of slope stability, seepage, settlement, and liquefaction susceptibility of the proposed improvements.

1.1 Project Goals and Objectives

The Almaden Lake Improvement Project (Project) is being undertaken to address a number of issues affecting the mercury related water quality in the lake as well as secondary environmental effects caused by the current configuration of the lake. As described in the District's project website, the objectives of the project include:

- Reduce methylmercury concentrations in the lake and production of methylmercury to meet water quality objectives set by the San Francisco Regional Water Quality Control Board;
- Reduce mercury in fish;
- Reduce thermal barrier to cold-water fish migration;
- Remove entrainment - incidental trapping of fish - and impacts from predatory species to cold-water fish and minimize impacts to recreational features.

1.2 Scope of Work

The scope of work completed for the design level geotechnical investigation and report included:

1. Management of the geotechnical investigation portion of the project; meetings with the District and other design team consultants (as needed) during design development; and geotechnical review of preliminary design documents.

2. Completion of an office study to identify and evaluate relevant geologic and geotechnical information available for the site, published geologic maps, and previously prepared reports regarding the site.
3. A subsurface exploration and laboratory testing program to develop information needed in geotechnical analyses and preparation of the geotechnical report and for the design and construction of the project.
4. Completion of engineering analyses to develop geotechnical parameters for design of the new levee and other appurtenant improvements.
5. Preparation of a draft and final geotechnical investigation report.

The scope of work did not include identification or evaluation of possible borrow sources for levee fill or general fill materials. However, this report identifies the required geotechnical properties of import materials for the levee fill and general fill.

The scope of work did not include evaluation of or characterization of soil or water contaminates at the site.

2. Site and Project Descriptions

2.1 Site Description

Almaden Lake Park is located in the City of San Jose at the southeast corner of Almaden Expressway and Coleman Road. The park was opened in 1982, encompasses approximately 65 acres, and is owned and operated by the City of San Jose (City) (Almaden Lake Park, City of San Jose Parks & Recreation Department website). The park is bounded on the north by Coleman Road, on the west by Almaden Expressway, on the east by Winfield Boulevard, and on the south by a pedestrian bridge over Alamitos Creek, Los Alamitos Creek Trail and commercial properties. Alamitos Creek flows through the south end of the park, into Almaden Lake, exits the lake at the north end, continues northward, and joins with Guadalupe Creek on the north side of Coleman Road. The location of Almaden Lake Park is shown on Figure 1, Site Location Map.

The on-land portion of the park property lies at elevations between approximately 190 and 210 feet above sea level (NAVD88). The high water elevation of the lake is approximately at elevation 190 feet.

The ground surface elevation within the lake is highly variable, with the lowest elevation of the lake at approximately 150 feet in the west lake area. There is a small island in the west-central portion of the lake.

2.1.1 Site History

Almaden Lake lies wholly within Almaden Lake Park and was opened for public use as a park in 1982. The 32-acre man-made body of water was once a privately owned gravel quarry and was created as a result of the quarry operation, which began in the late 1940s. Excavation for the quarry started adjacent to Alamitos Creek and moved outward, transforming a meadow where dairy cows once grazed into a lake. The lake has offered a range of activities over the years, including fishing, swimming, pedal boating and athletic events. (Almaden Lake Park, City of San Jose Parks & Recreation Department Website)

Over the years, elementary mercury from mines upstream has settled at the bottom of Almaden Lake and is converting to methylmercury, resulting in the designation of the lake as an impaired water body. To address the methylmercury problem, the San Francisco Regional Water Quality Control Board derived site-specific mercury water quality objectives for mercury in fish tissue and a total maximum daily load (TMDL) of mercury in water for Almaden Lake (District project website, http://www.valleywater.org/Mercury/AlmadenLake.aspx).

Another issue that has impaired the lake is waste from Canadian Geese and seagulls in and around the lake which has made the water unsafe for recreational swimming. In addition, the lake has been serving as a heat barrier to cold-water fish migrating upstream to spawn.

Cleanup efforts have included installation and operation of solar powered water-circulation machines, which have aided in decreasing the production of methylmercury in the lake, but not to the extent needed to meet the site-specific mercury water quality objectives (District project website, http://www.valleywater.org/Mercury/AlmadenLake.aspx).

2.1.2 Existing Improvements

Almaden Lake is centrally located within Almaden Lake Park. The City has made significant improvements to the park, which include a parking lot on the northwest side (accessed off of Almaden Expressway) with adjacent paved trails, playgrounds, bathroom facilities, picnic areas, a beach area (on the west lake shore) and other landscaping. Another parking lot (accessed off of Winfield Boulevard) is located on the southeast side of the park. Similar improvements located on the east side of the lake include trails, playgrounds, picnic areas, and landscaping, as well as additional bathroom facilities. A pedestrian bridge at the southern end of the park provides access across Alamitos Creek.

The paved trails around the lake link with the Los Alamitos Creek Trail that extends southward along the east side of Alamitos Creek. The trails extend northward along the lake, pass under the Coleman Avenue bridge over Alamito Creek, and join with the Guadalupe River Trail along the east side of Guadalupe Creek.

2.1.3 Lake Operations

The day-to-day operation of Lake Almaden Park is conducted by the City of San Jose Department of Parks, Recreation & Neighborhood Services.

2.2 Project Description

The District's Almaden Lake Improvement Project (Project) is intended to substantially reduce the amount of methylmercury produced in the lake and improve conditions for anadromous fish. The Project will include the following elements:

- Isolation of Alamitos Creek in a channel with a minimum width of approximately 210 feet, separated from the remaining lake to the east by a new embankment or levee.
- Re-contouring of the bottom of the lake to a more level surface and capping the existing mercury laden sediment with a 10-foot thick layer of clean low permeability clay fill.

- Expansion of the open park area to the west by filling in up to 1-acre of the westerly swimming hole.
- Piping to connect the lake to Alamitos Percolation Pond to develop a flow through system. Headwalls will be constructed where the pipes pass through the levee.
- Provide for a maintenance road and trail on the top of the new levee.
- Expansion of the existing island up to 0.75 acre and stabilization of the island shoreline.
- Establishment of a second island, up to 0.75 acre in area.
- Installation of riparian vegetation along the banks of the new channel and islands.

2.3 Preferred Alternatives 6 and 7

The general concepts of both Alternative 6 and Alternative 7 call for a restored creek section that is flanked by a lake to the east and park space to the west. The alternatives are nearly identical with the exception of the area on the west shore near the existing boating facility. District staff have indicated that Alternative 7 is currently the favored concept. The proposed improvements are shown on Figure 2, Alternative 6 Site Plan and Figure 3, Alternative 7 Site Plan.

Both alternatives require the existing boating facility to be relocated. Alternative 6 does not impact any other park facilities or land area. Alternative 7, however, calls for removing a portion of the existing lake shoreline where the boating facility is currently located. This will allow the restored creek section to be realigned more westerly and allow for more lake area to remain. Alternative 7 will also impact one picnic site and part of an existing pathway with both of these park facilities to be relocated in the same general area along the new western creek embankment. For both alternatives, the high water lake level will be maintained at its current level of 190 feet.

For both alternatives, approximately 1,600-feet of the creek will be restored. To divert creek water into the lake, a diversion structure will be constructed in the new levee near Coleman Road. The diversion structure will only allow water to flow one way into the lake and be screened so fish cannot pass between the creek and the lake. The upper 800-feet of the restored creek section will reflect a typical low-flowing creek channel similar to the existing creek area located at the upstream end of the park. We understand the lake is regularly maintained in a "full" condition primarily due its recreational use. However, we presume there may be a need to drain the lake periodically for maintenance purposes.

A new levee will separate the restored creek from the lake to the east. The levee will be a minimum of 40-feet wide at the top and on the top of the levee there will be a dual use maintenance road and pedestrian pathway. The pedestrian pathway will tie into the existing park pathways near Coleman Road and connect to the pathway at the south end of the park north of the existing pedestrian bridge. The side slopes of the levee are currently planned to have a 2H:1V gradient. Portions of the crest and sides of the new levee will be planted with small trees and low shrubbery appropriate to a riparian habitat, although a planting plan has not yet been developed. Limiting the types of vegetation on the levee will ensure that the integrity of the levee is not compromised by large tree roots and that the realigned creek channel can convey the design flows.

The two islands planned within the reconfigured Almaden Lake are shown to vary between approximately 120 feet and 240 feet in plan dimension and to have 1H:1V gradient side slopes.

The restored creek will vary in width between approximately 210-feet to over 400-feet wide from top of bank to top of bank and will be designed to convey a 100-year flood event. The 100-year water surface elevation will be a minimum of 2-feet below the top of the new levee. However, the entire perimeter of the existing Almaden Lake boundary will remain mapped in the existing FEMA flood maps. Flow velocities along the banks of the creek in the project area during the 100-year flood event have been determined by the District to be 8 feet per second (fps) (email of 11-26-2014 and telephone conversation of 12-4-2014 with James Ujah, District Project Manager).

Creation of the restored creek and levee will require the placement of between about 551,000 and 577,000 cubic yards of fill, depending on whether Alternative 6 or Alternative 7 is implemented. A source of levee fill import material has not been identified. However, District staff have indicated that Stevens Creek Quarry is a common source they use for levee fill material.

Representative cross sections depicting the proposed grade changes for Alternative 6 and 7 and shown on Figure 4, Alternative 6 Sections, and Figure 5, Alternative 7 Sections.

3. Geologic and Seismic Setting

3.1 Physical Setting

The Almaden Lake Improvement Project site lies within the Coast Ranges geomorphic province of California. This province is characterized by northwest-southeast trending mountain ranges and intervening valleys. The site is located on the northeastern margin of the Almaden Valley, a northwest-southeast trending valley immediately downstream and northwest of Calero Reservoir; topographic ridges bordering the valley also trend northwest-southeast. Alamitos Creek flows northwest through the site. The site is located at an elevation of about 195 feet above sea level. Land use in the vicinity is moderate-density residential.

3.2 Site Geology

The generalized geology of the San Jose area has been mapped by a number of geologists. Almaden Lake is located on the eastern margin of a relatively flat alluvial valley. Mclaughlin, et. al. (2001b) show the project site is primarily underlain by Quaternary age Holocene gravel pit deposit and bounded along the western margin by Holocene age alluvial fan deposits (Figure 6). The hillside to the east of the project site are mapped as Upper Cretaceous age franciscan mélange of the Central belt with Eocene age sandstone and mudstone mapped to the south and west of the project site. Knudsen, et. al. (2000) show the site to be underlain by latest Pleistocene to Holocene alluvial fan levee deposits and Holocene alluvium. Locally, the ridge on the northeastern side of the valley is composed of sandstone and mudstone. Dibblee (2005) shows the site primarily underlain by Quaternary age surficial sediments consisting of sand and gravel of major stream channels and bounded by Quaternary age alluvium consisting of gravel sand and clay of valleys. This mapping is consistent with the materials encountered in our exploratory borings.

It should be noted that the site has been mapped within an area where there has been a historical occurrence of liquefaction or where there is a potential for permanent ground displacements such that mitigation would be required (CGS, 2001) (Figure 7)

3.3 Surficial Soils

The surficial soil in the vicinity of the project location has been mapped by the USDA National Resource Conservation Service (Figure 8). Several soil types have been identified in the vicinity of the site. The mapped surficial soils primarily belong to the Urbanland-Landelspark complex for 0 to 2 percent slopes. The Urbanland-Landelspark complex encompasses the Almaden Lake shoreline along the northern, eastern, and western boundaries of the lake. These soils are well-drained, runoff is low, and are found in alluvial fans. The soils of the Urbanland-Landelspark complex classify as non-plastic to medium plasticity gravelly loam (GP), sandy loam (SC), and sandy clay loam (CL) which have a low shrink-swell potential.

Soils belonging to the Cumulic Haploxerolls for 1 to 5 percent slopes are located at the southern end of the project site where Alamitos Creek enters Almaden Lake. The Cumulic Haploxerolls soils are well-drained, exhibit very low runoff , and are found in streams. The soils of Cumulic Haploxerolls classify as low plasticity gravelly sandy loam (GP) which have a low shrink-swell potential.

Soils belonging to Urbanland-Clear Lake Complex for 0 to 2 percent slopes are located in the vicinity of the northeast and southeastern portions of the project site. These soils are poorly drained, exhibit lowrunoff, and are found in basin floors. The soils of the Urbanland-Clear Lake Complex classify as medium to high plasticity clays (CL-CH) which have a moderate to high shrink-swell potential.

Soils belonging to the Urban land-Elpaloalto complex for 0 to 2 percent slopes are located in the northwestern corner of the project area. These soils are well-drained, exhibit low runoff, and are found in alluvial fans. The soils of the Urban land-Elpaloalto complex classify as medium to high plasticity clays (CL-CH) which have a moderate shrink-swell potential.

Soils belonging to the Urbanland-Campbell complex for 0 to 2 percent slopes are located in the southwestern corner of the project area. These soils are moderately well-drained, exhibit very low runoff, and are found in alluvial fans. The soils of the Urbanland-Campbell complex classify as low to high plasticity clays (CL, CH) and silt loam (ML) which have a low to high shrink-swell potential.

3.4 Seismicity

The Project is located within the greater San Francisco Bay Area which is recognized as one of the more seismically active regions of California. The right-lateral strike-slip San Andreas fault system controls the northwest-southeast structural grain of the Coast Ranges and the Bay Area. The fault system marks the major boundary between two of earth’s tectonic plates, the Pacific Plate on the west and the North American Plate on the east. The Pacific Plate is moving north relative to the North American plate at approximately 40 mm/yr in the Bay Area (WGCEP, 2003).

Studies have shown that the Pacific Plate is slowly moving to the northwest relative to the more stable North American Plate (Page, 1992). The differential movements between the two crustal plates caused the formation of a series of active fault systems within the transform boundary. The transform boundary between the two plates extends across a broad zone of the North American Plate within which right lateral strike-slip faulting predominates. In this broad transform boundary, the San Andreas Fault accommodates less than half of the average total relative plate motion. Much of the remainder in the greater South Bay Area is distributed across the Monte Vista-Shannon, Sargent, Hayward southern extension, Calaveras south, Zayante-Vergeles, Hayward south, Greenville, and San Gregorio fault zones.

The Project is not located within an Earthquake Fault Zone for active faults as designated by the State Geologist (CDMG, 1991). However, the Monte Vista-Shannon fault system has been mapped approximately 2.8 kilometers from the site (CDMG, 1998). The other nearby active faults systems which could induce strong ground shaking at the site include the Sargent, San Andreas, Hayward southern extension, Calaveras south, Zayante-Vergeles, Hayward south, Greenville, and San Gregorio faults. These active faults and their distances from the project site are presented in Table 1 (CDMG, 1998).

A large magnitude earthquake on any of these fault systems has the potential to cause significant ground shaking at the site. The intensity of ground shaking that is likely to occur at the site is generally dependent upon the magnitude of the earthquake and the distance to the epicenter.

Table 1. Distances to Major Active Faults

Fault Name	**Distance and Direction From Site to Fault**
Monte Vista-Shannon	2.8 km south-southwest
Sargent	12.8 km southwest
San Andreas	12.9 km southwest
Hayward Southern extension	13.5 km east-northeast
Calaveras south	17.0 km northeast
Zayante-Vergeles	18.4 km southwest
Hayward south	24 km north
Greenville	38 km northeast
San Gregorio	40 km southwest

3.4.1 Probabilistic Ground Motion

Based on discussions with District staff (Project meeting with District, March 4, 2015), the probabilistic ground motion in the area of the project was assessed for an event having a 39.3 percent chance of being exceeded in 50 years or a return period of 100 years. Using tools contained on the USGS website (USGS, 2008; USGS, 2014), we completed a probabilistic assessment of the earthquake shaking hazard at the site. According to the USGS website for NEHRP Site Class C soils the anticipated peak ground acceleration is 0.24g (see Appendix C).

4. Site Investigation

4.1 Data Review

The District provided CE&G with proposed Alternative 6 and Alternative 7 base drawings, a preliminary boring location map, a base map with existing contours and bathymetric data, and a typical section for Alternatives 6 and 7. CE&G reviewed the project scope and the provided Alternatives 6 and 7 drawings and sections. Published geologic data and information regarding the project from the District website was also reviewed together with geotechnical and geologic information available in our files.

4.2 Field Reconnaissance

CE&G performed an initial field reconnaissance of the site on 7 July 2014. Representatives from the District, the City of San Jose, and Taber Drilling were present. The Project was discussed with emphasis on the Alternative 7 design. A reconnaissance of the site was conducted and observations were made of the proposed land-based boring locations, barge rig launch area, access and environmental constraints, and staging areas. The locations of the proposed borings were adjusted based on observations and discussions in the field.

A second field reconnaissance was performed by CE&G on 2 September 2014. The existing lake levels were observed, potential barge launching issues were identified, the site was marked for Underground Service Alert (USA), and the proposed land-based boring locations were staked. It was determined that utilization of an excavator or backhoe may be required for deployment and/or removal of the barge rig.

4.3 Current Subsurface Exploration

4.3.1 General Scope of Explorations

Seven geotechnical borings were completed for the project. Four borings were drilled on land using truck-mounted drilling equipment and three borings were drilled over-water using a barge-mounted drilling rig. The locations of the borings were selected based on the preferred Alternative 7 site plan provided by the District, our site reconnaissance, evaluation of existing improvements, access, and environmental constraints, and public/pedestrian safety. The locations of the borings are shown on Figures 2 and 3.

4.3.2 Land-based Borings

4.3.2.1 Drilling

The four land-based borings were drilled by Taber Drilling between 8 September 2014 and 9 September 2014 utilizing a CME-55 track-mounted rig using a 6 inch hollow stem auger. The borings were drilled to depths ranging between 50.3 and 51.5 feet below existing grade. Sampling protocol and drilled depths were determined based upon geologic conditions and by materials encountered during the drilling operation. Drilling permits were obtained from the District. Copies of the permits are included in Appendix A.

The boring locations were accessed via roads and trails within the park. Surface conditions at the boring locations varied and consisted of asphalt pavement, gravel surfaces, landscaped, or bare soil. Prior to drilling, CE&G coordinated with the District and the City of San Jose Parks Department regarding selection of the final locations of the borings.

Upon completion, the borings were backfilled with neat cement grout in accordance with the District's permit criteria. Drilling spoils were collected in 55-gallon drums which were labeled and removed and disposed of by Taber Drilling at the end of the drilling operation.

The locations of the completed borings were marked in the field and recorded by measuring with a tape from an established point of reference and using a handheld GPS device.

4.3.2.2 Logging and Sampling

The materials encountered in the borings were logged in the field by a CE&G engineering geologist. The soils were visually classified in the field, office, and laboratory according to the Unified Soil Classification System (USCS) in general accordance with ASTM D2488.

During the drilling operations, soil samples were obtained using one of the following sampling methods:

- California Modified (CM) Sampler; 3.0 inch outer diameter (O.D.), 2.5 inch inner diameter (I.D.) (ASTM D1586)

- Standard Penetration Test (SPT) Split Spoon Sampler; 2.0 inch O.D., 1.375 inch I.D. (ASTM D6066)

The samplers were driven 18 inches (unless otherwise noted) with a 140-pound automatic trip-hammer dropping 30 inches in general conformance with ASTM D6066 procedures. The number of blows required to drive the SPT or CM sampler 6 inches was recorded for each sample. The results are included on the boring logs in Appendix A. The blow counts included on the boring logs are uncorrected and represent the field values.

It should be noted that, in some instances recovery of a sample was not achieved following the initial driving of a sampler. In order to recover samples for logging and index property testing purposes, a sampler with the addition of a "catcher," or in some cases a smaller diameter sampler, was returned to the top of the previous sampling depth, driven 18 inches, and a sample retrieved. The borehole was then cleaned out to the bottom of the sample interval, or deeper, to obtain the next sample with minimal sluff or in-situ disturbance.

Soil samples obtained from the borings were packaged and sealed in the field to reduce the potential for moisture loss and disturbance. The samples were taken to CE&G's Oakland office for laboratory testing and storage. Selected samples from the borings were also sent to Cooper Testing Laboratories of Palo Alto, California.

4.3.2.3 Soil Conditions Encountered

Relatively uniform soil conditions were encountered in the land-based borings.

- Artificial Fill – The land-based borings encountered between 9 and 19 feet of artificial fill in the locations explored. The artificial fill consisted of variable thicknesses of silt with varying amounts of sand and gravel, lean clay with varying amounts of gravel and sand, well graded sand with gravel and clay, well graded sand with gravel, well graded gravel with sand, silty gravel with sand, asphalt and concrete debris.
    - The density of the granular artificial fill generally varied from medium dense to very dense.
    - The fine grained artificial fill generally varied in consistency from stiff to hard. One exception was a soft silt layer between 8 and 10 feet in Boring LB-2.
- Alluvial Deposits – The artificial fill encountered in the borings was underlain by alluvial deposits to depths explored. The alluvial deposits consisted primarily of granular soils comprised of well graded gravel and well graded sand, poorly graded sand, and silty sand, with a few layers of fine grained soil comprised of sandy silt, silt with sand, sandy clay with gravel, and lean clay.
    - The granular alluvial deposits generally varied in density from medium dense to very dense, with two exceptions noted in a loose silty sand layer in Boring LB-3

between 43 and 48 feet depth and a loose poorly graded sand layer in Boring LB-4 between 33 and 36 feet depth.

- o The fine grained alluvial deposits generally varied in consistency from stiff to very stiff.

For a more detailed description of the soils encountered in the borings, the logs of the borings and laboratory test results are included in Appendices A and B.

4.3.2.4 Groundwater Conditions Encountered

The groundwater level was found in the land-based borings (LB-1 through LB-4) to be between Elevation 178.5 and 186 feet (NAVD 88) or between 9 and 18.5 feet below the ground surface. It should be noted that groundwater depth is subject to seasonal fluctuations depending on rainfall, water recharging programs, well pumping, or other factors that may not be evident at the time of our investigation.

4.3.3 Over-water Borings

4.3.3.1 Drilling

The three over-water exploratory borings were drilled by Taber Drilling between 7 October 2014 and 9 October 2014 utilizing a CME-45 barge-mounted drill rig, using a 5-7/8 inch diameter bit rotary wash recirculation system. The borings were drilled to depths ranging between 5-½ and 48-½ feet below existing sediment grade at the exploration locations. Sampling protocol and drilled depths were determined based upon geologic conditions and by materials encountered during the drilling operation. Elevations of samples were maintained by measuring depth of water prior to and during the subsurface exploration. Drilling permits were obtained from the District. Copies of the permits are included in Appendix A.

Access to the site and deployment of the barge and drill rig into the water were performed with the use of an existing boat launch ramp near the southeastern corner of the lake. The launch site was accessed via the eastern parking lot and pedestrian trail. The barge was launched on Monday, 6 October 2014 and remained in the water until the completion of the drilling operation on Thursday, 9 October 2014. It should be noted that a backhoe and/or excavator was not required for deployment or removal of the barge rig from the lake.

Prior to leaving the site at the end of each day, the barge was secured and anchored at the next boring location. The barge was accessed each day via a small boat that was tied off at the launch ramp area. Support equipment was stored overnight at the District's Winfield Boulevard facility.

The exploration locations were established based on coordinates using a handheld GPS device and established visual points of reference.

To avoid the release of drilling fluids into the lake, the borings were completed using a closed circulation system (mud rotary drilling). Casing was utilized to span the depth between the sediment and the deck of the drilling barge. The casing was driven between 5 and 10 feet into the sediment to create a seal at the base of the casing to prevent soil and fluid loss into the lake. Drilling fluid was collected in drums located on the barge and then transferred to a container truck and off-hauled and disposed of by Taber Drilling at the completion of the drilling operation. Copies of analytical test results performed on the soil cuttings and drilling fluid were provided by Taber Drilling and are presented in Appendix A.

The boreholes were backfilled with a cement-bentonite grout at their completion in accordance with District requirements. The grout was placed in the boreholes by the tremie method to within 5 feet of the top of the sediment surface.

The locations of the completed borings were recorded using a handheld GPS device.

4.3.3.2 Logging and Sampling

The materials encountered in the borings were logged in the field by a CE&G engineering geologist. The soils were visually classified in the field, office, and laboratory according to the Unified Soil Classification System (USCS) in general accordance with ASTM D2488.

During the drilling operations, soil samples were obtained using one of the following sampling methods:

- California Modified (CM) Sampler; 3.0 inch outer diameter (O.D.), 2.5 inch inner diameter (I.D.) (ASTM D1586)
- Standard Penetration Test (SPT) Split Spoon Sampler; 2.0 inch O.D., 1.375 inch I.D. (ASTM D6066)
- Shelby Tube (ST) Thin-Walled Tube Sampler; 3.0 inch outer diameter (O.D) (ASTM D1587)

Except for the Shelby Tubes, the samplers were driven 18 inches (unless otherwise noted) with a 140-pound automatic trip-hammer dropping 30 inches in general conformance with ASTM D6066 procedures. The number of blows required to drive the SPT or CM sampler 6 inches was recorded for each sample. The results are included on the boring logs in Appendix A. The blow counts included on the boring logs are uncorrected and represent the field values. For the Shelby Tube sampler, the sampler was hydraulically pushed 24 inches to within 6 inches of each Shelby

Tube's 30-inch length. Each Shelby Tube was pushed into the underlying soil to obtain a relatively undisturbed sample. Some sampling runs were terminated when resistance from the soil was sufficient to reach a limiting hydraulic pressure selected by the driller to avoid damage to the tube and/or sampler. In cases where the underlying material was very soft, an Osterberg piston sampler was used.

It should be noted that, in some instances recovery of a sample was not achieved following the initial driving of a sampler. In order to recover samples for logging and index property testing purposes, a sampler with the addition of a "catcher," or in some cases a smaller diameter sampler, was returned to the top of the previous sampling depth, driven 18 inches, and a sample retrieved. The borehole was then cleaned out to the bottom of the sample interval, or deeper, to obtain the next sample with minimal sluff or in-situ disturbance.

Soil samples obtained from the borings were packaged and sealed in the field to reduce the potential for moisture loss and disturbance. The samples were taken to CE&G's Oakland office for laboratory testing and storage. Selected samples from the borings were also sent to Cooper Testing Laboratories of Palo Alto, California.

4.3.3.3 Soil Conditions Encountered

Relatively uniform soil conditions were encountered in the borings.

- Lake Sediments – The over-water borings indicated that at the locations explored the lake bottom is underlain by between 4 and 11 feet of lake sediments. The lake sediments consisted of variable thicknesses of silts having generally low plasticity with variable amounts of fine sand, peat, and fat clay, all with a very soft (cohesive) or loose (granular) consistency. The silts were judged to behave like loose cohesionless material.

- Alluvial Deposits – The lake sediments encountered were underlain by alluvial deposits to depths explored. The alluvial deposits consisted of well graded gravel, well graded gravel with sand, well graded sand with gravel, silt with variable amounts of sand, sand with variable amounts of silt, and elastic silt.

    - The granular alluvial deposits generally varied in density from medium dense to very dense.

    - The fine grained alluvial deposits generally varied in consistency from stiff to very stiff.

The boundary between the very soft lake sediments and the underlying alluvial deposits is characterized by a distinct increase in relative density.

For a more detailed description of the soils encountered in the borings, the logs of the borings are included in Appendix A and laboratory test results are included in Appendix B.

4.3.3.4 Groundwater Conditions Encountered

Because rotary wash drilling methods were used for the over-water borings, the groundwater level was not measured.

4.4 Geotechnical Laboratory Testing

Laboratory testing was performed to obtain information regarding the physical and index properties of selected samples recovered from the exploratory borings. Tests performed included natural moisture content, dry unit weight, Atterberg Limits, grain size distribution, consolidation, and unconsolidated-undrained triaxial strength testing. Tests were completed in general conformance with applicable ASTM standards. The laboratory testing indicates that the plasticity index ranges between 3 and 36 percent for the samples tested. The results of the laboratory tests are summarized on the boring logs and in Appendix B.

4.5 Environmental Sampling and Testing

Selected samples were retrieved from the upper 10 feet of the sediment encountered in the over-water borings for environmental testing. Samples were collected by CE&G, sealed and placed in a cooler, and retrieved by a representative from Light, Air, and Space Construction (LAS) near the end of each day of the drilling operation. Environmental testing was limited to CAM-17 metals. Results of the environmental sampling was provided directly to the District by LAS and are included in Appendix B of this report.

5. Levee Geotechnical Analysis

5.1 Scope of Analysis

Geotechnical analyses of the planned levee separating Alamitos Creek and Almaden Lake were completed to address the primary geotechnical considerations consisting of seepage, short- and long-term slope static stability, rapid drawdown and seismic stability, and settlement. Design analyses for the levee were completed in general conformance with the guidelines provided in the U.S. Army Corp of Engineers (USACE) engineering manual regarding the design and construction of levees (EM1110-2-1913). The analyses completed include hand calculations and computer modeling to evaluate a range of configurations.

5.2 Liquefaction Analysis

Liquefaction is a soil behavior phenomenon in which a soil located below the groundwater surface loses a substantial amount of strength due to high excess pore-water pressure generated and accumulated during strong earthquake ground shaking. During and immediately following earthquake ground shaking, induced cyclic shear creates a tendency in most soils to change volume by rearrangement of the soil-particle structure. The potential for excess pore-water pressure generation and strength loss associated with this volume change tendency is highly dependent on the gradation and density of the soil, with greater potential in looser generally cohesionless soils. Recently deposited (i.e., geologically young) and relatively loose natural soils, and uncompacted or poorly compacted artificial fills located below the groundwater table, are potentially susceptible to liquefaction.

Saturated granular materials, including fine sands and low-plasticity silts that are potentially susceptible to liquefaction from strong earthquake shaking were encountered in the borings. These conditions were pervasive within the loose lake sediments and sporadic within the generally dense alluvial soils below the lake sediments.

5.2.1 Mapped Seismic Hazards

The Seismic Hazard Zone map prepared by the California Geological Survey (CGS, 2003) for the USGS Santa Teresa Hills and Los Gatos quadrangles indicates that the entire Almaden Lake site and areas adjacent to Alamitos Creek are located within a liquefaction hazard zone. As a result, a liquefaction hazard evaluation was completed.

5.2.2 Probabilistic Ground Motions

A liquefaction assessment for the Alamitos Creek area was performed for the earthquake event having a 10 percent chance of being exceeded in 50 years or a return period of 475 years. Using tools contained on the USGS website (USGS, 2008; USGS, 2014), we completed a probabilistic assessment of the earthquake shaking hazard at the site. According to the USGS website, the anticipated peak ground acceleration is 0.44g from a 6.82 magnitude earthquake (see Appendix C).

Liquefaction analyses were performed on the geotechnical borings using the ground motions listed above.

5.2.3 Analysis Methodology

The liquefaction analysis was completed using methods described by Youd (2001). This empirical method was developed using field observations and laboratory test data in conjunction with results from SPT $(N_1)_{60}$ values. The measured SPT N-values were corrected to $(N_1)_{60}$ as recommended by Idriss and Boulanger (2004). The hammer energy efficiency correction C_E was evaluated by standard penetration energy measurements performed and reported by Taber Drilling, Inc. Further corrections were made for the reported SPT N-values for the effect of overburden pressure, short rod length, non-standardized sampler configuration and borehole diameter. All the correction factors used in the liquefaction analysis are listed below:

$$(N_1)_{60} = N \cdot C_N \cdot C_R \cdot C_S \cdot C_B \cdot C_E$$

where:

C_N = correction for overburden pressure

C_R = correction for short rod length

C_S = correction for non-standardized sampler configuration

C_B = correction for borehole diameter and

C_E = correction for hammer energy efficiency

The index properties of the soil layers including soil classification, unit weight, and percent fines of soil samples obtained from each of the land-based and water-based borings were used to complete the liquefaction analysis. In cases where lab tests were not performed, the soil characteristics were estimated based on lab tests on same or similar soil material at the same depth in nearby borings.

For the purposes of the liquefaction analysis it was assumed that groundwater will be at or near the elevation of the low flow channel or approximately elevation 190 feet.

Liquefaction susceptibility at each boring location was analyzed using the software program LiqIT v4.7.7.5 (GeoLogismiki, 2006). LiqIT takes measured field SPT data and assesses liquefaction potential, and post-earthquake vertical settlement given a user-defined earthquake magnitude and PGA. LiqIT utilizes the NCEER method (Youd et.al., 2001) for liquefaction susceptibility and (Ishihara K, Yoshimine M ,1992) for liquefaction-induced settlement.

5.2.4 Results of Liquefaction Analysis

The results of the liquefaction analysis are presented in Appendix C for boreholes LB-1 to LB-4, WB-1, and WB-2. Each output includes five graphs. The first graph presents SPT blow counts with depth. On the graph the raw SPT blow counts are plotted with $(N_1)_{60}$ corrected blow counts as described above and $(N_1)60_{cs}$ blow counts which are corrected for fines content. The second graph presents the results in terms of Cyclic Stress Ratio (CSR) applied by the earthquake and Cyclic Resistance Ratio (CRR) derived by the available $(N_1)_{60}$ and fines content for each data point. The third graph illustrates the corresponding factor of safety at each SPT value with depth. A factor of safety greater than 1 indicates the material is not liquefiable. The fourth graph presents the calculated settlement of sands with depth and the last graph plots each point on the $(N_1)60_{cs}$ versus the fully adjusted CSR identifying each SPT value as with liquefiable or not liquefiable.

Results of the liquefaction analyses indicate that the lake sediment deposits and some of the deeper sandy soil layers would likely liquefy during an earthquake event with a 100-year return period. Liquefaction induced settlements of about 2 inches were estimated for land-based boring LB-1 and 6 inches in water-based boring WB-2. About 75 percent of the liquefaction induced settlement is indicated to occur in the lake sediment deposits. Liquefaction analyses output are included in Appendix C.

5.3 Levee Configurations

5.3.1 Cross Section Geometry

Based on a consideration of geometry and subsurface conditions, four cross sections were selected for analyses. Two sections were selected for Alternative 7, one at station 10+00 and one at station 12+00. Sections were selected for Alternative 6, at station 2+50 and at station 7+00. The sections were selected based on existing ground surface conditions, levee fill thickness, and maximum fill thicknesses across the Alamitos Creek flood plain. These sections were chosen because they were judged to represent the conservative cross sections in terms of levee and creek back slope height. Each section was analyzed for both the lake side and creek side of the levee based on high water and rapid drawdown conditions for both the lake and creek.

Each of the cross sections analyzed had the same basic geometry consisting of:

- Levee height up to 13 feet tall
- 40 foot wide crest
- 2H:1V side slopes
- Flood plain width of 95 feet
- A 30 feet wide low flow channel
- Creek side high water elevation of 199 feet
- Creek side low water elevation of 188 to 194 feet
- Lake side high water elevation of 190 feet
- Lake side low water elevation of 185 feet

5.3.2 Cross Section Layers

Based on the limited number of geotechnical borings drilled, a uniform subsurface condition was assumed across the lake (Figure 9). The three water-based borings revealed 4 to 11 feet of lake sediment underlain by alluvium. Based on these results, 11 feet of soft lake sediment was assumed to be underlain by alluvium for all cross sections analyzed. The lake sediment layer was divided into two separate layers, with the upper Layer 1 being 5 feet thick and the lower Layer 2 being 6 feet thick. It should be noted that the thickness of the lake sediments may be greater than the maximum thickness observed in our borings.

Anticipated levee construction will include removing Lake Sediment Layer 1 and Layer 2 below the levee footprint down to the underlying stiff alluvium from the toe of the levee on the lake side to the toe of the levee on the creek side. A maximum 1H:1V temporary excavation slope was assumed from the top of the lake sediment layers down to the alluvium layer. It is anticipated that lake sediments located at other portions of the project can remain in place and the material removed from beneath the levee footprint can be relocated as fill at the bottom of the lake where the grades will be brought up to create a flat lake bottom, provided the material meets requirements for general fill outlined in Section 7.1.8. It may be that some of these lake sediments (or at least the upper portion) has too high organic content to use as general fill.

The results of the subsurface exploration indicate that the lake sediments are comprised of weak organic silts, elastic silt, silty sand, and fat clay. As a result, any grading at the lake bottom will be impracticable without first constructing a working layer on which to operate heavy equipment. The cross sections analyzed therefore included a aggregate base working layer comprised of Tensar TriAx TX160 geogrid reinforcement placed on top of lake sediment layer 1 and a 24-inch thick layer of 1-½-inch clean crushed rock in order to construct a firm foundation. For a detailed description of the geogrid reinforcement recommended for use on the project and design and construction of the working layer, refer to Section 7.1.5. A 10-foot thick low permeability clay cap will then be placed across the lake side and creek side of the levee to isolate the mercury laden soils from the flowing creek channel and lake waters. Levee fill material meeting the requirements of the District Levee Safety Technical Guidance Manual (District, 2002) will be used to construct the levee.

5.3.3 Material Properties for Analysis

The primary material properties needed for analysis included unit weights, permeability, and soil shear strength. These were selected as follows:

1. Unit weights for the clayey lake sediment layer 1 and layer 2 were selected based on average values from field and laboratory data and consideration of published typical values for similar materials. Unit weights for the sandy and gravelly alluvium layer were selected based on a comparison of published typical values for similar materials and calculated values based on laboratory water contents and assumed saturated conditions.
2. Permeabilities for cohesive materials located within the lake sediment layer 1 and layer 2 were selected based on calculations from consolidation tests, published typical values for similar materials, and engineering judgment. Permeabilities for the cohesionless alluvium layer were selected based on calculations using the Kozeny-Carmen equations (GEO-SLOPE International, Ltd., 2013) using the laboratory grain size distributions and published typical values for similar materials, and engineering judgment.
3. Shear strengths for lake sediment layer 1 and layer 2 were selected based on a comparison of field pocket penetrometer tests, and typical correlations with SPT values for similar materials.
4. Shear strengths for the sandy and gravelly alluvium layer were selected based on a comparison of laboratory results, and typical correlations with SPT values.

5.4 Seepage Analysis

Under normal flow conditions, water in Alamitos Creek will flow in a low flow channel located approximately 95 feet from the toe of the levee. The District's hydrology and hydraulic analysis indicates that during the 100-year flood event, water will rise briefly against the creek side of the levee with water as high as about 1 foot below the levee crest or elevation 199 feet. The 100-year flood condition is expected to be temporary and the duration of high water will only be a matter of hours so it is unlikely that seepage will extend more than a few feet into the levee. District staff have indicated they calculated a drawdown time period of 2-¾ hours. However, in accordance with USACE guidelines (USACE, 2000) seepage calculations were completed based on the assumption of steady state conditions. The cross sections used in our analyses were selected to represent the locations of the greatest head differential across the levee.

The SEEP/W module from GeoStudio 2012 (GeoSlope, Ltd., 2013), a two-dimensional, finite-element seepage analysis program, was used to estimate the steady-state pore pressures within and underlying the levee. Steady state exit gradients and the resulting pore pressures were calculated in the analysis for piping potential. The results were also used for modeling the phreatic surface in subsequent slope stability analysis. Seepage analyses were performed for the three cross sections selected for analyses. Representations of the surface and subsurface conditions for seepage analyses of the levee cross sections for Alternatives 6 and 7 cross sections (three total) are provided in Appendix D.

5.4.1 Boundary Conditions

Saturated and unsaturated zone permeabilities are calculated by the SEEP/W program using conductivity functions. General conductivity functions were chosen based on type of soils encountered in the exploratory borings. Typical conductivity functions were then adjusted by SEEP/W to match the input saturated-flow permeabilities.

Either the lake or flow channel and floodplain were considered as upstream and downstream sides of the levee, depending on the modeled water level conditions in the lake and channel. For analysis purposes the side of the levee with the higher water surface elevation was modeled as the upstream side of the levee. The side of the levee with the lower water surface elevation was modeled as the downstream side of the levee. The following boundary conditions were applied to the model:

- A fixed total head boundary condition corresponding to the high water surface elevation was applied along the levee slope.
- A potential seepage face boundary (nodes that allow water to flow out of the model boundary) was applied to the opposite slope of the levee and extended to the ground surface of the levee for the model extents. This allows SEEP/W to estimate a phreatic surface through the levee.

Seepage analysis was conducted for high water surface elevation of 190 feet on the lake side and a potential seepage face on the creek side as well as for a high water surface elevation of 199 feet on the creek side and a potential seepage face on the lake side.

5.4.2 Hydraulic Conductivity (Permeability)

From the grain size distribution of the soil material determined by laboratory testing, the vertical permeabilities of the stratigraphic units, k_v, were estimated within SEEP/W using the Kozeny-Carman equations. From the average of all sand grain size distributions for the alluvium layer, the estimated saturated hydraulic conductivity is 0.01 cm/s. Permeabilities for clayey materials were selected based on calculations from the consolidation tests, published typical values for similar materials, and engineering judgment. A permeability of 1×10^{-6} cm/s was assumed for the lake sediment deposits.

A permeability of 1×10^{-6} cm/s was assumed for fill to be used during construction of the levee as outlined in the District's Levee Safety Technical Guidance Manual (2002). Additionally, grain size distribution curves, Atterberg Limits, and a compaction curve were obtained from Stevens Creek Quarry for typical levee material that the District has used in the past for construction of these projects. With this data, a more refined hydraulic conductivity function was used based on laboratory test results rather than solely on material type correlations. A permeability of 1×10^{-7} cm/s was assumed for the clay cap layer. A soil anisotropy ratio of k_v / k_h of 0.25 was assumed for all naturally deposited layers and engineered fill layers. Material properties used as part of the analysis are summarized in Table 2.

Table 2: Material Properties Used for Seepage Analysis

Material	UCSC Soil Designation	Unit Weight (pcf)	Saturated Conductivity, ky (cm/sec)	k_y/k_x
Levee Fill	CL	127	1×10^{-6}	0.25
Clay Cap	CL	123	1×10^{-7}	0.25
Aggregate Base	GP	135	6.0×10^{-3}	0.25
Lake Sediment Layer 1	ML/MH/CH	93	1×10^{-6}	0.25
Lake Sediment Layer 2	CL/SM/MH	93	1×10^{-6}	0.25
Alluvium	GW-GM and SW-SM	135	0.01	0.25

5.4.3 Steady State Seepage Analysis

Consistent with USACE guidelines (USACE, 2000), the potential for internal erosion or piping to occur within the embankment, was evaluated by checking if the maximum average exit gradient at or downstream of the creek side toe is less than 0.5 in a steady-state condition and 0.8 for a distance of 150 feet away from the toe.

Seepage through the levee and under the levee were analyzed using the SEEP/W module contained within the GeoStudio software suite (GeoSlope, Ltd., 2013). The analysis assumed the levee will retain water for sufficient time to develop steady state seepage and resulted in an acceptably low exit gradient on the dry side of the levee. As previously stated, District staff have indicated they calculated a drawdown time period of 2-¾ hours for the 100-year storm waters in Alamitos Creek to recede. It is estimated that is could take upwards of 100 days to reach the steady state condition.

Appendix D includes figure outputs showing the contours of pressure head output from SEEP/W for the three cross sections. The vertical exit gradient is calculated through the blanket layer at the toe of the levee and several feet away from the toe. Additionally, the calculated total exit gradient along the drier side of the levee is plotted versus distance along that side.

The maximum vertical gradient through the blanket layer at the toe of the levee for each section is summarized in Table 3 for the assumed steady state condition. The exit gradient is calculated to be less than 0.5 for all three sections.

Table 3: Vertical Exit Gradients through the Blanket at Toe of Levee

Configuration	Vertical Gradient
Alternative 6 Station 2+50 HWSE Lake Side	0.08
Alternative 6 Station 2+50 HWSE Creek Side	0.23
Alternative 7 Station 10+00 HWSE Lake Side	0.01
Alternative 7 Station 10+00 HWSE Creek Side	0.30
Alternative 7 Station 12+00 HWSE Lake Side	0.05
Alternative 7 Station 12+00 HWSE Creek Side	0.41

5.5 Slope Stability Analysis

The computer program SLOPE/W (GeoSlope, Ltd., 2013) was used to evaluate slope stability. The program utilizes two-dimensional, limit-equilibrium methods to calculate factors of safety along slip surfaces through an embankment. Spencer's method, which satisfies both force and moment equilibrium and is restricted to a constant inter-slice force function, was used for all analyses. By specifying material zones delineated by strength functions, SLOPE/W estimates the normal stresses acting on a potential slip surface to calculate the shear strength along the surface and compares the strength with estimated (gravity-induced) driving stresses to calculate a factor of safety.

Stability analysis generally followed the procedure described in USACE guidelines (USACE, 2000). Five loading conditions were considered for each of the three cross sections:

- Static Condition
- End of Construction
- Steady State Seepage Condition
- Rapid Drawdown Condition
- Earthquake Condition

The plans show two islands to be constructed within the reconfigured lake, with the adjacent ground surface to be steeper than 2H:1V. Based on our discussions with District staff, we understand these slopes will be constructed using material which complies with the gradation requirements provided in the District's Levee Safety Guidance Manual. Based on soil descriptions and laboratory test results provided to us by Stevens Creek Quarry (a likely source for this material), this material will be comprised of low plasticity sandy clay/clay with sand. By inspection, the current slope configuration surrounding the islands is not considered stable. Consideration should be given to modifying the current design to incorporate 2H:1V side slopes for the islands.

5.5.1 Parameters Used in Stability Analyses

The soil parameters used in slope stability analysis are included in Table 4. Soil strength and unit weights for onsite materials were developed through evaluation of our subsurface exploration and laboratory testing program. The material properties used in our analyses are based on the Levee Fill Material and Impervious Backfill Material requirements set forth for levee fill in the District Levee Safety Technical Guidance Manual (2002), as follows:

- Impervious Backfill Material Requirements
  - Maximum particle size of 1 inch;
  - Consist of clayey material that contains not less than 30 percent by weight of material passing the No. 200 mesh sieve;
  - Plasticity index of not less than 8 percent and a liquid limit not greater than 50 percent;
  - The hydraulic conductivity should be not greater than 10^{-6} cm/sec;
  - Free of organic matter, deleterious substances, and debris.

- Levee Fill Material Requirements
  - Free of organic matter, deleterious substances, debris and rocks or lumps larger than 4 inches in greatest dimension; no more than 15 percent of the rocks or lumps should be larger than 2- ½ inches;
  - At least 75 percent of the material should be finer than No. 4 U.S. Standard Sieve and 50 percent finer than No. 200 U.S. Standard Sieve;
  - Plasticity index between 10 and 20 percent;
  - The hydraulic conductivity should be not greater than 10^{-6} cm/sec.

Table 4: Soil Parameters Used for Stability Analyses

Material	Moist Unit Weight (pcf)	Drained Strength Envelope Results		Undrained Strength Envelope Results	
		Effective Friction Angle, φ' (degrees)	Effective Cohesion, c' (psf)	Friction Angle, φ (degrees)	Cohesion, c (psf)
Levee Fill	127	28	100	0	2000
Clay Cap	123	20	300	0	2000
Working Layer	135	33	0	33	0
Lake Sediment Layer 1	93	0	200	0	200
Lake Sediment Layer 2	93	0	300	0	300
Alluvium	135	35	0	35	0

5.5.2 Static Condition

The static condition considers a situation where the water level in the creek and ground water level are contained to the low flow channel which is approximately 2.5 feet above the channel invert, with the lake at its highest water elevation. The analyses of slope stability for the static condition were performed using effective stress strength parameters.

Seven cases were analyzed, including both lake side and creek side of all three cross sections and the western creek bank located at station 7+00 in Alternative 6. The factors of safety are summarized in Table 5. The factors of safety of levee slope stability for the static condition ranged from 1.8 to 3.2. All exceeded the minimum value of 1.5 recommended for long-term loading in the USACE guidelines (USACE, 2002). The results from the stability analysis and figures illustrating the failure surface and factor of safeties are included in Appendix E.

5.5.3 End-of-Construction

For analysis of the end-of-construction, loading conditions the SLOPE/W analyses incorporated the results from the SIGMA/W module to model the pre-existing in-situ stress conditions and to model the changes in stress conditions as the levee is constructed. For short-term loading a target factor of safety of 1.3 is considered to be acceptable in accordance with the USACE guidelines (USACE, 2002).

Both lake side and creek side stability were evaluated for all three cross sections. The factors of safety are summarized in Table 5. The calculated factors of safety for the end-of-construction condition all meet or exceeded 1.3 and ranged between 1.3 and 1.9. This analysis also assumes that construction of the levee should take a minimum of six weeks to complete. A shorter duration could result in the buildup of excess pore water pressures which could result in a factor of safety less than the target factor of safety of 1.3. The results from the stability analysis along with figures illustrating the failure surface and factors of safety are included in Appendix E.

5.5.4 Long-Term Steady State Seepage Condition

The steady state seepage condition considers a situation where flood water level is sustained long enough to create steady-state flow through the levee, increase pore pressures within the levee and foundation materials, and thereby decrease the strength of the materials. We note that the steady state seepage assumption, though consistent with the state of the practice, is conservative for the levee and levee foundation conditions for the case of the 100-year flood condition identified for the creek side of the levee. The steady state condition for high water surface elevation on the lake side however may occur during the life of the project. Both configurations have been analyzed.

Locations of phreatic surfaces were taken directly from the results of the steady-state conditions developed in the seepage analysis completed using SEEP/W. As defined in the seepage analysis, the design flood level is approximately at 1 foot below the levee crest at elevation 199 feet. The stability computations were performed using effective stress strength parameters. Due to the water pressure against the waterside slope of the levee, for both the high water surface elevation on the lake side and creek side configurations, the waterside of the levee is deemed more stable than the low water side. Therefore, stability analyses under steady seepage were performed only for the low water side of each configuration.

The factors of safety of these three cases are summarized in Table 5. The results indicate that for steady state seepage for both high water surface elevations on the lakeside and creekside conditions are stable, with factors of safety ranging between 1.4 and 1.9. These values meet or exceed the minimum factor of safety of 1.4 recommended in the USACE guidelines (USACE, 2000). The results from the stability analysis along with figures illustrating the failure surface and factors of safety are included in Appendix E.

5.5.5 Rapid Drawdown Condition

The rapid drawdown loading condition considers a situation where the high water surface or flood water level are sustained long enough to create steady-state flow through the levee, and then water levels are quickly lowered, reducing the buttressing effect of the water loads on the waterside slope and increasing the driving stresses on the potential failure surface. It is assumed that drawdown is very fast, and no drainage occurs in materials with low permeability. A combination of effective stress strength parameters and undrained shear strength parameters were used and two different phreatic surfaces modeled. The first phreatic surface represents the pore-water pressure condition before rapid drawdown, in this case the 100 year flood condition. The second phreatic surface represents the pore-water pressure condition after rapid drawdown.

Each cross section was analyzed for rapid drawdown cases resulting from drawdown of the lake side and creek side configurations. Only the side of the levee where the high water surface elevation drops rapidly was analyzed for slope stability.

The factors of safety of the three cross sections and both cases of high water on the lake side and creek side are summarized in Table 5. The results show that under rapid drawdown conditions the levee is stable, with factors of safety ranging between 1.2 and 1.6. These values meet the minimum factor of safety of 1.2 outlined in the USACE levee guidelines. The results from the stability analysis along with figures illustrating the failure surface and factor of safeties are included in Appendix E.

5.5.6 Seismic Stability Condition

The USACE levee guidelines do not specifically address the method to be used to analyze seismic stability for levees. Therefore, pseudo-static seismic slope stability analyses have been completed using a pseudo-static coefficient determined according to the methods described in the 2008 California Geologic Survey document SP117A titled, “Guidelines for Evaluating and Mitigating Seismic Hazards in California.” The method is commonly used for evaluating seismic slope stability of embankments. As part of the method the mean moment magnitude and peak ground acceleration are used in selection of the pseudo-static seismic coefficient. These parameters are determined from a probabilistic seismic hazard deaggregation to determine the peak ground acceleration and moment magnitude for the earthquake event having a 39 percent chance of being exceeded in 50 years or return period of 100 years. Output of the deaggregation performed at the location of the project resulted in an estimated peak ground acceleration of

0.24g occurring from a 6.67 magnitude earthquake. Based on the results from the SP117A evaluation a pseudo-static coefficient of 0.10 was chosen for the analysis (Appendix E).

Seismic slope stability analyses were completed using both effective stress and undrained shear strength parameters with low water surface elevations for both the lake and creek side. The pseudo-static factors of safety determined for the three cross sections analyzed are summarized in Table 5. The results indicate that the levee has pseudo-static factors of safety that meet or exceed 1.0 with values ranging between 2.2 and 4.2 using undrained shear strength parameters and between 1.4 and 1.8 using effective stress parameters. The results from the stability analysis along with figures illustrating the failure surface and factors of safety are included in Appendix E.

Table 5: Factors of Safety from Stability Analyses

Configuration	Calculated Range of Factors of Safety by Loading Case									
	Static (Normal Water Elevation)		End of Construction		Static Steady Seepage		Rapid Drawdown		Seismic (Normal Water Elevation)	
Levee Side	Lake	Creek	Lake	Creek	Lake	Creek	Lake	Creek	Lake*	Creek*
Alt 6 STA 2+50	1.9	1.9	1.3	1.4	1.6	1.9	1.8	1.3	3.1/1.5	2.9/1.5
Alt 6 STA 7+00	N/A	3.2	N/A	N/A	N/A	N/A	N/A	2.8	N/A	2.23
Alt 7 STA 10+00	1.9	2.3	1.6	1.8	1.5	2.3	1.6	1.7	2.6/1.4	3.6/1.5
Alt 7 STA 12+00	1.8	2.4	1.4	2.0	1.6	2.4	1.2	1.3	2.6/1.4	4.2/1.8

*Undrained shear strength factor of safety / Effective shear strength factor of safety

5.6 Settlement Analysis

5.6.1 Static Settlement

Based on the results from the subsurface exploration within Almaden Lake it was determined that the sand and gravel alluvium underlying the lake sediments would likely experience immediate settlement during the construction process. As a result laboratory consolidation testing was performed only on the organic silt, plastic silt, and fat clay lake sediment deposits overlying the alluvium layer. Two consolidation tests were performed on the lake sediment deposits obtained from the water-based borings. Based upon evaluation of the results, the following consolidation parameters were developed for evaluation of settlement.

Table 6: Consolidation Parameters

Material	Cc'	Cr'	Cv (ft^2/yr)
Lake Sediment Layer 1	0.18	0.06	15 to 75
Lake Sediment Layer 2	0.22	0.02	170 to 280

Settlement analyses were completed using both hand calculations and using the computer program SIGMA/W within the GeoStudio software suite. The results from hand calculations were used to calibrate the SIGMA/W analysis so that the amount of settlement along the entire cross section could be determined. The results from these analyses indicate that, if the levee is constructed over the lake sediments, the levee fill placed over 11 feet of lake sediment could settle up to 21 inches. The results from the hand calculations and GeoStudio analysis are included as Appendix F and presented in Table 7. The calculations indicate settlements assuming the lake sediments are removed from beneath the levee and capped with a minimum of 10 feet of fill within the lake, low-flow channel, and adjacent flood plain.

Table 7: Settlement Estimates

Alternative and Station	Location	Thickness of Fill Placement (feet)	Range of Calculated Settlement (inches)*
Alternative 6 at Station 2+50	Lake	9 to 14	6-½ to 10
	Levee	15 to 32	¼ to ½
	Low Flow Channel	8 to 11	6-½ to 7-½
	Flood Plain	10 to 14	6-½ to 9
Alternative 7 at Station 10+00	Lake	5 to 7	< ¾
	Levee	14 to 32	¼ to ½
	Low Flow Channel	15 to 19	13-¼ to 13-¾
	Flood Plain	15 to 25	13-¼ to 17-½
Alternative 7 at Station 12+00	Lake	5 to 7	< ¾
	Levee	16 to 30	< ½
	Low Flow Channel	9 to 11	12 to 12-½
	Flood Plain	13 to 19	7 to 12-½

* Calculated at 95% consolidation settlement

These calculated settlements are based on the soil parameters outlined above and presented in detail in Appendix F. The settlement values should be considered when calculating fill quantities and cambers for the final grades.

5.6.2 Seismic Settlement

As described above in Section 5.1.4, earthquake-induced settlement is calculated to be up to about 6 inches due to densification of underlying sand and lake sediment layers.

5.6.3 Rate of Settlement

Based upon the November 2014 consolidation tests, the coefficient of consolidation, Cv is estimated to be 15 to 75 ft^2/year for the upper layer of the lake sediments and 170 to 280 ft^2/year for the lower portion of the lake sediments. Using these values, it is estimated that an 11-foot thick lake sediment layer would take between 1.5 months to 2.3 years to reach 95% total settlement due to consolidation.

5.7 Levee Embankment Erodability

The erodability of the levee embankment was evaluated using methods outlined in USACE Hydraulic Design of Flood Control Channels Manual EM 1110-2-1601. Hydraulic design values of Alamitos Creek used in the evaluation were provided by the District. Based on the flow velocities provided by the District, it is anticipated that creek channel velocities will be in excess of the anticipated maximum velocity for nonerodible channels constructed using the proposed levee fill material.

The proposed levee fill material will consist of sand, silt, and clay, and would be capable of resisting erosion due to channel flow velocities of up to 6 ft/s. The District's hydraulic design values (shown in Table 7 below) include a flow velocity adjacent to the bank of 8 ft/s for flows ranging from 300 cfs for the 100-year storm with 8,250 cfs. Analyses have been performed to determine the size of rock slope protection (RSP) to resist erosion of the creek banks for this design velocity.

Table 7: Hydraulic Design Values

Design Flow (cfs)	Max Levee Height (ft)	Bank Velocity (ft/s)	Water Surface Depth (ft)
Q_{100} 8250	15	8	11.5
Q_{10} 3400	15	2	5
1000	15	1	5
300	15	1	4

Design of the RSP was performed using the "California Bank and Shore Rock Slope Design," third edition (2000) as recommended in the District's Levee Safety Technical Guidance Manual. The analysis requires the channel flow velocity adjacent to the creek bank and channel geometry to calculate the size of RSP. Based on the flow velocity of 8 ft/s provided by the District and determining if the channel flow was impinging or parallel, two RSP design sections were determined.

For impinging flow the design section includes a total RSP thickness of 2 feet of facing class rock underlain by Caltrans Type A RSP fabric. For parallel flow the design section includes 0.75 feet of Backing No. 3 rock underlain by Caltrans Type A RSP fabric. Alternatively, an erosion resistant planting scheme may be contemplated, provided the landscape architect approves. The results from this analysis area included in Appendix G.

Based on the channel profiles outlined in Alternative 6 and 7 the current meandering channel geometry would be between impinging flow and parallel flow. Additionally, the District may elect to incorporate plantings as part of the levee development. While plantings will provide some erosion protection, the portions of the levee with plantings may exhibit greater erosion than if protected by rock, and may require a greater level of maintenance. The final design section would be dependent on the level of protection the District desires.

6. Conclusions

6.1 General

Based on the results of our geotechnical investigation, it is our opinion that the proposed Almaden Lake Improvement Project may proceed as currently contemplated and as shown in the District preliminary drawings for either Alternative 6 or Alternative 7.

6.2 Foundation Conditions

The upper 4 to 11 feet of the upper lake sediments are very soft, fine grained soils, some with a very high organic content. This material is highly compressible and has a low shear strength. In addition, the sediments are susceptible to liquefaction. To provide adequate support for the new levee, we recommend that the lake sediment materials be removed in the area the levee is to be constructed. It should be noted that, while we observed the thickness of the very soft lake sediments to vary from 4 to 11 feet, these measurements were taken in only three locations. The actual thickness of soft sediments will likely vary outside this range and may be thicker locally.

The process of draining the lake and exposing the soft lake sediments to drying will likely result in some increase in shear strength of those soils. We have not evaluated the effects of drying and resulting strength increase, and have not included this effect in our analysis. There are a number of influencing factors that involve the construction methods employed that are currently unknown. However, it should be noted that there will likely be some volume loss resulting from the drying of the soils, which should be considered in the grading volume calculations.

6.3 Levee Stability

The current design plans show the new levee to have slope gradients of approximately 2 to 1 (horizontal to vertical). Based on the estimated shear strength of the levee fill material (effective friction angle of 28 degrees and effective cohesion of 100 psf), our analyses indicate slope gradients of 2 to 1 to be stable, including for a saturated condition. It should be understood that our analysis is based on material properties of the levee fill material described in the District's Levee Safety Technical Guidance Manual, as well as laboratory tests for typical levee fill material provided by Stevens Creek Quarry. The assumed material properties that our analyses are based on will need to be verified during construction.

6.4 Groundwater

The groundwater level was found in the land-based borings (LB-1 through LB-4) to be between Elevation 178.5 and 186 feet (NAVD88). The normal lake water level is at approximately 190 feet. The deepest elevation at which earthwork will be required is approximately 150 feet. Therefore, dewatering may be required after the lake has been drained. It should be noted that groundwater depth is subject to seasonal fluctuations depending on rainfall, water recharging programs, well pumping, or other factors that may not be evident at the time of our investigation.

6.5 Erosion

Our analyses indicate that based on the maximum flow velocity in the creek channel, slope protection should be provided on the creek side slope of the new levee. Recommendations are provided below for Rock Slope Protection.

6.6 Seismic Hazards

The very soft lake sediments are considered to be susceptibility to liquefaction during strong earthquake ground shaking. For this reason, recommendations are provided below for mitigation of the liquefaction hazard, which include removal of the soft lake sediments within the foundation footprint of the new levee.

For other areas outside the levee embankment construction, the soft lake sediments are likely present across the entire lake bottom and are planned to be left in-place and overlain by a "capping" clay soil layer. The in-place sediments will underlay any new fill placed to raise the grade of the lake bottom. This includes the two islands to be constructed in the east portion of the lake and the Alamitos Creek low-flow channel. If the soft lake sediments were to liquefy or lose strength during an earthquake, this would likely result in settlement of the overlying ground surface and ground cracking. Although the levee would be expected to remain in a stable condition, seismically-induced effects could include some settlement and ground cracking of the island, low flow channel, and other areas underlain by the soft sediments. Such ground movements would require some level of repair.

7. Recommendations

7.1 Earthwork

Earth work items anticipated for this project include the following:

- Draining the lake;
- Clearing, stripping, and demolition;
- Removal and disposal of designated methylmercury-laden soils;
- Excavation of on-site soil to conform to finish grades;
- Import of fill;
- Placement of excavated on-site material and imported fill to raise grades to conform to finish grades, e.g. where the lake bottom will be raised;
- Construction of a "working platform" on which to operate heavy equipment atop the soft sediments;
- Construction of a clay cap layer over the methylmercury-laden soils remaining in-place;
- Construction of a levee that separates the lake from Alamitos Creek;
- Construction and reshaping of the islands;
- Reconfiguration/construction of the westerly park area;
- Construction of Alamitos Creek low-flow channel.

7.1.1 Draining the Lake

Prior to initiating earthwork at the site, Almaden Lake will need to be drained and Alamitos Creek will need to be diverted. The design of the lake dewatering and creek diversion should be made the responsibility of the contractor based on criteria provided by the District.

After the lake has been drained and creek flows diverted, the sediments on the bottom of the lake will be in a soft and wet condition. The amount of time required for these sediments to dry out to the point at which heavy equipment may be operated over them will be dependent on a number of factors, including temperature and wind. Earthwork operations, including the removal of methylmercury-laden sediments, will be hindered by the soft, wet soil conditions. To facilitate the earthwork operations, including contaminated soil removal and construction of the levee, it is anticipated that a temporary "working platform" on which to operate earthwork equipment will need to be constructed. Recommendations are provided below for a working surface. In addition to or alternatively, the use of light ground pressure equipment, such as a "mud cat" with a blade, will be needed to fluff the wet, soft lake sediments to aid in drying and further processing.

Recommendations for the handling and removal of the methylmercury-laden sediments will be provided by others.

7.1.2 Construction Dewatering

The lake will need to be drained to accomplish the construction. There is a potential for shallow or perched groundwater to be present during construction operations. Dewatering that may be required in the excavation for the levee foundation may be accomplished using sump pumps placed at the base of the excavation. However, the success of such an approach will depend largely on the contractor's ability to properly monitor and maintain the system. Should well points be required, the dewatering system should be designed and installed by an experienced dewatering contractor. It is recommended that the groundwater level be maintained at least 2 to 3 feet below the bottom of the excavation.

The existing flow in the Alamitos Creek channel will be required to be diverted away from the construction operation to facilitate the earthwork operations. A cofferdam or temporary pipe system may be constructed to accomplish diversion of the creek waters.

7.1.3 Clearing and Demolition

Prior to construction, areas to be graded should be cleared of designated existing improvements, deleterious materials, debris, obstructions, and stumps and primary roots of trees and brush (roots over 1 inch in diameter or longer than about 3 feet in length). Holes, depressions, and voids that extend below the proposed finish grade should be cleaned and backfilled with engineered fill compacted to the recommendations in this report. Abandoned utilities encountered during grading should be removed in their entirety.

After clearing, surface vegetation and organic laden soils should be stripped. Organic laden soils are defined as soils with more than 3 percent by weight of organic content. This may include the bird waste-laden sediments at the lake bottom. The required stripping depth should be determined in the field by the geotechnical engineer at the time of construction. Stripped material may be stockpiled for use in landscape areas if approved by the project landscape architect, or otherwise removed from the site.

7.1.4 Removal of Lake Sediment

All lake sediment within the foundation footprint of the new levee should be removed from the levee foundation area as shown on Figure 9. The final depth of sediment removal should be determined by the project geotechnical engineer during earthwork operations. Based on our subsurface exploration, it is estimated that the depth of soft lake sediments varies from 4 to 11 feet in the foundation area of the new levee. The base of the soft lake sediments is characterized by a distinct increase in density/consistency of the underlying alluvial sediments. It should be noted that this depth range is based on three boring locations and that the actual depth of soft sediments at the bottom of the lake will likely vary outside this range. Therefore, it is recommended that the District utilize appropriate measurement and payment clauses in the earthwork bid items to account for this anticipated variability.

The soft lake sediments consist of fine grained soils with an undrained shear strength of less than approximately 500 psf. In addition, they may contain abundant organic material originating from bird waste.

The need for removal of the soft lake sediments from other areas besides under the levee should be based on the expected or desired performance of the fill placed in these other areas and should be determined by the District.

A significant amount of the soft lake sediments are anticipated to contain elevated levels of mercury. The disposition of these soils will be determined by others, including the permissibility of leaving these soils on-site below the planned clay cap and the requirement for disposal of some of the sediments.

7.1.5 Working Surface

The new levee will be constructed over the soft lake sediments. It is likely that, due to schedule constraints, there will not be sufficient time to allow the lake sediments to dry out enough to allow heavy equipment over them. In order to facilitate operation of earthwork equipment over these soft soils, a working surface will likely need to be constructed. We currently anticipate a working surface may be constructed by placing a geogrid over the lake sediments, such as Tensar TriAx TX160, and placement of 24 inches of 1-½-inch clean crushed rock. A geotechnical engineer should be contacted to provide additional recommendations for design of a working surface or subgrade stabilization, depending on the conditions encountered during construction and the project’s requirements and restrictions.

7.1.6 Excavation

Excavations for the site will include removal of existing improvements, removal of contaminated soil, excavation for the base of the new levee, excavation of existing fill soil, and trenching for proposed conduits through the levee. It is judged that the excavations can be accomplished with conventional earthwork equipment such as excavators, backhoes, dozers, and loaders.

Because of the very low strength of the soft lake sediments and lack of an overlying confining layer, the requirement for shoring of excavations made in this material should be carefully evaluated during construction by the contractor. Contractors should be made aware that excavations should be sloped back or shored as necessary to provide safe working conditions. All excavations and shoring systems should meet the minimum requirements given in the State of California Occupational Safety and Health Standards, latest edition. Stability of all temporary excavations should be made contractually the responsibility of the contractor.

Temporary cut slopes for unshored excavations greater than 4 feet deep should be sloped back at an inclination no greater than 1:1 (horizontal to vertical). Temporary cuts made in excavated lake sediments may need to be flattened to 2:1 (horizontal to vertical) or flatter, depending on conditions encountered, due to their soft, and in some cases, loose, granular nature.

Temporary surcharge loads, including storage of construction supplies and operation of construction equipment, above the excavation should be considered in the final shoring design.

Groundwater was encountered during our investigation at between elevation 178.5 and 186 feet and will likely be encountered during the construction operation. Contractors should be made aware of the fact that the groundwater will likely complicate earthwork construction and, depending on the time of year, adjustments in the field may be necessary (e.g. subexcavation and removal of wet and soft material, installation of temporary drainage around excavations, etc.).

7.1.7 Subgrade Preparation

Subgrade soil in areas to receive engineered fills should be scarified to a minimum depth of 8 inches; moisture conditioned to about 1 to 3 percent above the laboratory optimum moisture content (as determined by ASTM D1557), and compacted to the recommendations given provided in Section 7.1.9. Prepared soil subgrades should be non-yielding when proof-rolled by a fully loaded water truck or equipment of similar weight, as approved by the geotechnical engineer. After the subgrade has been properly prepared, the area may be raised to design grades by placement of engineered fill.

Soil with moisture content above optimum value should be anticipated, given the wet environment at the site. Unstable, wet or soft soil will require processing before compaction can be achieved. If the construction schedule does not allow for air-drying, other means of creating a stable subgrade, such as lime or cement treatment, excavation and replacement, geogrids or geotextile fabrics may be considered. The method to be used should be determined at the time of construction based on the actual site conditions. It is recommended that unit prices for subgrade stabilization be obtained during the construction bid process.

7.1.8 Fill Materials

It is anticipated that fill materials for the project will include the following soil types:

- Foundation Layer or "Working Platform" – graded rock to be used, where necessary, to create a working surface for heavy equipment.
- Clay Cap – imported soil to be used as a low permeability barrier over the mercury-laden sediments in the lake. The clay cap material may be the same material as the Levee Fill Material provided it meets the requirements for permeability assumed in our analyses. In accordance with the District's Levee Safety Technical Guidance Manual, the Clay Cap material (referred to in the Manual as "Impervious Backfill Material"), should be as follows:
    - Clay Cap thickness shall be at least 5 feet in all areas. Where the clay cap is within 150 feet of the toe of the lakeside of the levee, the clay cap shall be a minimum of 10 feet thick. Alternatively, the upper 5 feet of the clay cap, where it is 10 feet thick, may be comprised of Levee Fill Material (see below);
    - Maximum particle size of 1 inch;
    - Consist of clayey material that contains not less than 30 percent by weight of material passing the No. 200 mesh sieve;
    - Plasticity index of not less than 8 percent and a liquid limit not greater than 50 percent.
    - Hydraulic conductivity of 10^{-6} cm/sec or less;
    - Free of organic matter, deleterious substances, and debris.
- Levee Fill Material – imported soil used to construct the levee. In accordance with the District's Levee Safety Technical Guidance Manual, the requirements for Levee Fill Material (referred to in the Manual as "Fill Materials for Levee"), are as follows:
    - Free of organic matter, deleterious substances, debris and rocks or lumps larger than 4 inches in greatest dimension; no more than 15 percent of the rocks or lumps should be larger than 2- ½ inches;
    - At least 75 percent of the material should be finer than No. 4 U.S. Standard Sieve and 50 percent finer than No. 200 U.S. Standard Sieve.
    - Plasticity index between 10 and 20 percent;
    - Hydraulic conductivity of 10^{-6} cm/sec or less.

7.1.9 Engineered Fill Placement and Compaction

Following the removal of the soft lake sediments from within the footprint of the proposed levee, the top of the older alluvium should be exposed. The upper 8 inches of alluvial soils should be scarified and moisture conditioned to between 1 and 3 percent above optimum moisture content, and compacted to no less than 95 percent relative compaction, based on ASTM D1557, latest edition. This compacted soil layer will serve as the base of the levee foundation.

Following the preparation of the base layer of the levee foundation, engineered fill should be placed in horizontal lifts each not exceeding 8 inches in thickness before compaction, moisture conditioned to between 1 and 3 percent above the laboratory optimum moisture content, and mechanically compacted to no less than 92 percent relative compaction. Moisture conditioning of soils should consist of adding water to the soils if they are too dry and allowing the soils to dry if they are too wet.

Due to the anticipated settlement of the soft lake sediments from placement of overlying fill, a camber (additional fill thickness) should be incorporated into the levee design. The settlement estimates provided in Section 5.6.1 should be used for guidance in determining an appropriate design camber.

Fill slopes should not be constructed steeper than 2H:1V including the levee side slopes, creek embankments, and island side slopes.

The upper 8 inches of the subgrade on the top of the levee should be compacted to no less than 95 percent relative compaction. Aggregate base in pavement areas should also be compacted to no less than 95 percent relative compaction at slightly above the optimum moisture content.

7.1.10 Proximity to Existing Structures

Based on the current plans for Alternatives 6 and 7, there does not appear to be significant structures adjacent to the area of improvements that will require protection during the construction of the proposed improvements.

7.1.11 Erosion Protection

Where Rock Slope Protection (RSP) is desired to limit the amount of erosion on the new levee slopes, the following recommendations should be considered.

For impinging flow conditions, the design section should include a total RSP thickness of 2 feet of facing class rock underlain by Caltrans Type A RSP fabric. For parallel flow conditions, the design section should include 0.75 feet of Backing No. 3 rock underlain by Caltrans Type A RSP fabric. Alternatively, an erosion resistant planting scheme may be utilized, provided the landscape architect approves.

7.2 Headwall Design Parameters

A headwall structure is planned for the inlet and outlet culvert pipes through the new levee and into the lake. The exact locations of these structures has not yet been determined. However, one will be located near the south end of the new levee and the other will be located near the north end of the new levee. It is anticipated that both structures will be constructed within levee fill. Vehicular traffic is expected over the culvert and should be considered in the culvert design. The headwall may be designed using the following recommendations.

7.2.1 Headwall Foundation Design

The proposed culverts headwalls may be supported on conventional footing foundations or mat slab foundations bearing on competent undisturbed native alluvial soil material (below the soft lake sediments) or engineered fill. Compaction of soil subgrades and engineered fill should be as recommended in Section 7.1.

For dead plus live loads, footings may be designed using a net allowable bearing pressure of 2,500 pounds per square foot (psf). The allowable bearing value may be increased by one-third when considering short-term loads such as wind and seismic forces. Reinforcement for the foundations should be determined by the project structural engineer.

Footings should be a minimum of 12 inches wide and should be embedded a minimum of 2 feet below the lowest adjacent grade or the anticipated depth of scour, whichever provides a deeper embedment.

Mat slabs should have a thickened perimeter extending to a minimum of 2 feet below the lowest adjacent grade or the anticipated depth of scour, whichever provides a deeper embedment.

Resistance to lateral loads may be developed from a combination of friction between the bottom of foundations and the supporting subgrade, and by passive resistance acting against the vertical sides of the foundations below the anticipated scour zone. For design, an friction coefficient of 0.35 between the foundations and supporting subgrade, and an passive resistance of 325 pounds per cubic foot (pcf, equivalent fluid weight) acting against the embedded sides of the foundations below the scour zone may be assumed. It should be noted that the passive resistance value is only applicable where the concrete is placed directly against undisturbed soil (the soft lake sediments do not apply) or engineered fills. Voids created by the use of forms should be backfilled with property compacted engineered fill or with concrete.

7.2.2 Lateral Earth Pressures

The headwalls and wing walls for the proposed culverts will be up to about 10 feet tall. The walls should be designed to resist static earth pressures due to the supported soil and surcharge pressures induced by exterior loads on the walls. Lateral pressures will depend on whether wall movements are allowed or desired, backfill type, backfill slope gradient, magnitude of external loads, design water elevation, and subsurface drainage provisions. The walls should be designed using the lateral pressures presented below, which are expressed as equivalent fluid weights for level backfill slope.

Soil Pressure	Normal Condition[1]	Rapid Drawdown[2]
Level Backfill Slope		
At-rest[3]	65 pcf	95 pcf
Active[4]	45 pcf	85 pcf
Passive[5]	325 pcf	325 pcf
Sloping Backfill		
At-rest[3]	88 pcf	108 pcf
Active[4]	68 pcf	98 pcf
Passive[5]	325 pcf	325 pcf

Notes:

1. Normal condition assumes water is below foundation on both water and land sides of wall.
2. Rapid drawdown condition assumes water on water side is below wall foundation level and water on land side is at high flood water level.
3. Walls that can tolerate very little or no movement, or walls where movement and settlement of the backfill associated with active soil condition is not desirable, should be designed using at-rest soil pressure.
4. To develop active soil pressures, wall movements of about 0.005H to 0.01H would be necessary for cohesive soils and 0.005H for cohesionless soils.
5. To develop passive soil pressures against wall footings, horizontal movement of up to about $0.04D_f$ would be necessary for cohesive soils and $0.005D_f$ for cohesionless soils, where D_f is the footing embedment depth.
6. Additional surcharges such as traffic and traffic impact force should be included in the design by the project structural engineer.

7.3 Additional Design Considerations

7.3.1 Settlement Monitoring

The settlement analysis indicates that the consolidation settlement of the soft lake sediments that will remain in the area beneath the low-flow channel and adjacent flood plain will take between 1.5 months and 2.3 years to reach 95% total settlement due to consolidation. Therefore, we recommend a settlement monitoring program be implemented during construction to provide information on the actual rate and amount of settlement exhibited to provide an estimate for the completion of settlement and to provide guidance on the recommended thickness of camber for the clay cap. Should the settlement prove to continue beyond the construction period, a provision should be made to evaluate the site grades after 95% consolidation has been reached and to make adjustments to the grades, if necessary.

Settlement monitoring plates with vertical riser pipes should to be installed during construction according to construction documents and before any fill is placed. The plate should be ¼-inch thick steel approximately 2-feet square and the pipe should be 2-inches in diameter. The pipe should be threaded so that extensions may be added as the fill thickness is increased. The locations of the settlement plates should be surveyed prior to placement of fill, and periodically during and following fill placement. The frequency of monitoring will depend on the rate at which fill is placed, but should be made at least once per week or as directed by the Geotechnical Engineer.

If the measured settlement is less than predicted, then the design camber can be reduced. If the measured settlement is greater than predicted, the camber should be increased accordingly. In no case should be levee side slopes be steepened to adjust for differences between the predicted and the actual settlement.

8. Limitations

The conclusions and recommendations of this report are based upon information provided to us regarding the proposed improvements, our geologic reconnaissance, subsurface conditions described on the boring logs, the results of the laboratory testing program, interpretation and analysis of the collected data, and professional judgment.

It is the District's responsibility to ensure that the recommendations contained in this report are brought to the attention of the architect, engineers, and contractors working on the project. Furthermore, it is the District's responsibility to make sure that these recommendations are carried out during the design and construction phases of the project.

Site conditions described in the text of this report are those existing at the time of our last field reconnaissance in October 2014 and are not necessarily representative of the site conditions at other times or locations.

Unanticipated soil conditions are frequently encountered during construction and cannot be fully determined by excavating a limited number of exploratory borings. Additional expenditures may be required during the construction phases of the project as conditions vary. It is recommended that a contingency fund be established to cover potential adverse soil and groundwater conditions which may be encountered during site development. If it is found during construction that subsurface conditions differ from those described on the logs of the borings, then the conclusions and recommendations in this report shall be considered invalid, unless the changes are reviewed and the conclusions and recommendations modified and approved in writing by Cal Engineering & Geology, Inc.

The findings of this report should be considered valid for period of five years unless the conditions of the site change. After a period of three years, CE&G should be contacted to review the site conditions and prepare a letter regarding the applicability of this report.

Cal Engineering & Geology, Inc. should be accorded the opportunity to review the 90 percent plans and specifications to determine if the recommendations of this report have been implemented in those documents. The recommendations of this report are contingent upon this stipulation.

Field observation and testing services are essential parts of the proposed project. It is important that Cal Engineering & Geology, Inc. be retained to observe the earthwork, foundation drilling and excavation, and other relevant construction operations. The recommendations of this report are contingent upon this stipulation.

The evaluation or identification of the potential presence of hazardous materials at the site was not requested and is beyond the scope of this project.

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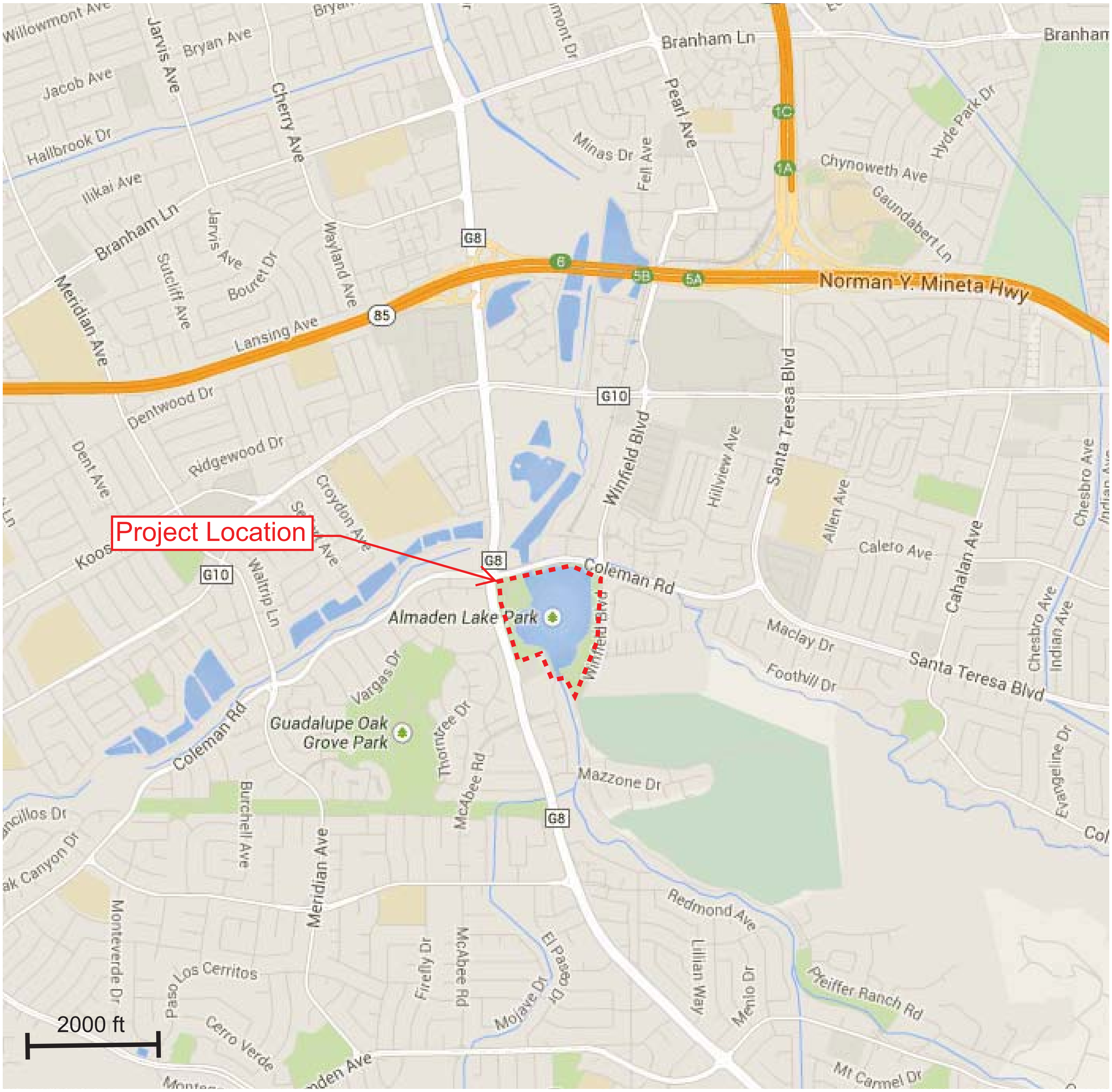
FIGURES



SOURCE: GOOGLE MAPS, 2014

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SANTA CLARA VALLEY WATER DISTRICT
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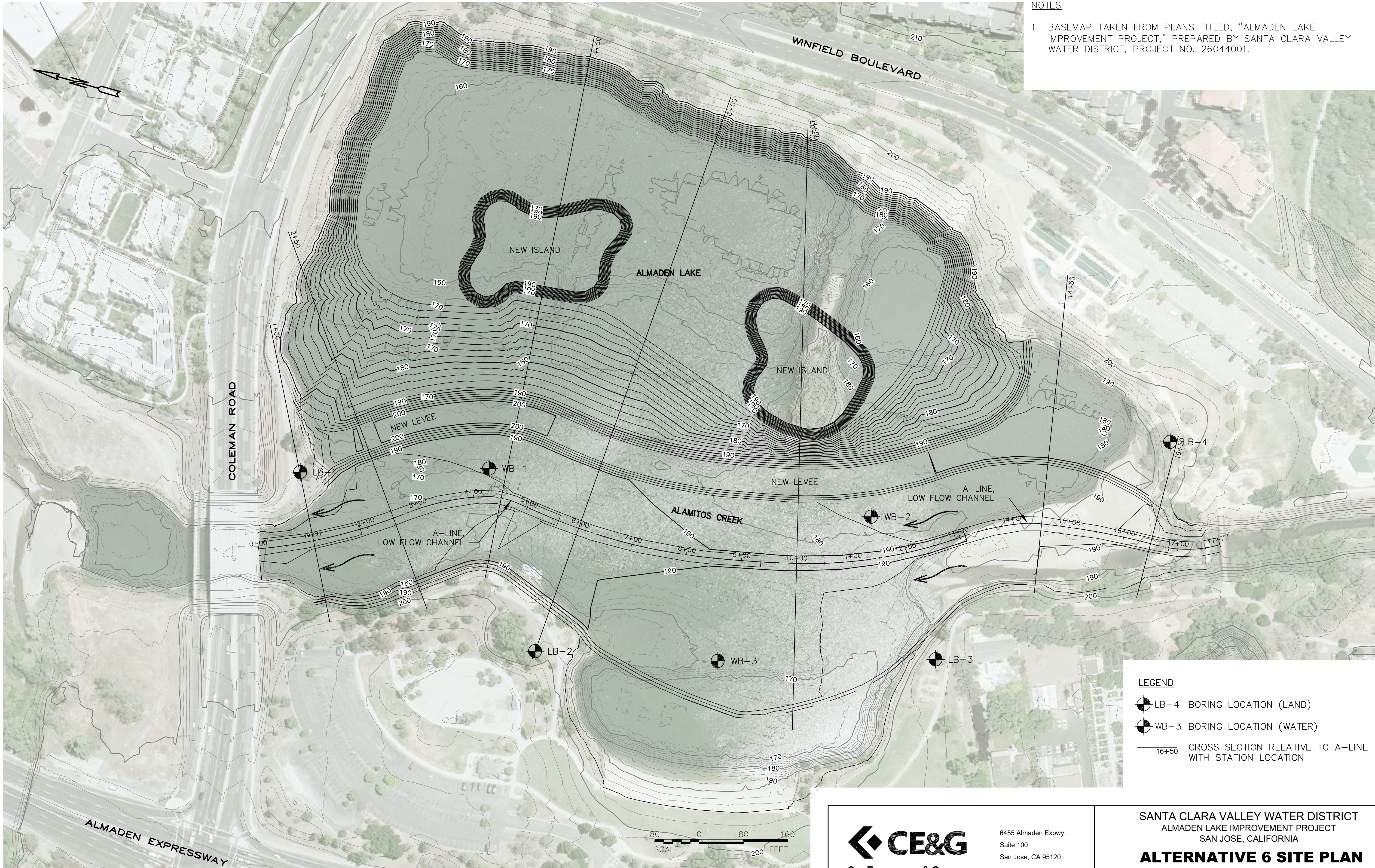
SITE LOCATION MAP

JOB NO. 140540	APRIL 2015	FIGURE 1



NOTES

1. BASEMAP TAKEN FROM PLANS TITLED, "ALMADEN LAKE IMPROVEMENT PROJECT," PREPARED BY SANTA CLARA VALLEY WATER DISTRICT, PROJECT NO. 26044001.

LEGEND

- LB-4 BORING LOCATION (LAND)
- WB-3 BORING LOCATION (WATER)
- 16+50 CROSS SECTION RELATIVE TO A-LINE WITH STATION LOCATION

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ALTERNATIVE 6 SITE PLAN

JOB NO. 140540	APRIL 2015	FIGURE 2

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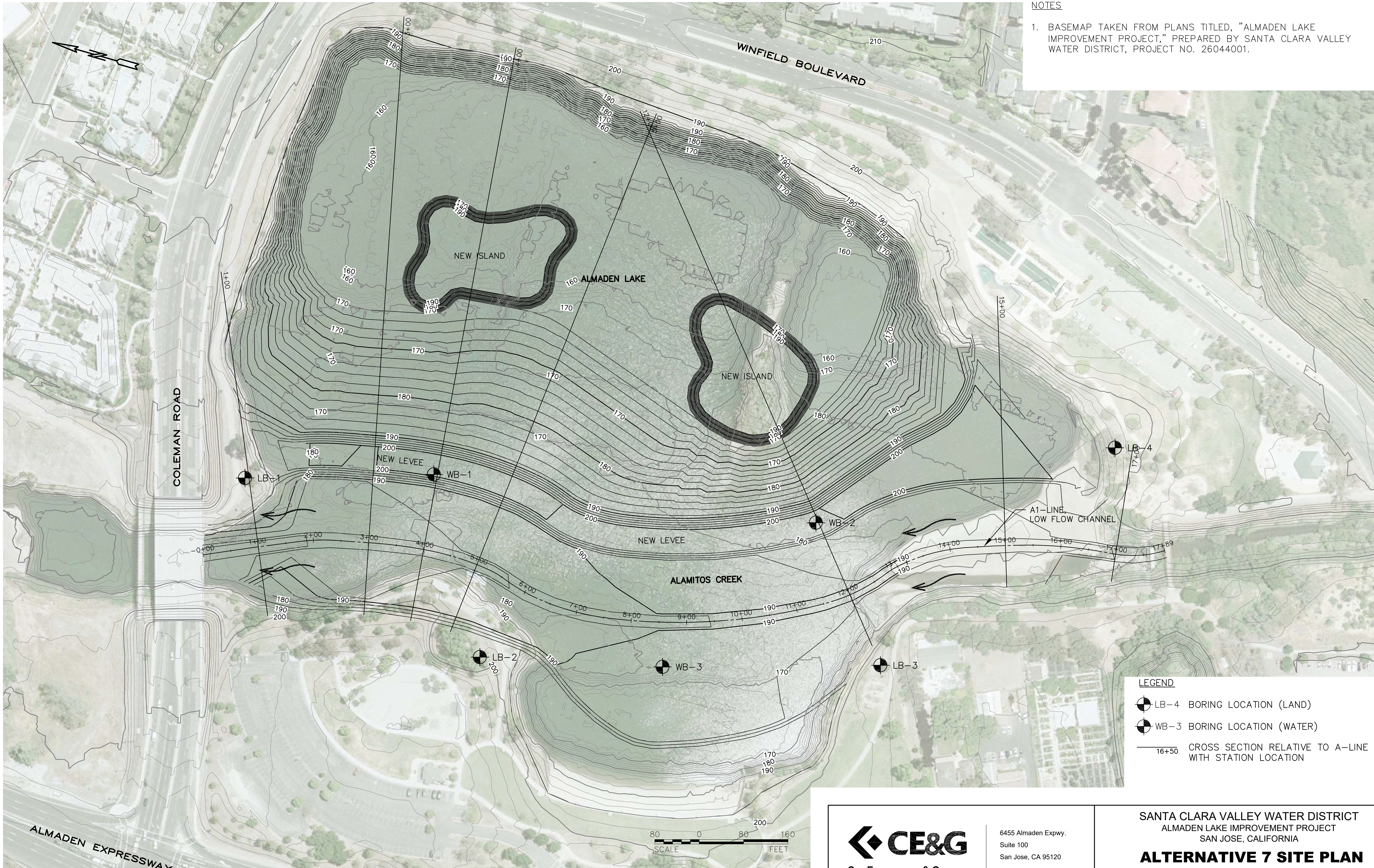

NOTES

1. BASEMAP TAKEN FROM PLANS TITLED, "ALMADEN LAKE IMPROVEMENT PROJECT," PREPARED BY SANTA CLARA VALLEY WATER DISTRICT, PROJECT NO. 26044001.

LEGEND

LB-4 BORING LOCATION (LAND)

WB-3 BORING LOCATION (WATER)

16+50 CROSS SECTION RELATIVE TO A-LINE WITH STATION LOCATION

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ALTERNATIVE 7 SITE PLAN

JOB NO. 140540	APRIL 2015	FIGURE 3

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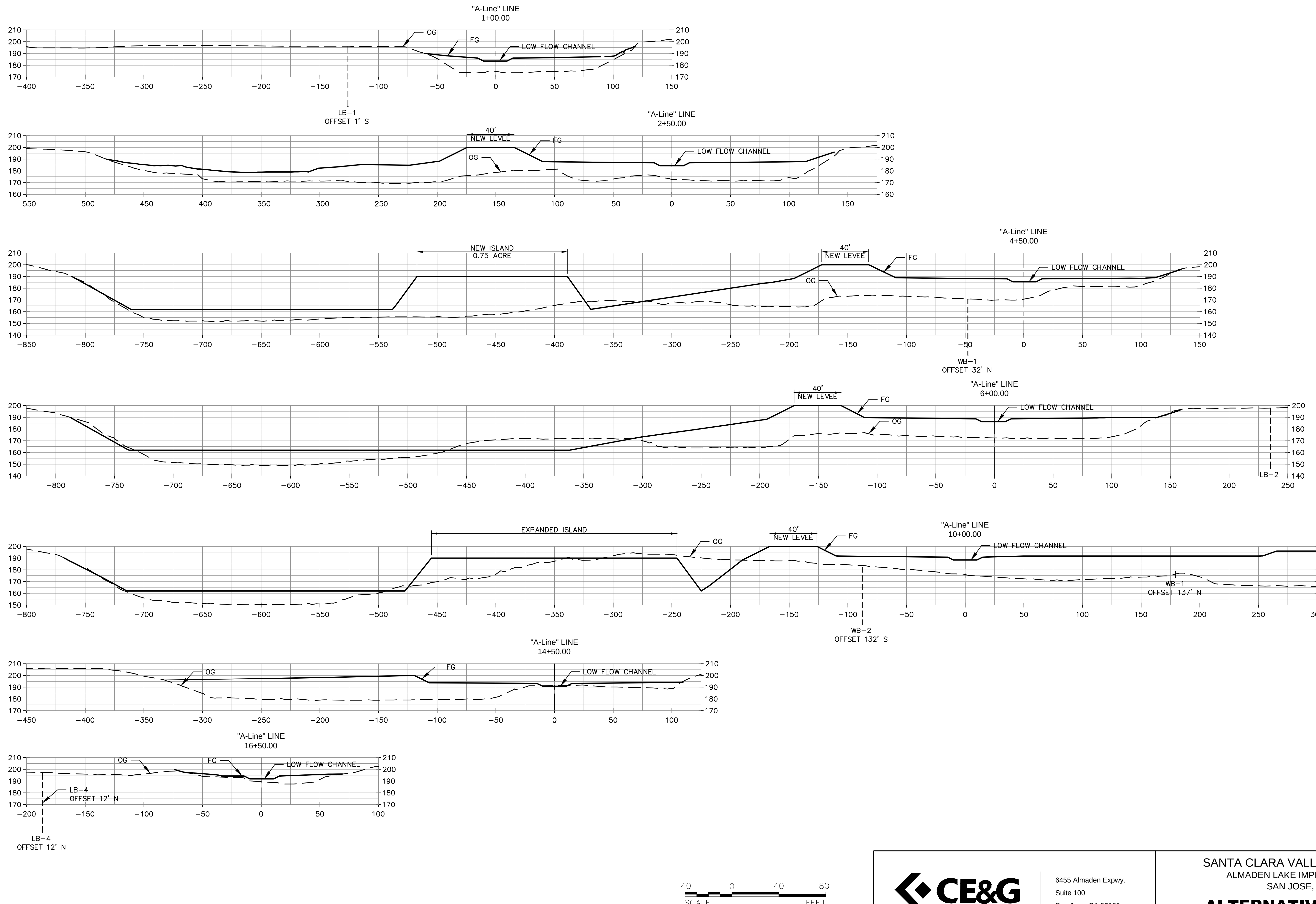

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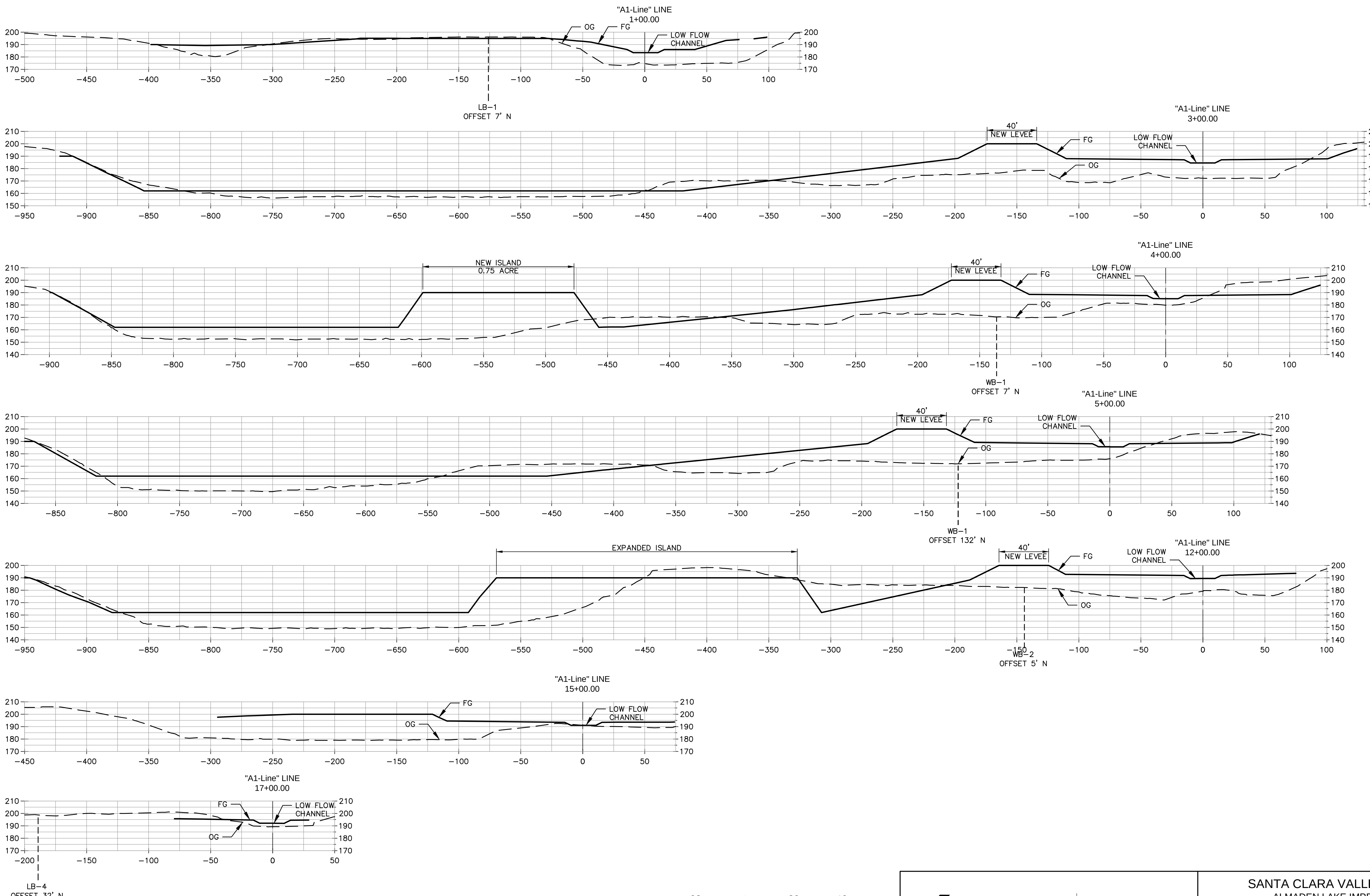
ALTERNATIVE 6 SECTIONS

JOB NO. 140540	APRIL 2015	FIGURE 4



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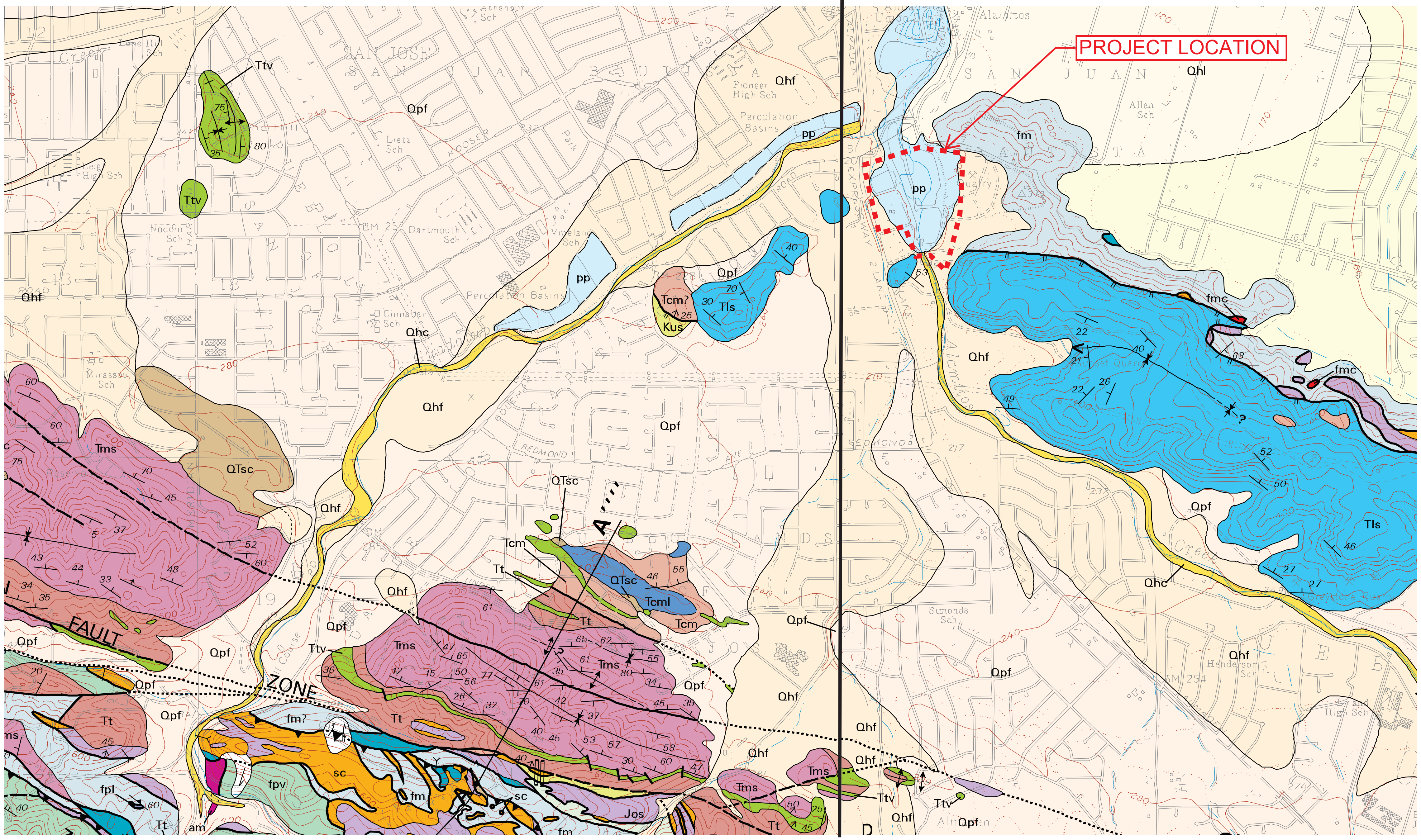
ALTERNATIVE 7 SECTIONS

JOB NO. 140540	APRIL 2015	FIGURE 5

LOS GATOS QUADRANGLE

SANTA TERESA HILLS QUADRANGLE



LEGEND

- pp Gravel pit (Holocene)
- Qhf Alluvial fan deposits (Holocene)
- Qhl Levee deposits (Holocene)
- Qhc Stream channel deposits (Holocene)
- Qpf Alluvial fan deposits (Pleistocene)
- sc Silica-carbonate rock (Miocene?)
- Jos Serpentinized ultramafic rocks (Jurassic?)
- fm Melange of the Central belt (Upper Cretaceous)
- fmc Radiolarian chert (Lower Cretaceous and Jurassic)
- Tls Sandstone and mudstone (Eocene)
- Tcm Mottled mudstone and sandstone of Mount Chual (Lower Eocene)
- Kus Sandstone and shale (Upper Cretaceous)

Note:
Units summary descriptions above are located within approximately 1 mile of the project location. Full descriptions of Units shown are located in USGS MF-2373.

SCALE 1:24 000

1 0.5 0 KILOMETERS 1 2
1000 500 0 METERS 1000 2000
1 0.5 0 MILES 1
1000 0 1000 2000 3000 4000 5000 6000 7000 8000 9000 10000 FEET

REFERENCE: "GEOLOGIC MAPS AND STRUCTURE SECTIONS OF THE SOUTHWESTERN SANTA CLARA VALLEY AND SOUTHERN SANTA CRUZ MOUNTAINS, SANTA CLARA AND SANTA CRUZ COUNTIES, CALIFORNIA," BY MCLAUGHLIN AND OTHERS, 2001, USGS MISCELLANEOUS FIELD STUDIES MAP MF-2373

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REGIONAL GEOLOGY MAP

JOB NO. 140540	APRIL 2015	FIGURE 6

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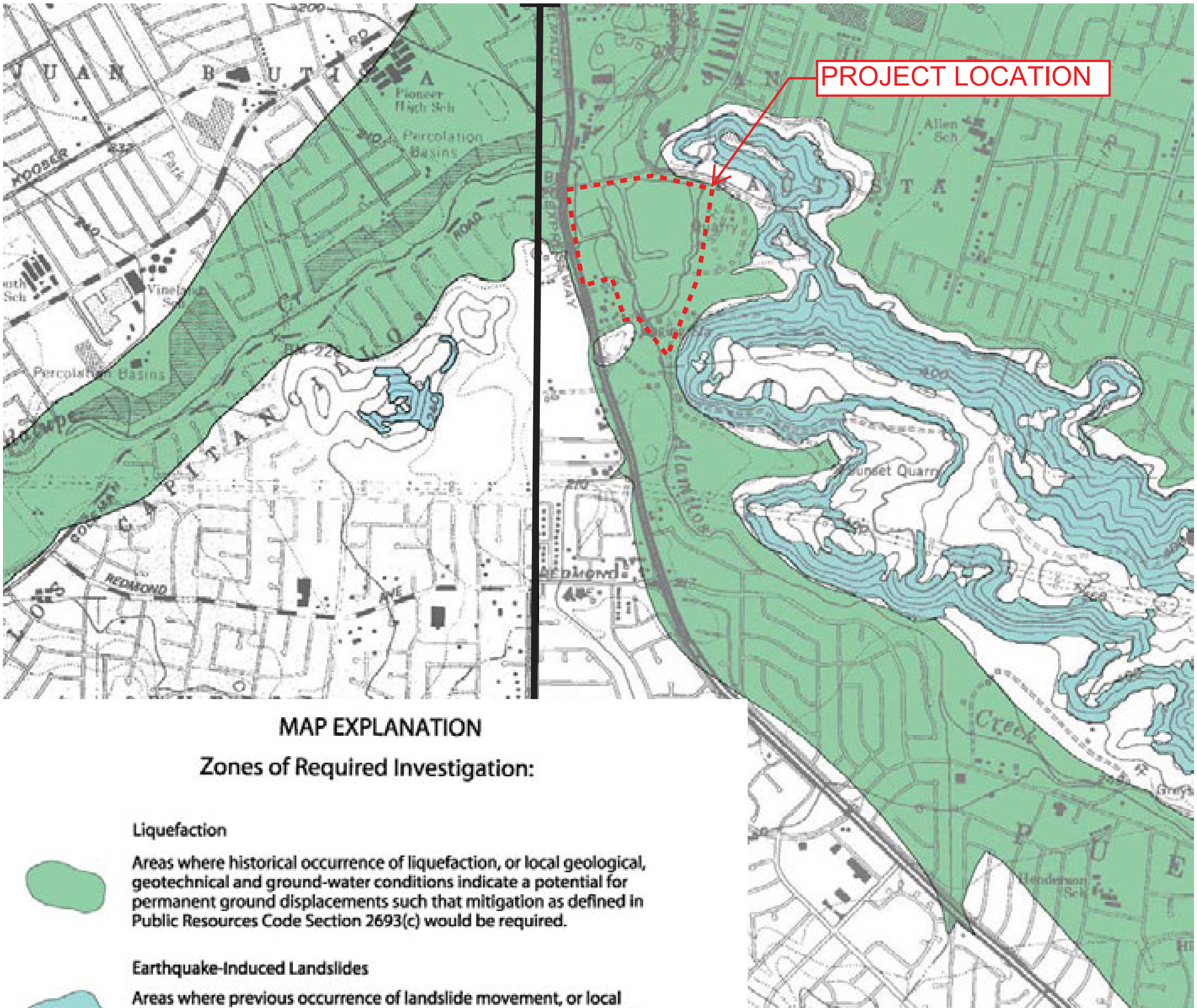
LOS GATOS QUADRANGLE

SANTA TERESA HILLS QUADRANGLE



MAP EXPLANATION

Zones of Required Investigation:

Liquefaction

Areas where historical occurrence of liquefaction, or local geological, geotechnical and ground-water conditions indicate a potential for permanent ground displacements such that mitigation as defined in Public Resources Code Section 2693(c) would be required.

Earthquake-Induced Landslides

Areas where previous occurrence of landslide movement, or local topographic, geological, geotechnical and subsurface water conditions indicate a potential for permanent ground displacements such that mitigation as defined in Public Resources Code Section 2693(c) would be required.

NOTE: Seismic Hazard Zones identified on this map may include developed land where delineated hazards have already been mitigated to city or county standards. Check with your local building/planning department for information regarding the location of such mitigated areas.

SCALE 1:24,000

1 .5 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 .5 0 1 KILOMETER

SOURCE - SEISMIC HAZARD ZONES MAP
LOS GATOS QUADRAGLE - 2002

SOURCE - SEISMIC HAZARD ZONES MAP
SANTA TERESA HILLS QUADRANGLE - 2003

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SEISMIC HAZARD ZONE MAP

JOB NO. 140540	APRIL 2015	FIGURE 7

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

Map Unit Symbol	Map Unit Name
131	Urban land-Elpaloalto complex, 0 to 2 percent slopes
160	Urbanland-Clear Lake complex, 0 to 2 percent slopes
165	Urbanland-Campbell complex, 0 to 2 percent slopes, protected
170	Urbanland-Landelspark complex, 0 to 2 percent slopes
190	Cumulic Haploxerolls, 1 to 5 percent slopes
306	Alo-Altamont complex, 30 to 50 percent slopes
375	Alumrock-Zepplin complex, 15 to 30 percent slopes
378	Urbanland-Alumrock-Zeppelin complex, 9 to 15 percent slopes
W	Water

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Santa Clara Area, California, Western Part
Survey Area Data: Version 3, Sep 18, 2014

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NRCS SURFICIAL SOIL MAP

JOB NO. 140540	APRIL 2015	FIGURE 8

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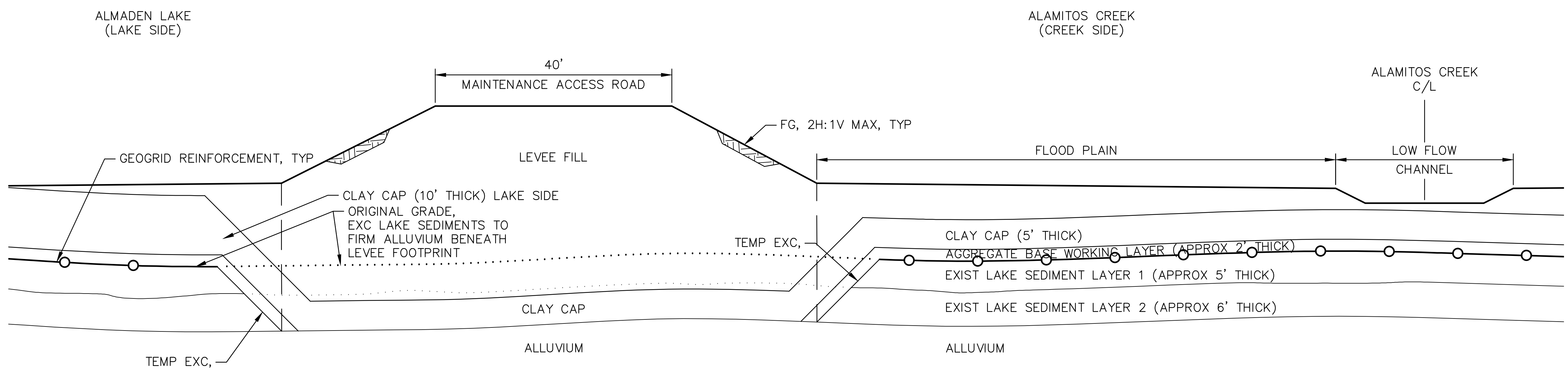
NOTES

1. THIS SECTION IS INTENDED TO SHOW THE TYPICAL WIDTH AND DEPTH OF THE LEVEE AND RECOMMENDED SUBEXCAVATION OF SOFT LAKE SEDIMENTS.

2. THE LAYER THICKNESSES SHOWN ARE SCHEMATIC AND VARY ACROSS THE SITE.

3. THE MINIMUM WIDTH OF THE SUBEXCAVATION SHOULD EXTEND FROM THE LEVEE TOE ON THE LAKE SIDE TO THE LEVEE TOE ON THE CREEK SIDE. STABILITY OF THE TEMPORARY CONSTRUCTION SLOPES ARE THE RESPONSIBILITY OF THE CONTRACTOR.



TYPICAL LEVEE SECTION

10 0 10 20
SCALE FEET

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SAN JOSE, CALIFORNIA

TYPICAL LEVEE SECTION

JOB NO. 140540	APRIL 2015	FIGURE 9

M:\2014\140540 SCVWD Almaden Lake Improvements\AutoCAD Files\Figures\Figure 9.2015.01.15.dwg 4-30-15 08:18:03 AM ezone

APPENDIX A

Boring Logs

Analytical Test Results of Drill Cuttings and Drilling Fluid

KEY TO SYMBOLS

CAL ENGINEERING & GEOLOGY

CLIENT Santa Clara Valley Water District

PROJECT NAME Almaden Lake Improvement Project

PROJECT NUMBER 140540

PROJECT LOCATION San Jose, California

LITHOLOGIC SYMBOLS (Unified Soil Classification System)

ASPHALT: Asphalt

CH: USCS High Plasticity Clay

CL: USCS Low Plasticity Clay

GM: USCS Silty Gravel

GP: USCS Poorly-graded Gravel

GW: USCS Well-graded Gravel

GW-GC: USCS Well-graded Gravel with Clay

GW-GM: USCS Well-graded Gravel with Silt

MH: USCS Elastic Silt

ML: USCS Silt

OH: USCS High Plasticity Organic silt or clay

SC: USCS Clayey Sand

SM: USCS Silty Sand

SP: USCS Poorly-graded Sand

SW: USCS Well-graded Sand

SW-SC: USCS Well-graded Sand with Clay

SAMPLER SYMBOLS

California Modified Sampler

Shelby Tube

Standard Penetration Test

WELL CONSTRUCTION SYMBOLS

ABBREVIATIONS

LL - LIQUID LIMIT (%)
PI - PLASTIC INDEX (%)
W - MOISTURE CONTENT (%)
DD - DRY DENSITY (PCF)
NP - NON PLASTIC
-200 - PERCENT PASSING NO. 200 SIEVE
PP - POCKET PENETROMETER (TSF)

TV - TORVANE
PID - PHOTOIONIZATION DETECTOR
UC - UNCONFINED COMPRESSION
ppm - PARTS PER MILLION

Water Level at Time Drilling, or as Shown

Water Level at End of Drilling, or as Shown

Water Level After 24 Hours, or as Shown

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Cal Engineering & Geology

BORING NUMBER LB-1

CLIENT Santa Clara Valley Water District

PROJECT NAME Almaden Lake Improvement Project

PROJECT NUMBER 140540

PROJECT LOCATION San Jose, California

DATE STARTED 9/8/2014 **COMPLETED** 9/8/2014

GROUND ELEVATION 197 ft **DATUM** WGS84 **HOLE SIZE** 6 in.

DRILLING CONTRACTOR Taber Drilling

COORDINATES: LATITUDE 37.2427 **LONGITUDE** -121.87241

DRILLING RIG/METHOD CME-55/6-in. Hollowstem Auger

▽ **GROUNDWATER AT TIME OF DRILLING** 18.5 ft / Elev 178.5 ft

LOGGED BY D. Burger **CHECKED BY** D. Peluso

GROUNDWATER AT END OF DRILLING ---

HAMMER TYPE 140 lb hammer with 30 in. autotrip

GROUNDWATER AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE	BLOW COUNTS (FIELD VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT (%)	ATTERBERG LIMITS: PLASTIC LIMIT (%)	ATTERBERG LIMITS: PLASTICITY INDEX (%)	FINES CONTENT (%)
0		SILT with SAND (ML), brown, dry (ARTIFICIAL FILL)									
		CLAYEY SAND (SC), brown and light brown, moist, dense, angular to rounded gravel up to 1/2 in., very fine to fine sand	CM	15-31-45			9	35	19	16	46
5		WELL GRADED GRAVEL with SILT and SAND (GW-GM), brown, dry to moist, very dense, gravel greater than 2.5 in., very fine to medium sand	CM	37-50							
		CLAYEY SAND (SC), brown, dry to moist, dense, gravel greater than 2.5 in., very fine to medium sand	SPT	17-13-40							
		Grades to WELL GRADED GRAVEL with SILT and SAND (GW-GM)									
10		CLAYEY SAND with GRAVEL (SC), brown grades to gray, moist, medium dense, rounded gravel up to 1/2 in., very fine to coarse sand	CM	6-7-14		120	8				16
		Asphalt with rounded gravel up to 1 in. at the bottom of the sample.									
15		WELL GRADED SAND with GRAVEL and CLAY (GW-GC) and Old Asphalt, very dark brown to black, moist, dense to very dense, rounded gravel up to 1/2 in., very fine to very coarse sand Assumed contact at 18 ft based on driller's indication.	CM	14-42-22		124	5				
		▽ POORLY GRADED SAND (SP) to WELL GRADED SAND with GRAVEL (SW) (ALLUVIUM)									
20		WELL GRADED GRAVEL with SAND and SILT (GW-GM), brown to gray brown, wet, medium dense, fine to very coarse sand, rounded to subrounded gravel up to 3/4 in.	CM	7-14-16		128	11				7
25		WELL GRADED GRAVEL with SAND and SILT (GW-GM), gray with red brown mottling, wet, dense to very dense, fine to very coarse sand, some clay, rounded to subangular gravel up to 1/2 in.	CM	16-41-32		131	9				
30		WELL GRADED GRAVEL with SAND and SILT (GW-GM), brown, wet, medium dense, fine to very coarse sand, rounded to subangular gravel up to 3/4 in.	CM	22-17-18							
		WELL GRADED SAND with GRAVEL and SILT (SW-SM), brown, wet, medium dense, fine to very coarse sand, rounded to subangular gravel up to 3/4 in.									
35											

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CLIENT Santa Clara Valley Water District
PROJECT NAME Almaden Lake Improvement Project
PROJECT NUMBER 140540
PROJECT LOCATION San Jose, California

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE	BLOW COUNTS (FIELD VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT (%)	ATTERBERG LIMITS: PLASTIC LIMIT (%)	ATTERBERG LIMITS: PLASTICITY INDEX (%)	FINES CONTENT (%)
35		WELL GRADED GRAVEL with SAND and SILT (GW-GM) grades to WELL GRADED GRAVEL with SAND (GW), brown, wet, medium dense, angular to subrounded gravel up to 1 in., very fine to very coarse sand	CM	15-14-15		118	14				10
40		WELL GRADED GRAVEL with SAND and SILT (GW-GM), wet, dense, fine to very coarse sand, angular to subrounded gravel up to 2 in.	CM	34-31-28							
		WELL GRADED SAND with GRAVEL and SILT (SW-SM), gray brown, wet, dense, fine to very coarse sand, angular to subangular gravel up to 1/2 in.									
45			CM	15-13-29							
		WELL GRADED GRAVEL with SAND (GW) to WELL GRADED GRAVEL with SILT (GW-GM), brown, wet, medium dense, subrounded to angular gravel up to 2 in., fine to coarse sand									
50			CM	7-13-15							

Bottom of borehole at 51.5 ft. Borehole backfilled with grout.

BORING NUMBER LB-2

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CLIENT Santa Clara Valley Water District
PROJECT NAME Almaden Lake Improvement Project
PROJECT NUMBER 140540
PROJECT LOCATION San Jose, California
DATE STARTED 9/9/2014 **COMPLETED** 9/9/2014
GROUND ELEVATION 197 ft **DATUM** WGS84 **HOLE SIZE** 6 in.
DRILLING CONTRACTOR Taber Drilling
COORDINATES: LATITUDE 37.24133 **LONGITUDE** -121.87305
DRILLING RIG/METHOD CME-55/6-in. Hollowstem Auger
GROUNDWATER AT TIME OF DRILLING ---
LOGGED BY D. Burger **CHECKED BY** D. Peluso
GROUNDWATER AT END OF DRILLING ---
HAMMER TYPE 140 lb hammer with 30 in. autotrip
GROUNDWATER AFTER DRILLING 15.0 ft / Elev 182.0 ft

DEPTH (ft)	MATERIAL DESCRIPTION	SAMPLE TYPE	BLOW COUNTS (FIELD VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT (%)	ATTERBERG LIMITS: PLASTIC LIMIT (%)	ATTERBERG LIMITS: PLASTICITY INDEX (%)	FINES CONTENT (%)
0	SANDY SILT (ARTIFICIAL FILL)									
	GRAVELLY LEAN CLAY (CL), brown, moist, hard, angular gravel up to 3/4 in., very fine to medium sand	CM	20-20-19		102	9				
	WELL GRADED GRAVEL with SAND and SILT (GW-GC), brown, moist, medium dense, angular gravel up to 75 in., very fine to medium sand									
5	SANDY SILT with GRAVEL (ML), brown, dry, hard	CM	27-30-25			3				12
	WELL GRADED GRAVEL with SAND and SILT (GW-GM), brown, dry, dense, angular gravel up to 3/4 in., very fine to medium sand									
	ELASTIC SILT (MH), very dark gray, wet, soft									
10	Old asphalt and base rock gravel and concrete. Concrete fragments in cuttings.	CM	3-50/3"							
		SPT	50/4"							
15	SILTY GRAVEL with SAND and ASPHALT (GM), dark gray, wet, medium dense, very fine to coarse sand, angular gravel up to .75 in.	CM	2-12-18		122	11				19
20	WELL GRADED SAND with GRAVEL and SILT (SW-SM), gray, wet, medium dense, fine to very coarse sand, subangular to rounded gravel up to 2 in. (ALLUVIUM) Wood fragments in cuttings at 23'.	CM	12-23-21		131	9				9
25	WELL GRADED GRAVEL with SAND and SILT (GW-GM), gray with brown lenses, wet, dense, angular to subrounded gravel up to 1 ft., fine to coarse sand	CM	19-25-24							8
	WELL GRADED GRAVEL with SAND and SILT (GW-GM), brown, wet, dense, fine to coarse sand, angular to subangular gravel up to 1 in.									
30		CM	23-33-25			14				8
35										

(Continued Next Page)

CLIENT Santa Clara Valley Water District

PROJECT NAME Almaden Lake Improvement Project

PROJECT NUMBER 140540

PROJECT LOCATION San Jose, California

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE	BLOW COUNTS (FIELD VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT (%)	ATTERBERG LIMITS: PLASTIC LIMIT (%)	ATTERBERG LIMITS: PLASTICITY INDEX (%)	FINES CONTENT (%)
35		WELL GRADED GRAVEL with SAND and SILT (GW-GM), brown to gray brown, wet, dense, fine to very coarse sand, angular to subrounded gravel up to 1/2 in. with isolated cobbles larger than 2.5 in. at the bottom of the sample. Lenses of well graded sand with gravel and silt	CM	13-30-34							
40		WELL GRADED GRAVEL with SAND (GW) to WELL GRADED SAND and SILT (GW-GM), brown gray, wet, very dense, gravel larger than 1.25 in. at the bottom	CM	30-44-50/5"							
45		WELL GRADED GRAVEL with SAND and SILT (GW-GM)	CM	13-24-25							
50		WELL GRADED GRAVEL with SAND and SILT (GW-GM), gray to brown, wet, dense, angular to subangular gravel up to 1in., fine to very coarse sand	SPT	12-17-17			11				

Bottom of borehole at 51.5 ft. Borehole backfilled with grout.

BORING NUMBER LB-3

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CLIENT Santa Clara Valley Water District
PROJECT NAME Almaden Lake Improvement Project
PROJECT NUMBER 140540
PROJECT LOCATION San Jose, California
DATE STARTED 9/9/2014 **COMPLETED** 9/9/2014
GROUND ELEVATION 202 ft **DATUM** WGS84 **HOLE SIZE** 6 in.
DRILLING CONTRACTOR Taber Drilling
COORDINATES: LATITUDE 37.23942 **LONGITUDE** -121.87238
DRILLING RIG/METHOD CME-55/6-in. Hollowstem Auger
GROUNDWATER AT TIME OF DRILLING ---
LOGGED BY D. Burger **CHECKED BY** D. Peluso
GROUNDWATER AT END OF DRILLING ---
HAMMER TYPE 140 lb hammer with 30 in. autotrip
GROUNDWATER AFTER DRILLING 14.0 ft / Elev 188.0 ft

DEPTH (ft)	MATERIAL DESCRIPTION	SAMPLE TYPE	BLOW COUNTS (FIELD VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT (%)	ATTERBERG LIMITS: PLASTIC LIMIT (%)	ATTERBERG LIMITS: PLASTICITY INDEX (%)	FINES CONTENT (%)
0	4 in. mulch underlain by silt with sand (ML) (ARTIFICIAL FILL)									
	SANDY SILT (ML), brown, dry, hard, few angular gravel, very fine to medium sand	CM	28-34-46							
5	WELL GRADED SAND with GRAVEL and SILT (SW-SM), brown, dry, dense, angular to subangular gravel up to 1/2 in. in SPT sampler	CM	35-44-34							
	WELL GRADED SAND with GRAVEL and SILT (SW-SM), brown, dry, very dense, angular to subrounded gravel up to 1 in., very fine to coarse sand, trace iron stains									
10		CM	25-47-48			3				10
14 (groundwater)	WELL GRADED SAND with GRAVEL and SILT (SW-SM), brown, wet, dense, angular sand, medium to very coarse, rounded to subangular gravel up to 1", chert and graywacke, rock fragments, isolated cobble at the bottom of sample greater than 2.5 in. (ALLUVIUM)									
15		CM	18-29-19		124	10				9
20		CM	15-24-35							
	WELL GRADED GRAVEL with SAND and CLAY (GW-GC), brown grades to brown gray, wet, dense, angular gravel up to 3/4 in., fine to very coarse sand									
	WELL GRADED GRAVEL with SAND and SILT (GW-GM), brown to gray brown, wet, medium dense, angular to subangular gravel, fine to very coarse sand									
25		CM	11-15-10		115	12				5
	WELL GRADED GRAVEL with SAND and SILT (GW-GM) to WELL GRADED GRAVEL with SILT (GW-GM), brown to gray brown, wet, medium dense									
30		CM	12-19-23		132	13				9
35										

(Continued Next Page)

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BORING NUMBER LB-3

CLIENT Santa Clara Valley Water District

PROJECT NAME Almaden Lake Improvement Project

PROJECT NUMBER 140540

PROJECT LOCATION San Jose, California

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE	BLOW COUNTS (FIELD VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT (%)	ATTERBERG LIMITS: PLASTIC LIMIT (%)	ATTERBERG LIMITS: PLASTICITY INDEX (%)	FINES CONTENT (%)
35		WELL GRADED SAND with GRAVEL and SILT (SW-SM) to WELL GRADED SAND with GRAVEL (SW), gray brown, wet, medium dense, medium to very coarse sand, subangular to subrounded gravel up to 1/2 in.	CM	23-28-20							
		SANDY SILT (ML), gray brown, wet, firm, low to non plastic, very fine to fine sand									
40			CM	5-13-20		114	17				27
		WELL GRADED SAND with GRAVEL and SILT (SW-SM), gray brown, wet, medium dense, angular to subrounded gravel up to 3/8 in., very fine to medium sand									
		SILTY SAND (SM), gray brown, wet, loose, fine to medium sand, trace iron stains									
45			CM	4-7-6		89	34				26
		Pushed rock while driving to recover gravel larger than 1.25 in. and SANDY CLAY with GRAVEL (CL) to WELL GRADED SAND with GRAVEL and CLAY (SW-SM), brown, wet, dense									
50			SPT	14-18-24			3				

Bottom of borehole at 51.5 ft. Borehole backfilled with grout.

BORING NUMBER LB-4

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CLIENT Santa Clara Valley Water District
PROJECT NAME Almaden Lake Improvement Project
PROJECT NUMBER 140540
PROJECT LOCATION San Jose, California
DATE STARTED 9/8/2014 **COMPLETED** 9/8/2014
GROUND ELEVATION 195 ft **DATUM** WGS84 **HOLE SIZE** 6 in.
DRILLING CONTRACTOR Taber Drilling
COORDINATES: LATITUDE 37.23862 **LONGITUDE** -121.87067
DRILLING RIG/METHOD CME-55/6-in. Hollowstem Auger
▽ **GROUNDWATER AT TIME OF DRILLING** 9.0 ft / Elev 186.0 ft
LOGGED BY D. Burger **CHECKED BY** D. Peluso
GROUNDWATER AT END OF DRILLING ---
HAMMER TYPE 140 lb hammer with 30 in. autotrip
GROUNDWATER AFTER DRILLING ---

DEPTH (ft)	MATERIAL DESCRIPTION	SAMPLE TYPE	BLOW COUNTS (FIELD VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT (%)	ATTERBERG LIMITS: PLASTIC LIMIT (%)	ATTERBERG LIMITS: PLASTICITY INDEX (%)	FINES CONTENT (%)
0	SILT with SAND and GRAVEL (ML), brown, dry (ARTIFICIAL FILL)									
	WELL GRADED GRAVEL with SAND and CLAY (GW-GC) to GRAVELLY LEAN CLAY with SAND (CL), brown to light brown and gray, dry to moist, very dense to very hard, angular to subangular gravel up to 1 in.	CM	15-40-40			4				
5	WELL GRADED GRAVEL with SAND (GW), brown, dry to moist, very dense, angular to rounded gravel up to 1 in..	CM	25-50			5				
	WELL GRADED SAND with GRAVEL and SILT (SW-SM), brown, moist, dense	SPT	27-22-16							
10	▽ Driller indicated large cobbles while drilling. WELL GRADED SAND with GRAVEL and SILT (SW-SM), brown, wet, medium dense, medium to very coarse sand, angular to subrounded gravel up to 1/2 in. (ALLUVIUM)	SPT	14-11-9			11				11
15	POORLY GRADED SAND (SP), olive gray brown, wet, loose, very fine to medium sand	CM	0-5-27		93	33				39
	CLAYEY SAND (SC), brown, wet, dense, angular gravel up to 3/4 in.									
20	WELL GRADED GRAVEL with SAND and CLAY (GW-GC), gray brown to brown, wet, dense, angular gravel up to 1/2 in. with gravel greater than 2.5 in. at the bottom of the sample, very fine to very coarse sand	CM	12-23-29		122	14				
25	WELL GRADED GRAVEL with SAND and CLAY (GW-GC) to CLAYEY GRAVEL in lenses (GW-GC), moist to wet, dense, rounded to subangular gravel up to 1 in., fine to coarse sand	CM	17-16-37		130	12				
30	SANDY LEAN CLAY (CL), brown, moist, firm grades to hard	CM	6-8-10		107	20	36	17	19	64
	SILT with SAND (ML)									
35	POORLY GRADED SAND (SP), brown gray, wet, loose, very fine to medium sand									

(Continued Next Page)

CLIENT Santa Clara Valley Water District
PROJECT NAME Almaden Lake Improvement Project
PROJECT NUMBER 140540
PROJECT LOCATION San Jose, California

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE	BLOW COUNTS (FIELD VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT (%)	ATTERBERG LIMITS: PLASTIC LIMIT (%)	ATTERBERG LIMITS: PLASTICITY INDEX (%)	FINES CONTENT (%)
35		WELL GRADED SAND with SILT (SW-SM), brown gray, wet, medium dense, fine to very coarse sand, angular to subangular gravel up to 1/2 in.	CM	3-5-20		116	18				5
40		WELL GRADED SAND (SW), brown gray, wet, dense									
		WELL GRADED GRAVEL (GW), angular gravel larger than 2.5 in. at 41 ft	CM	25-39-45			11				
		WELL GRADED SAND with GRAVEL and CLAY (GW-GC) to CLAYEY SAND with GRAVEL (SC), brown gray, wet, very dense, very fine to very coarse sand, angular to subangular gravel up to 3/4 in.									
45		WELL GRADED SAND with GRAVEL (SW), brown gray, wet, medium dense									
		SANDY FAT CLAY (CH), gray brown, moist, hard, trace gravel	CM	7-13-17				55	19	36	65
50		SILTY SAND (SM) grades to WELL GRADED GRAVEL with SAND and SILT (GW-GM), brown, gray, wet, very dense, very fine to coarse sand	SPT	50/3"							

Bottom of borehole at 50.3 ft. Borehole backfilled with grout.

BORING NUMBER WB-1

CE&G — CAL ENGINEERING & GEOLOGY

CLIENT Santa Clara Valley Water District
PROJECT NAME Almaden Lake Improvement Project
PROJECT NUMBER 140540
PROJECT LOCATION San Jose, California
DATE STARTED 10/8/2014 **COMPLETED** 10/8/2014
GROUND ELEVATION 173 ft **DATUM** WGS84 **HOLE SIZE** 5 in.
DRILLING CONTRACTOR Taber Drilling
COORDINATES: LATITUDE 37.24181 **LONGITUDE** -121.87205
DRILLING RIG/METHOD CME-45/Rotary Wash
GROUNDWATER AT TIME OF DRILLING --- 18 ft above Sediment
LOGGED BY D. Burger **CHECKED BY** D. Peluso
GROUNDWATER AT END OF DRILLING ---
HAMMER TYPE 140 lb hammer with 30 in. autotrip
GROUNDWATER AFTER DRILLING ---

DEPTH (ft)	MATERIAL DESCRIPTION	SAMPLE TYPE	BLOW COUNTS (FIELD VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT (%)	ATTERBERG LIMITS: PLASTIC LIMIT (%)	ATTERBERG LIMITS: PLASTICITY INDEX (%)	FINES CONTENT (%)
0	SILT (ML) to ELASTIC SILT (MH) with ORGANICS (OH), black, wet, very soft, few sand, Pocket Torvane= 0.016 tsf at 2 ft (LAKE SEDIMENT)	SH		0.1						
	Interbedded layers of SANDY SILT (ML), PEAT (PT), and FAT CLAY (CH), black to dark gray, wet, very soft	CM	0-0-1		32	145				
5	LEAN CLAY with SAND (CL), dark gray, wet, very soft, very fine to fine sand, Pocket Torvane= 0.05 tsf at 7 ft	SH			55	72	45	26	19	82
		CM	15-20-20	0.1	122	11				10
10	WELL GRADED GRAVEL with SAND and SILT (GW-GM), light gray olive brown, wet, medium dense (ALLUVIUM)									
	WELL GRADED GRAVEL with SAND and SILT (GW-GM), gray brown, wet, dense, fine to coarse sand, angular to subangular gravel up to 1/2 in.	SPT	17-17-15							
	WELL GRADED SAND with GRAVEL and SILT (SW-SM), brown gray, wet, dense, subrounded to subangular gravel up to 3/4 in., very fine to very coarse sand	SPT	17-13-24			9				11
15	Driller indicated isolated large gravel/cobbles and increased drilling resistance.									
	WELL GRADED GRAVEL with SAND and SILT (GW-GM), gray brown to brown gray, wet, very dense, fine to very coarse sand, angular to subangular gravel up to 3/4 in.	SPT	22-24-26			10				9
20	SILTY SAND (SM), brown gray, wet, dense, fine to coarse sand, angular to subangular gravel up to 1/2 in	SPT	24-25-17			10				13
25	Increased gravel content in cuttings at 24 ft.									
	WELL GRADED GRAVEL with SAND and SILT (GW-GM) with lenses of WELL GRADED SAND with GRAVEL and SILT (SW-SM), gray brown, wet, very dense, angular to subangular gravel up to 1 in., fine to very coarse sand	SPT	14-27-32			11				7
30	Increased gravel content in cuttings, subrounded gravel up to 3/4 in.									
	WELL GRADED GRAVEL with SAND and SILT (GW-GM), brown gray, wet, dense, gravel grater than 1.5 in. at bottom of sampler resulting in limited recovery of sample	SPT	20-26-20							
35										

(Continued Next Page)

CLIENT Santa Clara Valley Water District **PROJECT NAME** Almaden Lake Improvement Project

PROJECT NUMBER 140540 **PROJECT LOCATION** San Jose, California

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE	BLOW COUNTS (FIELD VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT (%)	ATTERBERG LIMITS: PLASTIC LIMIT (%)	ATTERBERG LIMITS: PLASTICITY INDEX (%)	FINES CONTENT (%)
35		SILTY SAND with GRAVEL (SM), olive gray, wet, medium dense	SPT	6-5-12			27	29	26	3	21
		WELL GRADED GRAVEL with SAND and SILT (GW-GM), brown gray, wet, medium dense, angular to subangular gravel up to 1 in., fine to very coarse sand									
40		WELL GRADED GRAVEL with SAND and CLAY (GW-GC), brown gray, wet, very dense, angular gravel up to 1 in., fine to very coarse sand, iron stains	SPT	34-39-35							
		Decreased coarse gravel in cuttings at 44 ft									
45		WELL GRADED GRAVEL with SAND and CLAY (GW-GC), brown gray, wet, dense, subrounded to subangular gravel up to 1 in., fine to coarse sand	SPT	21-25-21							

Bottom of borehole at 47.5 ft. Borehole backfilled with grout.

BORING NUMBER WB-2

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CAL ENGINEERING & GEOLOGY

CLIENT Santa Clara Valley Water District
PROJECT NAME Almaden Lake Improvement Project
PROJECT NUMBER 140540
PROJECT LOCATION San Jose, California
DATE STARTED 10/7/2014 **COMPLETED** 10/7/2014
GROUND ELEVATION 184 ft **DATUM** WGS84 **HOLE SIZE** 5 in.
DRILLING CONTRACTOR Taber Drilling
COORDINATES: LATITUDE 37.23993 **LONGITUDE** -121.87165
DRILLING RIG/METHOD CME-45/Rotary Wash
GROUNDWATER AT TIME OF DRILLING --- 7 ft above Sediment
LOGGED BY D. Burger **CHECKED BY** D. Peluso
GROUNDWATER AT END OF DRILLING ---
HAMMER TYPE 140 lb hammer with 30 in. autotrip
GROUNDWATER AFTER DRILLING ---

DEPTH (ft)	MATERIAL DESCRIPTION	SAMPLE TYPE	BLOW COUNTS (FIELD VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT (%)	ATTERBERG LIMITS: PLASTIC LIMIT (%)	ATTERBERG LIMITS: PLASTICITY INDEX (%)	FINES CONTENT (%)
0	ORGANIC RICH SILT (OH/MH), black, wet, very soft, trace sand, some clay, medium to high plasticity (LAKE SEDIMENT)	SH		0.1	53	75				
3	INTERBEDDED LAYERS OF FAT CLAY (CH), ELASTIC SILT (MH), and SAND (SW), blue gray, wet, very soft to very loose, very fine to coarse sand	CM	0-1-1							
5	ORGANIC SILTY SAND (SM), dark gray, wet, very loose, very fine to medium sand, fat clay and silt lenses	SH		0.2	55	69	37	27	10	42
9–10	ELASTIC SILT (MH), gray, wet, very soft, few sand, trace organics	CM	0-1-2							
11	Driller indicated harder drilling resistance at 11 ft with a color change to brown very coarse gravel in cuttings WELL GRADED SAND with GRAVEL and SILT (SW-SM), brown with blue gray mottling, wet, medium dense, very fine to coarse sand, angular to subangular gravel up to 1/2 in (ALLUVIUM)	SPT	6-10-9			13				14
17.5	WELL GRADED SAND with GRAVEL and SILT (SW-SM) ELASTIC SILT (MH), brown gray, to gray brown, wet, soft WELL GRADED SAND with GRAVEL and SILT (SW-SM), gray brown, wet, medium dense, angular gravel up to 1/2 in. with gravel grater than 1.5 in at 18.5 ft	SPT	13-6-15			14				22
22.5	WELL GRADED GRAVEL with SAND and SILT (GW-GM), brown to gray brown, wet, very dense, angular gravel greater than 1.5 in., very fine to coarse sand No recovery with SPT sampler, used CM sampler to recover. Subangular to subrounded gravel larger than 2.5 in. at bottom of CM sampler.	SPT	9-26-40			7				6
27.5	SILT (ML) to SILTY SAND (SM) based on limited recovery and observed cuttings. Driller indicated very easy drilling resistance between 28.5 ft and 31 ft and very dense and increased resistance at 31 ft.	SPT	10-6-4							
31	WELL GRADED GRAVEL (GW), gray, wet, very dense, angular gravel larger than 1.5 in.									
32.5–35	WELL GRADED SAND with GRAVEL and SILT (SW-SM), gray brown, wet, dense, fine to very coarse sand	SPT	27-29-16			11				

(Continued Next Page)

CLIENT Santa Clara Valley Water District

PROJECT NAME Almaden Lake Improvement Project

PROJECT NUMBER 140540

PROJECT LOCATION San Jose, California

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE	BLOW COUNTS (FIELD VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT (%)	ATTERBERG LIMITS: PLASTIC LIMIT (%)	ATTERBERG LIMITS: PLASTICITY INDEX (%)	FINES CONTENT (%)
35		Coarse sand and fine gravel observed in cuttings. Driller indicated increased drilling resistance between 35 and 37 ft. Driller indicated large gravel or cobble.	SPT	50/3"							
40		Driller indicated very hard drilling resistance.									
		Driller indicated decrease in drilling resistance at 40.5 ft.									
		WELL GRADED SAND with GRAVEL and CLAY (SW-SC), gray to brown gray with red nodules, wet, dense, very fine to coarse sand, angular to subangular gravel up to 1/2 in.	SPT	30-24-22							9
45											
		WELL GRADED SAND with GRAVEL and CLAY (SW-SC), brown gray, wet, dense, fine to very coarse sand	SPT	24-17-17							10

Bottom of borehole at 48.5 ft. Borehole backfilled with grout.

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BORING NUMBER WB-3

CLIENT Santa Clara Valley Water District
PROJECT NAME Almaden Lake Improvement Project
PROJECT NUMBER 140540
PROJECT LOCATION San Jose, California
DATE STARTED 10/9/2014 **COMPLETED** 10/9/2014
GROUND ELEVATION 180 ft **DATUM** WGS84 **HOLE SIZE** 5 in.
DRILLING CONTRACTOR Taber Drilling
COORDINATES: LATITUDE 37.24045 **LONGITUDE** -121.87278
DRILLING RIG/METHOD CME-45/Rotary Wash
GROUNDWATER AT TIME OF DRILLING --- 11 ft above Sediment
LOGGED BY D. Burger **CHECKED BY** D. Peluso
GROUNDWATER AT END OF DRILLING ---
HAMMER TYPE 140 lb hammer with 30 in. autotrip
GROUNDWATER AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE	BLOW COUNTS (FIELD VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT (%)	ATTERBERG LIMITS: PLASTIC LIMIT (%)	ATTERBERG LIMITS: PLASTICITY INDEX (%)	FINES CONTENT (%)
0		SILT (ML) to ELASTIC SILT (MH), black, wet, very soft (LAKE SEDIMENT)									
5		WELL GRADED SAND with GRAVEL and SILT (SW-SM), brown, wet, dense, angular gravel up to 1 in. (ALLUVIUM)	SPT	10-14-24			8				11

Bottom of borehole at 5.5 ft. Borehole backfilled with grout.

Santa Clara Valley Water District

5750 Almaden Expressway
San Jose, CA 95118-3686
(408) 265-2600

APPLICATION TO DRILL EXPLORATORY BORINGS

FC 285 (04-16-13)

Date Issued:	Expiration Date:	District Permit No.:
Client (if different from property owner): Santa Clara Valley Water District	**Property Owner:** —	Name of Business/Residence at Site: Lake Almaden
Client's Address: 5750 Almaden Expressway	Property Owner's Address:	Address of Site: Almaden Rd
City, State, Zip San Jose, CA 95118	City, State, Zip	City, State, Zip San Jose, CA
Telephone No.: 408-265-2600	Telephone No.:	Assessor's Parcel No. of Site: 69401038 Book ____ Page ____ Parcel ____

Consulting Company Name: Cal Engineering & Geology	Drilling Company Name: Taber Drilling	
Address: 1870 Olympic Blvd #100	Address: 536 Galvaston Street	
City, State, Zip Walnut Creek, CA 94596	City, State, Zip West Sacramento, CA 95691	
Telephone No.: 925-935-9771	Telephone No.: 916-371-8234	C-57/C-61 License No.: 969927
☐ Check if address or phone number has changed	☐ Check if address or phone number has changed	

In space at right, sketch location of proposed boring(s) in sufficient detail to identify location. In addition to distances to nearest street and intersection, show distances to any existing structures, landmarks, or topographic features.

How many borings will be installed on parcel?
2

☒ Proposed borings on District property/easement (See General Condition F, page 2.)

☒ Within 50 feet of the top of a creek bank or District facility

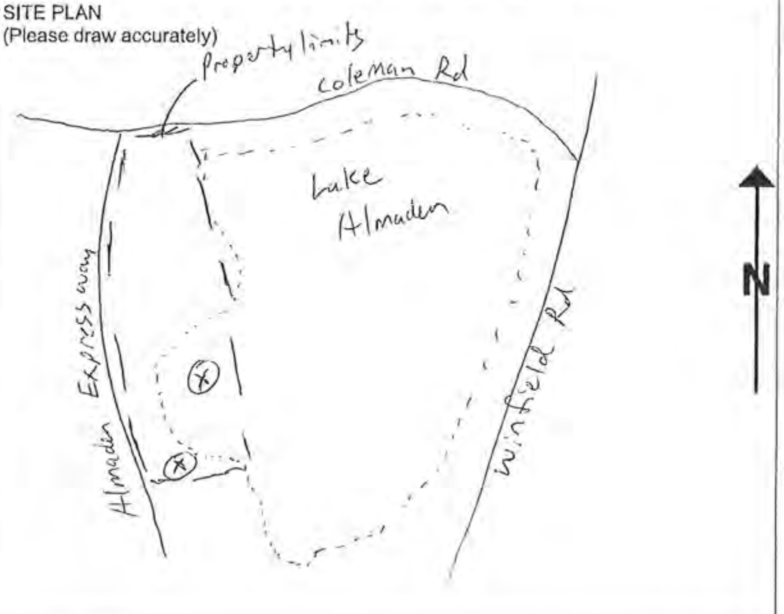
Proposed depth of boring(s):

☒ 45 to 150 feet
☐ 151 to 300 feet
☐ Over 300 feet

NOTE: No permit is required for borings under 45 feet deep.

Boring Type:	Boring Use:
☒ Hollow stem	☒ Geotechnical Investigation
☒ Rotary	☐ Environmental Investigation
☐ CPT	☐ Material Emplacement
☐ Hydropunch	☐ Sensor Emplacement
☐ Other: ____	☐ Other: ____

SITE PLAN
(Please draw accurately)



SIGNATURES

I understand and agree that all work associated with this permit is required to be done in accordance with Santa Clara Valley Water District (District) Well Ordinance 90-1, the District Well Standards, and conditions of this permit (see page 2). I certify that the information given in this permit is correct to the best of my knowledge and that the signature below, whether original, electronic, or photocopied, is authorized and valid, and is affixed with the intent to be enforceable. I also certify that a right of entry/encroachment agreement has been formalized between the well owner and property owner, if parties differ.

	Print/Type Name:	Date:
Signature of Property Owner/Agent:		
Signature of Client/Agent:		
Signature of Driller/Agent: [signature]	Brian Young	8.4.14
Signature of Consultant/Agent: [signature]	David Burger	8-4-14

IMPORTANT: A minimum 24-hour notice must be given to Santa Clara Valley Water District Well Inspection Department prior to installing the annular seal. Call (408) 265-2607, ext. 2660. Please allow 10 working days to process permit application.

Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118-3686
(408) 265-2600

APPLICATION TO DRILL EXPLORATORY BORINGS

GENERAL CONDITIONS

A. **District** (telephone 408-630-2660) **must be notified a minimum of one working day before the exploratory boring is backfilled.** An authorized District representative must be on site to witness the sealing operation. This requirement may be waived by an authorized District representative. If the District waives the inspection requirement, the District may request the permittee(s) to furnish certification under penalty of perjury that the seal was constructed in accordance with the District Well Standards.

B. This permit is valid only for the purpose specified herein. Boring destruction methods authorized under this permit may not be changed except by written approval of an authorized District representative, and only if the District believes that such a change will result in equal or superior compliance with the District and State Well Standards (e.g., if the District representative finds that site conditions warrant such a change).

C. This permit is only valid for the Assessor's Parcel No. indicated on it.

D. This permit may be voided if it contains incorrect information.

E. Borings shall be sealed within 24 hours following completion of testing or sampling activities. Borings shall not be left in such a condition as to allow for the introduction of surface waters or foreign materials into them. Borings shall be secured such that they do not endanger public health.

F. If any work associated with this permit will take place on District property/easement, an encroachment or construction permit must be granted by the District's Community Projects Review Unit (telephone 408-630-2350, -2217, or -2253).

G. The permittee(s) shall assume entire responsibility for all activities and uses under this permit and shall indemnify, defend, and hold the District, its officers, agents, and employees, free and harmless from any and all expense, cost, and liability in connection with or resulting from the granting or exercise of this permit including, but not limited to, property damage, personal injury, and wrongful death.

H. Permittees are required to be in full compliance with Cal/OSHA California Labor Code Section 6300.

I. A current C-57 or C-61 Contractor's License is required for work associated with this permit.

J. Permittee, permittee's contractors, consultants, or agents shall be responsible to assure that all materials or waters generated during drilling, boring destruction, and/or other activities associated with this permit will be safely handled, properly managed, and disposed of according to all applicable federal, state, and local statues regulating such. In no case shall these materials and/or waters be allowed to enter, or potentially enter, on- or off-site storm sewers, dry wells, or waterways or be allowed to move off the property where the work is being completed.

K. The driller and consultants (if applicable) shall have an active copy of their Worker's Compensation Insurance on file with District.

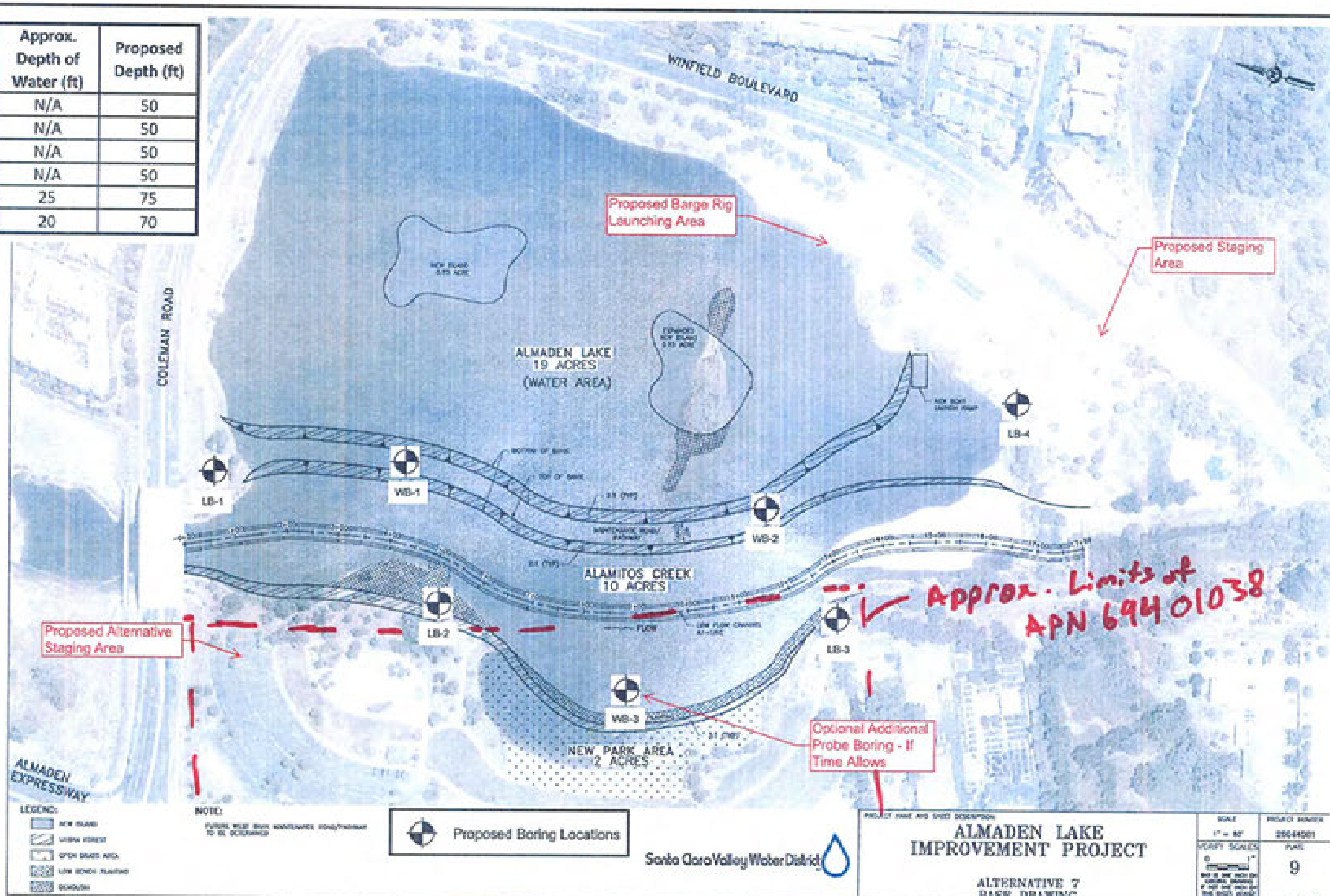
L. This permit shall expire if not exercised within 180 calendar days of its approval, unless an extension of the permit expiration date is granted by an authorized District representative.

M. This permit shall be kept on site during all activities associated with it and shall immediately be presented to an authorized District representative upon request.

Permit Approved by:	Date:

Please allow 10 working days to process this application.

Boring	Approx. Depth of Water (ft)	Proposed Depth (ft)
LB-1	N/A	50
LB-2	N/A	50
LB-3	N/A	50
LB-4	N/A	50
WB-1	25	75
WB-2	20	70



Notes:
1) Environmental samples shall be taken in the upper 2 feet of the exploratory borings;
2) Boring LB-1 shall be performed on a Monday morning - during the park closure;
3) Optional Boring WB-3 depth shall be determined by the thickness of the soft lake sediments

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SANTA CLARA VALLEY WATER DISTRICT
ALAMADEN LAKE IMPROVEMENT PROJECT
SAN JOSE, CALIFORNIA

PROPOSED BORING LCOATIONS

JOB NO. 140540	JULY 2014	PLATE 1

Santa Clara Valley Water District | 5750 Almaden Expressway
San Jose, CA 95118-3686
(408) 265-2600

APPLICATION TO DRILL EXPLORATORY BORINGS

FC 285 (04-16-13)

Date Issued:	Expiration Date:	District Permit No.:
Client (if different from property owner): Santa Clara Valley Water District	**Property Owner:**	Name of Business/Residence at Site: Lake Almaden
Client's Address: 5750 Almaden Expressway City, State, Zip: San Jose, CA 95118	Property Owner's Address: City, State, Zip	Address of Site: 1037 Coleman Ave City, State, Zip: San Jose, CA
Telephone No.: 408-265-2600	Telephone No.:	Assessor's Parcel No. of Site: 69402027 Book ____ Page ____ Parcel ____

Consulting Company Name: Cal Engineering & Geology	Drilling Company Name: Taber Drilling
Address: 1870 Olympic Blvd #100	Address: 536 Galvaston St.
City, State, Zip: Walnut Creek, CA 94596	City, State, Zip: West Sacramento, CA 95691
Telephone No.: 925-935-9771	Telephone No.: 916-371-8234 — C-57/C-61 License No.: 969927
☐ Check if address or phone number has changed	☐ Check if address or phone number has changed

In space at right, sketch location of proposed boring(s) in sufficient detail to identify location. In addition to distances to nearest street and intersection, show distances to any existing structures, landmarks, or topographic features.

How many borings will be installed on parcel? 5

☒ Proposed borings on District property/easement (See General Condition F, page 2.)

☒ Within 50 feet of the top of a creek bank or District facility

Proposed depth of boring(s):

☒ 45 to 150 feet
☐ 151 to 300 feet
☐ Over 300 feet

NOTE: No permit is required for borings under 45 feet deep.

Boring Type:	Boring Use:
☒ Hollow stem	☒ Geotechnical Investigation
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☐ CPT	☐ Material Emplacement
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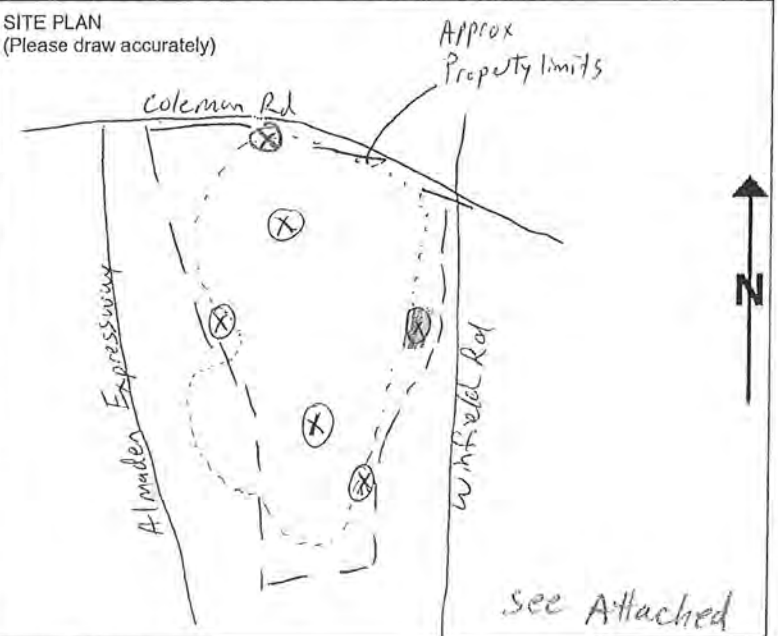
SITE PLAN
(Please draw accurately)



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	Print/Type Name:	Date:
Signature of Property Owner/Agent:		
Signature of Client/Agent:		
Signature of Driller/Agent: [signature]	Brian Young	8.4.14
Signature of Consultant/Agent: [signature]	David Burger	8-4-14

IMPORTANT: A minimum 24-hour notice must be given to Santa Clara Valley Water District Well Inspection Department prior to installing the annular seal. Call (408) 265-2607, ext. 2660. Please allow 10 working days to process permit application.

Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118-3686
(408) 265-2600

APPLICATION TO DRILL EXPLORATORY BORINGS

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LB-2	N/A	50
LB-3	N/A	50
LB-4	N/A	50
WB-1	25	75
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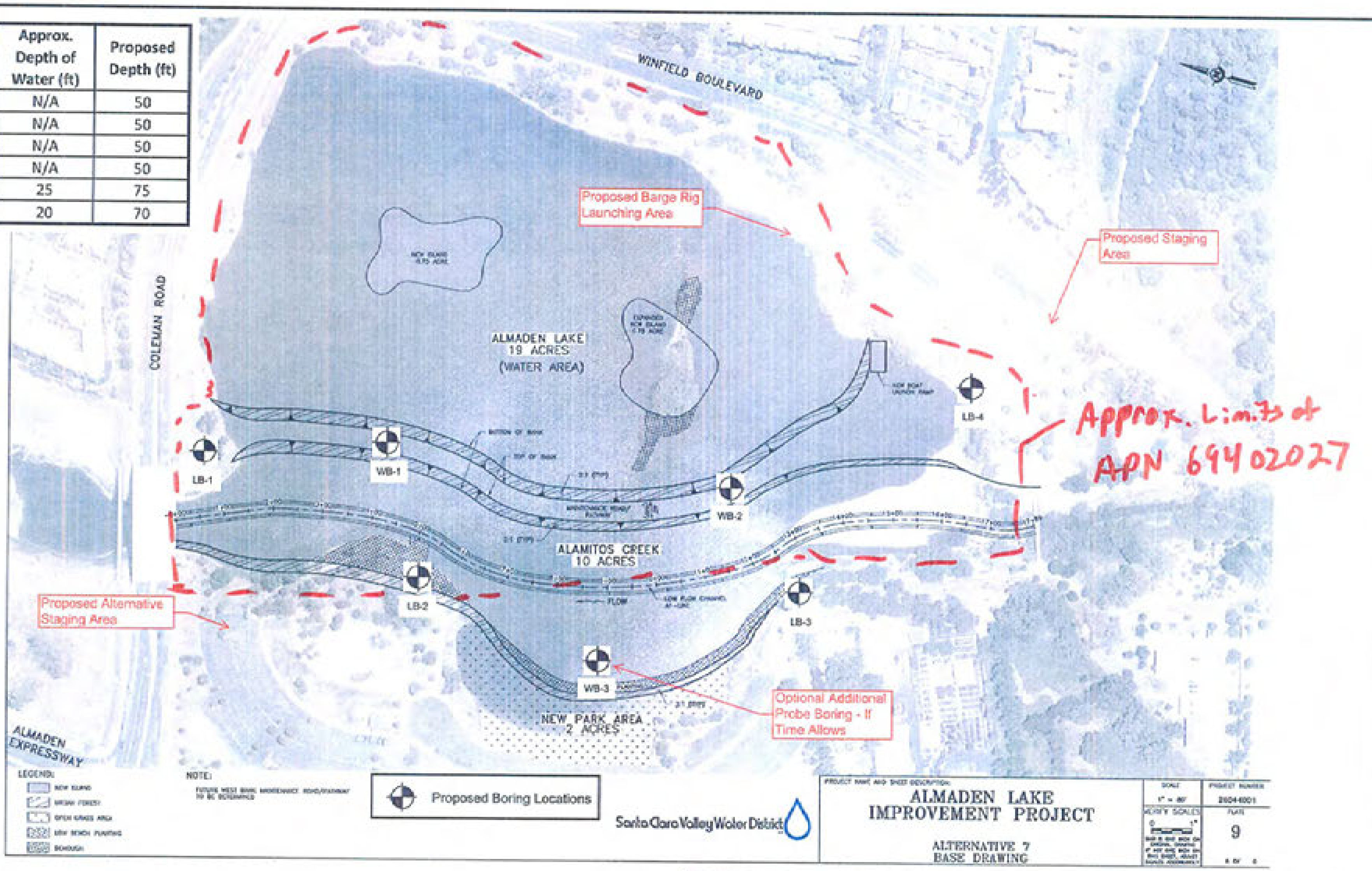

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2) Boring LB-1 shall be performed on a Monday morning - during the park closure;
3) Optional Boring WB-3 depth shall be determined by the thickness of the soft lake sediments

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SANTA CLARA VALLEY WATER DISTRICT
ALMADEN LAKE IMPROVEMENT PROJECT
SAN JOSE, CALIFORNIA
PROPOSED BORING LCOATIONS

JOB NO. 140540	JULY 2014	PLATE 1

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WORK ORDER NUMBER: 14-09-2102

The difference is service

AIR | SOIL | WATER | MARINE CHEMISTRY

Analytical Report For

Client: ENV Environmental International, Inc.

Client Project Name: TAB1401

Attention: David Solis
1090 Adams Street, Suite D
Benicia, CA 94510-2953

Approved for release on 10/06/2014 by:
Don Burley
Project Manager

ResultLink ▸

Email your PM ▸

7440 Lincoln Way, Garden Grove, CA 92841-1432 • TEL: (714) 895-5494 • FAX: (714) 894-7501 • www.calscience.com

NELAP ID: 03220CA | ACLASS DoD-ELAP ID: ADE-1864 (ISO/IEC 17025:2005) | CSDLAC ID: 10109 | SCAQMD ID: 93LA0830

eurofins | Calscience

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Work Order Number: 14-09-2102

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Work Order Narrative

Condition Upon Receipt:

Samples were received under Chain-of-Custody (COC) on 09/26/14. They were assigned to Work Order 14-09-2102.

Unless otherwise noted on the Sample Receiving forms all samples were received in good condition and within the recommended EPA temperature criteria for the methods noted on the COC. The COC and Sample Receiving Documents are integral elements of the analytical report and are presented at the back of the report.

Holding Times:

All samples were analyzed within prescribed holding times (HT) and/or in accordance with the Calscience Sample Acceptance Policy unless otherwise noted in the analytical report and/or comprehensive case narrative, if required.

Any parameter identified in 40CFR Part 136.3 Table II that is designated as "analyze immediately" with a holding time of <= 15 minutes (40CFR-136.3 Table II, footnote 4), is considered a "field" test and the reported results will be qualified as being received outside of the stated holding time unless received at the laboratory within 15 minutes of the collection time.

Quality Control:

All quality control parameters (QC) were within established control limits except where noted in the QC summary forms or described further within this report.

Additional Comments:

Air - Sorbent-extracted air methods (EPA TO-4A, EPA TO-10, EPA TO-13A, EPA TO-17): Analytical results are converted from mass/sample basis to mass/volume basis using client-supplied air volumes.

New York NELAP air certification does not certify for all reported methods and analytes, reference the accredited items here: http://www.calscience.com/PDF/New_York.pdf

Solid - Unless otherwise indicated, solid sample data is reported on a wet weight basis, not corrected for % moisture. All QC results are always reported on a wet weight basis.

Subcontractor Information:

Unless otherwise noted below (or on the subcontract form), no samples were subcontracted.

Return to Contents

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Sample Summary

Client:	ENV Environmental International, Inc.	Work Order:	14-09-2102
	1090 Adams Street, Suite D	Project Name:	TAB1401
	Benicia, CA 94510-2953	PO Number:	
		Date/Time Received:	09/26/14 07:55
		Number of Containers:	1
Attn:	David Solis		

Sample Identification	Lab Number	Collection Date and Time	Number of Containers	Matrix
Bin-COMP-1	14-09-2102-1	09/24/14 13:00	1	Solid

Return to Contents

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Analytical Report

ENV Environmental International, Inc.	Date Received: 09/26/14
1090 Adams Street, Suite D	Work Order: 14-09-2102
Benicia, CA 94510-2953	Preparation: EPA 3550B
	Method: EPA 8015B (M)
	Units: mg/kg
Project: TAB1401	Page 1 of 2

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Bin-COMP-1	**14-09-2102-1-A**	**09/24/14 13:00**	**Solid**	**GC 45**	**09/30/14**	**09/30/14 23:45**	**140930B04B**

Comment(s): - The total concentration includes individual carbon range concentrations (estimated), if any, below the RL reported as ND.

Parameter	Result	RL	DF	Qualifiers
C6	ND	5.0	1.00	
C7	ND	5.0	1.00	
C8	ND	5.0	1.00	
C9-C10	ND	5.0	1.00	
C11-C12	11	5.0	1.00	
C13-C14	37	5.0	1.00	
C15-C16	12	5.0	1.00	
C17-C18	ND	5.0	1.00	
C19-C20	ND	5.0	1.00	
C21-C22	ND	5.0	1.00	
C23-C24	ND	5.0	1.00	
C25-C28	ND	5.0	1.00	
C29-C32	6.2	5.0	1.00	
C33-C36	ND	5.0	1.00	
C37-C40	ND	5.0	1.00	
C41-C44	ND	5.0	1.00	
C6-C44 Total	83	5.0	1.00	

Surrogate	Rec. (%)	Control Limits	Qualifiers
n-Octacosane	75	61-145	

Return to Contents

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

ENV Environmental International, Inc.		Date Received:	09/26/14
1090 Adams Street, Suite D		Work Order:	14-09-2102
Benicia, CA 94510-2953		Preparation:	EPA 3550B
		Method:	EPA 8015B (M)
		Units:	mg/kg
Project: TAB1401			Page 2 of 2

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Method Blank	**099-15-490-1177**	**N/A**	**Solid**	**GC 45**	**09/30/14**	**09/30/14 22:51**	**140930B04B**

Parameter	Result	RL	DF	Qualifiers
C6	ND	5.0	1.00	
C7	ND	5.0	1.00	
C8	ND	5.0	1.00	
C9-C10	ND	5.0	1.00	
C11-C12	ND	5.0	1.00	
C13-C14	ND	5.0	1.00	
C15-C16	ND	5.0	1.00	
C17-C18	ND	5.0	1.00	
C19-C20	ND	5.0	1.00	
C21-C22	ND	5.0	1.00	
C23-C24	ND	5.0	1.00	
C25-C28	ND	5.0	1.00	
C29-C32	ND	5.0	1.00	
C33-C36	ND	5.0	1.00	
C37-C40	ND	5.0	1.00	
C41-C44	ND	5.0	1.00	
C6-C44 Total	ND	5.0	1.00	

Surrogate	Rec. (%)	Control Limits	Qualifiers
n-Octacosane	79	61-145	

Return to Contents

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

eurofins Calscience

Analytical Report

ENV Environmental International, Inc.		Date Received:	09/26/14
1090 Adams Street, Suite D		Work Order:	14-09-2102
Benicia, CA 94510-2953		Preparation:	EPA 3050B
		Method:	EPA 6010B
		Units:	mg/kg
Project: TAB1401			Page 1 of 2

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Bin-COMP-1	**14-09-2102-1-A**	**09/24/14 13:00**	**Solid**	**ICP 7300**	**10/01/14**	**10/03/14 21:59**	**141001L21**

Parameter	Result	RL	DF	Qualifiers
Antimony	ND	0.761	1.02	
Arsenic	4.14	0.761	1.02	
Barium	174	0.508	1.02	
Beryllium	0.459	0.254	1.02	
Cadmium	ND	0.508	1.02	
Chromium	66.0	0.254	1.02	
Cobalt	16.0	0.254	1.02	
Copper	49.4	0.508	1.02	
Lead	6.69	0.508	1.02	
Molybdenum	0.490	0.254	1.02	
Nickel	100	0.254	1.02	
Selenium	ND	0.761	1.02	
Silver	ND	0.254	1.02	
Thallium	ND	0.761	1.02	
Vanadium	46.4	0.254	1.02	
Zinc	49.1	1.02	1.02	

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RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

ENV Environmental International, Inc.		Date Received:	09/26/14
1090 Adams Street, Suite D		Work Order:	14-09-2102
Benicia, CA 94510-2953		Preparation:	EPA 3050B
		Method:	EPA 6010B
		Units:	mg/kg
Project: TAB1401			Page 2 of 2

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Method Blank	**097-01-002-19240**	**N/A**	**Solid**	**ICP 7300**	**10/01/14**	**10/03/14 14:01**	**141001L21**

Parameter	Result	RL	DF	Qualifiers
Antimony	ND	0.750	1.00	
Arsenic	ND	0.750	1.00	
Barium	ND	0.500	1.00	
Beryllium	ND	0.250	1.00	
Cadmium	ND	0.500	1.00	
Chromium	ND	0.250	1.00	
Cobalt	ND	0.250	1.00	
Copper	ND	0.500	1.00	
Lead	ND	0.500	1.00	
Molybdenum	ND	0.250	1.00	
Nickel	ND	0.250	1.00	
Selenium	ND	0.750	1.00	
Silver	ND	0.250	1.00	
Thallium	ND	0.750	1.00	
Vanadium	ND	0.250	1.00	
Zinc	ND	1.00	1.00	

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RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

ENV Environmental International, Inc.	Date Received: 09/26/14
1090 Adams Street, Suite D	Work Order: 14-09-2102
Benicia, CA 94510-2953	Preparation: EPA 7471A Total
	Method: EPA 7471A
	Units: mg/kg
Project: TAB1401	Page 1 of 1

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Bin-COMP-1	**14-09-2102-1-A**	**09/24/14 13:00**	**Solid**	**Mercury 05**	**10/02/14**	**10/02/14 21:44**	**141002L05**

Parameter	Result	RL	DF	Qualifiers
Mercury	ND	0.0847	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Method Blank	**099-16-272-613**	**N/A**	**Solid**	**Mercury 05**	**10/02/14**	**10/02/14 20:48**	**141002L05**

Parameter	Result	RL	DF	Qualifiers
Mercury	ND	0.0833	1.00	

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RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

ENV Environmental International, Inc.		Date Received:	09/26/14
1090 Adams Street, Suite D		Work Order:	14-09-2102
Benicia, CA 94510-2953		Preparation:	EPA 3545
		Method:	EPA 8270C
		Units:	mg/kg
Project: TAB1401			Page 1 of 6

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Bin-COMP-1	**14-09-2102-1-A**	**09/24/14 13:00**	**Solid**	**GC/MS SS**	**09/30/14**	**10/01/14 15:57**	**140930L12**

Parameter	Result	RL	DF	Qualifiers
Acenaphthene	ND	0.50	1.00	
Acenaphthylene	ND	0.50	1.00	
Aniline	ND	0.50	1.00	
Anthracene	ND	0.50	1.00	
Azobenzene	ND	0.50	1.00	
Benzidine	ND	10	1.00	
Benzo (a) Anthracene	ND	0.50	1.00	
Benzo (a) Pyrene	ND	0.50	1.00	
Benzo (b) Fluoranthene	ND	0.50	1.00	
Benzo (g,h,i) Perylene	ND	0.50	1.00	
Benzo (k) Fluoranthene	ND	0.50	1.00	
Benzoic Acid	ND	2.5	1.00	
Benzyl Alcohol	ND	0.50	1.00	
Bis(2-Chloroethoxy) Methane	ND	0.50	1.00	
Bis(2-Chloroethyl) Ether	ND	2.5	1.00	
Bis(2-Chloroisopropyl) Ether	ND	0.50	1.00	
Bis(2-Ethylhexyl) Phthalate	0.61	0.50	1.00	
4-Bromophenyl-Phenyl Ether	ND	0.50	1.00	
Butyl Benzyl Phthalate	ND	0.50	1.00	
4-Chloro-3-Methylphenol	ND	0.50	1.00	
4-Chloroaniline	ND	0.50	1.00	
2-Chloronaphthalene	ND	0.50	1.00	
2-Chlorophenol	ND	0.50	1.00	
4-Chlorophenyl-Phenyl Ether	ND	0.50	1.00	
Chrysene	ND	0.50	1.00	
Di-n-Butyl Phthalate	ND	0.50	1.00	
Di-n-Octyl Phthalate	ND	0.50	1.00	
Dibenz (a,h) Anthracene	ND	0.50	1.00	
Dibenzofuran	ND	0.50	1.00	
1,2-Dichlorobenzene	ND	0.50	1.00	
1,3-Dichlorobenzene	ND	0.50	1.00	
1,4-Dichlorobenzene	ND	0.50	1.00	
3,3'-Dichlorobenzidine	ND	10	1.00	
2,4-Dichlorophenol	ND	0.50	1.00	
Diethyl Phthalate	ND	0.50	1.00	

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RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

ENV Environmental International, Inc.		Date Received:	09/26/14
1090 Adams Street, Suite D		Work Order:	14-09-2102
Benicia, CA 94510-2953		Preparation:	EPA 3545
		Method:	EPA 8270C
		Units:	mg/kg
Project: TAB1401			Page 2 of 6

Parameter	Result	RL	DF	Qualifiers
Dimethyl Phthalate	ND	0.50	1.00	
2,4-Dimethylphenol	ND	0.50	1.00	
4,6-Dinitro-2-Methylphenol	ND	2.5	1.00	
2,4-Dinitrophenol	ND	2.5	1.00	
2,4-Dinitrotoluene	ND	0.50	1.00	
2,6-Dinitrotoluene	ND	0.50	1.00	
Fluoranthene	ND	0.50	1.00	
Fluorene	ND	0.50	1.00	
Hexachloro-1,3-Butadiene	ND	0.50	1.00	
Hexachlorobenzene	ND	0.50	1.00	
Hexachlorocyclopentadiene	ND	2.5	1.00	
Hexachloroethane	ND	0.50	1.00	
Indeno (1,2,3-c,d) Pyrene	ND	0.50	1.00	
Isophorone	ND	0.50	1.00	
2-Methylnaphthalene	ND	0.50	1.00	
1-Methylnaphthalene	ND	0.50	1.00	
2-Methylphenol	ND	0.50	1.00	
3/4-Methylphenol	ND	0.50	1.00	
N-Nitroso-di-n-propylamine	ND	0.50	1.00	
N-Nitrosodimethylamine	ND	0.50	1.00	
N-Nitrosodiphenylamine	ND	0.50	1.00	
Naphthalene	ND	0.50	1.00	
4-Nitroaniline	ND	0.50	1.00	
3-Nitroaniline	ND	0.50	1.00	
2-Nitroaniline	ND	0.50	1.00	
Nitrobenzene	ND	2.5	1.00	
4-Nitrophenol	ND	0.50	1.00	
2-Nitrophenol	ND	0.50	1.00	
Pentachlorophenol	ND	2.5	1.00	
Phenanthrene	ND	0.50	1.00	
Phenol	ND	0.50	1.00	
Pyrene	ND	0.50	1.00	
Pyridine	ND	0.50	1.00	
1,2,4-Trichlorobenzene	ND	0.50	1.00	
2,4,6-Trichlorophenol	ND	0.50	1.00	
2,4,5-Trichlorophenol	ND	0.50	1.00	

Surrogate	Rec. (%)	Control Limits	Qualifiers
2-Fluorobiphenyl	85	27-120	

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

ENV Environmental International, Inc.		Date Received:	09/26/14
1090 Adams Street, Suite D		Work Order:	14-09-2102
Benicia, CA 94510-2953		Preparation:	EPA 3545
		Method:	EPA 8270C
		Units:	mg/kg
Project: TAB1401			Page 3 of 6

Surrogate	Rec. (%)	Control Limits	Qualifiers
2-Fluorophenol	83	25-120	
Nitrobenzene-d5	82	33-123	
p-Terphenyl-d14	82	27-159	
Phenol-d6	85	26-122	
2,4,6-Tribromophenol	92	18-138	

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RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

ENV Environmental International, Inc.	Date Received: 09/26/14
1090 Adams Street, Suite D	Work Order: 14-09-2102
Benicia, CA 94510-2953	Preparation: EPA 3545
	Method: EPA 8270C
	Units: mg/kg
Project: TAB1401	Page 4 of 6

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Method Blank	**099-12-549-3077**	**N/A**	**Solid**	**GC/MS SS**	**09/30/14**	**10/01/14 14:42**	**140930L12**

Parameter	Result	RL	DF	Qualifiers
Acenaphthene	ND	0.50	1.00	
Acenaphthylene	ND	0.50	1.00	
Aniline	ND	0.50	1.00	
Anthracene	ND	0.50	1.00	
Azobenzene	ND	0.50	1.00	
Benzidine	ND	10	1.00	
Benzo (a) Anthracene	ND	0.50	1.00	
Benzo (a) Pyrene	ND	0.50	1.00	
Benzo (b) Fluoranthene	ND	0.50	1.00	
Benzo (g,h,i) Perylene	ND	0.50	1.00	
Benzo (k) Fluoranthene	ND	0.50	1.00	
Benzoic Acid	ND	2.5	1.00	
Benzyl Alcohol	ND	0.50	1.00	
Bis(2-Chloroethoxy) Methane	ND	0.50	1.00	
Bis(2-Chloroethyl) Ether	ND	2.5	1.00	
Bis(2-Chloroisopropyl) Ether	ND	0.50	1.00	
Bis(2-Ethylhexyl) Phthalate	ND	0.50	1.00	
4-Bromophenyl-Phenyl Ether	ND	0.50	1.00	
Butyl Benzyl Phthalate	ND	0.50	1.00	
4-Chloro-3-Methylphenol	ND	0.50	1.00	
4-Chloroaniline	ND	0.50	1.00	
2-Chloronaphthalene	ND	0.50	1.00	
2-Chlorophenol	ND	0.50	1.00	
4-Chlorophenyl-Phenyl Ether	ND	0.50	1.00	
Chrysene	ND	0.50	1.00	
Di-n-Butyl Phthalate	ND	0.50	1.00	
Di-n-Octyl Phthalate	ND	0.50	1.00	
Dibenz (a,h) Anthracene	ND	0.50	1.00	
Dibenzofuran	ND	0.50	1.00	
1,2-Dichlorobenzene	ND	0.50	1.00	
1,3-Dichlorobenzene	ND	0.50	1.00	
1,4-Dichlorobenzene	ND	0.50	1.00	
3,3'-Dichlorobenzidine	ND	10	1.00	
2,4-Dichlorophenol	ND	0.50	1.00	
Diethyl Phthalate	ND	0.50	1.00	

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RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

ENV Environmental International, Inc.		Date Received:	09/26/14
1090 Adams Street, Suite D		Work Order:	14-09-2102
Benicia, CA 94510-2953		Preparation:	EPA 3545
		Method:	EPA 8270C
		Units:	mg/kg
Project: TAB1401			Page 5 of 6

Parameter	Result	RL	DF	Qualifiers
Dimethyl Phthalate	ND	0.50	1.00	
2,4-Dimethylphenol	ND	0.50	1.00	
4,6-Dinitro-2-Methylphenol	ND	2.5	1.00	
2,4-Dinitrophenol	ND	2.5	1.00	
2,4-Dinitrotoluene	ND	0.50	1.00	
2,6-Dinitrotoluene	ND	0.50	1.00	
Fluoranthene	ND	0.50	1.00	
Fluorene	ND	0.50	1.00	
Hexachloro-1,3-Butadiene	ND	0.50	1.00	
Hexachlorobenzene	ND	0.50	1.00	
Hexachlorocyclopentadiene	ND	2.5	1.00	
Hexachloroethane	ND	0.50	1.00	
Indeno (1,2,3-c,d) Pyrene	ND	0.50	1.00	
Isophorone	ND	0.50	1.00	
2-Methylnaphthalene	ND	0.50	1.00	
1-Methylnaphthalene	ND	0.50	1.00	
2-Methylphenol	ND	0.50	1.00	
3/4-Methylphenol	ND	0.50	1.00	
N-Nitroso-di-n-propylamine	ND	0.50	1.00	
N-Nitrosodimethylamine	ND	0.50	1.00	
N-Nitrosodiphenylamine	ND	0.50	1.00	
Naphthalene	ND	0.50	1.00	
4-Nitroaniline	ND	0.50	1.00	
3-Nitroaniline	ND	0.50	1.00	
2-Nitroaniline	ND	0.50	1.00	
Nitrobenzene	ND	2.5	1.00	
4-Nitrophenol	ND	0.50	1.00	
2-Nitrophenol	ND	0.50	1.00	
Pentachlorophenol	ND	2.5	1.00	
Phenanthrene	ND	0.50	1.00	
Phenol	ND	0.50	1.00	
Pyrene	ND	0.50	1.00	
Pyridine	ND	0.50	1.00	
1,2,4-Trichlorobenzene	ND	0.50	1.00	
2,4,6-Trichlorophenol	ND	0.50	1.00	
2,4,5-Trichlorophenol	ND	0.50	1.00	

Surrogate	Rec. (%)	Control Limits	Qualifiers
2-Fluorobiphenyl	87	27-120	

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

ENV Environmental International, Inc.		Date Received:	09/26/14
1090 Adams Street, Suite D		Work Order:	14-09-2102
Benicia, CA 94510-2953		Preparation:	EPA 3545
		Method:	EPA 8270C
		Units:	mg/kg
Project: TAB1401			Page 6 of 6

Surrogate	Rec. (%)	Control Limits	Qualifiers
2-Fluorophenol	96	25-120	
Nitrobenzene-d5	87	33-123	
p-Terphenyl-d14	85	27-159	
Phenol-d6	89	26-122	
2,4,6-Tribromophenol	100	18-138	

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RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

ENV Environmental International, Inc.	Date Received: 09/26/14
1090 Adams Street, Suite D	Work Order: 14-09-2102
Benicia, CA 94510-2953	Preparation: EPA 5030C
	Method: EPA 8260B
	Units: ug/kg
Project: TAB1401	Page 1 of 6

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Bin-COMP-1	**14-09-2102-1-A**	**09/24/14 13:00**	**Solid**	**GC/MS Q**	**09/26/14**	**09/27/14 11:38**	**140927L009**

Parameter	Result	RL	DF	Qualifiers
Acetone	ND	130	1.00	
Benzene	ND	5.1	1.00	
Bromobenzene	ND	5.1	1.00	
Bromochloromethane	ND	5.1	1.00	
Bromodichloromethane	ND	5.1	1.00	
Bromoform	ND	5.1	1.00	
Bromomethane	ND	25	1.00	
2-Butanone	ND	51	1.00	
n-Butylbenzene	ND	5.1	1.00	
sec-Butylbenzene	ND	5.1	1.00	
tert-Butylbenzene	ND	5.1	1.00	
Carbon Disulfide	ND	51	1.00	
Carbon Tetrachloride	ND	5.1	1.00	
Chlorobenzene	ND	5.1	1.00	
Chloroethane	ND	5.1	1.00	
Chloroform	ND	5.1	1.00	
Chloromethane	ND	25	1.00	
2-Chlorotoluene	ND	5.1	1.00	
4-Chlorotoluene	ND	5.1	1.00	
Dibromochloromethane	ND	5.1	1.00	
1,2-Dibromo-3-Chloropropane	ND	10	1.00	
1,2-Dibromoethane	ND	5.1	1.00	
Dibromomethane	ND	5.1	1.00	
1,2-Dichlorobenzene	ND	5.1	1.00	
1,3-Dichlorobenzene	ND	5.1	1.00	
1,4-Dichlorobenzene	ND	5.1	1.00	
Dichlorodifluoromethane	ND	5.1	1.00	
1,1-Dichloroethane	ND	5.1	1.00	
1,2-Dichloroethane	ND	5.1	1.00	
1,1-Dichloroethene	ND	5.1	1.00	
c-1,2-Dichloroethene	ND	5.1	1.00	
t-1,2-Dichloroethene	ND	5.1	1.00	
1,2-Dichloropropane	ND	5.1	1.00	
1,3-Dichloropropane	ND	5.1	1.00	
2,2-Dichloropropane	ND	5.1	1.00	

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RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

ENV Environmental International, Inc.		Date Received:	09/26/14
1090 Adams Street, Suite D		Work Order:	14-09-2102
Benicia, CA 94510-2953		Preparation:	EPA 5030C
		Method:	EPA 8260B
		Units:	ug/kg
Project: TAB1401			Page 2 of 6

Parameter	Result	RL	DF	Qualifiers
1,1-Dichloropropene	ND	5.1	1.00	
c-1,3-Dichloropropene	ND	5.1	1.00	
t-1,3-Dichloropropene	ND	5.1	1.00	
Ethylbenzene	ND	5.1	1.00	
2-Hexanone	ND	51	1.00	
Isopropylbenzene	ND	5.1	1.00	
p-Isopropyltoluene	ND	5.1	1.00	
Methylene Chloride	ND	51	1.00	
4-Methyl-2-Pentanone	ND	51	1.00	
Naphthalene	ND	51	1.00	
n-Propylbenzene	ND	5.1	1.00	
Styrene	ND	5.1	1.00	
1,1,1,2-Tetrachloroethane	ND	5.1	1.00	
1,1,2,2-Tetrachloroethane	ND	5.1	1.00	
Tetrachloroethene	ND	5.1	1.00	
Toluene	ND	5.1	1.00	
1,2,3-Trichlorobenzene	ND	10	1.00	
1,2,4-Trichlorobenzene	ND	5.1	1.00	
1,1,1-Trichloroethane	ND	5.1	1.00	
1,1,2-Trichloroethane	ND	5.1	1.00	
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND	51	1.00	
Trichloroethene	ND	5.1	1.00	
1,2,3-Trichloropropane	ND	5.1	1.00	
1,2,4-Trimethylbenzene	ND	5.1	1.00	
Trichlorofluoromethane	ND	51	1.00	
1,3,5-Trimethylbenzene	ND	5.1	1.00	
Vinyl Acetate	ND	51	1.00	
Vinyl Chloride	ND	5.1	1.00	
p/m-Xylene	ND	5.1	1.00	
o-Xylene	ND	5.1	1.00	
Methyl-t-Butyl Ether (MTBE)	ND	5.1	1.00	
Tert-Butyl Alcohol (TBA)	ND	51	1.00	
Diisopropyl Ether (DIPE)	ND	10	1.00	
Ethyl-t-Butyl Ether (ETBE)	ND	10	1.00	
Tert-Amyl-Methyl Ether (TAME)	ND	10	1.00	
Ethanol	ND	250	1.00	

Surrogate	Rec. (%)	Control Limits	Qualifiers
1,4-Bromofluorobenzene	98	60-132	

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

ENV Environmental International, Inc.		Date Received:	09/26/14
1090 Adams Street, Suite D		Work Order:	14-09-2102
Benicia, CA 94510-2953		Preparation:	EPA 5030C
		Method:	EPA 8260B
		Units:	ug/kg
Project: TAB1401			Page 3 of 6

Surrogate	Rec. (%)	Control Limits	Qualifiers
Dibromofluoromethane	98	63-141	
1,2-Dichloroethane-d4	102	62-146	
Toluene-d8	97	80-120	

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RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

ENV Environmental International, Inc.		Date Received:	09/26/14
1090 Adams Street, Suite D		Work Order:	14-09-2102
Benicia, CA 94510-2953		Preparation:	EPA 5030C
		Method:	EPA 8260B
		Units:	ug/kg
Project: TAB1401			Page 4 of 6

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Method Blank	**099-12-796-8919**	**N/A**	**Solid**	**GC/MS Q**	**09/27/14**	**09/27/14 10:46**	**140927L009**

Parameter	Result	RL	DF	Qualifiers
Acetone	ND	120	1.00	
Benzene	ND	5.0	1.00	
Bromobenzene	ND	5.0	1.00	
Bromochloromethane	ND	5.0	1.00	
Bromodichloromethane	ND	5.0	1.00	
Bromoform	ND	5.0	1.00	
Bromomethane	ND	25	1.00	
2-Butanone	ND	50	1.00	
n-Butylbenzene	ND	5.0	1.00	
sec-Butylbenzene	ND	5.0	1.00	
tert-Butylbenzene	ND	5.0	1.00	
Carbon Disulfide	ND	50	1.00	
Carbon Tetrachloride	ND	5.0	1.00	
Chlorobenzene	ND	5.0	1.00	
Chloroethane	ND	5.0	1.00	
Chloroform	ND	5.0	1.00	
Chloromethane	ND	25	1.00	
2-Chlorotoluene	ND	5.0	1.00	
4-Chlorotoluene	ND	5.0	1.00	
Dibromochloromethane	ND	5.0	1.00	
1,2-Dibromo-3-Chloropropane	ND	10	1.00	
1,2-Dibromoethane	ND	5.0	1.00	
Dibromomethane	ND	5.0	1.00	
1,2-Dichlorobenzene	ND	5.0	1.00	
1,3-Dichlorobenzene	ND	5.0	1.00	
1,4-Dichlorobenzene	ND	5.0	1.00	
Dichlorodifluoromethane	ND	5.0	1.00	
1,1-Dichloroethane	ND	5.0	1.00	
1,2-Dichloroethane	ND	5.0	1.00	
1,1-Dichloroethene	ND	5.0	1.00	
c-1,2-Dichloroethene	ND	5.0	1.00	
t-1,2-Dichloroethene	ND	5.0	1.00	
1,2-Dichloropropane	ND	5.0	1.00	
1,3-Dichloropropane	ND	5.0	1.00	
2,2-Dichloropropane	ND	5.0	1.00	

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RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

ENV Environmental International, Inc.		Date Received:	09/26/14
1090 Adams Street, Suite D		Work Order:	14-09-2102
Benicia, CA 94510-2953		Preparation:	EPA 5030C
		Method:	EPA 8260B
		Units:	ug/kg
Project: TAB1401			Page 5 of 6

Parameter	Result	RL	DF	Qualifiers
1,1-Dichloropropene	ND	5.0	1.00	
c-1,3-Dichloropropene	ND	5.0	1.00	
t-1,3-Dichloropropene	ND	5.0	1.00	
Ethylbenzene	ND	5.0	1.00	
2-Hexanone	ND	50	1.00	
Isopropylbenzene	ND	5.0	1.00	
p-Isopropyltoluene	ND	5.0	1.00	
Methylene Chloride	ND	50	1.00	
4-Methyl-2-Pentanone	ND	50	1.00	
Naphthalene	ND	50	1.00	
n-Propylbenzene	ND	5.0	1.00	
Styrene	ND	5.0	1.00	
1,1,1,2-Tetrachloroethane	ND	5.0	1.00	
1,1,2,2-Tetrachloroethane	ND	5.0	1.00	
Tetrachloroethene	ND	5.0	1.00	
Toluene	ND	5.0	1.00	
1,2,3-Trichlorobenzene	ND	10	1.00	
1,2,4-Trichlorobenzene	ND	5.0	1.00	
1,1,1-Trichloroethane	ND	5.0	1.00	
1,1,2-Trichloroethane	ND	5.0	1.00	
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND	50	1.00	
Trichloroethene	ND	5.0	1.00	
1,2,3-Trichloropropane	ND	5.0	1.00	
1,2,4-Trimethylbenzene	ND	5.0	1.00	
Trichlorofluoromethane	ND	50	1.00	
1,3,5-Trimethylbenzene	ND	5.0	1.00	
Vinyl Acetate	ND	50	1.00	
Vinyl Chloride	ND	5.0	1.00	
p/m-Xylene	ND	5.0	1.00	
o-Xylene	ND	5.0	1.00	
Methyl-t-Butyl Ether (MTBE)	ND	5.0	1.00	
Tert-Butyl Alcohol (TBA)	ND	50	1.00	
Diisopropyl Ether (DIPE)	ND	10	1.00	
Ethyl-t-Butyl Ether (ETBE)	ND	10	1.00	
Tert-Amyl-Methyl Ether (TAME)	ND	10	1.00	
Ethanol	ND	250	1.00	

Surrogate	Rec. (%)	Control Limits	Qualifiers
1,4-Bromofluorobenzene	97	60-132	

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

ENV Environmental International, Inc.		Date Received:	09/26/14
1090 Adams Street, Suite D		Work Order:	14-09-2102
Benicia, CA 94510-2953		Preparation:	EPA 5030C
		Method:	EPA 8260B
		Units:	ug/kg
Project: TAB1401			Page 6 of 6

Surrogate	Rec. (%)	Control Limits	Qualifiers
Dibromofluoromethane	99	63-141	
1,2-Dichloroethane-d4	101	62-146	
Toluene-d8	96	80-120	

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RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Quality Control - Spike/Spike Duplicate

ENV Environmental International, Inc.	Date Received: 09/26/14
1090 Adams Street, Suite D	Work Order: 14-09-2102
Benicia, CA 94510-2953	Preparation: EPA 3550B
	Method: EPA 8015B (M)
Project: TAB1401	Page 1 of 5

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
14-09-2173-6	**Sample**	**Solid**	**GC 45**	**09/30/14**	**10/01/14 02:07**	**140930S04**
14-09-2173-6	**Matrix Spike**	**Solid**	**GC 45**	**09/30/14**	**10/01/14 00:02**	**140930S04**
14-09-2173-6	**Matrix Spike Duplicate**	**Solid**	**GC 45**	**09/30/14**	**10/01/14 00:21**	**140930S04**

Parameter	Sample Conc.	Spike Added	MS Conc.	MS %Rec.	MSD Conc.	MSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
TPH as Diesel	21.65	400.0	337.0	79	340.3	80	71-125	1	0-12	

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RPD: Relative Percent Difference.   CL: Control Limits

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Quality Control - Spike/Spike Duplicate

ENV Environmental International, Inc.
1090 Adams Street, Suite D
Benicia, CA 94510-2953

Date Received: 09/26/14
Work Order: 14-09-2102
Preparation: EPA 3050B
Method: EPA 6010B

Project: TAB1401

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
14-09-2173-3	**Sample**	**Solid**	**ICP 7300**	**10/01/14**	**10/03/14 14:05**	**141001S21**
14-09-2173-3	**Matrix Spike**	**Solid**	**ICP 7300**	**10/01/14**	**10/03/14 14:06**	**141001S21**
14-09-2173-3	**Matrix Spike Duplicate**	**Solid**	**ICP 7300**	**10/01/14**	**10/03/14 14:07**	**141001S21**

Parameter	Sample Conc.	Spike Added	MS Conc.	MS %Rec.	MSD Conc.	MSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Antimony	ND	25.00	5.789	23	6.460	26	80-120	11	0-20	3
Arsenic	1.737	25.00	26.53	99	27.54	103	80-120	4	0-20	
Barium	56.36	25.00	79.61	93	108.8	210	80-120	31	0-20	3,4
Beryllium	ND	25.00	26.12	104	27.08	108	80-120	4	0-20	
Cadmium	ND	25.00	24.89	100	25.60	102	80-120	3	0-20	
Chromium	9.886	25.00	35.01	100	36.04	105	80-120	3	0-20	
Cobalt	4.562	25.00	29.89	101	30.63	104	80-120	2	0-20	
Copper	7.298	25.00	32.32	100	33.44	105	80-120	3	0-20	
Lead	38.60	25.00	35.32	0	35.13	0	80-120	1	0-20	3
Molybdenum	ND	25.00	21.66	87	21.75	87	80-120	0	0-20	
Nickel	8.413	25.00	33.59	101	34.37	104	80-120	2	0-20	
Selenium	ND	25.00	23.06	92	24.17	97	80-120	5	0-20	
Silver	ND	12.50	11.82	95	12.12	97	80-120	2	0-20	
Thallium	ND	25.00	23.14	93	23.60	94	80-120	2	0-20	
Vanadium	19.89	25.00	42.81	92	44.53	99	80-120	4	0-20	
Zinc	24.76	25.00	45.67	84	52.08	109	80-120	13	0-20	

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RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - Spike/Spike Duplicate

ENV Environmental International, Inc.		Date Received:	09/26/14
1090 Adams Street, Suite D		Work Order:	14-09-2102
Benicia, CA 94510-2953		Preparation:	EPA 7471A Total
		Method:	EPA 7471A
Project: TAB1401			Page 3 of 5

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
14-09-2112-4	**Sample**	**Solid**	**Mercury 05**	**10/02/14**	**10/02/14 20:52**	**141002S05**
14-09-2112-4	**Matrix Spike**	**Solid**	**Mercury 05**	**10/02/14**	**10/02/14 20:55**	**141002S05**
14-09-2112-4	**Matrix Spike Duplicate**	**Solid**	**Mercury 05**	**10/02/14**	**10/02/14 20:57**	**141002S05**

Parameter	Sample Conc.	Spike Added	MS Conc.	MS %Rec.	MSD Conc.	MSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Mercury	ND	0.8350	0.8560	103	0.8557	102	71-137	0	0-14	

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RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - Spike/Spike Duplicate

ENV Environmental International, Inc.
1090 Adams Street, Suite D
Benicia, CA 94510-2953

Date Received: 09/26/14
Work Order: 14-09-2102
Preparation: EPA 3545
Method: EPA 8270C

Project: TAB1401

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
Bin-COMP-1	**Sample**	**Solid**	**GC/MS SS**	**09/30/14**	**10/01/14 15:57**	**140930S12**
Bin-COMP-1	**Matrix Spike**	**Solid**	**GC/MS SS**	**09/30/14**	**10/01/14 16:15**	**140930S12**
Bin-COMP-1	**Matrix Spike Duplicate**	**Solid**	**GC/MS SS**	**09/30/14**	**10/01/14 17:12**	**140930S12**

Parameter	Sample Conc.	Spike Added	MS Conc.	MS %Rec.	MSD Conc.	MSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Acenaphthene	ND	10.00	6.857	69	6.827	68	34-148	0	0-20	
Acenaphthylene	ND	10.00	6.983	70	6.934	69	53-120	1	0-20	
Butyl Benzyl Phthalate	ND	10.00	6.678	67	6.870	69	15-189	3	0-20	
4-Chloro-3-Methylphenol	ND	10.00	7.085	71	7.105	71	32-120	0	0-20	
2-Chlorophenol	ND	10.00	6.986	70	6.945	69	53-120	1	0-20	
1,4-Dichlorobenzene	ND	10.00	6.621	66	6.555	66	43-120	1	0-26	
Dimethyl Phthalate	ND	10.00	6.698	67	6.645	66	44-122	1	0-20	
2,4-Dinitrotoluene	ND	10.00	6.456	65	6.461	65	28-120	0	0-20	
Fluorene	ND	10.00	6.878	69	6.870	69	12-186	0	0-20	
N-Nitroso-di-n-propylamine	ND	10.00	6.782	68	6.799	68	38-140	0	0-20	
Naphthalene	ND	10.00	6.858	69	6.788	68	20-140	1	0-20	
4-Nitrophenol	ND	10.00	5.442	54	5.402	54	14-128	1	0-59	
Pentachlorophenol	ND	10.00	6.204	62	6.042	60	10-124	3	0-20	
Phenol	ND	10.00	7.140	71	7.084	71	22-124	1	0-20	
Pyrene	ND	10.00	6.736	67	6.966	70	31-169	3	0-20	
1,2,4-Trichlorobenzene	ND	10.00	6.623	66	6.552	66	56-120	1	0-20	

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RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - Spike/Spike Duplicate

ENV Environmental International, Inc.
1090 Adams Street, Suite D
Benicia, CA 94510-2953

Project: TAB1401

Date Received: 09/26/14
Work Order: 14-09-2102
Preparation: EPA 5030C
Method: EPA 8260B

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
Bin-COMP-1	**Sample**	**Solid**	**GC/MS Q**	**09/26/14**	**09/27/14 11:38**	**140927S004**
Bin-COMP-1	**Matrix Spike**	**Solid**	**GC/MS Q**	**09/26/14**	**09/27/14 12:04**	**140927S004**
Bin-COMP-1	**Matrix Spike Duplicate**	**Solid**	**GC/MS Q**	**09/26/14**	**09/27/14 12:31**	**140927S004**

Parameter	Sample Conc.	Spike Added	MS Conc.	MS %Rec.	MSD Conc.	MSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Benzene	ND	50.00	46.21	92	44.92	90	61-127	3	0-20	
Carbon Tetrachloride	ND	50.00	47.71	95	47.48	95	51-135	0	0-29	
Chlorobenzene	ND	50.00	44.96	90	44.46	89	57-123	1	0-20	
1,2-Dibromoethane	ND	50.00	47.41	95	47.31	95	64-124	0	0-20	
1,2-Dichlorobenzene	ND	50.00	41.54	83	41.79	84	35-131	1	0-25	
1,2-Dichloroethane	ND	50.00	45.21	90	44.03	88	80-120	3	0-20	
1,1-Dichloroethene	ND	50.00	45.27	91	43.57	87	47-143	4	0-25	
Ethylbenzene	ND	50.00	42.92	86	43.00	86	57-129	0	0-22	
Toluene	ND	50.00	45.21	90	44.14	88	63-123	2	0-20	
Trichloroethene	ND	50.00	60.55	121	51.53	103	44-158	16	0-20	
Vinyl Chloride	ND	50.00	39.05	78	39.76	80	49-139	2	0-47	
p/m-Xylene	ND	100.0	88.12	88	88.08	88	70-130	0	0-30	
o-Xylene	ND	50.00	45.13	90	45.15	90	70-130	0	0-30	
Methyl-t-Butyl Ether (MTBE)	ND	50.00	47.41	95	47.23	94	57-123	0	0-21	
Tert-Butyl Alcohol (TBA)	ND	250.0	260.3	104	247.0	99	30-168	5	0-34	
Diisopropyl Ether (DIPE)	ND	50.00	47.09	94	46.35	93	57-129	2	0-20	
Ethyl-t-Butyl Ether (ETBE)	ND	50.00	48.54	97	48.25	97	55-127	1	0-20	
Tert-Amyl-Methyl Ether (TAME)	ND	50.00	49.44	99	48.77	98	58-124	1	0-20	
Ethanol	ND	500.0	462.9	93	432.7	87	17-167	7	0-47	

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RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - PDS

ENV Environmental International, Inc.
1090 Adams Street, Suite D
Benicia, CA 94510-2953

Date Received: 09/26/14
Work Order: 14-09-2102
Preparation: EPA 3050B
Method: EPA 6010B

Project: TAB1401

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Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	PDS/PDSD Batch Number
14-09-2173-3	**Sample**	**Solid**	**ICP 7300**	**10/01/14 00:00**	**10/03/14 14:05**	**141001S21**
14-09-2173-3	**PDS**	**Solid**	**ICP 7300**	**10/01/14 00:00**	**10/03/14 14:08**	**141001S21**

Parameter	Sample Conc.	Spike Added	PDS Conc.	PDS %Rec.	%Rec. CL	Qualifiers
Antimony	ND	25.00	26.35	105	75-125	
Arsenic	1.737	25.00	28.18	106	75-125	
Barium	56.36	25.00	80.18	95	75-125	
Beryllium	ND	25.00	26.50	106	75-125	
Cadmium	ND	25.00	25.26	101	75-125	
Chromium	9.886	25.00	35.71	103	75-125	
Cobalt	4.562	25.00	30.39	103	75-125	
Copper	7.298	25.00	32.87	102	75-125	
Lead	38.60	25.00	64.39	103	75-125	
Molybdenum	ND	25.00	24.96	100	75-125	
Nickel	8.413	25.00	34.11	103	75-125	
Selenium	ND	25.00	25.94	104	75-125	
Silver	ND	12.50	12.53	100	75-125	
Thallium	ND	25.00	23.24	93	75-125	
Vanadium	19.89	25.00	44.24	97	75-125	
Zinc	24.76	25.00	48.42	95	75-125	

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RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - LCS

ENV Environmental International, Inc.		Date Received:	09/26/14
1090 Adams Street, Suite D		Work Order:	14-09-2102
Benicia, CA 94510-2953		Preparation:	EPA 3550B
		Method:	EPA 8015B (M)
Project: TAB1401			Page 1 of 5

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	LCS Batch Number
099-15-490-1177	**LCS**	**Solid**	**GC 45**	**09/30/14**	**09/30/14 23:09**	**140930B04B**

Parameter	Spike Added	Conc. Recovered	LCS %Rec.	%Rec. CL	Qualifiers
TPH as Diesel	400.0	315.6	79	75-123	

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RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - LCS

ENV Environmental International, Inc.
1090 Adams Street, Suite D
Benicia, CA 94510-2953

Date Received: 09/26/14
Work Order: 14-09-2102
Preparation: EPA 3050B
Method: EPA 6010B

Project: TAB1401

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	LCS Batch Number
097-01-002-19240	**LCS**	**Solid**	**ICP 7300**	**10/01/14**	**10/03/14 14:03**	**141001L21**

Parameter	Spike Added	Conc. Recovered	LCS %Rec.	%Rec. CL	ME CL	Qualifiers
Antimony	25.00	26.52	106	80-120	73-127	
Arsenic	25.00	25.84	103	80-120	73-127	
Barium	25.00	25.81	103	80-120	73-127	
Beryllium	25.00	25.42	102	80-120	73-127	
Cadmium	25.00	27.30	109	80-120	73-127	
Chromium	25.00	27.05	108	80-120	73-127	
Cobalt	25.00	28.06	112	80-120	73-127	
Copper	25.00	25.66	103	80-120	73-127	
Lead	25.00	28.20	113	80-120	73-127	
Molybdenum	25.00	25.38	102	80-120	73-127	
Nickel	25.00	28.28	113	80-120	73-127	
Selenium	25.00	25.38	102	80-120	73-127	
Silver	12.50	11.84	95	80-120	73-127	
Thallium	25.00	26.70	107	80-120	73-127	
Vanadium	25.00	24.79	99	80-120	73-127	
Zinc	25.00	26.51	106	80-120	73-127	

Total number of LCS compounds: 16
Total number of ME compounds: 0
Total number of ME compounds allowed: 1
LCS ME CL validation result: Pass

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RPD: Relative Percent Difference.   CL: Control Limits

Calscience

Quality Control - LCS

ENV Environmental International, Inc.	Date Received: 09/26/14
1090 Adams Street, Suite D	Work Order: 14-09-2102
Benicia, CA 94510-2953	Preparation: EPA 7471A Total
	Method: EPA 7471A
Project: TAB1401	Page 3 of 5

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	LCS Batch Number
099-16-272-613	**LCS**	**Solid**	**Mercury 05**	**10/02/14**	**10/02/14 20:50**	**141002L05**

Parameter	Spike Added	Conc. Recovered	LCS %Rec.	%Rec. CL	Qualifiers
Mercury	0.8350	0.7373	88	85-121	

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RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - LCS

ENV Environmental International, Inc.	Date Received: 09/26/14
1090 Adams Street, Suite D	Work Order: 14-09-2102
Benicia, CA 94510-2953	Preparation: EPA 3545
	Method: EPA 8270C
Project: TAB1401	Page 4 of 5

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	LCS Batch Number
099-12-549-3077	**LCS**	**Solid**	**GC/MS SS**	**09/30/14**	**10/01/14 15:00**	**140930L12**

Parameter	Spike Added	Conc. Recovered	LCS %Rec.	%Rec. CL	ME CL	Qualifiers
Acenaphthene	10.00	8.199	82	51-123	39-135	
Acenaphthylene	10.00	8.284	83	52-120	41-131	
Butyl Benzyl Phthalate	10.00	8.478	85	43-139	27-155	
4-Chloro-3-Methylphenol	10.00	8.453	85	55-121	44-132	
2-Chlorophenol	10.00	7.493	75	58-124	47-135	
1,4-Dichlorobenzene	10.00	7.039	70	42-132	27-147	
Dimethyl Phthalate	10.00	8.382	84	51-123	39-135	
2,4-Dinitrotoluene	10.00	8.262	83	51-129	38-142	
Fluorene	10.00	8.431	84	54-126	42-138	
N-Nitroso-di-n-propylamine	10.00	7.717	77	40-136	24-152	
Naphthalene	10.00	7.611	76	32-146	13-165	
4-Nitrophenol	10.00	6.880	69	24-126	7-143	
Pentachlorophenol	10.00	7.598	76	23-131	5-149	
Phenol	10.00	7.763	78	40-130	25-145	
Pyrene	10.00	8.527	85	47-143	31-159	
1,2,4-Trichlorobenzene	10.00	7.175	72	45-129	31-143	

Total number of LCS compounds: 16
Total number of ME compounds: 0
Total number of ME compounds allowed: 1
LCS ME CL validation result: Pass

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RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - LCS

ENV Environmental International, Inc.
1090 Adams Street, Suite D
Benicia, CA 94510-2953

Date Received: 09/26/14
Work Order: 14-09-2102
Preparation: EPA 5030C
Method: EPA 8260B

Project: TAB1401

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	LCS Batch Number
099-12-796-8919	**LCS**	**Solid**	**GC/MS Q**	**09/27/14**	**09/27/14 09:48**	**140927L009**

Parameter	Spike Added	Conc. Recovered	LCS %Rec.	%Rec. CL	ME CL	Qualifiers
Benzene	50.00	50.34	101	78-120	71-127	
Carbon Tetrachloride	50.00	54.81	110	49-139	34-154	
Chlorobenzene	50.00	52.38	105	79-120	72-127	
1,2-Dibromoethane	50.00	49.31	99	80-120	73-127	
1,2-Dichlorobenzene	50.00	51.16	102	75-120	68-128	
1,2-Dichloroethane	50.00	48.20	96	80-120	73-127	
1,1-Dichloroethene	50.00	49.78	100	74-122	66-130	
Ethylbenzene	50.00	50.87	102	76-120	69-127	
Toluene	50.00	50.44	101	77-120	70-127	
Trichloroethene	50.00	47.66	95	80-120	73-127	
Vinyl Chloride	50.00	44.82	90	68-122	59-131	
p/m-Xylene	100.0	107.0	107	75-125	67-133	
o-Xylene	50.00	54.15	108	75-125	67-133	
Methyl-t-Butyl Ether (MTBE)	50.00	47.48	95	77-120	70-127	
Tert-Butyl Alcohol (TBA)	250.0	264.5	106	68-122	59-131	
Diisopropyl Ether (DIPE)	50.00	48.86	98	78-120	71-127	
Ethyl-t-Butyl Ether (ETBE)	50.00	49.83	100	78-120	71-127	
Tert-Amyl-Methyl Ether (TAME)	50.00	50.26	101	75-120	68-128	
Ethanol	500.0	453.1	91	56-140	42-154	

Total number of LCS compounds: 19
Total number of ME compounds: 0
Total number of ME compounds allowed: 1
LCS ME CL validation result: Pass

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RPD: Relative Percent Difference. CL: Control Limits

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Sample Analysis Summary Report

Work Order: 14-09-2102 Page 1 of 1

Method	Extraction	Chemist ID	Instrument	Analytical Location
EPA 6010B	EPA 3050B	469	ICP 7300	1
EPA 7471A	EPA 7471A Total	915	Mercury 05	1
EPA 8015B (M)	EPA 3550B	682	GC 45	1
EPA 8260B	EPA 5030C	823	GC/MS Q	2
EPA 8270C	EPA 3545	608	GC/MS SS	1

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Location 1: 7440 Lincoln Way, Garden Grove, CA 92841
Location 2: 7445 Lampson Avenue, Garden Grove, CA 92841

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Glossary of Terms and Qualifiers

Work Order: 14-09-2102 Page 1 of 1

Qualifiers	Definition
*	See applicable analysis comment.
<	Less than the indicated value.
>	Greater than the indicated value.
1	Surrogate compound recovery was out of control due to a required sample dilution. Therefore, the sample data was reported without further clarification.
2	Surrogate compound recovery was out of control due to matrix interference. The associated method blank surrogate spike compound was in control and, therefore, the sample data was reported without further clarification.
3	Recovery of the Matrix Spike (MS) or Matrix Spike Duplicate (MSD) compound was out of control due to suspected matrix interference. The associated LCS recovery was in control.
4	The MS/MSD RPD was out of control due to suspected matrix interference.
5	The PDS/PDSD or PES/PESD associated with this batch of samples was out of control due to suspected matrix interference.
6	Surrogate recovery below the acceptance limit.
7	Surrogate recovery above the acceptance limit.
B	Analyte was present in the associated method blank.
BU	Sample analyzed after holding time expired.
BV	Sample received after holding time expired.
E	Concentration exceeds the calibration range.
ET	Sample was extracted past end of recommended max. holding time.
HD	The chromatographic pattern was inconsistent with the profile of the reference fuel standard.
HDH	The sample chromatographic pattern for TPH matches the chromatographic pattern of the specified standard but heavier hydrocarbons were also present (or detected).
HDL	The sample chromatographic pattern for TPH matches the chromatographic pattern of the specified standard but lighter hydrocarbons were also present (or detected).
J	Analyte was detected at a concentration below the reporting limit and above the laboratory method detection limit. Reported value is estimated.
JA	Analyte positively identified but quantitation is an estimate.
ME	LCS Recovery Percentage is within Marginal Exceedance (ME) Control Limit range (+/- 4 SD from the mean).
ND	Parameter not detected at the indicated reporting limit.
Q	Spike recovery and RPD control limits do not apply resulting from the parameter concentration in the sample exceeding the spike concentration by a factor of four or greater.
SG	The sample extract was subjected to Silica Gel treatment prior to analysis.
X	% Recovery and/or RPD out-of-range.
Z	Analyte presence was not confirmed by second column or GC/MS analysis.
	Solid - Unless otherwise indicated, solid sample data is reported on a wet weight basis, not corrected for % moisture. All QC results are reported on a wet weight basis.
	Any parameter identified in 40CFR Part 136.3 Table II that is designated as "analyze immediately" with a holding time of <= 15 minutes (40CFR-136.3 Table II, footnote 4), is considered a "field" test and the reported results will be qualified as being received outside of the stated holding time unless received at the laboratory within 15 minutes of the collection time.
	A calculated total result (Example: Total Pesticides) is the summation of each component concentration and/or, if "J" flags are reported, estimated concentration. Component concentrations showing not detected (ND) are summed into the calculated total result as zero concentrations.

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ENV
1090 Adams St., Ste D
BENICIA, CA 94510
TEL: (707) 751-3817 . FAX: (707) 751-3897

CHAIN OF CUSTODY RECORD

DATE: 09/25/14
PAGE: 1 OF 1

LABORATORY CLIENT: ENV America, Inc.
ADDRESS: 1090 Adams St., Ste D
CITY: Benicia STATE: CA ZIP: 94510
TEL: 707-751-3817 FAX: 707-751-3897 E-MAIL: dsolis@envamerica.com

CLIENT PROJECT NAME / NUMBER: TAB1401
SITE LOCATION:
PROJECT CONTACT: D. Solis
LABORATORY: Cal Science
SAMPLER(S): (SIGNATURE)
14-09-2102

TURNAROUND TIME: ☐ SAME DAY ☐ 24 HR ☐ 48 HR ☐ 72 HR ☑ 5 DAYS ☐ 10 DAYS

SPECIAL REQUIREMENTS (ADDITIONAL COSTS MAY APPLY)
☐ RWQCB REPORTING ☐ ARCHIVE SAMPLES UNTIL ___/___/___

SPECIAL INSTRUCTIONS:

10X Rule for Metals

REQUESTED ANALYSIS

LAB USE ONLY	SAMPLE ID	LOCATION / DESCRIPTION	SAMPLING DATE	SAMPLING TIME	MATRIX	NO. OF CONT.	Please list tests required	Hydrocarbon Chain 8015M	VOC 8260B	CAM 17 Metals - 6010	Semi-VOC 8270
1	Bin-COMP-1	Bin	9-24	1300	S	1		X	X	X	X

Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
M. G.	To Omalley ECI	9/25/14	1505
Ton Omalley TO 650 9/25/14 1730	Wdhat ECI	9/26/14	0755

02/24/10 Revision

GSO

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800-322-5555 www.gso.com

2102

Ship From:
ALAN KEMP
CAL SCIENCE- CONCORD
5063 COMMERCIAL CIRCLE #H
CONCORD, CA 94520

Ship To:
SAMPLE RECEIVING
CEL
7440 LINCOLN WAY
GARDEN GROVE, CA 92841

COD:
$0.00

Reference:
ENV, BTS (ARCADIS), ERM

Delivery Instructions:

Signature Type:
SIGNATURE REQUIRED

Tracking #: 525726758

NPS

ORC

A

GARDEN GROVE

D92845A

29099714

Print Date : 09/25/14 15:23 PM

Package 1 of 1

Send Label To Printer ☑ Print All Edit Shipment Finish

LABEL INSTRUCTIONS:

Do not copy or reprint this label for additional shipments - each package must have a unique barcode.

STEP 1 - Use the "Send Label to Printer" button on this page to print the shipping label on a laser or inkjet printer.

STEP 2 - Fold this page in half.

STEP 3 - Securely attach this label to your package, do not cover the barcode.

STEP 4 - Request an on-call pickup for your package, if you do not have scheduled daily pickup service or Drop-off your package at the nearest GSO drop box. Locate nearest GSO dropbox locations using this link.

ADDITIONAL OPTIONS:

Send Label Via Email Create Return Label

TERMS AND CONDITIONS:

By giving us your shipment to deliver, you agree to all the service terms and conditions described in this section.
Our liability for loss or damage to any package is limited to your actual damages or $100 whichever is less, unless you pay for and declare a higher authorized value. If you declare a higher value and pay the additional charge, our liability will be the lesser of your declared value or the actual value of your loss or damage. In any event, we will not be liable for any damage, whether direct, incidental, special or consequential, in excess of the declared value of a shipment whether or not we had knowledge that such damage might be incurred including but not limited to loss of income or profit. We will not be liable for your acts or omissions, including but not limited to improper or insufficient packaging, securing, marking or addressing. Also, we will not be liable if you or the recipient violates any of the terms of our agreement. We will not be liable for loss, damage or delay caused by events we cannot control, including but not limited to acts of God, perils of the air, weather conditions, act of public enemies, war, strikes, or civil commotion. The highest declared value for our GSO Priority Letter or GSO Priority Package is $500. For other shipments the highest declared value is $10,000 unless your package contains items of "extraordinary value", in which case the highest declared value we allow is $500. Items of "extraordinary value" include, but or not limited to, artwork, jewelry, furs, precious metals, tickets, negotiable instruments and other items with intrinsic value.

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WORK ORDER #: 14-09-2102

SAMPLE RECEIPT FORM

Cooler 1 of 1

CLIENT: ENV AMERICA

DATE: 09/26/14

TEMPERATURE: Thermometer ID: SC1 (Criteria: 0.0 °C – 6.0 °C, not frozen except sediment/tissue)

Temperature 3.1 °C - 0.3 °C (CF) = 2.8 °C ☑ Blank ☐ Sample

☐ Sample(s) outside temperature criteria (PM/APM contacted by: ______)

☐ Sample(s) outside temperature criteria but received on ice/chilled on same day of sampling.

☐ **Received at ambient temperature, placed on ice for transport by Courier.**

Ambient Temperature: ☐ Air ☐ Filter

Checked by: 426

CUSTODY SEALS INTACT:

☑ Cooler	☐ ______	☐ No (Not Intact)	☐ Not Present	☐ N/A	Checked by: 426
☐ Sample	☐ ______	☐ No (Not Intact)	☑ Not Present		Checked by: 619

SAMPLE CONDITION:	Yes	No	N/A
Chain-Of-Custody (COC) document(s) received with samples	☑	☐	☐
COC document(s) received complete	☑	☐	☐
☐ Collection date/time, matrix, and/or # of containers logged in based on sample labels.			
☐ No analysis requested. ☐ Not relinquished. ☐ No date/time relinquished.			
Sampler's name indicated on COC	☐	☑	☐
Sample container label(s) consistent with COC	☑	☐	☐
Sample container(s) intact and good condition	☑	☐	☐
Proper containers and sufficient volume for analyses requested	☑	☐	☐
Analyses received within holding time	☑	☐	☐
Aqueous samples received within 15-minute holding time			
☐ pH ☐ Residual Chlorine ☐ Dissolved Sulfides ☐ Dissolved Oxygen	☐	☐	☑
Proper preservation noted on COC or sample container	☐	☐	☑
☐ Unpreserved vials received for Volatiles analysis			
Volatile analysis container(s) free of headspace	☐	☐	☑
Tedlar bag(s) free of condensation	☐	☐	☑

CONTAINER TYPE:

Solid: ☐4ozCGJ ☑8ozCGJ ☐16ozCGJ ☐Sleeve (_____) ☐EnCores® ☐TerraCores® ☐________

Aqueous: ☐VOA ☐VOAh ☐VOAna$_2$ ☐125AGB ☐125AGBh ☐125AGBp ☐1AGB ☐1AGBna$_2$ ☐1AGBs ☐500AGB ☐500AGJ ☐500AGJs ☐250AGB ☐250CGB ☐250CGBs ☐1PB ☐1PBna ☐500PB ☐250PB ☐250PBn ☐125PB ☐125PBznna ☐100PJ ☐100PJna$_2$ ☐________ ☐________ ☐________

Air: ☐Tedlar® ☐Canister **Other:** ☐________ **Trip Blank Lot#:**__________ **Labeled/Checked by:** 619

Container: **C:** Clear **A:** Amber **P:** Plastic **G:** Glass **J:** Jar **B:** Bottle **Z:** Ziploc/Resealable Bag **E:** Envelope **Reviewed by:** 3W

Preservative: **h:** HCL **n:** HNO_3 **na$_2$:**$Na_2S_2O_3$ **na:** NaOH **p:** H_3PO_4 **s:** H_2SO_4 **u:** Ultra-pure **znna:** $ZnAc_2$+NaOH **f:** Filtered **Scanned by:** 3W

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Supplemental Report 1

Additional requested analyses are reported as a stand-alone report.

WORK ORDER NUMBER: 14-09-2102

The difference is service

AIR | SOIL | WATER | MARINE CHEMISTRY

Analytical Report For

Client: ENV Environmental International, Inc.

Client Project Name: TAB1401

Attention: David Solis
1090 Adams Street, Suite D
Benicia, CA 94510-2953

Approved for release on 10/10/2014 by:
Don Burley
Project Manager

ResultLink ▸

Email your PM ▸

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Contents

Client Project Name: TAB1401
Work Order Number: 14-09-2102

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3 Client Sample Data. 5
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4 Quality Control Sample Data. 6
4.1 MS/MSD. 6
4.2 LCS/LCSD. 7

5 Sample Analysis Summary. 8

6 Glossary of Terms and Qualifiers. 9

7 Chain-of-Custody/Sample Receipt Form. 10

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Work Order Narrative

Condition Upon Receipt:

Samples were received under Chain-of-Custody (COC) on 09/26/14. They were assigned to Work Order 14-09-2102.

Unless otherwise noted on the Sample Receiving forms all samples were received in good condition and within the recommended EPA temperature criteria for the methods noted on the COC. The COC and Sample Receiving Documents are integral elements of the analytical report and are presented at the back of the report.

Holding Times:

All samples were analyzed within prescribed holding times (HT) and/or in accordance with the Calscience Sample Acceptance Policy unless otherwise noted in the analytical report and/or comprehensive case narrative, if required.

Any parameter identified in 40CFR Part 136.3 Table II that is designated as "analyze immediately" with a holding time of <= 15 minutes (40CFR-136.3 Table II, footnote 4), is considered a "field" test and the reported results will be qualified as being received outside of the stated holding time unless received at the laboratory within 15 minutes of the collection time.

Quality Control:

All quality control parameters (QC) were within established control limits except where noted in the QC summary forms or described further within this report.

Additional Comments:

Air - Sorbent-extracted air methods (EPA TO-4A, EPA TO-10, EPA TO-13A, EPA TO-17): Analytical results are converted from mass/sample basis to mass/volume basis using client-supplied air volumes.

New York NELAP air certification does not certify for all reported methods and analytes, reference the accredited items here: http://www.calscience.com/PDF/New_York.pdf

Solid - Unless otherwise indicated, solid sample data is reported on a wet weight basis, not corrected for % moisture. All QC results are always reported on a wet weight basis.

Subcontractor Information:

Unless otherwise noted below (or on the subcontract form), no samples were subcontracted.

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Sample Summary

Client:	ENV Environmental International, Inc.	Work Order:	14-09-2102
	1090 Adams Street, Suite D	Project Name:	TAB1401
	Benicia, CA 94510-2953	PO Number:	
		Date/Time Received:	09/26/14 07:55
		Number of Containers:	1
Attn:	David Solis		

Sample Identification	Lab Number	Collection Date and Time	Number of Containers	Matrix
Bin-COMP-1	14-09-2102-1	09/24/14 13:00	1	Solid

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Analytical Report

ENV Environmental International, Inc.		Date Received:	09/26/14
1090 Adams Street, Suite D		Work Order:	14-09-2102
Benicia, CA 94510-2953		Preparation:	T22.11.5. AII
		Method:	EPA 6010B
		Units:	mg/L
Project: TAB1401			Page 1 of 1

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Bin-COMP-1	**14-09-2102-1-A**	**09/24/14 13:00**	**Solid**	**ICP 7300**	**10/06/14**	**10/09/14 00:13**	**141008LA4A**

Comment(s): - The analysis was performed on a STLC extract of the sample.

Parameter	Result	RL	DF	Qualifiers
Chromium	0.990	0.100	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Method Blank	**097-05-006-7496**	**N/A**	**Aqueous**	**ICP 7300**	**10/06/14**	**10/08/14 23:48**	**141008LA4A**

Parameter	Result	RL	DF	Qualifiers
Chromium	ND	0.100	1.00	

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RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Quality Control - Spike/Spike Duplicate

ENV Environmental International, Inc.
1090 Adams Street, Suite D
Benicia, CA 94510-2953

Date Received: 09/26/14
Work Order: 14-09-2102
Preparation: T22.11.5. All
Method: EPA 6010B

Project: TAB1401

Page 1 of 1

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
14-10-0525-1	**Sample**	**Aqueous**	**ICP 7300**	**10/08/14**	**10/08/14 23:51**	**141008SA4**
14-10-0525-1	**Matrix Spike**	**Aqueous**	**ICP 7300**	**10/08/14**	**10/08/14 23:53**	**141008SA4**
14-10-0525-1	**Matrix Spike Duplicate**	**Aqueous**	**ICP 7300**	**10/08/14**	**10/08/14 23:54**	**141008SA4**

Parameter	Sample Conc.	Spike Added	MS Conc.	MS %Rec.	MSD Conc.	MSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Chromium	ND	5.000	5.045	101	5.050	101	75-125	0	0-20	

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RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - LCS

ENV Environmental International, Inc.
1090 Adams Street, Suite D
Benicia, CA 94510-2953

Project: TAB1401

Date Received: 09/26/14
Work Order: 14-09-2102
Preparation: T22.11.5. All
Method: EPA 6010B

Page 1 of 1

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	LCS Batch Number
097-05-006-7496	**LCS**	**Aqueous**	**ICP 7300**	**10/06/14**	**10/08/14 23:50**	**141008LA4A**

Parameter	Spike Added	Conc. Recovered	LCS %Rec.	%Rec. CL	Qualifiers
Chromium	5.000	4.958	99	80-120	

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RPD: Relative Percent Difference. CL: Control Limits

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Sample Analysis Summary Report

Work Order: 14-09-2102 Page 1 of 1

Method	Extraction	Chemist ID	Instrument	Analytical Location
EPA 6010B	T22.11.5. All	469	ICP 7300	1

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Location 1: 7440 Lincoln Way, Garden Grove, CA 92841

eurofins Calscience

Glossary of Terms and Qualifiers

Work Order: 14-09-2102 Page 1 of 1

Qualifiers	Definition
*	See applicable analysis comment.
<	Less than the indicated value.
>	Greater than the indicated value.
1	Surrogate compound recovery was out of control due to a required sample dilution. Therefore, the sample data was reported without further clarification.
2	Surrogate compound recovery was out of control due to matrix interference. The associated method blank surrogate spike compound was in control and, therefore, the sample data was reported without further clarification.
3	Recovery of the Matrix Spike (MS) or Matrix Spike Duplicate (MSD) compound was out of control due to suspected matrix interference. The associated LCS recovery was in control.
4	The MS/MSD RPD was out of control due to suspected matrix interference.
5	The PDS/PDSD or PES/PESD associated with this batch of samples was out of control due to suspected matrix interference.
6	Surrogate recovery below the acceptance limit.
7	Surrogate recovery above the acceptance limit.
B	Analyte was present in the associated method blank.
BU	Sample analyzed after holding time expired.
BV	Sample received after holding time expired.
E	Concentration exceeds the calibration range.
ET	Sample was extracted past end of recommended max. holding time.
HD	The chromatographic pattern was inconsistent with the profile of the reference fuel standard.
HDH	The sample chromatographic pattern for TPH matches the chromatographic pattern of the specified standard but heavier hydrocarbons were also present (or detected).
HDL	The sample chromatographic pattern for TPH matches the chromatographic pattern of the specified standard but lighter hydrocarbons were also present (or detected).
J	Analyte was detected at a concentration below the reporting limit and above the laboratory method detection limit. Reported value is estimated.
JA	Analyte positively identified but quantitation is an estimate.
ME	LCS Recovery Percentage is within Marginal Exceedance (ME) Control Limit range (+/- 4 SD from the mean).
ND	Parameter not detected at the indicated reporting limit.
Q	Spike recovery and RPD control limits do not apply resulting from the parameter concentration in the sample exceeding the spike concentration by a factor of four or greater.
SG	The sample extract was subjected to Silica Gel treatment prior to analysis.
X	% Recovery and/or RPD out-of-range.
Z	Analyte presence was not confirmed by second column or GC/MS analysis.

Solid - Unless otherwise indicated, solid sample data is reported on a wet weight basis, not corrected for % moisture. All QC results are reported on a wet weight basis.

Any parameter identified in 40CFR Part 136.3 Table II that is designated as "analyze immediately" with a holding time of <= 15 minutes (40CFR-136.3 Table II, footnote 4), is considered a "field" test and the reported results will be qualified as being received outside of the stated holding time unless received at the laboratory within 15 minutes of the collection time.

A calculated total result (Example: Total Pesticides) is the summation of each component concentration and/or, if "J" flags are reported, estimated concentration. Component concentrations showing not detected (ND) are summed into the calculated total result as zero concentrations.

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ENV
1090 Adams St., Ste D
BENICIA, CA 94510
TEL: (707) 751-3817 . FAX: (707) 751-3897

CHAIN OF CUSTODY RECORD

DATE: 09/25/14
PAGE: 1 OF 1

LABORATORY CLIENT: ENV America, Inc.
ADDRESS: 1090 Adams St., Ste D
CITY: Benicia STATE: CA ZIP: 94510
TEL: 707-751-3817 FAX: 707-751-3897 E-MAIL: dsolis@envamerica.com

CLIENT PROJECT NAME / NUMBER: TAB1401
SITE LOCATION:
PROJECT CONTACT: D. Solis
LABORATORY: Cal Science
SAMPLER(S): (SIGNATURE)
14-09-2102

TURNAROUND TIME: ☐ SAME DAY ☐ 24 HR ☐ 48 HR ☐ 72 HR ☑ 5 DAYS ☐ 10 DAYS

SPECIAL REQUIREMENTS (ADDITIONAL COSTS MAY APPLY)
☐ RWQCB REPORTING ☐ ARCHIVE SAMPLES UNTIL ___/___/___

SPECIAL INSTRUCTIONS:
10X Rule for Metals

REQUESTED ANALYSIS

LAB USE ONLY	SAMPLE ID	LOCATION / DESCRIPTION	SAMPLING DATE	SAMPLING TIME	MATRIX	NO. OF CONT.	Please list tests required	Hydrocarbon Chain 8015M	VOC 8260B	CAM 17 Metals - 6010	Semi-VOC 8270
1	Bin-COMP-1	Bin	9-24	1300	S	1		x	x	x	x

Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
M. [illegible]	Tom Omalley ECI	9/25/14	1505
Tom Omalley TO 650 9/25/14 1730	Wdhatn ECI	9/26/14	0755

02/24/10 Revision

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800-322-5555 www.gso.com

2102

Ship From:
ALAN KEMP
CAL SCIENCE- CONCORD
5063 COMMERCIAL CIRCLE #H
CONCORD, CA 94520

Ship To:
SAMPLE RECEIVING
CEL
7440 LINCOLN WAY
GARDEN GROVE, CA 92841

COD:
$0.00

Reference:
ENV, BTS (ARCADIS), ERM

Delivery Instructions:

Signature Type:
SIGNATURE REQUIRED

Tracking #: 525726758

NPS

ORC

A

GARDEN GROVE

D92845A

29099714

Print Date : 09/25/14 15:23 PM

Package 1 of 1

Send Label To Printer ☑ Print All Edit Shipment Finish

LABEL INSTRUCTIONS:

Do not copy or reprint this label for additional shipments - each package must have a unique barcode.

STEP 1 - Use the "Send Label to Printer" button on this page to print the shipping label on a laser or inkjet printer.

STEP 2 - Fold this page in half.

STEP 3 - Securely attach this label to your package, do not cover the barcode.

STEP 4 - Request an on-call pickup for your package, if you do not have scheduled daily pickup service or Drop-off your package at the nearest GSO drop box. Locate nearest GSO dropbox locations using this link.

ADDITIONAL OPTIONS:

Send Label Via Email Create Return Label

TERMS AND CONDITIONS:

By giving us your shipment to deliver, you agree to all the service terms and conditions described in this section.
Our liability for loss or damage to any package is limited to your actual damages or $100 whichever is less, unless you pay for and declare a higher authorized value. If you declare a higher value and pay the additional charge, our liability will be the lesser of your declared value or the actual value of your loss or damage. In any event, we will not be liable for any damage, whether direct, incidental, special or consequential, in excess of the declared value of a shipment whether or not we had knowledge that such damage might be incurred including but not limited to loss of income or profit. We will not be liable for your acts or omissions, including but not limited to improper or insufficient packaging, securing, marking or addressing. Also, we will not be liable if you or the recipient violates any of the terms of our agreement. We will not be liable for loss, damage or delay caused by events we cannot control, including but not limited to acts of God, perils of the air, weather conditions, act of public enemies, war, strikes, or civil commotion. The highest declared value for our GSO Priority Letter or GSO Priority Package is $500. For other shipments the highest declared value is $10,000 unless your package contains items of "extraordinary value", in which case the highest declared value we allow is $500. Items of "extraordinary value" include, but or not limited to, artwork, jewelry, furs, precious metals, tickets, negotiable instruments and other items with intrinsic value.

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WORK ORDER #: 14-09-2102

SAMPLE RECEIPT FORM

Cooler 1 of 1

CLIENT: ENV AMERICA

DATE: 09/26/14

TEMPERATURE: Thermometer ID: SC1 (Criteria: 0.0 °C – 6.0 °C, not frozen except sediment/tissue)

Temperature 3.1 °C - 0.3 °C (CF) = 2.8 °C ☑ Blank ☐ Sample

☐ Sample(s) outside temperature criteria (PM/APM contacted by: ________)

☐ Sample(s) outside temperature criteria but received on ice/chilled on same day of sampling.

☐ **Received at ambient temperature, placed on ice for transport by Courier.**

Ambient Temperature: ☐ Air ☐ Filter **Checked by:** 426

CUSTODY SEALS INTACT:

☑ Cooler ☐ ________ ☐ No (Not Intact) ☐ Not Present ☐ N/A **Checked by:** 426

☐ Sample ☐ ________ ☐ No (Not Intact) ☑ Not Present **Checked by:** 659

SAMPLE CONDITION:	Yes	No	N/A
Chain-Of-Custody (COC) document(s) received with samples	☑	☐	☐
COC document(s) received complete	☑	☐	☐
☐ Collection date/time, matrix, and/or # of containers logged in based on sample labels.			
☐ No analysis requested. ☐ Not relinquished. ☐ No date/time relinquished.			
Sampler's name indicated on COC	☐	☑	☐
Sample container label(s) consistent with COC	☑	☐	☐
Sample container(s) intact and good condition	☑	☐	☐
Proper containers and sufficient volume for analyses requested	☑	☐	☐
Analyses received within holding time	☑	☐	☐
Aqueous samples received within 15-minute holding time			
☐ pH ☐ Residual Chlorine ☐ Dissolved Sulfides ☐ Dissolved Oxygen	☐	☐	☑
Proper preservation noted on COC or sample container	☐	☐	☑
☐ Unpreserved vials received for Volatiles analysis			
Volatile analysis container(s) free of headspace	☐	☐	☑
Tedlar bag(s) free of condensation	☐	☐	☑

CONTAINER TYPE:

Solid: ☐4ozCGJ ☑8ozCGJ ☐16ozCGJ ☐Sleeve (_____) ☐EnCores® ☐TerraCores® ☐________

Aqueous: ☐VOA ☐**VOAh** ☐**VOAna₂** ☐125AGB ☐**125AGBh** ☐**125AGBp** ☐1AGB ☐**1AGBna₂** ☐**1AGBs**

☐500AGB ☐500AGJ ☐**500AGJs** ☐250AGB ☐250CGB ☐**250CGBs** ☐1PB ☐**1PBna** ☐500PB

☐250PB ☐**250PBn** ☐125PB ☐**125PBznna** ☐100PJ ☐**100PJna₂** ☐________ ☐________ ☐________

Air: ☐Tedlar® ☐Canister **Other:** ☐________ **Trip Blank Lot#:**__________ **Labeled/Checked by:** 659

Container: **C:** Clear **A:** Amber **P:** Plastic **G:** Glass **J:** Jar **B:** Bottle **Z:** Ziploc/Resealable Bag **E:** Envelope **Reviewed by:** 300

Preservative: **h:** HCL **n:** HNO_3 **na₂:**$Na_2S_2O_3$ **na:** NaOH **p:** H_3PO_4 **s:** H_2SO_4 **u:** Ultra-pure **znna:** $ZnAc_2$+NaOH **f:** Filtered **Scanned by:** 300

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Curtis & Tompkins, Ltd.
Analytical Laboratories, Since 1878

Curtis & Tompkins, Ltd., Analytical Laboratories, Since 1878

2323 Fifth Street, Berkeley, CA 94710, Phone (510) 486-0900

Laboratory Job Number 265476
ANALYTICAL REPORT

ENV America Incorporated 1090 Adams St. Benicia, CA 94510	Project : TAB1501 Location : W. Sacramento Level : II

Sample ID	Lab ID
BC-1	265476-001

This data package has been reviewed for technical correctness and completeness. Release of this data has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature. The results contained in this report meet all requirements of NELAC and pertain only to those samples which were submitted for analysis. This report may be reproduced only in its entirety.

Signature: Mikelle Chong   Date: 03/30/2015

Mikelle Chong
Project Manager
mikelle.chong@ctberk.com

CA ELAP# 2896, NELAP# 4044-001

Curtis & Tompkins, Ltd.

CASE NARRATIVE

Laboratory number:	**265476**
Client:	**ENV America Incorporated**
Project:	**TAB1501**
Location:	**W. Sacramento**
Request Date:	**03/20/15**
Samples Received:	**03/20/15**

This data package contains sample and QC results for one soil sample, requested for the above referenced project on 03/20/15. The sample was received on ice and intact.

TPH-Purgeables and/or BTXE by GC (EPA 8015B):
No analytical problems were encountered.

TPH-Extractables by GC (EPA 8015B):
Low recoveries were observed for diesel C10-C24 in the MS/MSD of BC-1 (lab # 265476-001); the LCS was within limits, and the associated RPD was within limits. No other analytical problems were encountered.

Volatile Organics by GC/MS (EPA 8260B):
No analytical problems were encountered.

Metals (EPA 6010B and EPA 7471A):
No analytical problems were encountered.

Page 1 of 1

23.0

ENV

1090 Adams St., Ste D
BENICIA, CA 94510
TEL: (707) 751-3817 . FAX: (707) 751-3897

265476

CHAIN OF CUSTODY RECORD

DATE: 03/20/15
PAGE: 1 OF 1

LABORATORY CLIENT: ENV America, Inc.
ADDRESS: 1090 Adams St., Ste D
CITY: Benicia STATE: CA ZIP: 94510
TEL: 707-751-3817 FAX: 707-751-3897 E-MAIL: dsolis@envamerica.com

CLIENT PROJECT NAME / NUMBER: TAB1501
SITE LOCATION: W. Sacramento
PROJECT CONTACT: D. Solis
LABORATORY: Curtis & Tompkins
SAMPLER(S): (SIGNATURE)
LAB USE ONLY: ☐☐-☐☐☐☐

TURNAROUND TIME:
☐ SAME DAY ☐ 24 HR ☐ 48 HR ☐ 72 HR ☑ 5 DAYS ☐ 10 DAYS

SPECIAL REQUIREMENTS (ADDITIONAL COSTS MAY APPLY)
☐ RWQCB REPORTING ☐ ARCHIVE SAMPLES UNTIL ___/___/___

SPECIAL INSTRUCTIONS:

X10 RULE FOR METALS

REQUESTED ANALYSIS

LAB USE ONLY	SAMPLE ID	LOCATION / DESCRIPTION	SAMPLING DATE	SAMPLING TIME	MATRIX	NO. OF CONT.	Please list tests required	Hydrocarbon Chain 8015	VOC 8260B	CAM 17 Metals 6010B
	BC-1	Bin	3/18/2015	11:30 AM	S	1		x	x	x

Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
N. [signature]	Pat [signature]	3/20/15	1:08
Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:

02/24/10 Revision

COOLER RECEIPT CHECKLIST Curtis & Tompkins, Ltd.

Login # 265476 Date Received 3/20/15 Number of coolers 1

Client ENV America, Inc. Project TRC 1501

Date Opened 3/20 By (print) SC (sign)

Date Logged in 3/20 By (print) BL (sign)

1. Did cooler come with a shipping slip (airbill, etc) YES **NO**

   Shipping info

2A. Were custody seals present? .... ☐ YES (circle) on cooler on samples ☒ NO

   How many ______ Name ______ Date ______

2B. Were custody seals intact upon arrival? YES NO **N/A**

3. Were custody papers dry and intact when received? **YES** NO

4. Were custody papers filled out properly (ink, signed, etc)? **YES** NO

5. Is the project identifiable from custody papers? (If so fill out top of form) **YES** NO

6. Indicate the packing in cooler: (if other, describe)

   ☐ Bubble Wrap ☐ Foam blocks ☐ Bags ☒ None

   ☐ Cloth material ☐ Cardboard ☐ Styrofoam ☐ Paper towels

7. Temperature documentation: * Notify PM if temperature exceeds 6°C

   Type of ice used: ☒ Wet ☐ Blue/Gel ☐ None Temp(°C) 5.7°

   ☐ Samples Received on ice & cold without a temperature blank; temp. taken with IR gun

   ☐ Samples received on ice directly from the field. Cooling process had begun

8. Were Method 5035 sampling containers present? YES **NO**

   If YES, what time were they transferred to freezer?

9. Did all bottles arrive unbroken/unopened? **YES** NO

10. Are there any missing / extra samples? YES **NO**

11. Are samples in the appropriate containers for indicated tests? **YES** NO

12. Are sample labels present, in good condition and complete? **YES** NO

13. Do the sample labels agree with custody papers? **YES** NO

14. Was sufficient amount of sample sent for tests requested? **YES** NO

15. Are the samples appropriately preserved? YES NO **N/A**

16. Did you check preservatives for all bottles for each sample? YES NO **N/A**

17. Did you document your preservative check? YES NO **N/A**

18. Did you change the hold time in LIMS for unpreserved VOAs? YES NO **N/A**

19. Did you change the hold time in LIMS for preserved terracores? YES NO **N/A**

20. Are bubbles > 6mm absent in VOA samples? YES NO **N/A**

21. Was the client contacted concerning this sample delivery? YES **NO**

    If YES, Who was called? ______ By ______ Date: ______

COMMENTS

Rev 10, 9/12

Curtis & Tompkins, Ltd.

Detections Summary for 265476

Results for any subcontracted analyses are not included in this summary.

Client : ENV America Incorporated
Project : TAB1501
Location : W. Sacramento

Client Sample ID : BC-1 Laboratory Sample ID : 265476-001

Analyte	Result	Flags	RL	Units	Basis	IDF	Method	Prep Method
Diesel C10-C24	190	Y	1.0	mg/Kg	As Recd	1.000	EPA 8015B	EPA 3550B
Motor Oil C24-C36	180		5.0	mg/Kg	As Recd	1.000	EPA 8015B	EPA 3550B
Hydraulic Fluid, C10-40	310		5.0	mg/Kg	As Recd	1.000	EPA 8015B	EPA 3550B
Arsenic	7.3		0.24	mg/Kg	As Recd	1.000	EPA 6010B	EPA 3050B
Barium	72		0.24	mg/Kg	As Recd	1.000	EPA 6010B	EPA 3050B
Beryllium	0.50		0.097	mg/Kg	As Recd	1.000	EPA 6010B	EPA 3050B
Cadmium	0.94		0.24	mg/Kg	As Recd	1.000	EPA 6010B	EPA 3050B
Chromium	26		0.24	mg/Kg	As Recd	1.000	EPA 6010B	EPA 3050B
Cobalt	6.4		0.24	mg/Kg	As Recd	1.000	EPA 6010B	EPA 3050B
Copper	9.0		0.24	mg/Kg	As Recd	1.000	EPA 6010B	EPA 3050B
Lead	9.8		0.24	mg/Kg	As Recd	1.000	EPA 6010B	EPA 3050B
Mercury	0.041		0.018	mg/Kg	As Recd	1.000	EPA 7471A	METHOD
Molybdenum	0.35		0.24	mg/Kg	As Recd	1.000	EPA 6010B	EPA 3050B
Nickel	11		0.24	mg/Kg	As Recd	1.000	EPA 6010B	EPA 3050B
Vanadium	46		0.24	mg/Kg	As Recd	1.000	EPA 6010B	EPA 3050B
Zinc	74		0.97	mg/Kg	As Recd	1.000	EPA 6010B	EPA 3050B

Y = Sample exhibits chromatographic pattern which does not resemble standard

Curtis & Tompkins, Ltd.

Total Volatile Hydrocarbons

Lab #:	265476	Location:	W. Sacramento
Client:	ENV America Incorporated	Prep:	EPA 5030B
Project#:	TAB1501	Analysis:	EPA 8015B
Field ID:	BC-1	Diln Fac:	1.000
Matrix:	Soil	Batch#:	221673
Units:	mg/Kg	Sampled:	03/18/15
Basis:	as received	Received:	03/20/15

Type: SAMPLE   Analyzed: 03/26/15
Lab ID: 265476-001

Analyte	Result	RL
Gasoline C7-C12	ND	1.1

Surrogate	%REC	Limits
Bromofluorobenzene (FID)	97	78-138

Type: BLANK   Analyzed: 03/25/15
Lab ID: QC782046

Analyte	Result	RL
Gasoline C7-C12	ND	0.20

Surrogate	%REC	Limits
Bromofluorobenzene (FID)	98	78-138

ND= Not Detected
RL= Reporting Limit

Batch QC Report

Total Volatile Hydrocarbons

Lab #:	265476	Location:	W. Sacramento
Client:	ENV America Incorporated	Prep:	EPA 5030B
Project#:	TAB1501	Analysis:	EPA 8015B
Type:	LCS	Diln Fac:	1.000
Lab ID:	QC782045	Batch#:	221673
Matrix:	Soil	Analyzed:	03/25/15
Units:	mg/Kg		

Analyte	Spiked	Result	%REC	Limits
Gasoline C7-C12	1.000	0.9397	94	80-121

Surrogate	%REC	Limits
Bromofluorobenzene (FID)	104	78-138

Curtis & Tompkins, Ltd.

Batch QC Report

Total Volatile Hydrocarbons

Lab #:	265476	Location:	W. Sacramento
Client:	ENV America Incorporated	Prep:	EPA 5030B
Project#:	TAB1501	Analysis:	EPA 8015B
Field ID:	ZZZZZZZZZZ	Diln Fac:	1.000
MSS Lab ID:	265500-005	Batch#:	221673
Matrix:	Soil	Sampled:	03/20/15
Units:	mg/Kg	Received:	03/20/15
Basis:	as received	Analyzed:	03/26/15

Type: MS Lab ID: QC782047

Analyte	MSS Result	Spiked	Result	%REC	Limits
Gasoline C7-C12	0.1046	10.20	6.830	66	50-120

Surrogate	%REC	Limits
Bromofluorobenzene (FID)	108	78-138

Type: MSD Lab ID: QC782048

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
Gasoline C7-C12	10.64	6.689	62	50-120	6	31

Surrogate	%REC	Limits
Bromofluorobenzene (FID)	119	78-138

RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

Total Extractable Hydrocarbons

Lab #:	265476	Location:	W. Sacramento
Client:	ENV America Incorporated	Prep:	EPA 3550B
Project#:	TAB1501	Analysis:	EPA 8015B
Field ID:	BC-1	Batch#:	221632
Matrix:	Soil	Sampled:	03/18/15
Units:	mg/Kg	Received:	03/20/15
Basis:	as received	Prepared:	03/24/15
Diln Fac:	1.000	Analyzed:	03/25/15

Type: SAMPLE   Lab ID: 265476-001

Analyte	Result	RL
Diesel C10-C24	190 Y	1.0
Motor Oil C24-C36	180	5.0
Hydraulic Fluid, C10-40	310	5.0

Surrogate	%REC	Limits
o-Terphenyl	99	59-140

Type: BLANK   Lab ID: QC781888

Analyte	Result	RL
Diesel C10-C24	ND	1.0
Motor Oil C24-C36	ND	5.0
Hydraulic Fluid, C10-40	ND	5.0

Surrogate	%REC	Limits
o-Terphenyl	100	59-140

Y= Sample exhibits chromatographic pattern which does not resemble standard
ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Batch QC Report

Total Extractable Hydrocarbons

Lab #:	265476	Location:	W. Sacramento
Client:	ENV America Incorporated	Prep:	EPA 3550B
Project#:	TAB1501	Analysis:	EPA 8015B
Type:	LCS	Diln Fac:	1.000
Lab ID:	QC781889	Batch#:	221632
Matrix:	Soil	Prepared:	03/24/15
Units:	mg/Kg	Analyzed:	03/25/15

Cleanup Method: EPA 3630C

Analyte	Spiked	Result	%REC	Limits
Diesel C10-C24	50.44	44.18	88	58-137

Surrogate	%REC	Limits
o-Terphenyl	88	59-140

Curtis & Tompkins, Ltd.

Batch QC Report

Total Extractable Hydrocarbons

Lab #:	265476	Location:	W. Sacramento
Client:	ENV America Incorporated	Prep:	EPA 3550B
Project#:	TAB1501	Analysis:	EPA 8015B
Field ID:	BC-1	Batch#:	221632
MSS Lab ID:	265476-001	Sampled:	03/18/15
Matrix:	Soil	Received:	03/20/15
Units:	mg/Kg	Prepared:	03/24/15
Basis:	as received	Analyzed:	03/25/15
Diln Fac:	1.000		

Type: MS   Lab ID: QC781890

Analyte	MSS Result	Spiked	Result	%REC	Limits
Diesel C10-C24	193.5	50.27	190.7	-6 *	46-154

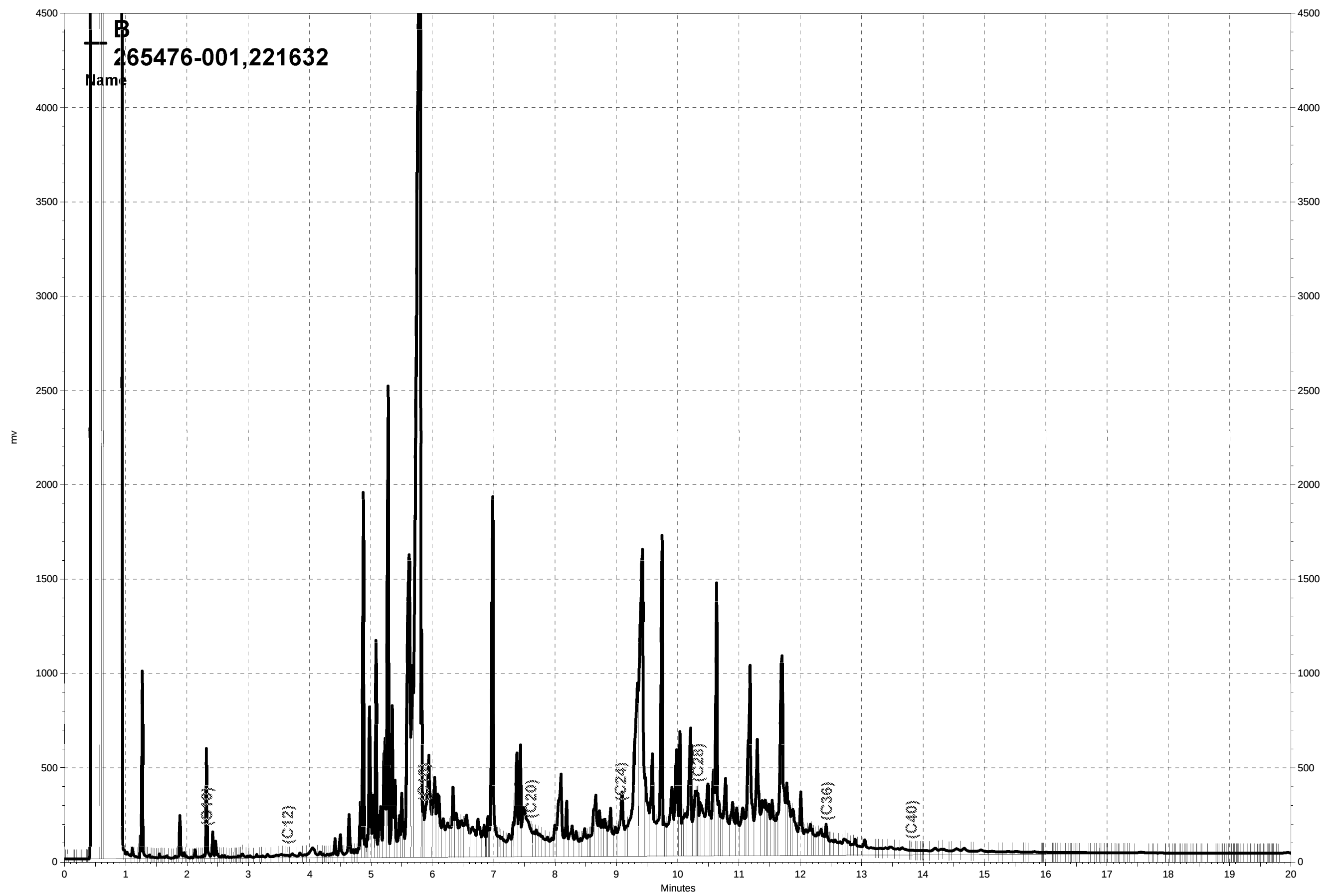
Surrogate	%REC	Limits
o-Terphenyl	127	59-140

Type: MSD   Lab ID: QC781891

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
Diesel C10-C24	50.43	182.2	-22 *	46-154	5	50

Surrogate	%REC	Limits
o-Terphenyl	82	59-140

*= Value outside of QC limits; see narrative
RPD= Relative Percent Difference



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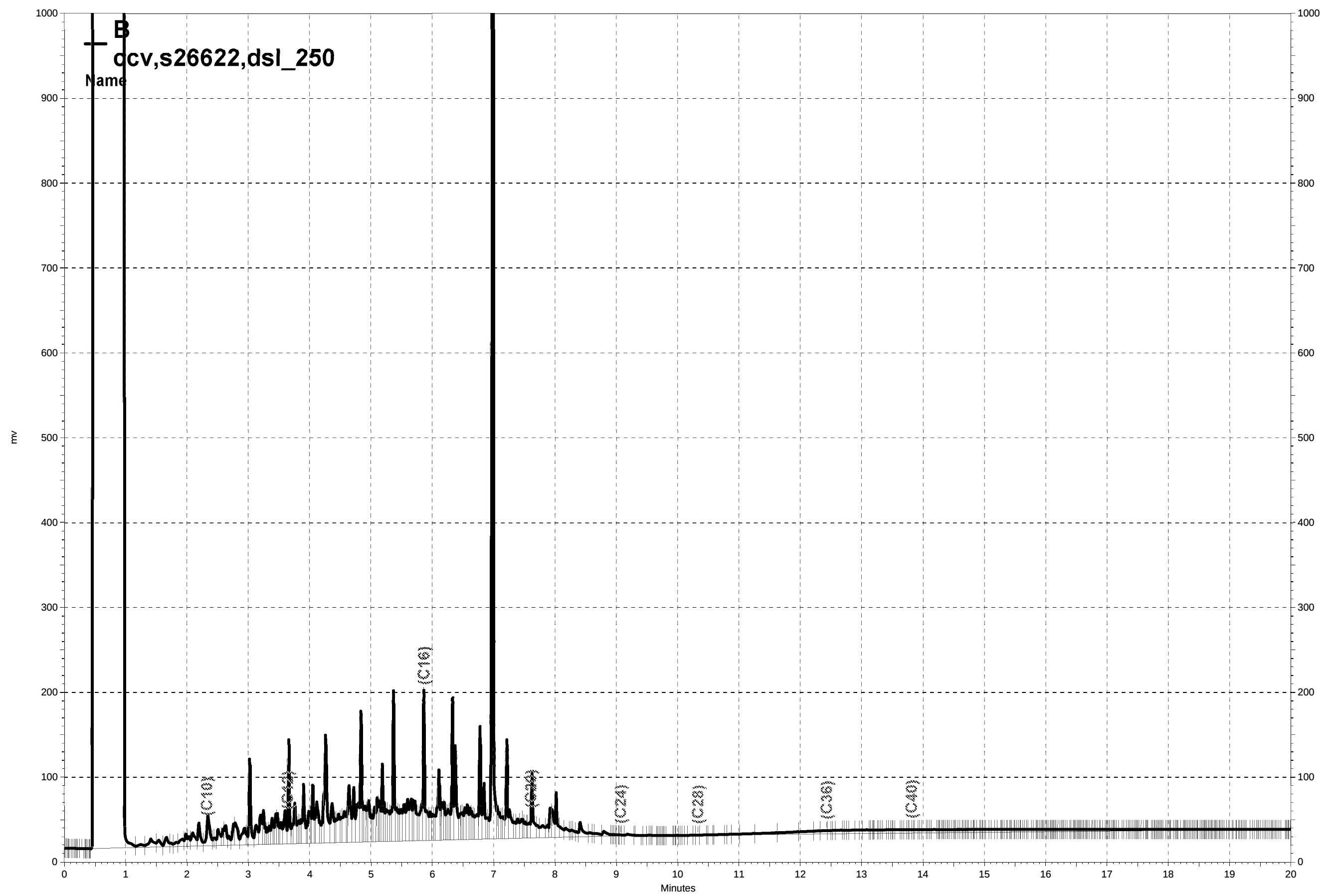

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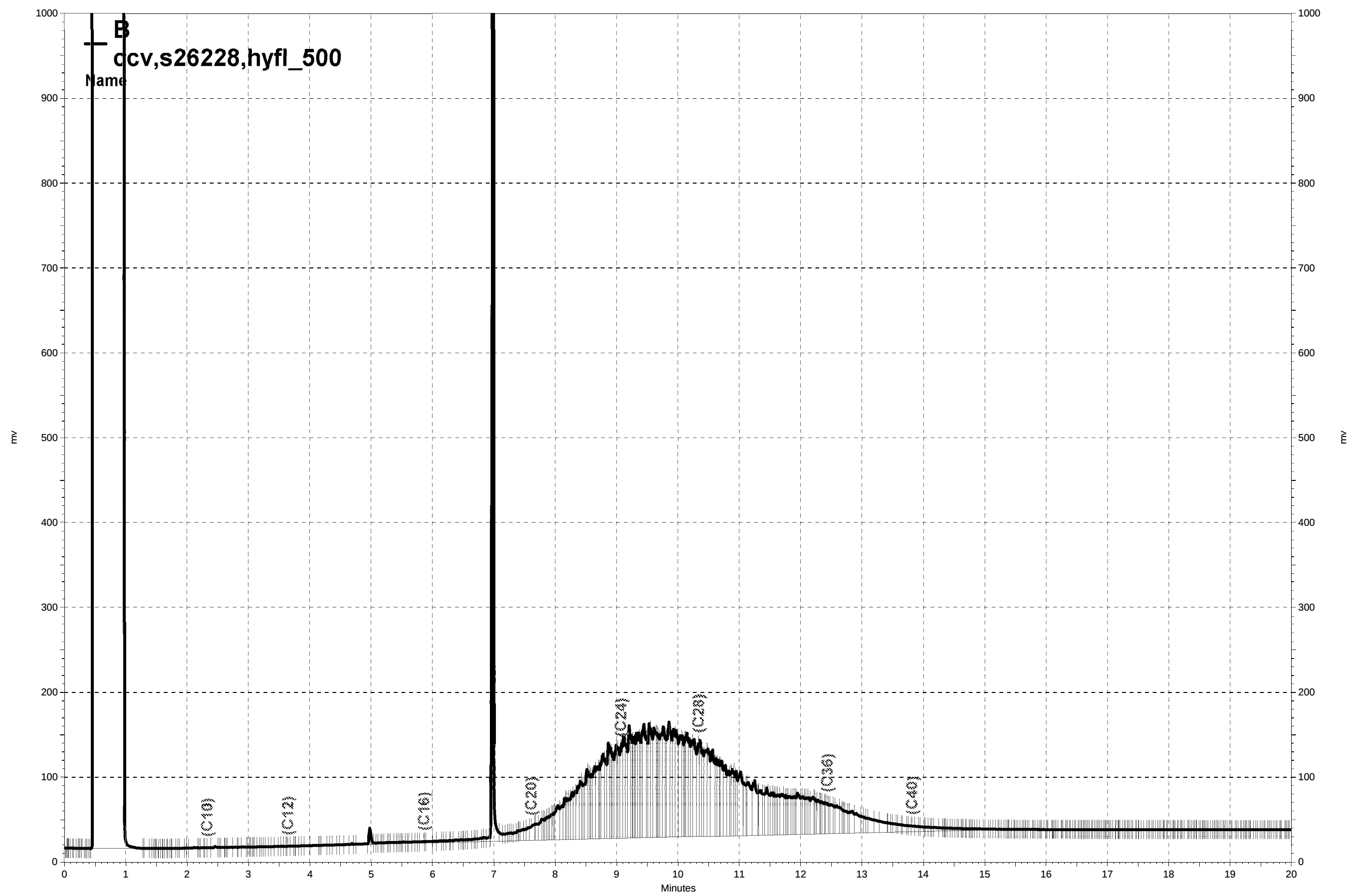

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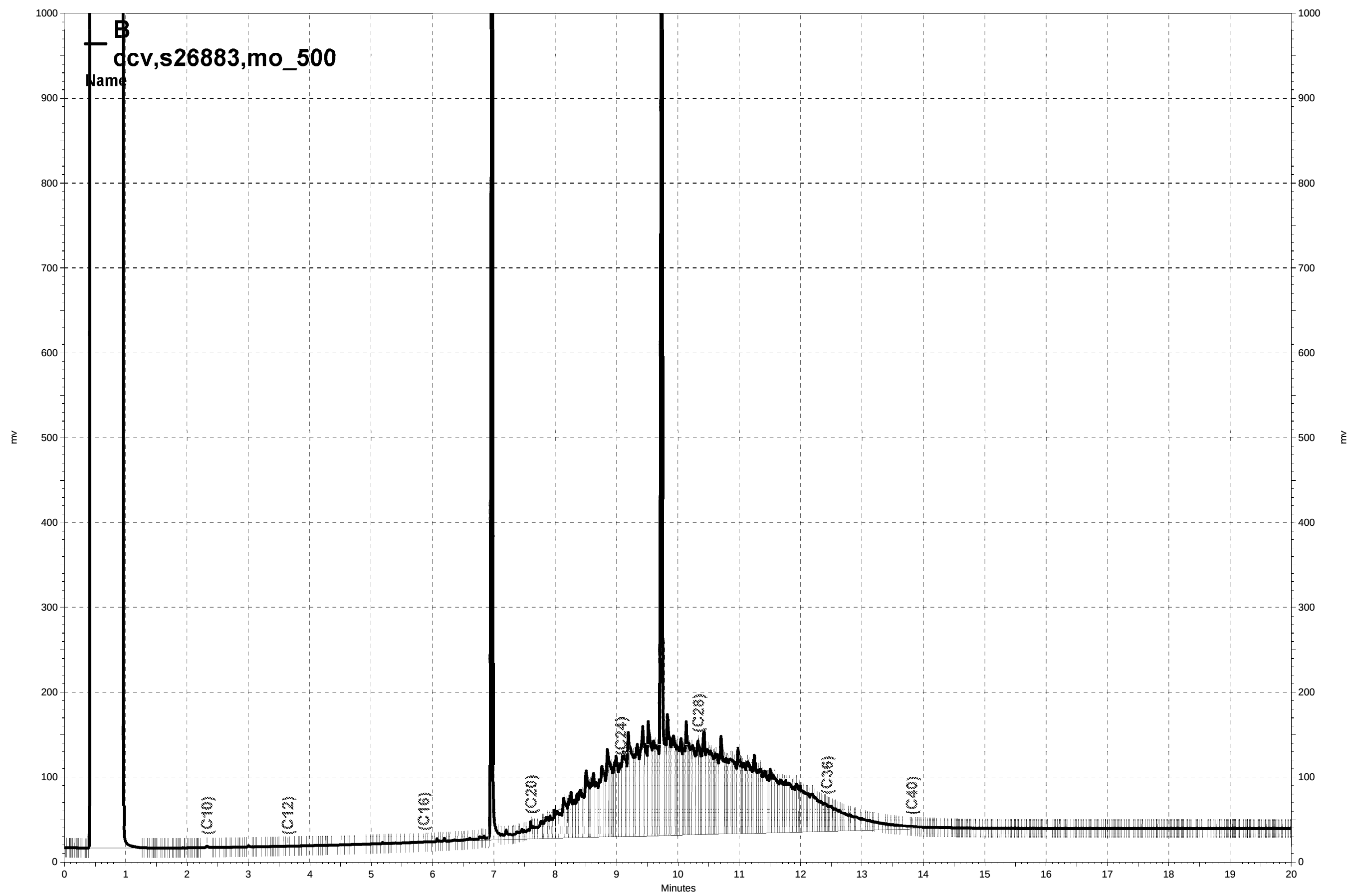

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Curtis & Tompkins, Ltd.

Purgeable Organics by GC/MS

Lab #:	265476	Location:	W. Sacramento
Client:	ENV America Incorporated	Prep:	EPA 5030B
Project#:	TAB1501	Analysis:	EPA 8260B
Field ID:	BC-1	Diln Fac:	0.9980
Lab ID:	265476-001	Batch#:	221525
Matrix:	Soil	Sampled:	03/18/15
Units:	ug/Kg	Received:	03/20/15
Basis:	as received	Analyzed:	03/20/15

Analyte	Result	RL
Freon 12	ND	10
Chloromethane	ND	10
Vinyl Chloride	ND	10
Bromomethane	ND	10
Chloroethane	ND	10
Trichlorofluoromethane	ND	5.0
Acetone	ND	20
Freon 113	ND	5.0
1,1-Dichloroethene	ND	5.0
Methylene Chloride	ND	20
Carbon Disulfide	ND	5.0
MTBE	ND	5.0
trans-1,2-Dichloroethene	ND	5.0
Vinyl Acetate	ND	50
1,1-Dichloroethane	ND	5.0
2-Butanone	ND	10
cis-1,2-Dichloroethene	ND	5.0
2,2-Dichloropropane	ND	5.0
Chloroform	ND	5.0
Bromochloromethane	ND	5.0
1,1,1-Trichloroethane	ND	5.0
1,1-Dichloropropene	ND	5.0
Carbon Tetrachloride	ND	5.0
1,2-Dichloroethane	ND	5.0
Benzene	ND	5.0
Trichloroethene	ND	5.0
1,2-Dichloropropane	ND	5.0
Bromodichloromethane	ND	5.0
Dibromomethane	ND	5.0
4-Methyl-2-Pentanone	ND	10
cis-1,3-Dichloropropene	ND	5.0
Toluene	ND	5.0
trans-1,3-Dichloropropene	ND	5.0
1,1,2-Trichloroethane	ND	5.0
2-Hexanone	ND	10
1,3-Dichloropropane	ND	5.0
Tetrachloroethene	ND	5.0

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Purgeable Organics by GC/MS

Lab #:	265476	Location:	W. Sacramento
Client:	ENV America Incorporated	Prep:	EPA 5030B
Project#:	TAB1501	Analysis:	EPA 8260B
Field ID:	BC-1	Diln Fac:	0.9980
Lab ID:	265476-001	Batch#:	221525
Matrix:	Soil	Sampled:	03/18/15
Units:	ug/Kg	Received:	03/20/15
Basis:	as received	Analyzed:	03/20/15

Analyte	Result	RL
Dibromochloromethane	ND	5.0
1,2-Dibromoethane	ND	5.0
Chlorobenzene	ND	5.0
1,1,1,2-Tetrachloroethane	ND	5.0
Ethylbenzene	ND	5.0
m,p-Xylenes	ND	5.0
o-Xylene	ND	5.0
Styrene	ND	5.0
Bromoform	ND	5.0
Isopropylbenzene	ND	5.0
1,1,2,2-Tetrachloroethane	ND	5.0
1,2,3-Trichloropropane	ND	5.0
Propylbenzene	ND	5.0
Bromobenzene	ND	5.0
1,3,5-Trimethylbenzene	ND	5.0
2-Chlorotoluene	ND	5.0
4-Chlorotoluene	ND	5.0
tert-Butylbenzene	ND	5.0
1,2,4-Trimethylbenzene	ND	5.0
sec-Butylbenzene	ND	5.0
para-Isopropyl Toluene	ND	5.0
1,3-Dichlorobenzene	ND	5.0
1,4-Dichlorobenzene	ND	5.0
n-Butylbenzene	ND	5.0
1,2-Dichlorobenzene	ND	5.0
1,2-Dibromo-3-Chloropropane	ND	5.0
1,2,4-Trichlorobenzene	ND	5.0
Hexachlorobutadiene	ND	5.0
Naphthalene	ND	5.0
1,2,3-Trichlorobenzene	ND	5.0

Surrogate	%REC	Limits
Dibromofluoromethane	117	78-134
1,2-Dichloroethane-d4	138	80-138
Toluene-d8	97	80-120
Bromofluorobenzene	106	78-123

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Batch QC Report

Purgeable Organics by GC/MS

Lab #:	265476	Location:	W. Sacramento
Client:	ENV America Incorporated	Prep:	EPA 5030B
Project#:	TAB1501	Analysis:	EPA 8260B
Matrix:	Soil	Batch#:	221525
Units:	ug/Kg	Analyzed:	03/20/15
Diln Fac:	1.000		

Type: BS Lab ID: QC781469

Analyte	Spiked	Result	%REC	Limits
1,1-Dichloroethene	20.00	20.59	103	70-134
Benzene	20.00	22.16	111	80-123
Trichloroethene	20.00	21.42	107	80-128
Toluene	20.00	22.70	114	80-120
Chlorobenzene	20.00	23.40	117	80-123

Surrogate	%REC	Limits
Dibromofluoromethane	93	78-134
1,2-Dichloroethane-d4	90	80-138
Toluene-d8	98	80-120
Bromofluorobenzene	90	78-123

Type: BSD Lab ID: QC781470

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
1,1-Dichloroethene	20.00	19.64	98	70-134	5	22
Benzene	20.00	21.99	110	80-123	1	21
Trichloroethene	20.00	21.58	108	80-128	1	23
Toluene	20.00	21.41	107	80-120	6	20
Chlorobenzene	20.00	22.60	113	80-123	3	20

Surrogate	%REC	Limits
Dibromofluoromethane	94	78-134
1,2-Dichloroethane-d4	94	80-138
Toluene-d8	95	80-120
Bromofluorobenzene	88	78-123

RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

Batch QC Report

Purgeable Organics by GC/MS

Lab #:	265476	Location:	W. Sacramento
Client:	ENV America Incorporated	Prep:	EPA 5030B
Project#:	TAB1501	Analysis:	EPA 8260B
Type:	BLANK	Diln Fac:	1.000
Lab ID:	QC781471	Batch#:	221525
Matrix:	Soil	Analyzed:	03/20/15
Units:	ug/Kg		

Analyte	Result	RL
Freon 12	ND	10
Chloromethane	ND	10
Vinyl Chloride	ND	10
Bromomethane	ND	10
Chloroethane	ND	10
Trichlorofluoromethane	ND	5.0
Acetone	ND	20
Freon 113	ND	5.0
1,1-Dichloroethene	ND	5.0
Methylene Chloride	ND	20
Carbon Disulfide	ND	5.0
MTBE	ND	5.0
trans-1,2-Dichloroethene	ND	5.0
Vinyl Acetate	ND	50
1,1-Dichloroethane	ND	5.0
2-Butanone	ND	10
cis-1,2-Dichloroethene	ND	5.0
2,2-Dichloropropane	ND	5.0
Chloroform	ND	5.0
Bromochloromethane	ND	5.0
1,1,1-Trichloroethane	ND	5.0
1,1-Dichloropropene	ND	5.0
Carbon Tetrachloride	ND	5.0
1,2-Dichloroethane	ND	5.0
Benzene	ND	5.0
Trichloroethene	ND	5.0
1,2-Dichloropropane	ND	5.0
Bromodichloromethane	ND	5.0
Dibromomethane	ND	5.0
4-Methyl-2-Pentanone	ND	10
cis-1,3-Dichloropropene	ND	5.0
Toluene	ND	5.0
trans-1,3-Dichloropropene	ND	5.0
1,1,2-Trichloroethane	ND	5.0
2-Hexanone	ND	10
1,3-Dichloropropane	ND	5.0
Tetrachloroethene	ND	5.0

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Batch QC Report

Purgeable Organics by GC/MS

Lab #:	265476	Location:	W. Sacramento
Client:	ENV America Incorporated	Prep:	EPA 5030B
Project#:	TAB1501	Analysis:	EPA 8260B
Type:	BLANK	Diln Fac:	1.000
Lab ID:	QC781471	Batch#:	221525
Matrix:	Soil	Analyzed:	03/20/15
Units:	ug/Kg		

Analyte	Result	RL
Dibromochloromethane	ND	5.0
1,2-Dibromoethane	ND	5.0
Chlorobenzene	ND	5.0
1,1,1,2-Tetrachloroethane	ND	5.0
Ethylbenzene	ND	5.0
m,p-Xylenes	ND	5.0
o-Xylene	ND	5.0
Styrene	ND	5.0
Bromoform	ND	5.0
Isopropylbenzene	ND	5.0
1,1,2,2-Tetrachloroethane	ND	5.0
1,2,3-Trichloropropane	ND	5.0
Propylbenzene	ND	5.0
Bromobenzene	ND	5.0
1,3,5-Trimethylbenzene	ND	5.0
2-Chlorotoluene	ND	5.0
4-Chlorotoluene	ND	5.0
tert-Butylbenzene	ND	5.0
1,2,4-Trimethylbenzene	ND	5.0
sec-Butylbenzene	ND	5.0
para-Isopropyl Toluene	ND	5.0
1,3-Dichlorobenzene	ND	5.0
1,4-Dichlorobenzene	ND	5.0
n-Butylbenzene	ND	5.0
1,2-Dichlorobenzene	ND	5.0
1,2-Dibromo-3-Chloropropane	ND	5.0
1,2,4-Trichlorobenzene	ND	5.0
Hexachlorobutadiene	ND	5.0
Naphthalene	ND	5.0
1,2,3-Trichlorobenzene	ND	5.0

Surrogate	%REC	Limits
Dibromofluoromethane	95	78-134
1,2-Dichloroethane-d4	99	80-138
Toluene-d8	100	80-120
Bromofluorobenzene	98	78-123

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Batch QC Report

Purgeable Organics by GC/MS

Lab #:	265476	Location:	W. Sacramento
Client:	ENV America Incorporated	Prep:	EPA 5030B
Project#:	TAB1501	Analysis:	EPA 8260B
Field ID:	ZZZZZZZZZZ	Batch#:	221525
MSS Lab ID:	265465-002	Sampled:	03/20/15
Matrix:	Soil	Received:	03/20/15
Units:	ug/Kg	Analyzed:	03/21/15
Basis:	as received		

Type: MS   Diln Fac: 0.9398
Lab ID: QC781551

Analyte	MSS Result	Spiked	Result	%REC	Limits
1,1-Dichloroethene	<0.9230	46.99	42.79	91	56-133
Benzene	<0.8863	46.99	42.14	90	57-120
Trichloroethene	<0.8204	46.99	39.91	85	49-145
Toluene	<0.6987	46.99	36.61	78	51-120
Chlorobenzene	<0.6740	46.99	38.55	82	47-120

Surrogate	%REC	Limits
Dibromofluoromethane	105	78-134
1,2-Dichloroethane-d4	106	80-138
Toluene-d8	90	80-120
Bromofluorobenzene	84	78-123

Type: MSD   Diln Fac: 0.9208
Lab ID: QC781552

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
1,1-Dichloroethene	46.04	41.82	91	56-133	0	46
Benzene	46.04	39.04	85	57-120	6	44
Trichloroethene	46.04	37.18	81	49-145	5	46
Toluene	46.04	34.74	75	51-120	3	47
Chlorobenzene	46.04	35.99	78	47-120	5	50

Surrogate	%REC	Limits
Dibromofluoromethane	98	78-134
1,2-Dichloroethane-d4	99	80-138
Toluene-d8	91	80-120
Bromofluorobenzene	86	78-123

RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

California Title 22 Metals

Lab #:	265476	Project#:	TAB1501
Client:	ENV America Incorporated	Location:	W. Sacramento
Field ID:	BC-1	Basis:	as received
Lab ID:	265476-001	Diln Fac:	1.000
Matrix:	Soil	Sampled:	03/18/15
Units:	mg/Kg	Received:	03/20/15

Analyte	Result	RL	Batch#	Prepared	Analyzed	Prep	Analysis
Antimony	ND	0.49	221639	03/25/15	03/25/15	EPA 3050B	EPA 6010B
Arsenic	7.3	0.24	221639	03/25/15	03/25/15	EPA 3050B	EPA 6010B
Barium	72	0.24	221639	03/25/15	03/25/15	EPA 3050B	EPA 6010B
Beryllium	0.50	0.097	221639	03/25/15	03/25/15	EPA 3050B	EPA 6010B
Cadmium	0.94	0.24	221639	03/25/15	03/25/15	EPA 3050B	EPA 6010B
Chromium	26	0.24	221639	03/25/15	03/25/15	EPA 3050B	EPA 6010B
Cobalt	6.4	0.24	221639	03/25/15	03/25/15	EPA 3050B	EPA 6010B
Copper	9.0	0.24	221639	03/25/15	03/25/15	EPA 3050B	EPA 6010B
Lead	9.8	0.24	221639	03/25/15	03/25/15	EPA 3050B	EPA 6010B
Mercury	0.041	0.018	221718	03/27/15	03/27/15	METHOD	EPA 7471A
Molybdenum	0.35	0.24	221639	03/25/15	03/25/15	EPA 3050B	EPA 6010B
Nickel	11	0.24	221639	03/25/15	03/25/15	EPA 3050B	EPA 6010B
Selenium	ND	0.49	221639	03/25/15	03/25/15	EPA 3050B	EPA 6010B
Silver	ND	0.24	221639	03/25/15	03/25/15	EPA 3050B	EPA 6010B
Thallium	ND	0.49	221639	03/25/15	03/25/15	EPA 3050B	EPA 6010B
Vanadium	46	0.24	221639	03/25/15	03/25/15	EPA 3050B	EPA 6010B
Zinc	74	0.97	221639	03/25/15	03/25/15	EPA 3050B	EPA 6010B

ND= Not Detected
RL= Reporting Limit

Batch QC Report

California Title 22 Metals

Lab #:	265476	Location:	W. Sacramento
Client:	ENV America Incorporated	Prep:	EPA 3050B
Project#:	TAB1501	Analysis:	EPA 6010B
Type:	BLANK	Diln Fac:	1.000
Lab ID:	QC781912	Batch#:	221639
Matrix:	Soil	Prepared:	03/25/15
Units:	mg/Kg	Analyzed:	03/25/15

Analyte	Result	RL
Antimony	ND	0.50
Arsenic	ND	0.25
Barium	ND	0.25
Beryllium	ND	0.10
Cadmium	ND	0.25
Chromium	ND	0.25
Cobalt	ND	0.25
Copper	ND	0.25
Lead	ND	0.25
Molybdenum	ND	0.25
Nickel	ND	0.25
Selenium	ND	0.50
Silver	ND	0.25
Thallium	ND	0.50
Vanadium	ND	0.25
Zinc	ND	1.0

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Batch QC Report

California Title 22 Metals

Lab #:	265476	Location:	W. Sacramento
Client:	ENV America Incorporated	Prep:	EPA 3050B
Project#:	TAB1501	Analysis:	EPA 6010B
Matrix:	Soil	Batch#:	221639
Units:	mg/Kg	Prepared:	03/25/15
Diln Fac:	5.000	Analyzed:	03/25/15

Type: BS Lab ID: QC781913

Analyte	Spiked	Result	%REC	Limits
Antimony	50.00	47.85	96	80-120
Arsenic	50.00	49.62	99	80-120
Barium	50.00	50.00	100	80-120
Beryllium	50.00	49.81	100	80-120
Cadmium	50.00	51.95	104	80-120
Chromium	50.00	49.74	99	80-120
Cobalt	50.00	46.85	94	80-120
Copper	50.00	48.37	97	80-120
Lead	50.00	47.43	95	80-120
Molybdenum	50.00	50.18	100	80-120
Nickel	50.00	47.82	96	80-120
Selenium	50.00	49.20	98	80-120
Silver	50.00	48.14	96	80-120
Thallium	50.00	49.88	100	80-120
Vanadium	50.00	51.20	102	80-120
Zinc	50.00	49.64	99	80-120

Type: BSD Lab ID: QC781914

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
Antimony	50.00	48.47	97	80-120	1	20
Arsenic	50.00	51.39	103	80-120	4	20
Barium	50.00	49.86	100	80-120	0	20
Beryllium	50.00	51.01	102	80-120	2	20
Cadmium	50.00	52.11	104	80-120	0	20
Chromium	50.00	49.81	100	80-120	0	20
Cobalt	50.00	47.44	95	80-120	1	20
Copper	50.00	48.23	96	80-120	0	20
Lead	50.00	48.13	96	80-120	1	20
Molybdenum	50.00	50.82	102	80-120	1	20
Nickel	50.00	48.51	97	80-120	1	20
Selenium	50.00	52.60	105	80-120	7	20
Silver	50.00	47.83	96	80-120	1	20
Thallium	50.00	49.50	99	80-120	1	20
Vanadium	50.00	51.34	103	80-120	0	20
Zinc	50.00	50.83	102	80-120	2	20

RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

Batch QC Report

California Title 22 Metals

Lab #:	265476	Location:	W. Sacramento
Client:	ENV America Incorporated	Prep:	EPA 3050B
Project#:	TAB1501	Analysis:	EPA 6010B
Field ID:	BC-1	Batch#:	221639
MSS Lab ID:	265476-001	Sampled:	03/18/15
Matrix:	Soil	Received:	03/20/15
Units:	mg/Kg	Prepared:	03/25/15
Basis:	as received	Analyzed:	03/25/15
Diln Fac:	5.000		

Type: MS Lab ID: QC781915

Analyte	MSS Result	Spiked	Result	%REC	Limits
Antimony	0.3872	51.55	9.802	18	15-120
Arsenic	7.340	51.55	55.40	93	69-120
Barium	71.87	51.55	127.9	109	35-154
Beryllium	0.4974	51.55	49.91	96	75-120
Cadmium	0.9442	51.55	50.02	95	71-120
Chromium	25.71	51.55	79.15	104	57-133
Cobalt	6.437	51.55	51.99	88	56-125
Copper	9.006	51.55	56.72	93	54-144
Lead	9.764	51.55	55.61	89	53-125
Molybdenum	0.3461	51.55	44.59	86	66-120
Nickel	10.73	51.55	59.62	95	44-141
Selenium	<0.1551	51.55	44.13	86	61-120
Silver	0.1724	51.55	47.62	92	69-120
Thallium	<0.1363	51.55	47.57	92	59-120
Vanadium	45.53	51.55	100.6	107	52-144
Zinc	73.97	51.55	131.8	112	45-145

Type: MSD Lab ID: QC781916

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
Antimony	49.50	9.700	19	15-120	3	41
Arsenic	49.50	53.89	94	69-120	1	35
Barium	49.50	119.4	96	35-154	5	36
Beryllium	49.50	47.90	96	75-120	0	20
Cadmium	49.50	48.20	95	71-120	0	25
Chromium	49.50	72.91	95	57-133	6	33
Cobalt	49.50	50.21	88	56-125	0	36
Copper	49.50	54.47	92	54-144	1	38
Lead	49.50	52.98	87	53-125	1	42
Molybdenum	49.50	42.70	86	66-120	0	20
Nickel	49.50	56.61	93	44-141	2	39
Selenium	49.50	43.74	88	61-120	3	33
Silver	49.50	45.23	91	69-120	1	22
Thallium	49.50	45.67	92	59-120	0	27
Vanadium	49.50	93.97	98	52-144	5	29
Zinc	49.50	123.4	100	45-145	5	39

RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

Batch QC Report

California Title 22 Metals

Lab #:	265476	Location:	W. Sacramento
Client:	ENV America Incorporated	Prep:	METHOD
Project#:	TAB1501	Analysis:	EPA 7471A
Analyte:	Mercury	Diln Fac:	1.000
Type:	BLANK	Batch#:	221718
Lab ID:	QC782212	Prepared:	03/27/15
Matrix:	Soil	Analyzed:	03/27/15
Units:	mg/Kg		

Result	RL
ND	0.017

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Batch QC Report

California Title 22 Metals

Lab #:	265476	Location:	W. Sacramento
Client:	ENV America Incorporated	Prep:	METHOD
Project#:	TAB1501	Analysis:	EPA 7471A
Analyte:	Mercury	Batch#:	221718
Matrix:	Soil	Prepared:	03/27/15
Units:	mg/Kg	Analyzed:	03/27/15
Diln Fac:	1.000		

Type	Lab ID	Spiked	Result	%REC	Limits	RPD	Lim
BS	QC782213	0.2083	0.2313	111	80-120		
BSD	QC782214	0.2083	0.2163	104	80-120	7	20

RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

Batch QC Report

California Title 22 Metals

Lab #:	265476	Location:	W. Sacramento
Client:	ENV America Incorporated	Prep:	METHOD
Project#:	TAB1501	Analysis:	EPA 7471A
Analyte:	Mercury	Diln Fac:	1.000
Field ID:	BC-1	Batch#:	221718
MSS Lab ID:	265476-001	Sampled:	03/18/15
Matrix:	Soil	Received:	03/20/15
Units:	mg/Kg	Prepared:	03/27/15
Basis:	as received	Analyzed:	03/27/15

Type	Lab ID	MSS Result	Spiked	Result	%REC	Limits	RPD	Lim
MS	QC782215	0.04125	0.2273	0.2671	99	69-142		
MSD	QC782216		0.1953	0.2355	99	69-142	0	36

RPD= Relative Percent Difference

Please print or type.
(Form designed for use on elite (12-pitch) typewriter.)

NON-HAZARDOUS WASTE MANIFEST	1. Generator ID Number: N/A	2. Page 1 of 1	3. Emergency Response Phone: 707-751-3817	4. Waste Tracking Number: NH-TAB1401110414-003

5. Generator's Name and Mailing Address
Taber Drilling
536 Galveston St.
West Sacramento, CA 95691
Generator's Phone: (919) 952-8546
Generator's Site Address (if different than mailing address)

6. Transporter 1 Company Name: ENV Environmental International, Inc. — U.S. EPA ID Number: CAR000247189

7. Transporter 2 Company Name — U.S. EPA ID Number

8. Designated Facility Name and Site Address
Potrero Hills Landfill
3675 Potrero Hills Lane
Suisun, CA 94585
Facility's Phone: (707) 432-4622
U.S. EPA ID Number: CAR000089466

9. Waste Shipping Name and Description	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.
1. Non-Hazardous Waste Solid (soil, drill cuttings)	01	CM	20	Y
2.				
3.				
4.				

13. Special Handling Instructions and Additional Information
9.b1. Profile Number: PHLF-14-569 — Bin # R29905 PL
Always wear proper PPE when handling this material
Send invoice to: ENV America // Project No. TAB1401

14. GENERATOR'S CERTIFICATION: I certify the materials described above on this manifest are not subject to federal regulations for reporting proper disposal of Hazardous Waste.
Generator's/Offeror's Printed/Typed Name — Signature: Charles Pierce — Month 11 Day 4 Year 14

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter Signature (for exports only): Date leaving U.S.:

16. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: Tom Chimpky — Signature — Month 11 Day 4 Year 14
Transporter 2 Printed/Typed Name — Signature — Month Day Year

17. Discrepancy
17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
17b. Alternate Facility (or Generator) — U.S. EPA ID Number
Facility's Phone:
17c. Signature of Alternate Facility (or Generator) — Month Day Year

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a
Printed/Typed Name: Sharmaine Jones — Signature — Month 11 Day 10 Year 14

GENERATOR — INT'L — TRANSPORTER — DESIGNATED FACILITY

DESIGNATED FACILITY TO GENERATOR

Please print or type.
(Form designed for use on elite (12-pitch) typewriter.)

NON-HAZARDOUS WASTE MANIFEST

1. Generator ID Number N/A	2. Page 1 of 1	3. Emergency Response Phone 707-751-3817
4. Waste Tracking Number NH-TAB1401110414-002		

5. Generator's Name and Mailing Address
Taber Drilling
536 Galveston St.
West Sacramento, CA 95691
Generator's Phone: (916) 952-8546

Generator's Site Address (if different than mailing address)

6. Transporter 1 Company Name
ENV Environmental International, Inc.
U.S. EPA ID Number CAR000247189

7. Transporter 2 Company Name
U.S. EPA ID Number

8. Designated Facility Name and Site Address
Potrero Hills Landfill
3675 Potrero Hills Lane
Suisun, CA 94585
Facility's Phone: (707) 432-4622
U.S. EPA ID Number CAR000089466

9. Waste Shipping Name and Description	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.
1. Non-Hazardous Waste Solid (soil, drill cuttings)	01	CM	20	Y
2.				
3.				
4.				

13. Special Handling Instructions and Additional Information
9b1. Profile Number: PHLF-14-569 Bin# R28452 PL

Always wear proper PPE when handling this material.

Send Invoice to: ENV America // Project No. TAB1401

14. GENERATOR'S CERTIFICATION: I certify the materials described above on this manifest are not subject to federal regulations for reporting proper disposal of Hazardous Waste.

Generator's/Offeror's Printed/Typed Name | Signature Charles Pierce | Month 11 Day 4 Year 14

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter Signature (for exports only): Date leaving U.S.:

16. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name Tom Chumpley | Signature | Month 11 Day 4 Year 14
Transporter 2 Printed/Typed Name | Signature | Month Day Year

17. Discrepancy
17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

17b. Alternate Facility (or Generator) U.S. EPA ID Number

Facility's Phone:

17c. Signature of Alternate Facility (or Generator) Month Day Year

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a
Printed/Typed Name S Jones Sharmaine Jones | Signature S Jones | Month 11 Day 10 Year 14

GENERATOR / INT'L / TRANSPORTER / DESIGNATED FACILITY

GC Labels • Printed in the USA 1-800-997-6966

DESIGNATED FACILITY TO GENERATOR

Reorder Part# MANIFEST-C6NHW 913-897-5966

POTRERO HILLS LANDFILL, INC.
Weighed at:
POTRERO HILLS LANDFILL, INC.
P.O. Box 68
FAIRFIELD, CA 94533

Deputy: Janee Quinonez
Deposit: Sharmaine Jones
BILL TO: 137
ENV AMERICA/ENV ENVIROMNT

Vehicle ID: 524035
Reference: PHLF14569
Grid: 12N
HaulCust#: ORIGIN-W SACRAMENTO
DriverOn?: N
Route: NH-TAB14011110414-002,
TRLR/LP#: NH-TAB14011110414-003

Origin: WEST SACRAMENTO
DATE IN: 11/10/2014 TIME IN: 09:51:16
DATE OUT: 11/10/2014 TIME OUT: 12:08:21

INBOUND TICKET Number: 01-00517223

SCALE 1 GROSS WT.	93640	LB
SCALE 3 TARE WT.	42820	LB
NET WEIGHT	50820	LB

Qty	Description	Amount
25.41	Profile Soil-T ADC	

X________________________

WEIGHMASTER CERTIFICATE:

THIS IS TO CERTIFY that the following described commodity was weighed, measured, or counted by a weighmaster, whose signature is on this certificate, who is a recognized authority of accuracy, as prescribed by Chapter 7 (commencing with Section 12700) of Division 5 of the California Business and Professions Code), administered by the Division of Measurement Standards of the California Department of Food and Agriculture.

X________________________
(Deputy Signature)

This is to certify that this load does not contain any hazardous materials,

APPENDIX B

Laboratory Test Results

Environmental Test Results by Light, Air, & Space Construction

CE&G
CAL ENGINEERING & GEOLOGY

SUMMARY OF LABORATORY RESULTS

CLIENT Santa Clara Valley Water District **PROJECT NAME** Almaden Lake Improvement Project

PROJECT NUMBER 140540 **PROJECT LOCATION** San Jose, California

Borehole	Depth	Date Tested	Liquid Limit	Plastic Limit	Plasticity Index	Maximum Screen Size (mm)	%<#200 Sieve	Class-ification	Water Content (%)	Dry Density (pcf)	Satur-ation (%)	Void Ratio
LB-1	3.0	11/4/2014	35	19	16	19	46	SC	9.0			
LB-1	16.0	11/4/2014							5.3	123.9	41	0.346
LB-1	21.0	11/4/2014				37.5	7		11.4	127.7	99	0.305
LB-1	26.0	11/4/2014							9.1	130.6	88	0.276
LB-1	36.0	11/4/2014				25	10		14.4	118.2	94	0.410
LB-2	3.0	11/4/2014							8.8	102.5	37	0.627
LB-2	6.0	11/4/2014				19	12		3.2			
LB-2	11.0	11/4/2014										
LB-2	16.0	11/4/2014				19	19		10.8	122.3	80	0.363
LB-2	21.0	11/4/2014				19	9		9.1	131.1	89	0.272
LB-2	25.5	11/4/2014				37.5	8					
LB-2	26.0	11/4/2014										
LB-2	31.0	11/4/2014				37.5	8		14.4			
LB-2	41.0	11/4/2014										
LB-2	46.0	11/4/2014										
LB-2	50.0	11/4/2014							11.2			
LB-3	11.0	10/22/2014				25	10		3.3			
LB-3	16.0	10/22/2014				19	9		9.9	124.5	78	0.339
LB-3	26.0	10/22/2014				0.075	5		12.0	115.2	72	0.446
LB-3	31.0	10/22/2014				0.075	9		12.9	132.3	132	0.260
LB-3	41.0	10/22/2014				0.075	27		17.2	114.1	99	0.461
LB-3	46.0	10/22/2014				9.5	26		33.6	89.0	103	0.873
LB-3	50.0	10/22/2014							3.3			
LB-4	3.0	10/22/2014							4.4			
LB-4	5.5	10/22/2014							4.7			
LB-4	10.0	10/22/2014				25	11		10.9			
LB-4	15.5	10/22/2014				4.75	39		33.1	92.8	111	0.802
LB-4	21.0	10/22/2014							14.1	121.8	102	0.368
LB-4	26.0	10/22/2014							12.0	129.7	112	0.285
LB-4	30.5	10/22/2014	36	17	19	0.075	64	CL	19.6	107.4	93	0.569
LB-4	36.0	10/22/2014				0.075	5		17.5	116.3	107	0.439
LB-4	41.0	10/22/2014							11.5			
LB-4	46.0	10/22/2014	55	19	36	0.075	65	CH				
WB-1	2.0	11/11/2014							144.7	31.5	90	4.343
WB-1	8.5	10/22/2014				12.5	10		10.8	121.9	78	0.368
WB-1	11.0	10/22/2014				25	11		8.8			
WB-1	16.0	10/22/2014				25	9		10.2			
WB-1	21.0	10/22/2014				0.075	13		10.4			
WB-1	26.0	10/22/2014				0.075	7		11.1			
WB-1	36.0	10/22/2014	29	26	3	25	21	SM	26.8			
WB-2	0.0	10/22/2014										
WB-2	2.0	11/11/2014							75.0	52.5	92	2.209
WB-2	12.0	10/22/2014				19	14		13.5			

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SUMMARY OF LABORATORY RESULTS

CLIENT Santa Clara Valley Water District

PROJECT NAME Almaden Lake Improvement Project

PROJECT NUMBER 140540

PROJECT LOCATION San Jose, California

Borehole	Depth	Date Tested	Liquid Limit	Plastic Limit	Plasticity Index	Maximum Screen Size (mm)	%<#200 Sieve	Class-ification	Water Content (%)	Dry Density (pcf)	Satur-ation (%)	Void Ratio
WB-2	17.0	10/22/2014				0.075	22		14.0			
WB-2	22.0	10/22/2014				0.075	6		7.3			
WB-2	27.0	10/22/2014										
WB-2	32.0	10/22/2014							11.0			
WB-2	42.0	10/22/2014				0.075	9					
WB-2	47.0	10/22/2014				0.075	10					
WB-3	4.0	11/11/2014				25	11		8.5			
WB-3	5.5	10/22/2014										

ATTERBERG LIMITS RESULTS

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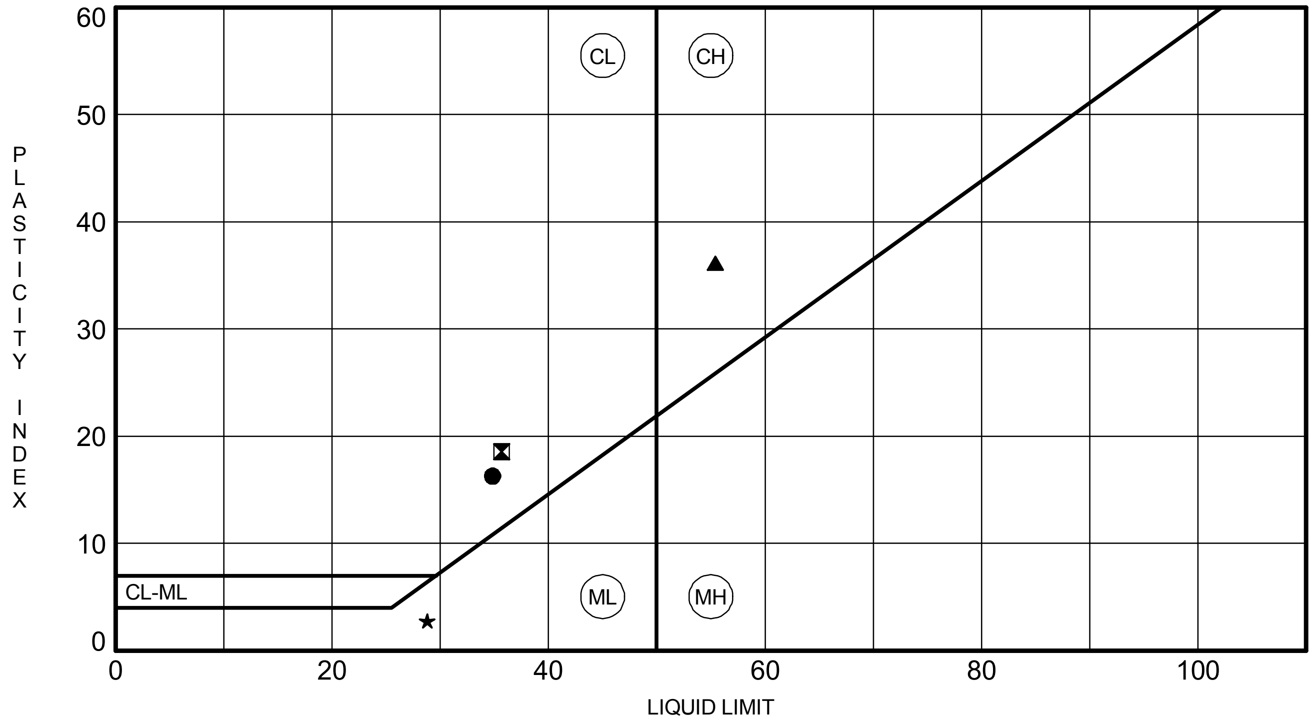
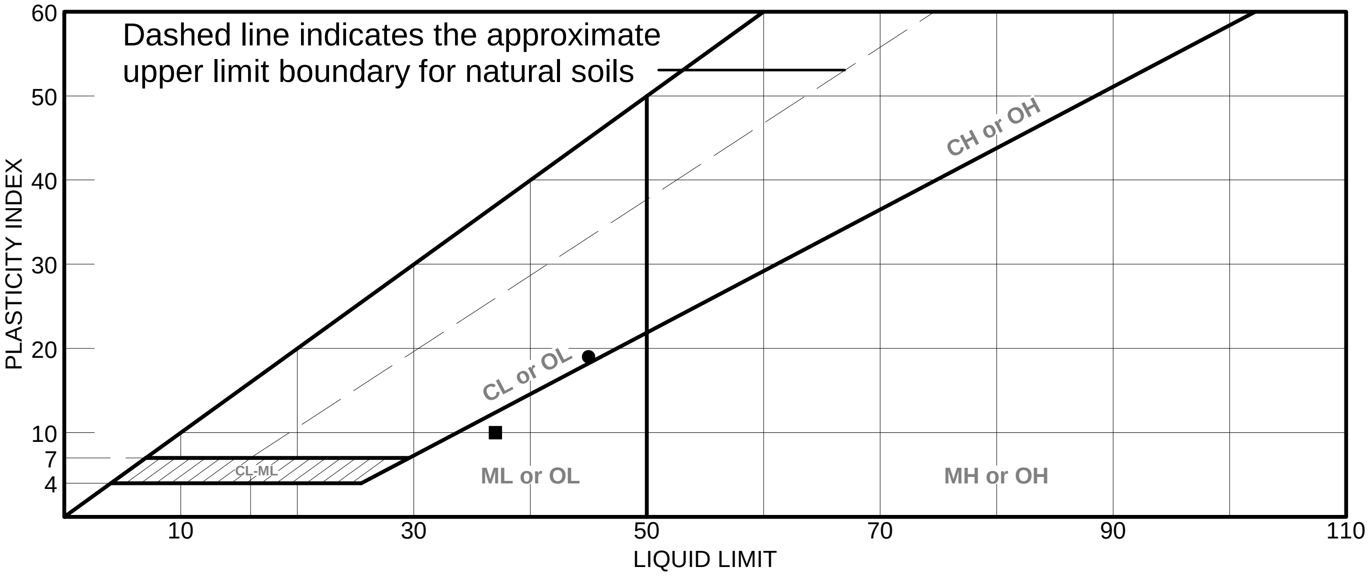
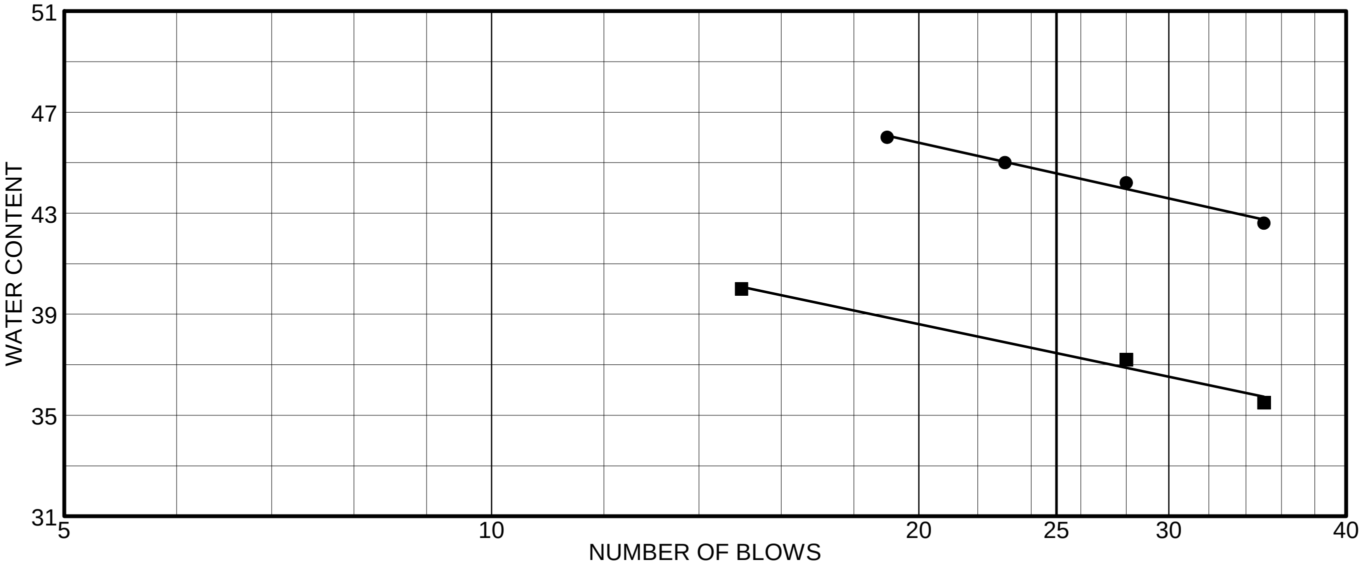
CLIENT Santa Clara Valley Water District
PROJECT NAME Almaden Lake Improvement Project
PROJECT NUMBER 140540
PROJECT LOCATION San Jose, California



	BOREHOLE	DEPTH	LL	PL	PI	Fines	Classification	Date Tested
●	**LB-1**	**3.0**	**35**	**19**	**16**	**46**	**Fractured Sample**	**10/22/2014**
⊠	**LB-4**	**30.5**	**36**	**17**	**19**	**64**	**SANDY LEAN CLAY(CL)**	**10/22/2014**
▲	**LB-4**	**46.0**	**55**	**19**	**36**	**65**	**SANDY FAT CLAY(CH)**	**10/22/2014**
★	**WB-1**	**36.0**	**29**	**26**	**3**	**21**	**SILTY SAND with GRAVEL(SM)**	**10/22/2014**

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Dark Gray Lean CLAY w/ Sand	45	26	19			
■	Dark Gray Organic Silty SAND	37	27	10			

Project No. 471-120 **Client:** Cal Engineering & Geology

Project: Almaden - 140540

● **Source:** WB-1 **Sample No.:** 1-3 **Elev./Depth:** 5'

■ **Source:** WB-2 **Sample No.:** 2-3 **Elev./Depth:** 8-10(Tip-4")

Remarks:

●

■

LIQUID AND PLASTIC LIMITS TEST REPORT

COOPER TESTING LABORATORY

Figure

GRAIN SIZE DISTRIBUTION

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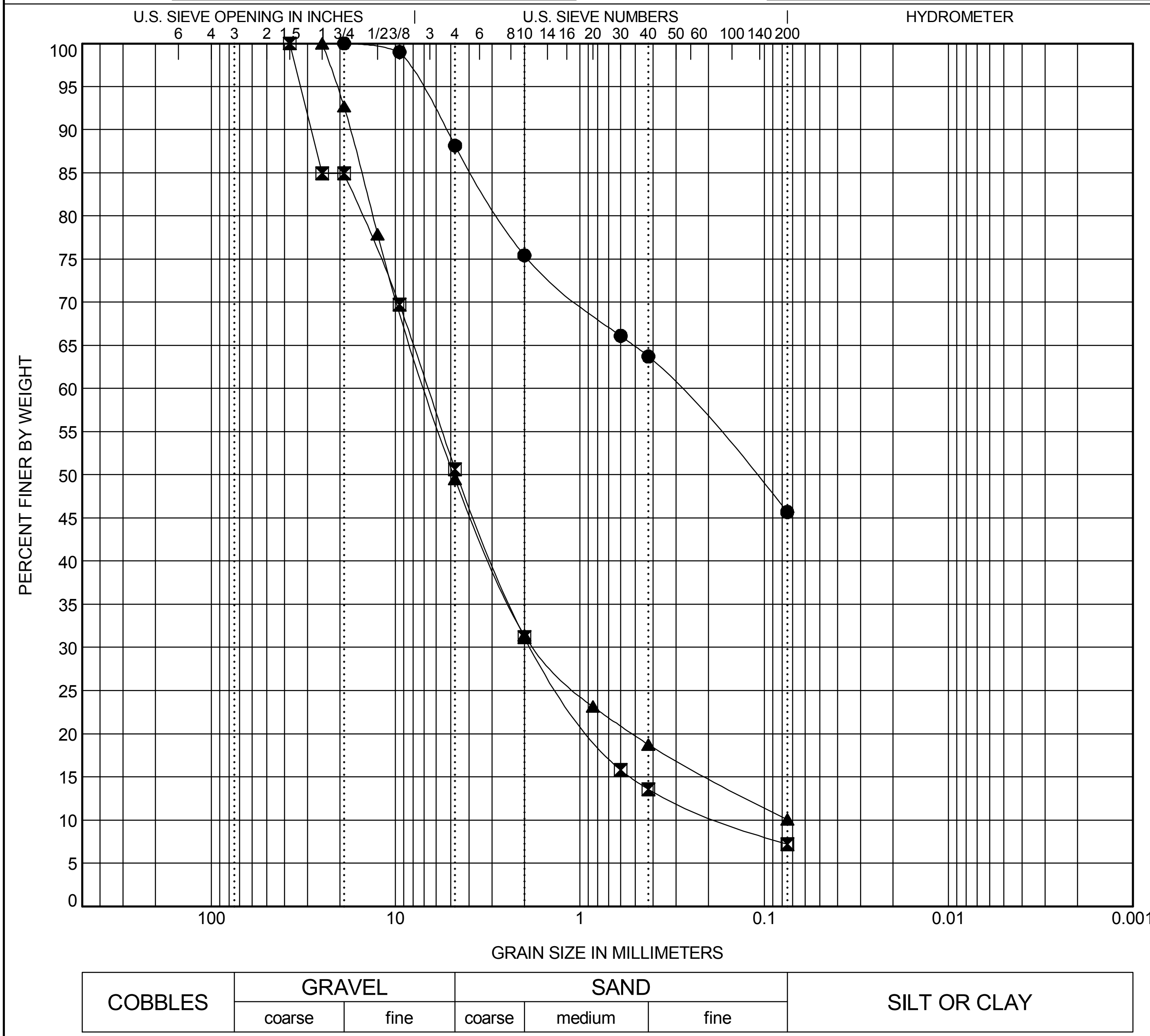
CAL ENGINEERING & GEOLOGY

CLIENT Santa Clara Valley Water District **PROJECT NAME** Almaden Lake Improvement Project

PROJECT NUMBER 140540 **PROJECT LOCATION** San Jose, California



BOREHOLE		DEPTH	DATE TESTED	Classification	LL	PL	PI	Cc	Cu
●	**LB-1**	**3.0**	**11/4/2014**	**Fractured Sample**					
⊠	**LB-1**	**21.0**	**11/4/2014**					**3.07**	**41.28**
▲	**LB-1**	**36.0**	**11/4/2014**					**5.94**	**91.41**

BOREHOLE		DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**LB-1**	**3.0**	**19**	**0.297**			**11.8**	**42.5**	**45.7**	
⊠	**LB-1**	**21.0**	**37.5**	**6.676**	**1.822**	**0.162**	**49.4**	**43.5**	**7.2**	
▲	**LB-1**	**36.0**	**25**	**6.792**	**1.731**		**50.5**	**39.5**	**10.0**	

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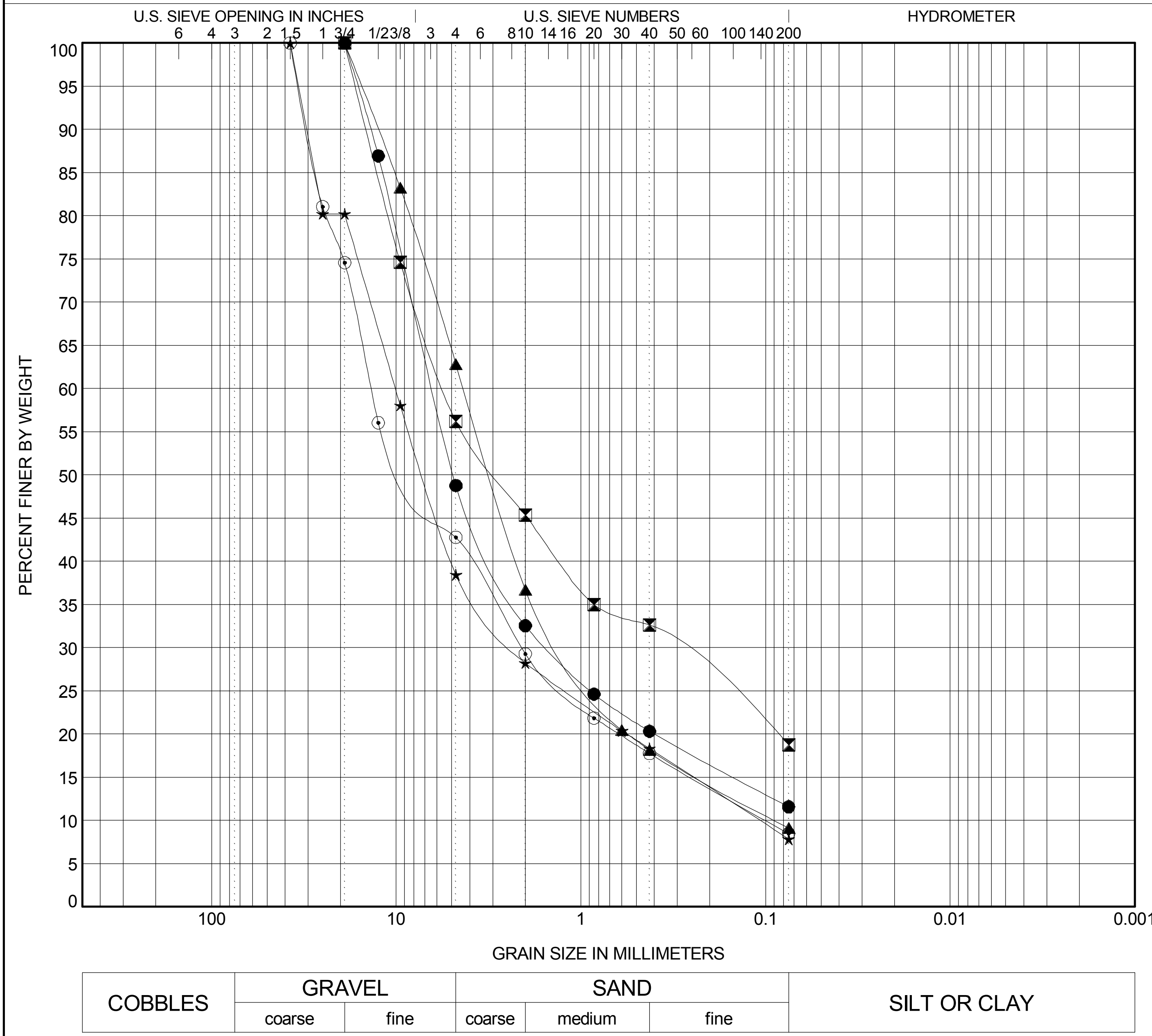
GRAIN SIZE DISTRIBUTION

CLIENT Santa Clara Valley Water District **PROJECT NAME** Almaden Lake Improvement Project

PROJECT NUMBER 140540 **PROJECT LOCATION** San Jose, California



	BOREHOLE	DEPTH	DATE TESTED	Classification	LL	PL	PI	Cc	Cu
●	**LB-2**	**6.0**	**11/4/2014**	**Fractured Sample**				**6.65**	**115.31**
⧗	**LB-2**	**16.0**	**11/4/2014**						
▲	**LB-2**	**21.0**	**11/4/2014**					**3.87**	**48.86**
★	**LB-2**	**25.5**	**11/4/2014**					**4.99**	**94.31**
⊙	**LB-2**	**31.0**	**11/4/2014**	**Fractured Sample**				**3.22**	**137.20**

	BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**LB-2**	**6.0**	**19**	**6.313**	**1.517**		**51.2**	**37.2**	**11.6**	
⧗	**LB-2**	**16.0**	**19**	**5.479**	**0.306**		**43.8**	**37.4**	**18.8**	
▲	**LB-2**	**21.0**	**19**	**4.323**	**1.216**	**0.088**	**37.2**	**53.7**	**9.1**	
★	**LB-2**	**25.5**	**37.5**	**10.093**	**2.322**	**0.107**	**61.5**	**30.6**	**7.9**	
⊙	**LB-2**	**31.0**	**37.5**	**13.669**	**2.094**	**0.1**	**57.2**	**34.3**	**8.5**	

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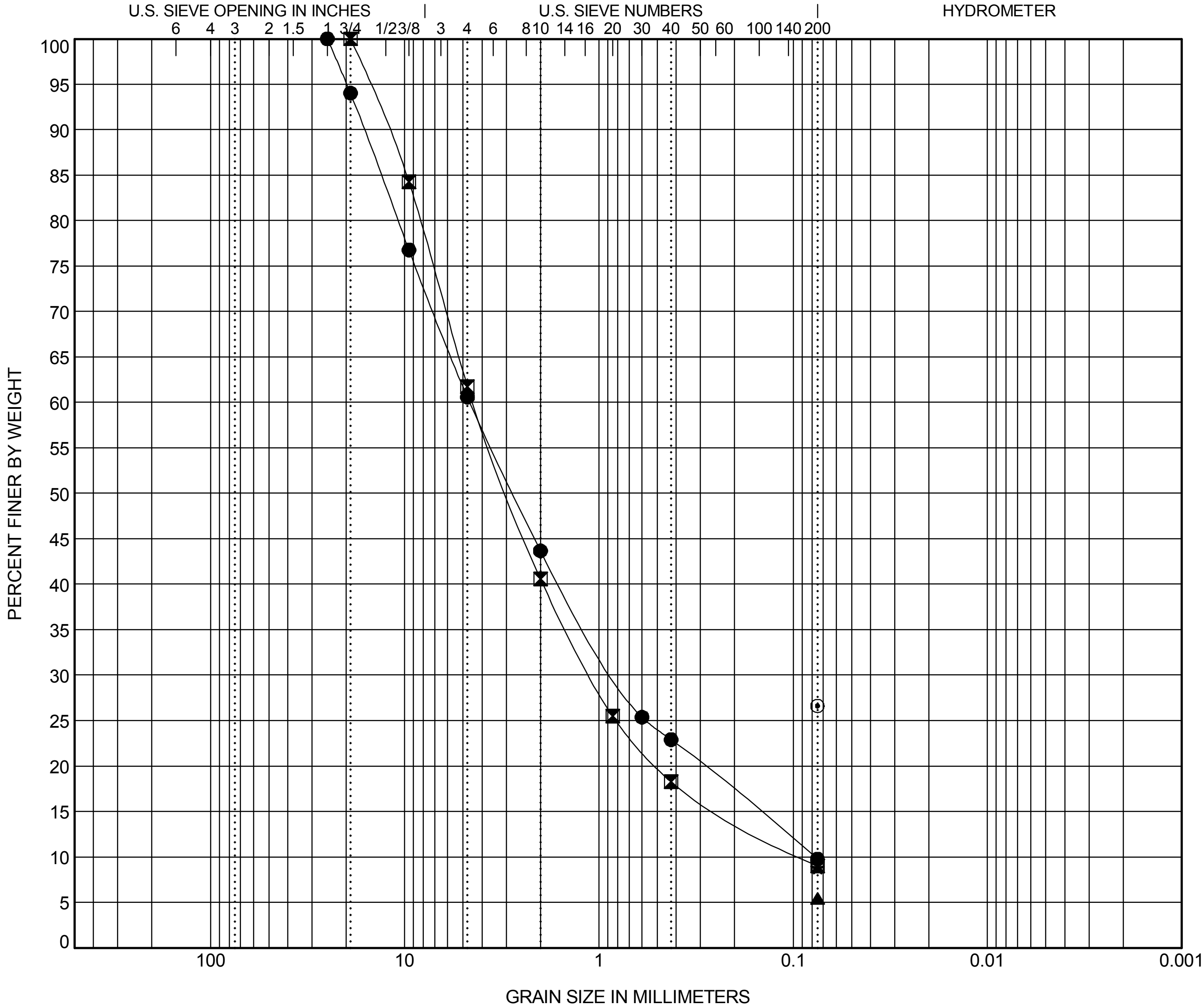
GRAIN SIZE DISTRIBUTION

CLIENT Santa Clara Valley Water District **PROJECT NAME** Almaden Lake Improvement Project

PROJECT NUMBER 140540 **PROJECT LOCATION** San Jose, California



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BOREHOLE	DEPTH	DATE TESTED	Classification	LL	PL	PI	Cc	Cu
●	**LB-3**	**11.0**	**10/22/2014**	**Fractured Sample**				**1.85**	**59.44**
⊠	**LB-3**	**16.0**	**10/22/2014**					**3.01**	**48.91**
▲	**LB-3**	**26.0**	**10/22/2014**						
★	**LB-3**	**31.0**	**10/22/2014**						
⊙	**LB-3**	**41.0**	**10/22/2014**						

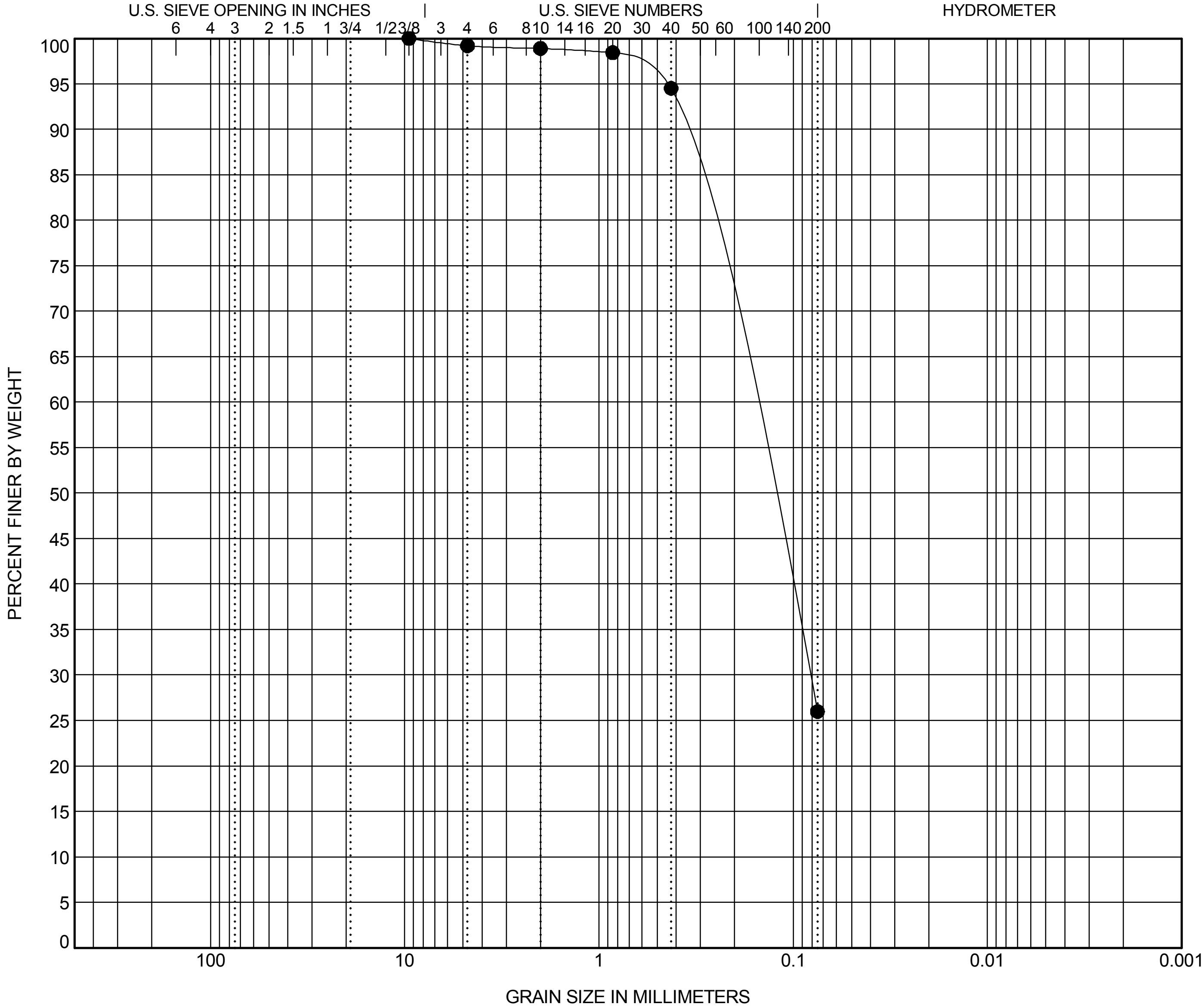
	BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**LB-3**	**11.0**	**25**	**4.609**	**0.814**	**0.078**	**39.4**	**50.8**	**9.7**	
⊠	**LB-3**	**16.0**	**19**	**4.426**	**1.099**	**0.09**	**38.3**	**52.7**	**9.0**	
▲	**LB-3**	**26.0**	**0.075**						**5.4**	
★	**LB-3**	**31.0**	**0.075**						**8.8**	
⊙	**LB-3**	**41.0**	**0.075**						**26.6**	

CAL ENGINEERING & GEOLOGY

GRAIN SIZE DISTRIBUTION

CLIENT Santa Clara Valley Water District **PROJECT NAME** Almaden Lake Improvement Project

PROJECT NUMBER 140540 **PROJECT LOCATION** San Jose, California



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BOREHOLE	DEPTH	DATE TESTED	Classification	LL	PL	PI	Cc	Cu
●	**LB-3**	**46.0**	**10/22/2014**						

	BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**LB-3**	**46.0**	**9.5**	**0.177**	**0.083**		**0.8**	**73.2**	**26.0**	

GRAIN SIZE DISTRIBUTION

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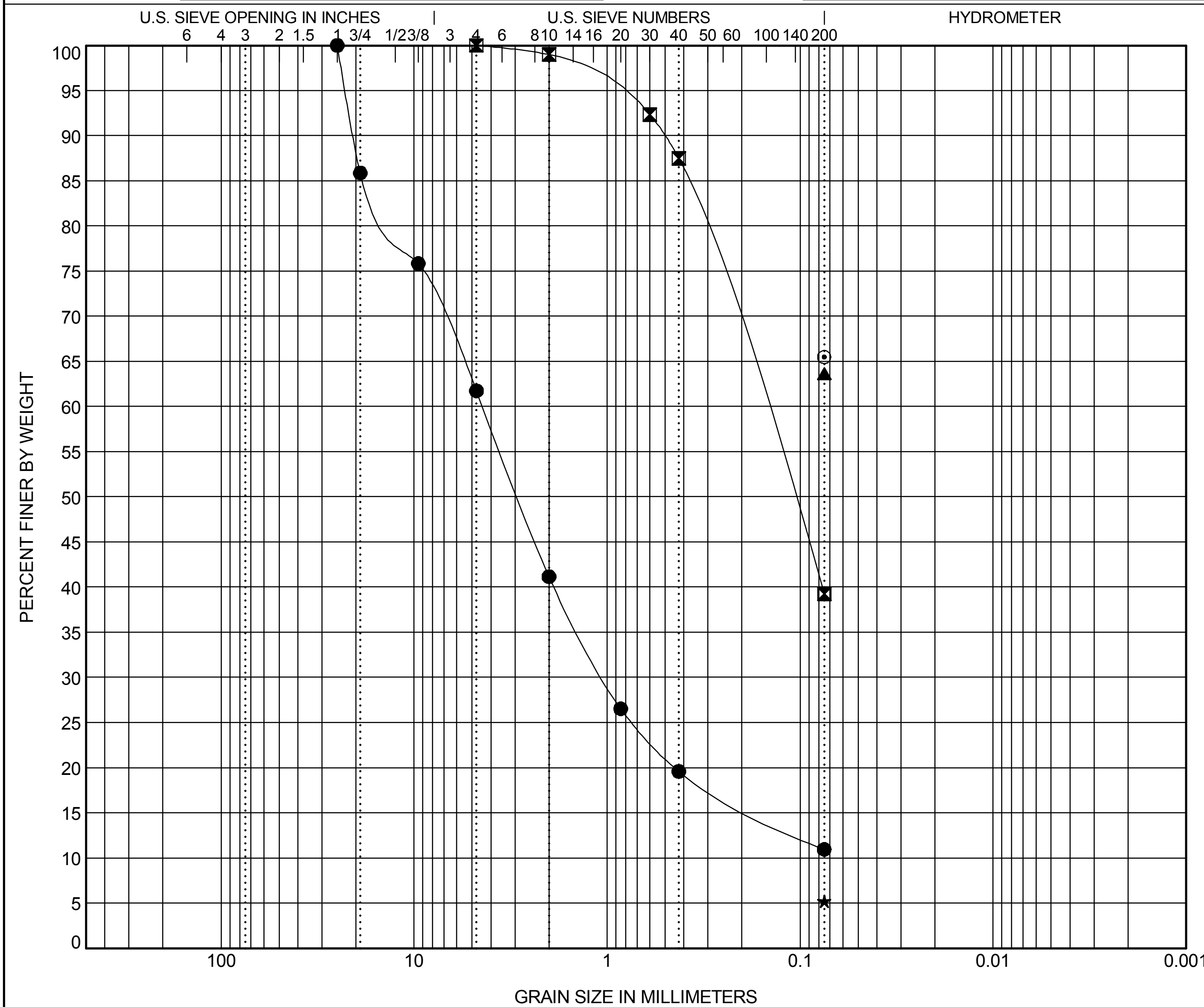
CAL ENGINEERING & GEOLOGY

CLIENT Santa Clara Valley Water District **PROJECT NAME** Almaden Lake Improvement Project

PROJECT NUMBER 140540 **PROJECT LOCATION** San Jose, California



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BOREHOLE	DEPTH	DATE TESTED	Classification	LL	PL	PI	Cc	Cu
●	**LB-4**	**10.0**	**10/22/2014**					**3.96**	**71.08**
⧗	**LB-4**	**15.5**	**10/22/2014**						
▲	**LB-4**	**30.5**	**10/22/2014**	**SANDY LEAN CLAY(CL)**	**36**	**17**	**19**		
★	**LB-4**	**36.0**	**10/22/2014**						
⊙	**LB-4**	**46.0**	**10/22/2014**	**SANDY FAT CLAY(CH)**	**55**	**19**	**36**		

	BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt / %Clay
●	**LB-4**	**10.0**	**25**	**4.416**	**1.042**		**38.3**	**50.8**	**10.9**
⧗	**LB-4**	**15.5**	**4.75**	**0.158**			**0.0**	**60.8**	**39.2**
▲	**LB-4**	**30.5**	**0.075**						**63.7**
★	**LB-4**	**36.0**	**0.075**						**5.2**
⊙	**LB-4**	**46.0**	**0.075**						**65.5**

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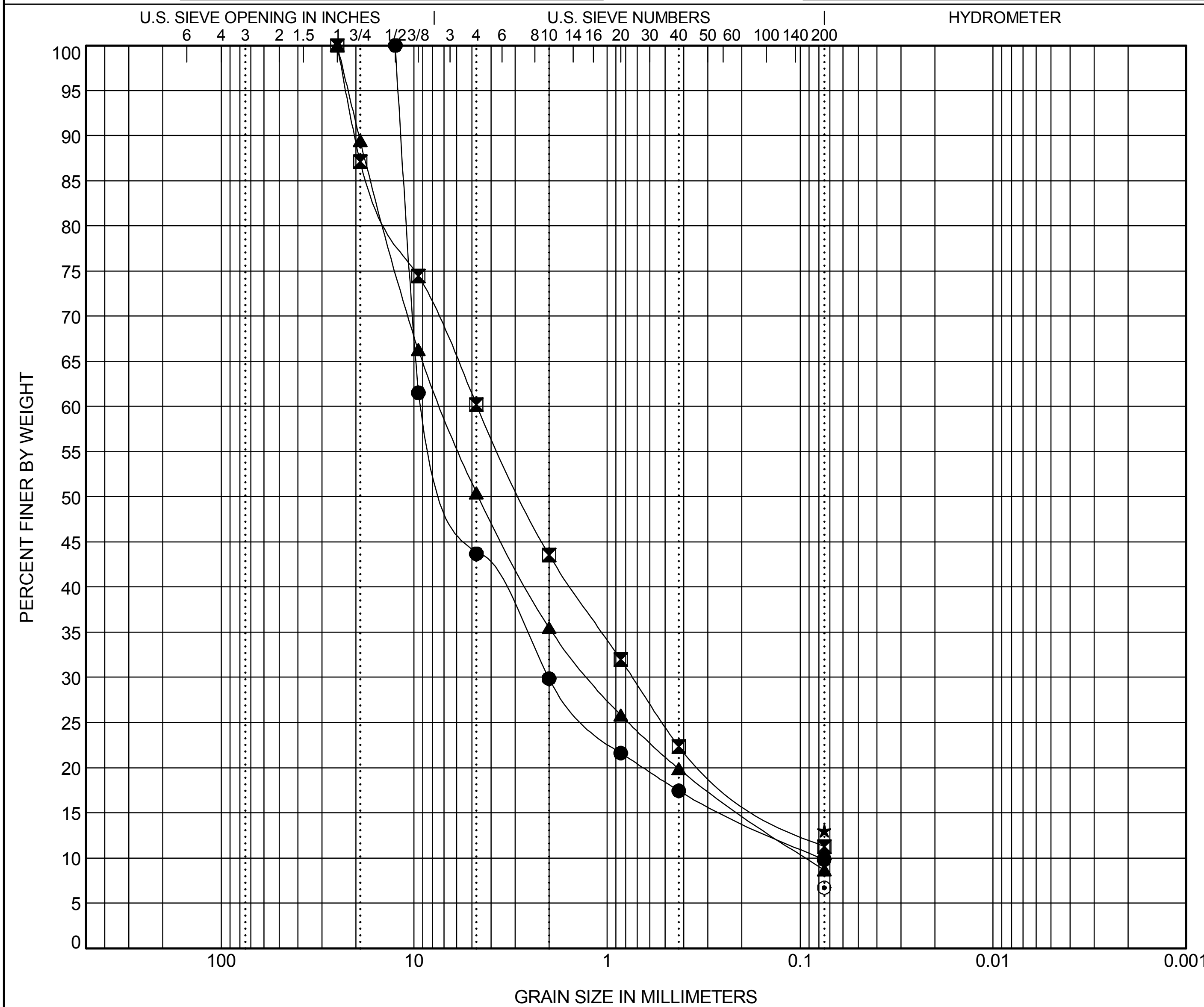
Cal Engineering & Geology

GRAIN SIZE DISTRIBUTION

CLIENT Santa Clara Valley Water District **PROJECT NAME** Almaden Lake Improvement Project

PROJECT NUMBER 140540 **PROJECT LOCATION** San Jose, California



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BOREHOLE	DEPTH	DATE TESTED	Classification	LL	PL	PI	Cc	Cu
●	**WB-1**	**8.5**	**10/22/2014**					**5.83**	**114.78**
⊠	**WB-1**	**11.0**	**10/22/2014**					**1.88**	**76.40**
▲	**WB-1**	**16.0**	**10/22/2014**					**2.28**	**78.23**
★	**WB-1**	**21.0**	**10/22/2014**						
⊙	**WB-1**	**26.0**	**10/22/2014**						

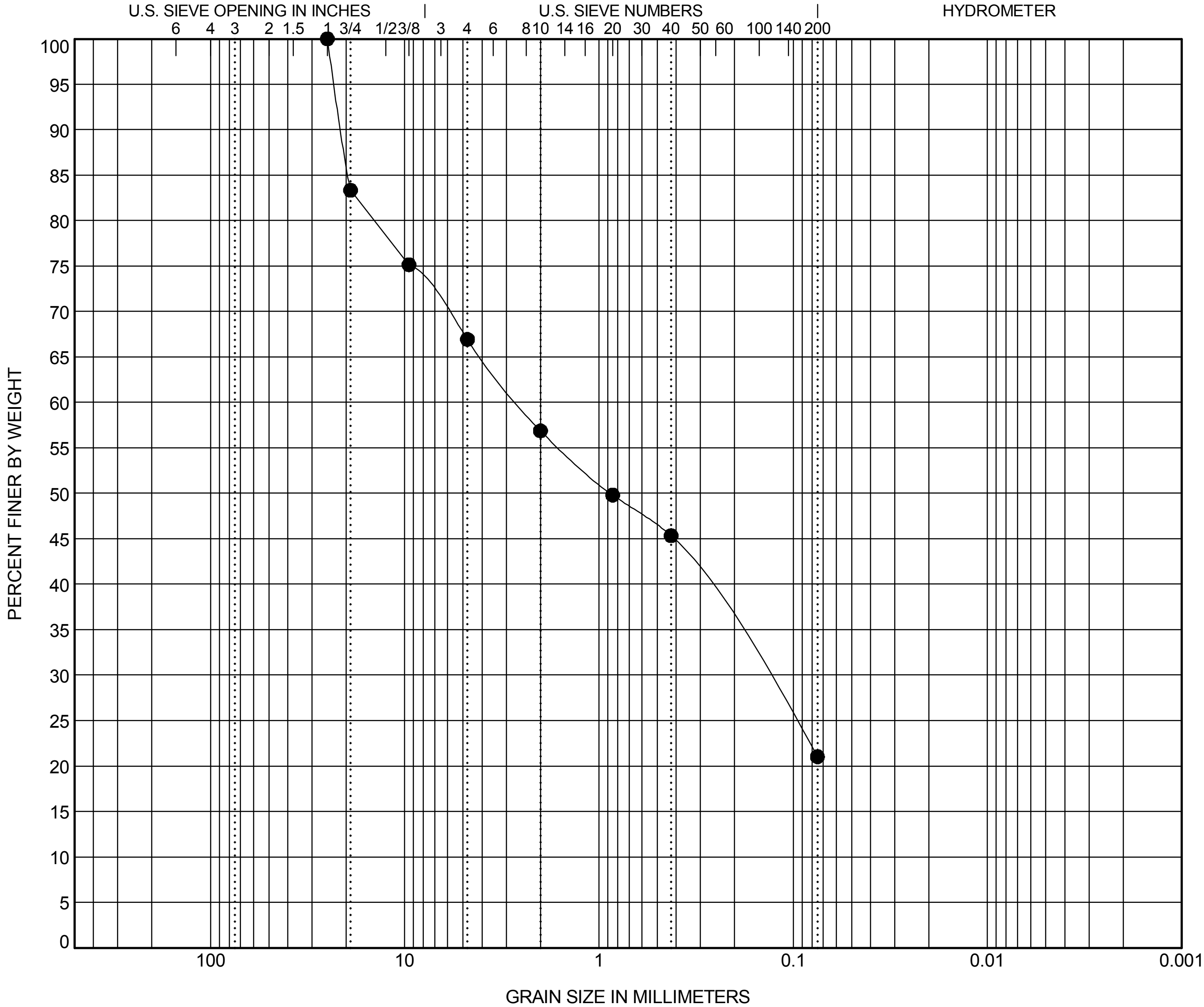
	BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**WB-1**	**8.5**	**12.5**	**8.956**	**2.018**	**0.078**	**56.3**	**33.9**	**9.8**	
⊠	**WB-1**	**11.0**	**25**	**4.7**	**0.737**		**39.8**	**48.9**	**11.3**	
▲	**WB-1**	**16.0**	**25**	**7.214**	**1.231**	**0.092**	**49.6**	**41.8**	**8.7**	
★	**WB-1**	**21.0**	**0.075**						**13.0**	
⊙	**WB-1**	**26.0**	**0.075**						**6.7**	

GRAIN SIZE DISTRIBUTION

CE&G
Cal Engineering & Geology

CLIENT Santa Clara Valley Water District **PROJECT NAME** Almaden Lake Improvement Project

PROJECT NUMBER 140540 **PROJECT LOCATION** San Jose, California



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

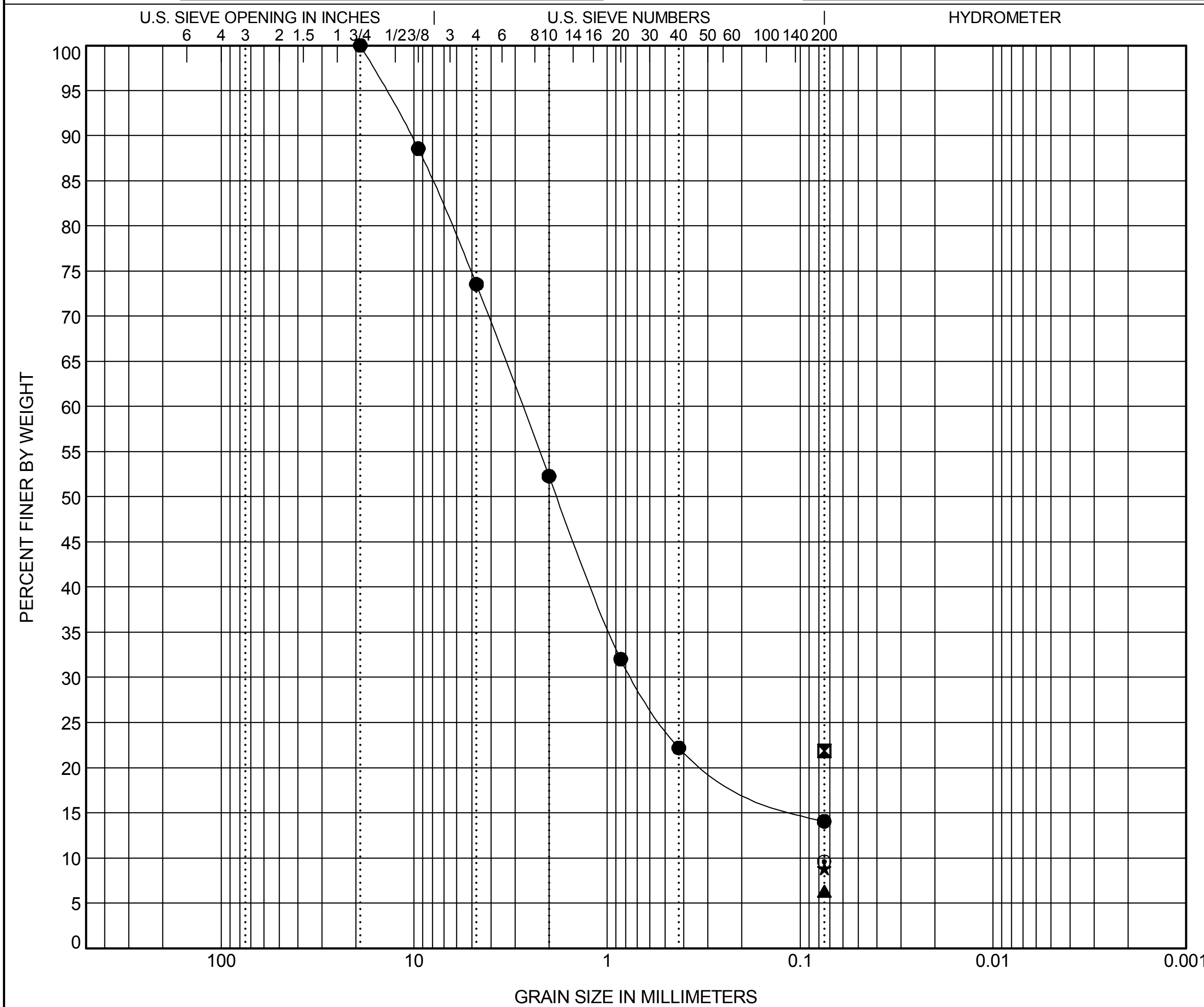
	BOREHOLE	DEPTH	DATE TESTED	Classification	LL	PL	PI	Cc	Cu
●	**WB-1**	**36.0**	**10/22/2014**	**SILTY SAND with GRAVEL(SM)**	**29**	**26**	**3**		

	BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**WB-1**	**36.0**	**25**	**2.618**	**0.142**		**33.1**	**45.9**	**21.0**	

GRAIN SIZE DISTRIBUTION

CE&G
Cal Engineering & Geology

CLIENT Santa Clara Valley Water District
PROJECT NAME Almaden Lake Improvement Project
PROJECT NUMBER 140540
PROJECT LOCATION San Jose, California



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

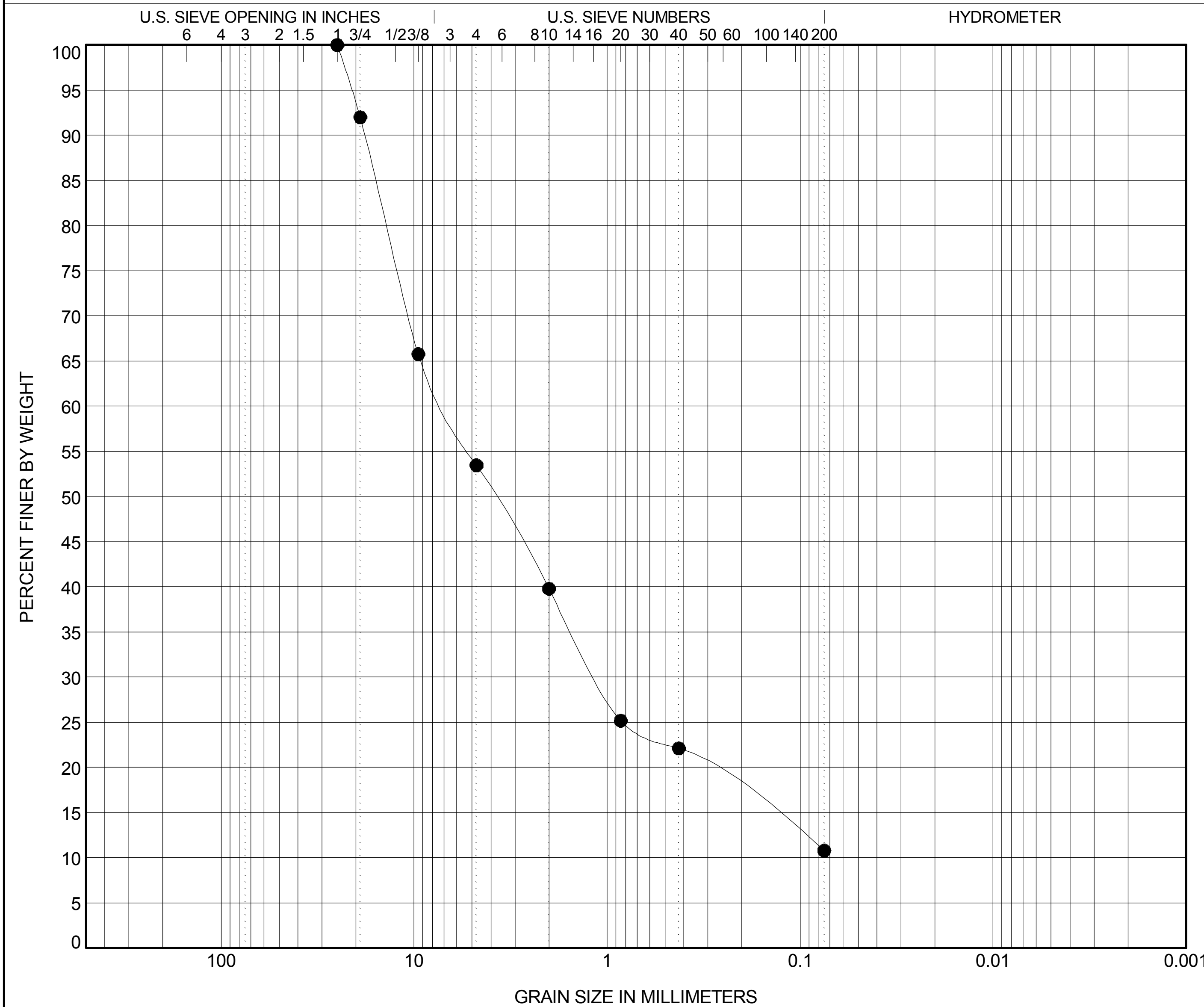
	BOREHOLE	DEPTH	DATE TESTED	Classification	LL	PL	PI	Cc	Cu
●	**WB-2**	**12.0**	**10/22/2014**						
⧗	**WB-2**	**17.0**	**10/22/2014**						
▲	**WB-2**	**22.0**	**10/22/2014**						
★	**WB-2**	**42.0**	**10/22/2014**						
⊙	**WB-2**	**47.0**	**10/22/2014**						

	BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt / %Clay
●	**WB-2**	**12.0**	**19**	**2.738**	**0.738**		**26.5**	**59.5**	**14.0**
⧗	**WB-2**	**17.0**	**0.075**						**21.9**
▲	**WB-2**	**22.0**	**0.075**						**6.3**
★	**WB-2**	**42.0**	**0.075**						**8.8**
⊙	**WB-2**	**47.0**	**0.075**						**9.6**

GRAIN SIZE DISTRIBUTION

CE&G Cal Engineering & Geology

CLIENT Santa Clara Valley Water District
PROJECT NAME Almaden Lake Improvement Project
PROJECT NUMBER 140540
PROJECT LOCATION San Jose, California



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BOREHOLE	DEPTH	DATE TESTED	Classification	LL	PL	PI	Cc	Cu
●	**WB-3**	**4.0**	**11/11/2014**					**2.79**	**103.48**

	BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**WB-3**	**4.0**	**25**	**6.863**	**1.126**		**46.5**	**42.7**	**10.8**	

#200 Sieve Wash Analysis
ASTM D 1140

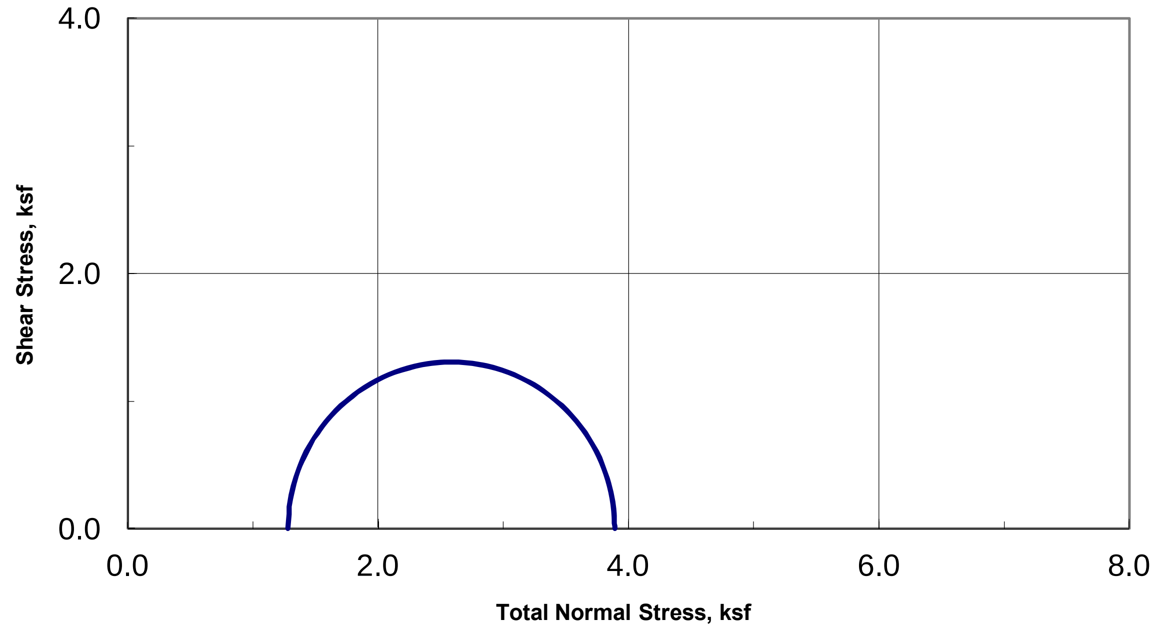
COOPER TESTING LABORATORY

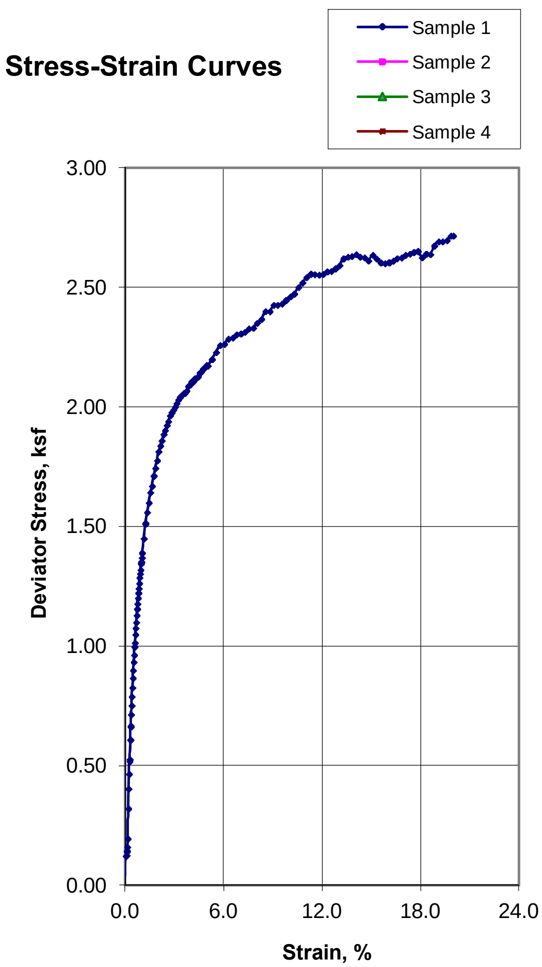
Job No.: 471-120 **Project No.:** 140540 **Run By:** MD
Client: CE&G **Date:** 11/3/2014 **Checked By:** DC
Project: Almaden

Boring:	WB-1	WB-2	LB-1						
Sample:	1-3	2-3	1-4						
Depth, ft.:	5	8-10(Tip-4")	10.5						
Soil Type:	Dark Gray Lean CLAY w/ Sand	Dark Gray Organic Silty SAND	Very Dark Gray Clayey SAND w/ Gravel						
Wt of Dish & Dry Soil, gm	323.7	546.9	664.5						
Weight of Dish, gm	134.7	324.1	209.4						
Weight of Dry Soil, gm	189.0	222.8	455.0						
Wt. Ret. on #4 Sieve, gm	0.0	0.7	169.6						
Wt. Ret. on #200 Sieve, gm	33.7	129.8	381.2						
% Gravel	**0.0**	**0.3**	**37.3**						
% Sand	**17.8**	**57.9**	**46.5**						
% Silt & Clay	**82.2**	**41.7**	**16.2**						

Remarks: As an added benefit to our clients, the gravel fraction may be included in this report. Whether or not it is included is dependent upon both the technician's time available and if there is a significant enough amount of gravel. The gravel is always included in the percent retained on the #200 sieve but may not be weighed separately to determine the percentage, especially if there is only a trace amount, (5% or less).

Unconsolidated-Undrained Triaxial Test
ASTM D2850





Sample Data	1	2	3	4
Moisture %	8.4			
Dry Den,pcf	120.2			
Void Ratio	0.403			
Saturation %	56.5			
Height in	4.97			
Diameter in	2.38			
Cell psi	8.9			
Strain %	15.00			
Deviator, ksf	2.611			
Rate %/min	1.00			
in/min	0.050			
Job No.:	**471-120**			
Client:	**Cal Engineering & Geology**			
Project:	**140540**			
Boring:	LB-1			
Sample:	1-4			
Depth ft:	10.5			

Visual Soil Description

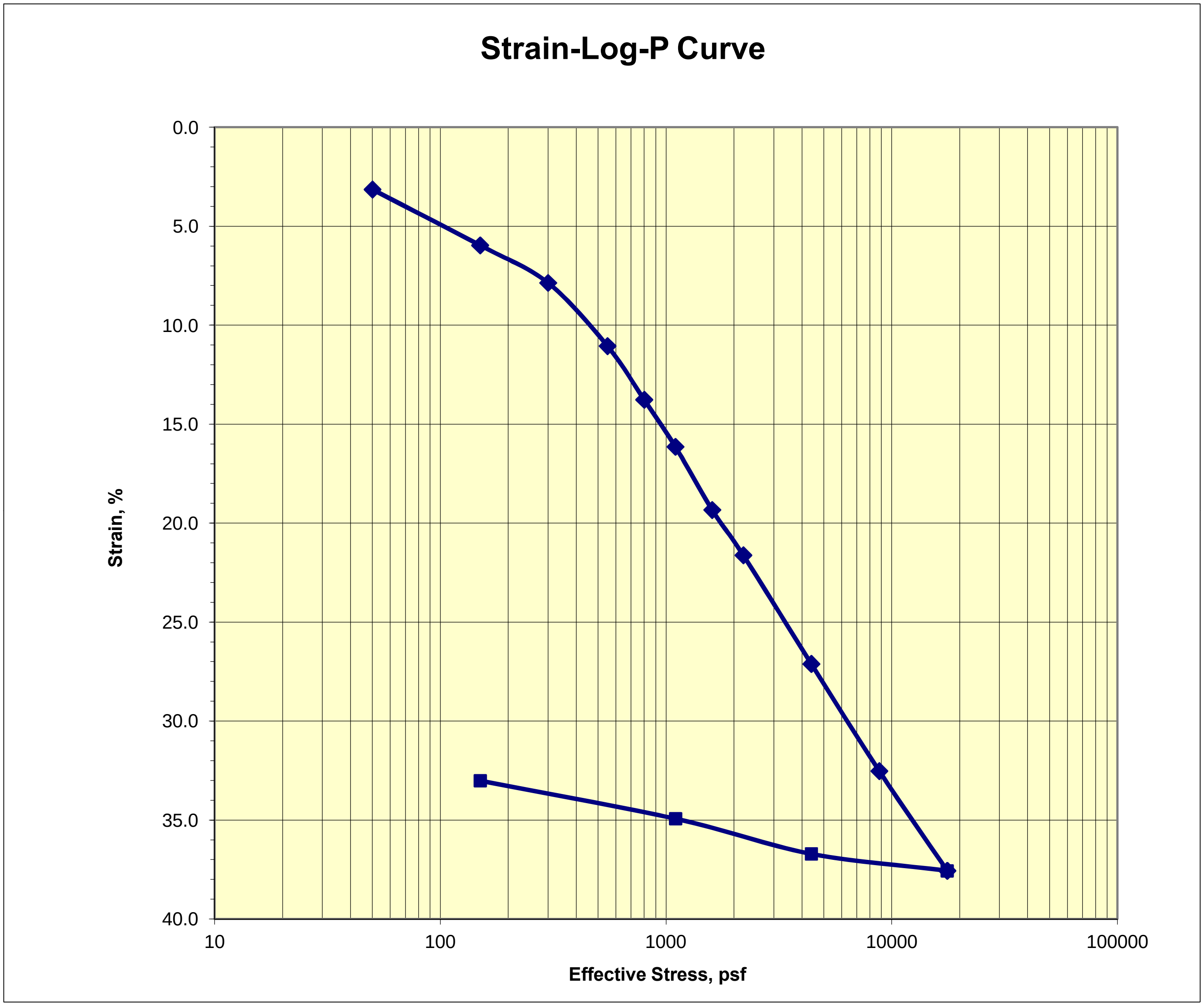
Sample #	
1	Very Dark Gray Clayey SAND w/ Gravel
2	
3	
4	

Remarks:

Note: Strengths are picked at the peak deviator stress or 15% strain which ever occurs first per ASTM D2850.

Consolidation Test
ASTM D2435

Job No.:	471-120	**Boring:**	WB-1	**Run By:**	MD
Client:	Cal Engineering & Geology	**Sample:**	1-3	**Reduced:**	PJ
Project:	Almaden - 140540	**Depth, ft.:**	5(Tip-5")	**Checked:**	PJ/DC
Soil Type:	Dark Gray Lean CLAY w/ Sand			**Date:**	11/4/2014

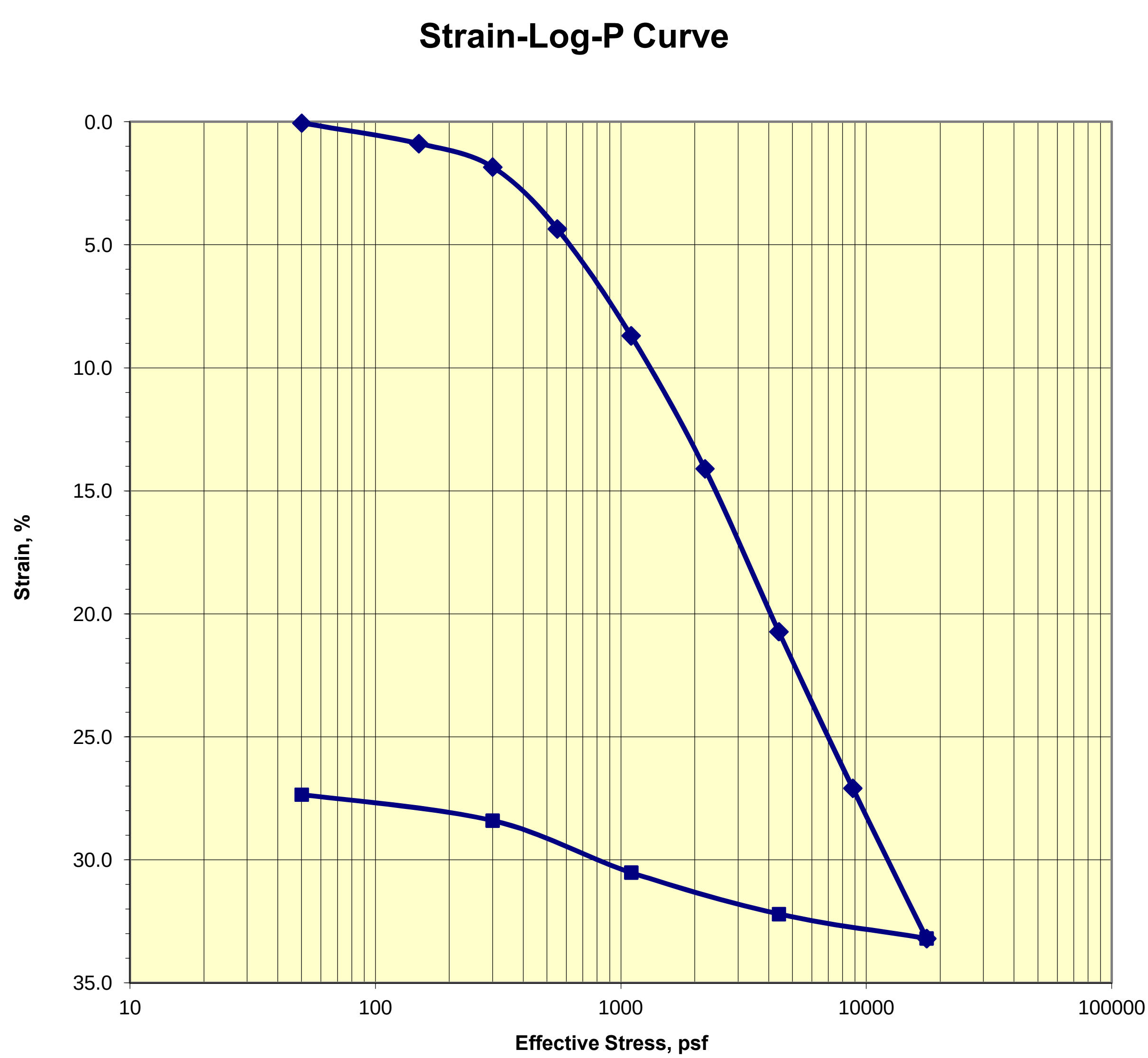


Assumed Gs 2.7	**Initial**	**Final**
Moisture %:	71.7	35.9
Dry Density, pcf:	55.0	85.5
Void Ratio:	2.064	0.971
% Saturation:	93.8	100.0

Remarks:

Consolidation Test
ASTM D2435

Job No.:	471-120	**Boring:**	WB-2	**Run By:**	MD
Client:	Cal Engineering & Geology	**Sample:**	2-3	**Reduced:**	PJ
Project:	Almaden - 140540	**Depth, ft.:**	8-10(Tip-4")	**Checked:**	PJ/DC
Soil Type:	Dark Gray Organic Silty SAND			**Date:**	11/3/2014



Assumed Gs 2.65	Initial	Final
Moisture %:	68.9	40.4
Dry Density, pcf:	55.2	79.9
Void Ratio:	1.998	1.071
% Saturation:	91.4	100.0

Remarks:

March 18, 2015
LA&S Project # 1515

Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118

Attn: James Ujah

Subject: Results of Metals Testing from
Lake Bottom Sediment Samples
Collected from Lake Almaden.

Dear Mr. Ujah,

Light, Air and Space Construction (LA&S) has prepared this Letter Report presenting our comments concerning the metals testing conducted on lake bottom samples from Lake Almaden in San Jose. LA&S understands that grading work is planned along the shoreline and the District wants opinions from a technical consultant concerning re-use/disposal options for the soil.

I. Sampling and Testing Activities

Four (4) discrete sediment samples were collected by a drilling contractor employed by the District working from a barge on Lake Almaden. Sediment sample WB-1-2 was obtained from a depth of 3' to 3.5' below top of sediment. Sediment sample WB-1-4 was obtained from a depth of 8' below top of sediment. Sediment sample WB-2-2 was obtained from a depth of 3'-3.5' below top of sediment and Sediment sample WB-2-4 was obtained from a depth of 9.5' to 10' below top of sediment.

The actual four (4) sample locations were not provided to LA&S by the District for this report. The sediment samples were collected in pre-cleaned lab supplied sampling containers. Chain-of-Custody records were used to track the sediment samples from the time of collection through receipt by the analytical laboratory. The sediment samples were kept iced or refrigerated from the time of collection until the time of analysis. A fully signed Chain-of-Custody record was returned with the final laboratory reports (provided in Appendix B of this report).

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WETLAND AND RIPARIAN HABITAT – ASSESSMENT – DESIGN – RESTORATION – CONSTRUCTION – MITIGATION MONITORING

All sediment samples were individually tested for CAM17 group of metals, which consists of antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, lead, mercury, molybdenum, nickel, selenium, silver, thallium, vanadium and zinc. All analysis was performed using regulatory accepted, standard test methods by the District's contract, state-certified lab (TestAmerica), including QA/QC protocols.

II. **Data Evaluation and Comments**

No field observations of contamination (e.g., suspicious odors or discolorations) were evident or reported during any of the sampling activities. Test America's laboratory reports for this project's testing are presented in Appendix A.

Table 1 immediately following this section provides a summary of the data. The two columns on the right-hand side list the most commonly used environmental screening levels (ESLs; per California Regional Water Quality Control Board-San Francisco Bay, December 2013) and the California thresholds for hazardous waste classification. All entries are presented in milligrams per kilogram (mg/kg), which is parts per million. The listed ESLs are the "default, Tier 1" values that assume an unrestricted land use and underlying groundwater of potential drinking water use. There are numerous other ESLs for situations of lower risk concern to human health and the environment.

Sediment sample WB-1-2 exceeded the ESLs with Arsenic at 5.0 ppm, Mercury at 29ppm and Nickel at 190ppm. Sediment sample WB-1-4 exceeded the ESLs with Arsenic at 3.4 ppm. Sediment sample WB-2-2 exceeded the ESLs with Arsenic at 5.7 ppm, Mercury at 26ppm and Nickel at 180ppm. Sediment sample WB-2-4 exceeded the ESLs with Arsenic at 6.6 ppm and Mercury at 17ppm. Measured sediment samples that exceed the listed ESL criteria in Table 1 are highlighted in red.

All detected amounts of total arsenic exceed the 0.39 mg/kg residential ESL. However, measured concentrations are generally consistent with naturally-occurring concentrations for Bay Area soils. The California Environmental protection Agency's Department of Toxic Substances Control (DTSC) considers an arsenic concentration of 12 mg/kg to be a useful screening level in consideration of potential soil contamination for sensitive site uses such as schools (DTSC, August 2008, *Interim Guide for Sampling Agricultural Properties, Third Revision, Section 5.2.1).* The RWQCB-SF endorses an upper estimate for background arsenic of 11 mg/kg for land settings, such as this project encompasses. The highest measured arsenic in this evaluation was only 6.6 mg/kg.

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WETLAND AND RIPARIAN HABITAT – ASSESSMENT – DESIGN – RESTORATION – CONSTRUCTION – MITIGATION MONITORING

The other detected metal concentrations that exceeded the ESLs were Sediment sample WB-1-2 Mercury at 29ppm and Nickel at 190ppm. Sediment sample WB-2-2 Mercury at 26ppm and Nickel at 180ppm. Sediment sample WB-2-4 Mercury at 17ppm. Although there were no background tests conducted, these concentrations are also considered naturally occurring, based on other investigations LA&S has conducted in the area and Guadalupe watershed.

TABLE 1

Metals (mg/kg)	WB-1-2 (3'-3.5')	WB-1-4 (8')	WB-2-2 (3.5'-4.0')	WB-2-4 (9.5'-10.0')	ESLs (Dec2013) (mg/kg)	Calif HazWaste TTLC (mg/kg)
Antimony	0.85	1.2	1.4	0.54	20	500
Arsenic	5.0	3.4	5.7	6.6	0.39	500
Barium	91	79	110	120	750	10,000
Beryllium	ND	ND	0.16	0.17	4.0	75
Cadmium	0.15	ND	0.18	0.26	12	100
Chromium (total)	120	93	100	77	1,000	2,500
Cobalt	16	15	16	13	23	8,000
Copper	29	39	25	25	230	2,500
Lead	11	3.1	26	47	80	1,000
Mercury	29	4.5	26	17	6.7	20
Molybdenum	ND	ND	ND	ND	40	3,500
Nickel	190	130	180	140	150	2,000
Selenium	ND	ND	ND	ND	10	100
Silver	ND	ND	ND	ND	20	500
Thallium	ND	ND	ND	ND	0.78	700
Vanadium	40	61	37	34	200	2,400
Zinc	56	65	52	63	800	5,000

III. **Opinions and Conclusions**

Based upon the subject exploration and sediment soil testing, the Lake Almaden soil appears aggregately suitable for on-site re-use for purposes such as re-sculpturing the Lake Almaden basin and Los Alamito Creek channel. The material should also be acceptable for offsite disposal at a standard (i.e. non-hazardous, Class III) landfill. Due to the ESL exceedances, it may be difficult to find a non-landfill, offsite re-use for the subject sediment soil. Commercial property fills and embankment construction projects are two potentially viable types of re-uses. The demand for excess soil and specific projects involving earthwork are constantly changing.

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LA&S does not believe that it would be cost effective to try to segregate soils that exceed multiple ESLs from those that have the low background arsenic ESL exceedance. Further, it is possible prospective offsite disposal/re-use options may require testing for additional parameters/chemicals before acceptance.

IV. **Limitations**

This Letter Report was prepared specifically for the SCVWD, and the use of this report by third parties is entirely at their own risk. The interpretations and conclusions made herein are based upon the reported analytical metal data for the cited sediment soil samples. Point sample locations and laboratory analytical results are inherently limited and do not provide a warranty as to the conditions that may exist throughout the lake bottom. Such a warranty is impossible to achieve. Conditions may also change over time. Additionally, the available soil re-use options and landfill acceptance criteria must be recognized as non-static. Depending upon the specific re-use or disposal options being considered at the time of grading, metal concentrations currently considered acceptable may at that time disqualify the material.

Prepared by:

____

David B. Guthridge, Principal

Attachment: Appendix A: Certified Laboratory Report and Chain-of Custody

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Almaden Lake Project Fill Quantities

	Alternative #4		Alternative # 6		Alternative # 7	
Component	Area (Ac)	Fill (CY)	Area (Ac)	Fill (CY)	Area (Ac)	Fill (CY)
East Lake	18	159,762	17	163,420	19	156,540
Levee	2.6	70,435	1.635	52,622	1.9	67,212
West Bank Maint Rd	0.4	12,935	0	0	0	0
Channel	8.2	160,390	11	226,395	10	194,833
New West Park Space	3.8	129,241	2	69,342	2	67,212
Island	0.75	21,780	0.75	21,780	0.75	21,780
New Island	0.75	43,560	0.75	43,560	0.75	43,560
Total Fill		598,103		577,119		551,137

James Ujah

From: Jack Xu
Sent: Tuesday, March 17, 2015 9:48 AM
To: James Ujah
Subject: Drawdown Time
Attachments: Drawdown Time 100-yr Hydrograph.xlsx

Hi James,

See attached spreadsheet for calculated drawdown time. The unsteady model behaves a little differently than the steady model, so I used the most upstream cross section (70+00), which was the closest in elevation to the steady design model you had, and offset the elevation to match yours. Assuming a critical elevation of 200’, there was about 2:45 of drawdown time.

Santa Clara Valley Water District

Jack Xu, PE, CFM
Hydraulics, Hydrology, & Geomorphology
Watersheds Division
(408) 630-2913

APPENDIX C

Liquefaction Evaluation

DOCUMENT REVIEW COVER SHEET

CE&G
CAL ENGINEERING & GEOLOGY

1. PROJECT NAME	2. PROJECT NUMBER
Almaden Lake Improvement Project	140540

3. DOCUMENT TITLE
Appendix C Liquefaction Analysis

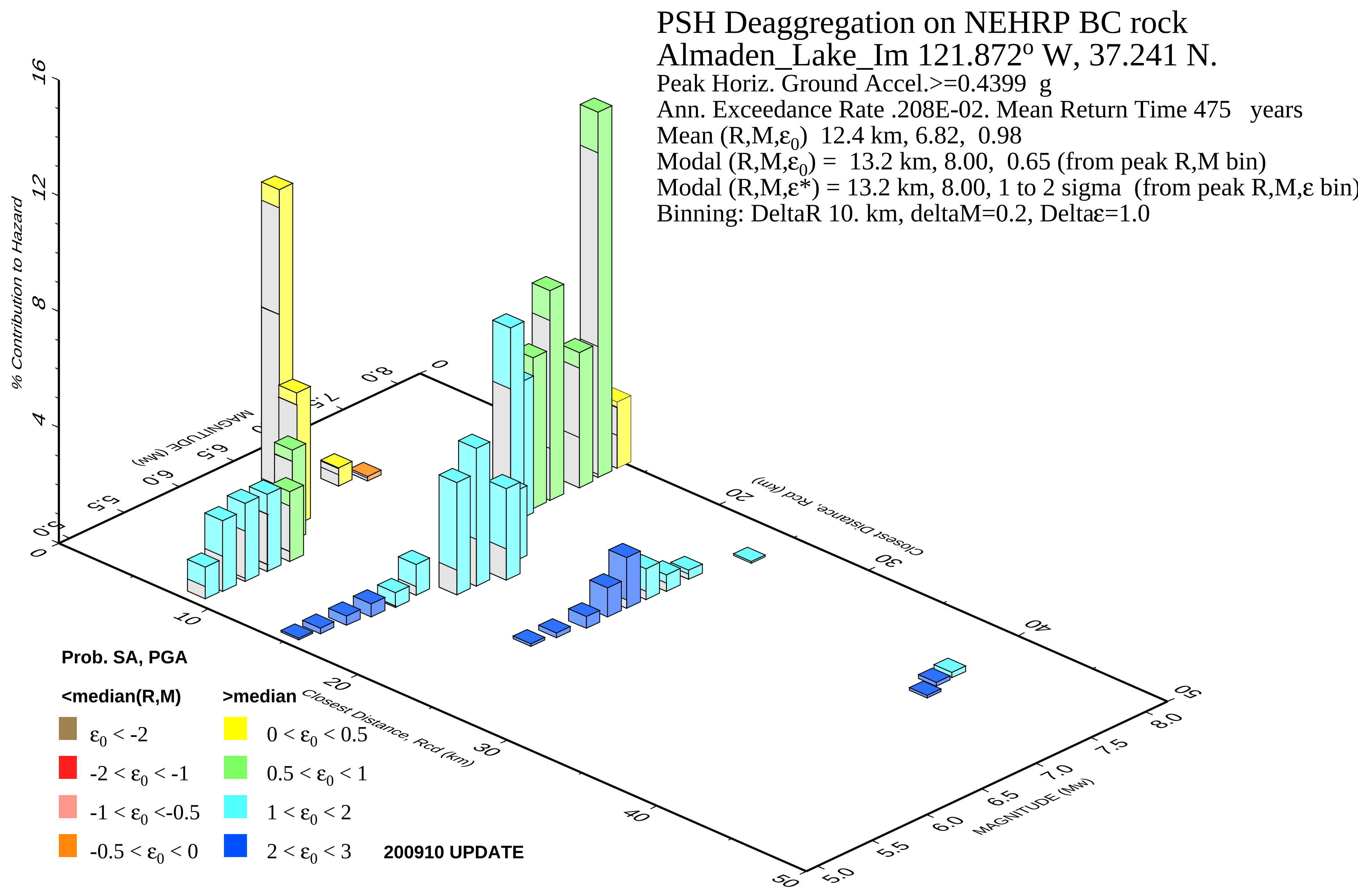
4. DOCUMENT STATUS DESIGNATION
☐ Preliminary ☒ Final ☐ Cancelled

5. NOTES/COMMENTS
The purpose of this calculation is to perform liquefaction analysis at each of the land and water boring locations using index properties obtained from the laboratory testing program.

ATTACHMENTS	TOTAL NO. OF PAGES
USGS seismic deaggregation	1
Land Boring LB-1 Liquefaction Analysis	3
Land Boring Lb-2 Liquefaction Analysis	3
Land Boring Lb-3 Liquefaction Analysis	3
Land Boring Lb-4 Liquefaction Analysis	3
Water Boring Wb-1 Liquefaction Analysis	3
Water Boring Wb-2 Liquefaction Analysis	3

RECORD OF REVISIONS

6. No.	7. Reason For Revision	8. Tot. Pgs	10. Originator (Print/Sign/Date)	11. Checker (Print/Sign/Date)	12. QA/QC (Print/Sign/Date)	13. Apprvd./Accptd (Print/Sign)	14. Date (M/D/YY)
1	Final Issue	19	Eli Zane	Dan Peluso	Dan Peluso	Dan Peluso	4/30/15



GMT 2014 Dec 22 16:50:44 Distance (R), magnitude (M), epsilon (E0,E) deaggregation for a site on rock with average vs= 760. m/s top 30 m. USGS CGHT PSHA2008 UPDATE Bins with lt 0.05% contrib. omitted

Cal Engineering & Geology
Oakland, CA 510.451.2350
Walnut Creek, CA 925.935.9771
San Jose, CA 408.440.4542

LIQUEFACTION ANALYSIS REPORT

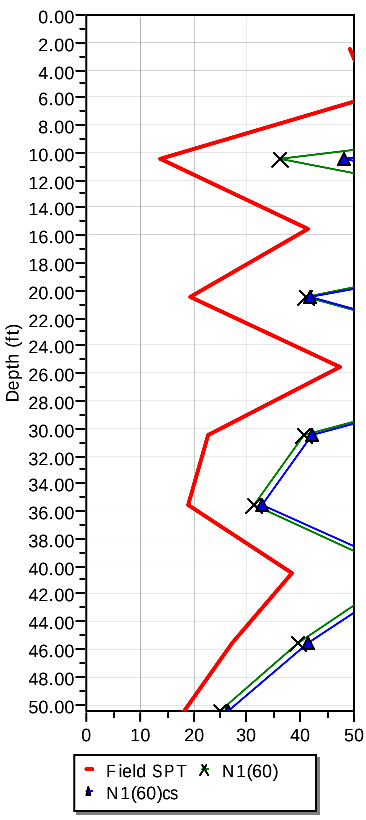
Project title : Almaden Lake Improvements

Project subtitle : LB-1

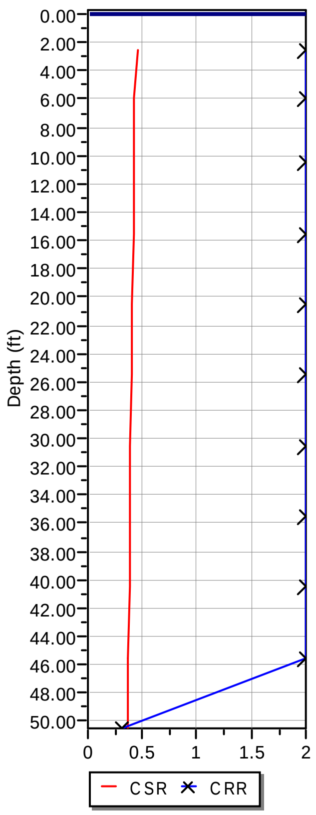
Input parameters and analysis data

In-situ data type:	Standard Penetration Test	Depth to water table:	0.00 ft
Analysis type:	Deterministic	Earthquake magnitude M_w:	6.82
Analysis method:	NCEER 1998	Peak ground accelaration:	0.44 g
Fines correction method:	Idriss & Seed	User defined F.S.:	1.00

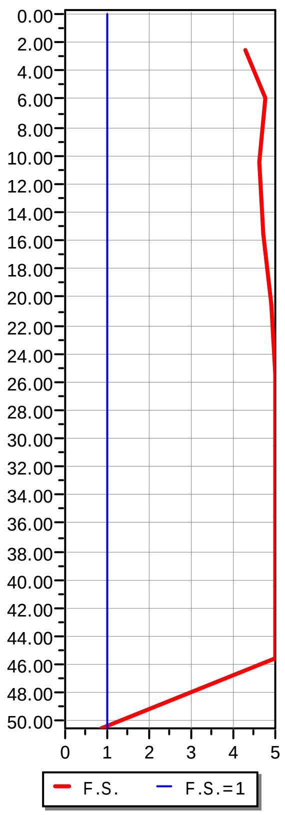
SPT data graph



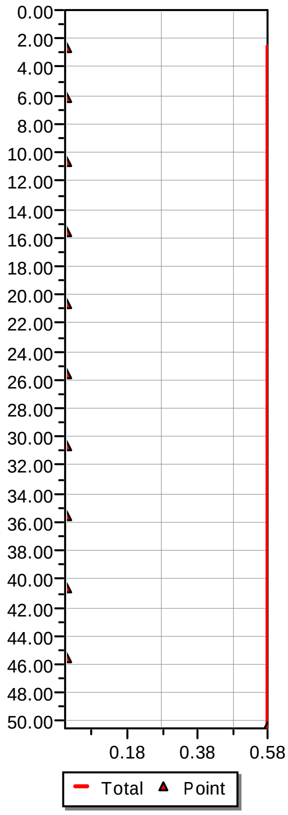
Shear stress ratio



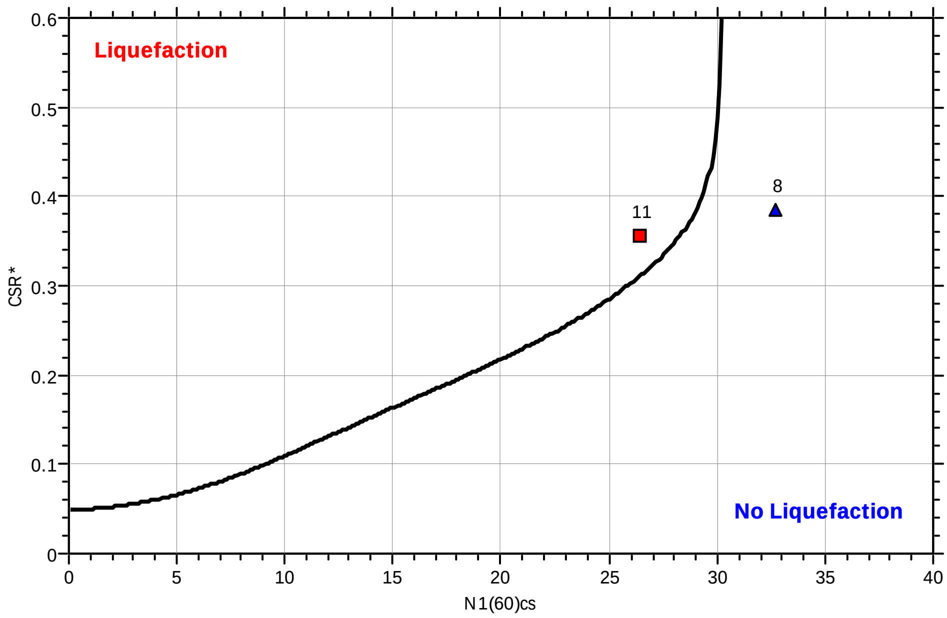
Factor of safety



Settlements (in)



$M_w = 7^{1/2}$, sigma' = 1 atm base curve



:: Field input data ::

Point ID	Depth (ft)	Field N_{SPT} (blows/feet)	Unit weight (pcf)	Fines content (%)
1	2.50	49.40	120.00	46.00
2	6.00	53.00	140.00	10.00
3	10.50	13.65	120.00	60.00
4	15.50	41.60	130.00	15.00
5	20.50	19.50	142.00	7.00
6	25.50	47.45	143.00	7.00
7	30.50	22.80	140.00	10.00
8	35.50	18.90	135.00	10.00
9	40.50	38.40	140.00	10.00
10	45.50	27.30	135.00	10.00
11	50.50	18.20	140.00	10.00

Depth : Depth from free surface, at which SPT was performed (ft)
Field SPT : SPT blows measured at field (blows/feet)
Unit weight : Bulk unit weight of soil at test depth (pcf)
Fines content : Percentage of fines in soil (%)

:: Cyclic Stress Ratio calculation (CSR fully adjusted and normalized) ::

Point ID	Depth (ft)	Sigma (tsf)	u (tsf)	Sigma' (tsf)	r_d	CSR	MSF	$CSR_{eq,M=7.5}$	K_{sigma}	CSR^*
1	2.50	0.15	0.08	0.07	0.99	0.59	1.28	0.46	1.00	0.46
2	6.00	0.40	0.19	0.21	0.99	0.54	1.28	0.42	1.00	0.42
3	10.50	0.67	0.33	0.34	0.98	0.55	1.28	0.43	1.00	0.43
4	15.50	0.99	0.48	0.51	0.96	0.54	1.28	0.42	1.00	0.42
5	20.50	1.35	0.64	0.70	0.95	0.52	1.28	0.41	1.00	0.41
6	25.50	1.70	0.80	0.91	0.94	0.51	1.28	0.40	1.00	0.40
7	30.50	2.05	0.95	1.10	0.93	0.49	1.28	0.39	0.99	0.39
8	35.50	2.39	1.11	1.28	0.89	0.47	1.28	0.37	0.96	0.39
9	40.50	2.74	1.26	1.48	0.85	0.45	1.28	0.35	0.93	0.38
10	45.50	3.08	1.42	1.66	0.80	0.43	1.28	0.34	0.91	0.37
11	50.50	3.43	1.58	1.85	0.76	0.40	1.28	0.32	0.89	0.36

Depth : Depth from free surface, at which SPT was performed (ft)
Sigma : Total overburden pressure at test point, during earthquake (tsf)
u : Water pressure at test point, during earthquake (tsf)
Sigma' : Effective overburden pressure, during earthquake (tsf)
r_d : Nonlinear shear mass factor
CSR : Cyclic Stress Ratio
MSF : Magnitude Scaling Factor
$CSR_{eq,M=7.5}$ CSR adjusted for M=7.5
K_{sigma} Effective overburden stress factor
CSR^* CSR fully adjusted

:: Cyclic Resistance Ratio calculation $CRR_{7.5}$ ::

Point ID	Field SPT	C_n	C_e	C_b	C_r	C_s	$N_{1(60)}$	DeltaN	$N_{1(60)cs}$	$CRR_{7.5}$
1	49.40	1.70	1.45	1.05	0.75	1.20	115.07	28.01	143.09	2.00
2	53.00	1.70	1.45	1.05	0.80	1.20	131.69	3.72	135.41	2.00
3	13.65	1.70	1.45	1.05	0.85	1.20	36.04	12.21	48.24	2.00
4	41.60	1.44	1.45	1.05	0.95	1.20	103.72	7.49	111.20	2.00
5	19.50	1.22	1.45	1.05	0.95	1.20	41.19	0.47	41.66	2.00
6	47.45	1.07	1.45	1.05	0.95	1.20	88.40	0.87	89.27	2.00
7	22.80	0.97	1.45	1.05	1.00	1.20	40.58	1.75	42.33	2.00
8	18.90	0.90	1.45	1.05	1.00	1.20	31.17	1.54	32.71	2.00
9	38.40	0.84	1.45	1.05	1.00	1.20	59.02	2.15	61.16	2.00
10	27.30	0.79	1.45	1.05	1.00	1.20	39.60	1.73	41.32	2.00
11	18.20	0.75	1.45	1.05	1.00	1.20	24.98	1.41	26.39	0.31

:: Cyclic Resistance Ratio calculation $CRR_{7.5}$ ::

Point ID	Field SPT	C_n	C_e	C_b	C_r	C_s	$N_{1(60)}$	DeltaN	$N_{1(60)cs}$	$CRR_{7.5}$

C_n : Overburden corretion factor
C_e : Energy correction factor
C_b : Borehole diameter correction factor
C_r : Rod length correction factor
C_s : Liner correction factor
$N_{1(60)}$: Corrected N_{SPT}
DeltaN : Addition to corrected N_{SPT} value due to the presence of fines
$N_{1(60)cs}$: Corected $N_{1(60)}$ value for fines
$CRR_{7.5)}$: Cyclic resistance ratio for M=7.5

:: Settlements calculation for saturated sands ::

Point ID	$N_{1(60)}$	N_1	FS_L	e_v (%)	Settle. (in)
1	143.09	119.24	4.30	0.00	0.00
2	135.41	112.84	4.75	0.00	0.00
3	48.24	40.20	4.63	0.00	0.00
4	111.20	92.67	4.73	0.00	0.00
5	41.66	34.72	4.91	0.00	0.00
6	89.27	74.39	5.00	0.00	0.00
7	42.33	35.27	5.00	0.00	0.00
8	32.71	27.26	5.00	0.00	0.00
9	61.16	50.97	5.00	0.00	0.00
10	41.32	34.43	5.00	0.00	0.00
11	26.39	21.99	0.87	1.93	0.58

Total settlement : 0.58

$N_{1,(60)}$: Stress normalized and corrected SPT blow count
N_1: Japanese equivalent corrected value
FS_L: Calculated factor of safety
e_v: Post-liquefaction volumentric strain (%)
Settle.: Calculated settlement (in)

:: Liquefaction potential according to Iwasaki ::

Point ID	F	w_z	I_L
1	0.00	9.62	0.00
2	0.00	9.09	0.00
3	0.00	8.40	0.00
4	0.00	7.64	0.00
5	0.00	6.88	0.00
6	0.00	6.11	0.00
7	0.00	5.35	0.00
8	0.00	4.59	0.00
9	0.00	3.83	0.00
10	0.00	3.07	0.00
11	0.13	2.30	0.45

Overall potential I_L : 0.45

I_L = 0.00 - No liquefaction
I_L between 0.00 and 5 - Liquefaction not probable
I_L between 5 and 15 - Liquefaction probable
I_L > 15 - Liquefaction certain

Cal Engineering & Geology
Oakland, CA 510.451.2350
Walnut Creek, CA 925.935.9771
San Jose, CA 408.440.4542

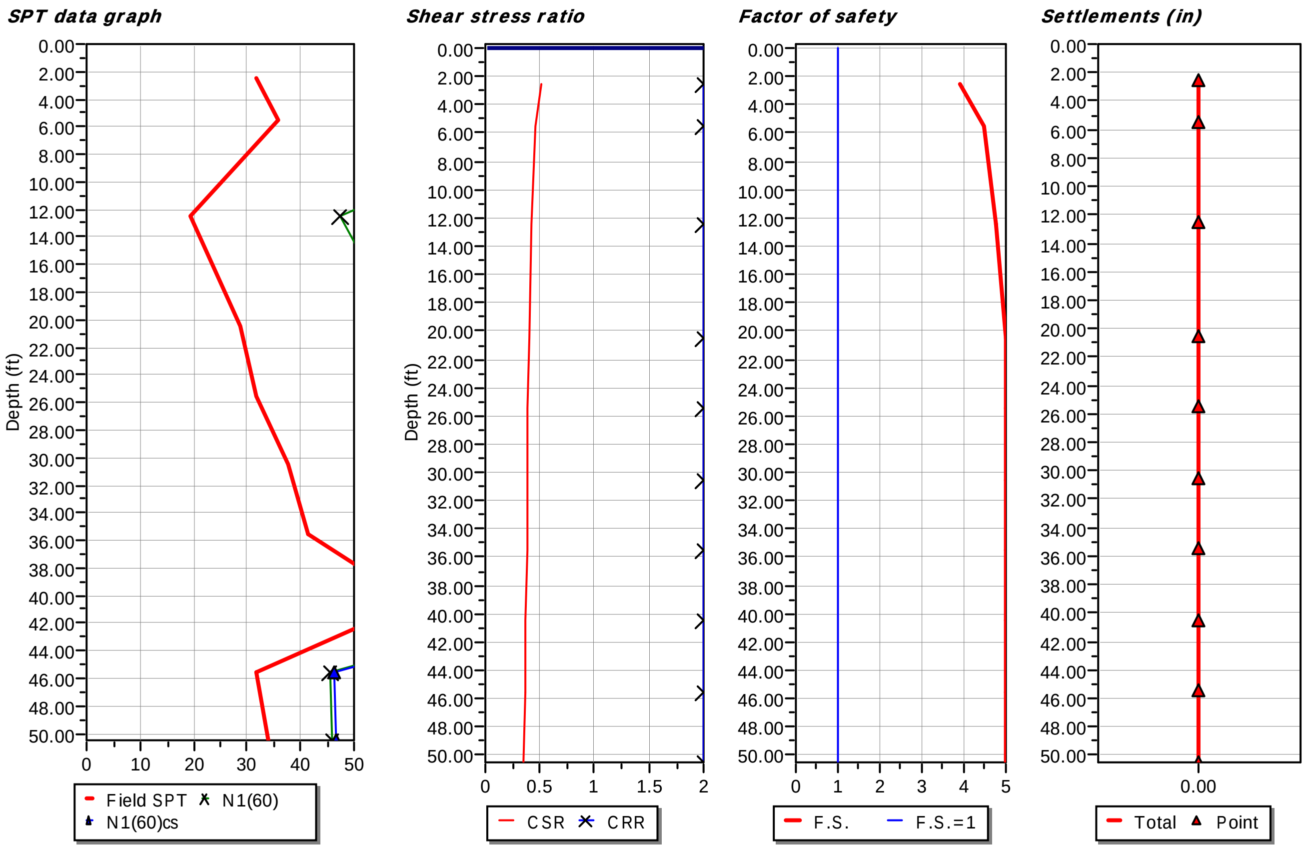
LIQUEFACTION ANALYSIS REPORT

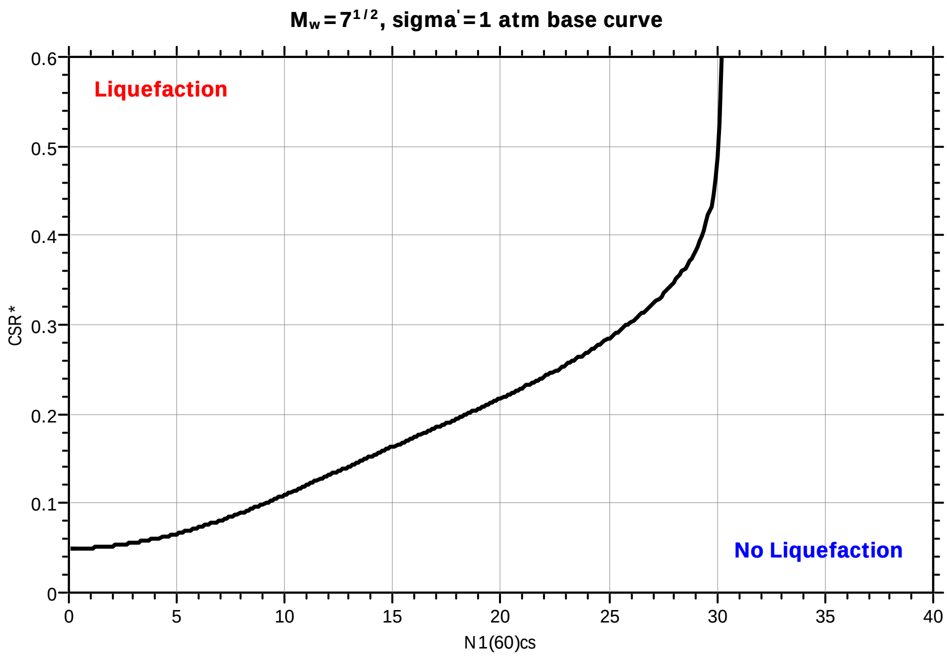
Project title : Almaden Lake Improvements

Project subtitle : LB-2

Input parameters and analysis data

In-situ data type:	Standard Penetration Test	Depth to water table:	0.00 ft
Analysis type:	Deterministic	Earthquake magnitude M_w:	6.82
Analysis method:	NCEER 1998	Peak ground accelaration:	0.44 g
Fines correction method:	Idriss & Seed	User defined F.S.:	1.00





9

:: Field input data ::

Point ID	Depth (ft)	Field N_{SPT} (blows/feet)	Unit weight (pcf)	Fines content (%)
1	2.50	31.90	111.00	60.00
2	5.50	35.80	135.00	12.00
3	12.50	19.50	135.00	19.00
4	20.50	28.60	143.00	9.00
5	25.50	31.90	143.00	8.00
6	30.50	37.70	140.00	8.00
7	35.50	41.60	140.00	8.00
8	40.50	61.10	140.00	8.00
9	45.50	31.90	140.00	8.00
10	50.50	34.00	140.00	8.00

Depth : Depth from free surface, at which SPT was performed (ft)
Field SPT : SPT blows measured at field (blows/feet)
Unit weight : Bulk unit weight of soil at test depth (pcf)
Fines content : Percentage of fines in soil (%)

:: Cyclic Stress Ratio calculation (CSR fully adjusted and normalized) ::

Point ID	Depth (ft)	Sigma (tsf)	u (tsf)	Sigma' (tsf)	r_d	CSR	MSF	$CSR_{eq,M=7.5}$	K_{sigma}	CSR^*
1	2.50	0.14	0.08	0.06	0.99	0.65	1.28	0.51	1.00	0.51
2	5.50	0.34	0.17	0.17	0.99	0.57	1.28	0.45	1.00	0.45
3	12.50	0.81	0.39	0.42	0.97	0.53	1.28	0.42	1.00	0.42
4	20.50	1.39	0.64	0.75	0.95	0.51	1.28	0.40	1.00	0.40
5	25.50	1.74	0.80	0.95	0.94	0.50	1.28	0.39	1.00	0.39
6	30.50	2.09	0.95	1.14	0.93	0.49	1.28	0.38	0.98	0.39
7	35.50	2.44	1.11	1.33	0.89	0.46	1.28	0.36	0.95	0.38
8	40.50	2.79	1.26	1.53	0.85	0.44	1.28	0.35	0.93	0.37
9	45.50	3.14	1.42	1.72	0.80	0.42	1.28	0.33	0.90	0.36
10	50.50	3.49	1.58	1.92	0.76	0.40	1.28	0.31	0.89	0.35

Depth : Depth from free surface, at which SPT was performed (ft)
Sigma : Total overburden pressure at test point, during earthquake (tsf)
u : Water pressure at test point, during earthquake (tsf)
Sigma' : Effective overburden pressure, during earthquake (tsf)
r_d : Nonlinear shear mass factor
CSR : Cyclic Stress Ratio
MSF : Magnitude Scaling Factor
$CSR_{eq,M=7.5}$ CSR adjusted for M=7.5
K_{sigma} Effective overburden stress factor
CSR^* CSR fully adjusted

:: Cyclic Resistance Ratio calculation $CRR_{7.5}$ ::

Point ID	Field SPT	C_n	C_e	C_b	C_r	C_s	$N_{1(60)}$	DeltaN	$N_{1(60)cs}$	$CRR_{7.5}$
1	31.90	1.70	1.45	1.05	0.75	1.20	74.31	19.86	94.17	2.00
2	35.80	1.70	1.45	1.05	0.80	1.20	88.95	4.36	93.31	2.00
3	19.50	1.57	1.45	1.05	0.85	1.20	47.55	6.90	54.45	2.00
4	28.60	1.18	1.45	1.05	0.95	1.20	58.74	1.56	60.30	2.00
5	31.90	1.05	1.45	1.05	0.95	1.20	58.14	1.03	59.17	2.00
6	37.70	0.96	1.45	1.05	1.00	1.20	65.89	1.13	67.02	2.00
7	41.60	0.88	1.45	1.05	1.00	1.20	67.22	1.15	68.37	2.00
8	61.10	0.83	1.45	1.05	1.00	1.20	92.26	1.46	93.72	2.00
9	31.90	0.78	1.45	1.05	1.00	1.20	45.38	0.87	46.25	2.00
10	34.00	0.74	1.45	1.05	1.00	1.20	45.85	0.88	46.73	2.00

:: Cyclic Resistance Ratio calculation $CRR_{7.5}$ ::

Point ID	Field SPT	C_n	C_e	C_b	C_r	C_s	$N_{1(60)}$	DeltaN	$N_{1(60)cs}$	$CRR_{7.5}$

C_n : Overburden corretion factor
C_e : Energy correction factor
C_b : Borehole diameter correction factor
C_r : Rod length correction factor
C_s : Liner correction factor
$N_{1(60)}$: Corrected N_{SPT}
DeltaN : Addition to corrected N_{SPT} value due to the presence of fines
$N_{1(60)cs}$: Corected $N_{1(60)}$ value for fines
$CRR_{7.5)}$: Cyclic resistance ratio for M=7.5

:: Settlements calculation for saturated sands ::

Point ID	$N_{1(60)}$	N_1	FS_L	e_v (%)	Settle. (in)
1	94.17	78.48	3.92	0.00	0.00
2	93.31	77.76	4.49	0.00	0.00
3	54.45	45.37	4.78	0.00	0.00
4	60.30	50.25	5.00	0.00	0.00
5	59.17	49.31	5.00	0.00	0.00
6	67.02	55.85	5.00	0.00	0.00
7	68.37	56.97	5.00	0.00	0.00
8	93.72	78.10	5.00	0.00	0.00
9	46.25	38.54	5.00	0.00	0.00
10	46.73	38.94	5.00	0.00	0.00

Total settlement : 0.00

$N_{1,(60)}$: Stress normalized and corrected SPT blow count
N_1: Japanese equivalent corrected value
FS_L: Calculated factor of safety
e_v: Post-liquefaction volumentric strain (%)
Settle.: Calculated settlement (in)

:: Liquefaction potential according to Iwasaki ::

Point ID	F	w_z	I_L
1	0.00	9.62	0.00
2	0.00	9.16	0.00
3	0.00	8.10	0.00
4	0.00	6.88	0.00
5	0.00	6.11	0.00
6	0.00	5.35	0.00
7	0.00	4.59	0.00
8	0.00	3.83	0.00
9	0.00	3.07	0.00
10	0.00	2.30	0.00

Overall potential I_L : 0.00

I_L = 0.00 - No liquefaction
I_L between 0.00 and 5 - Liquefaction not probable
I_L between 5 and 15 - Liquefaction probable
I_L > 15 - Liquefaction certain

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San Jose, CA 408.440.4542

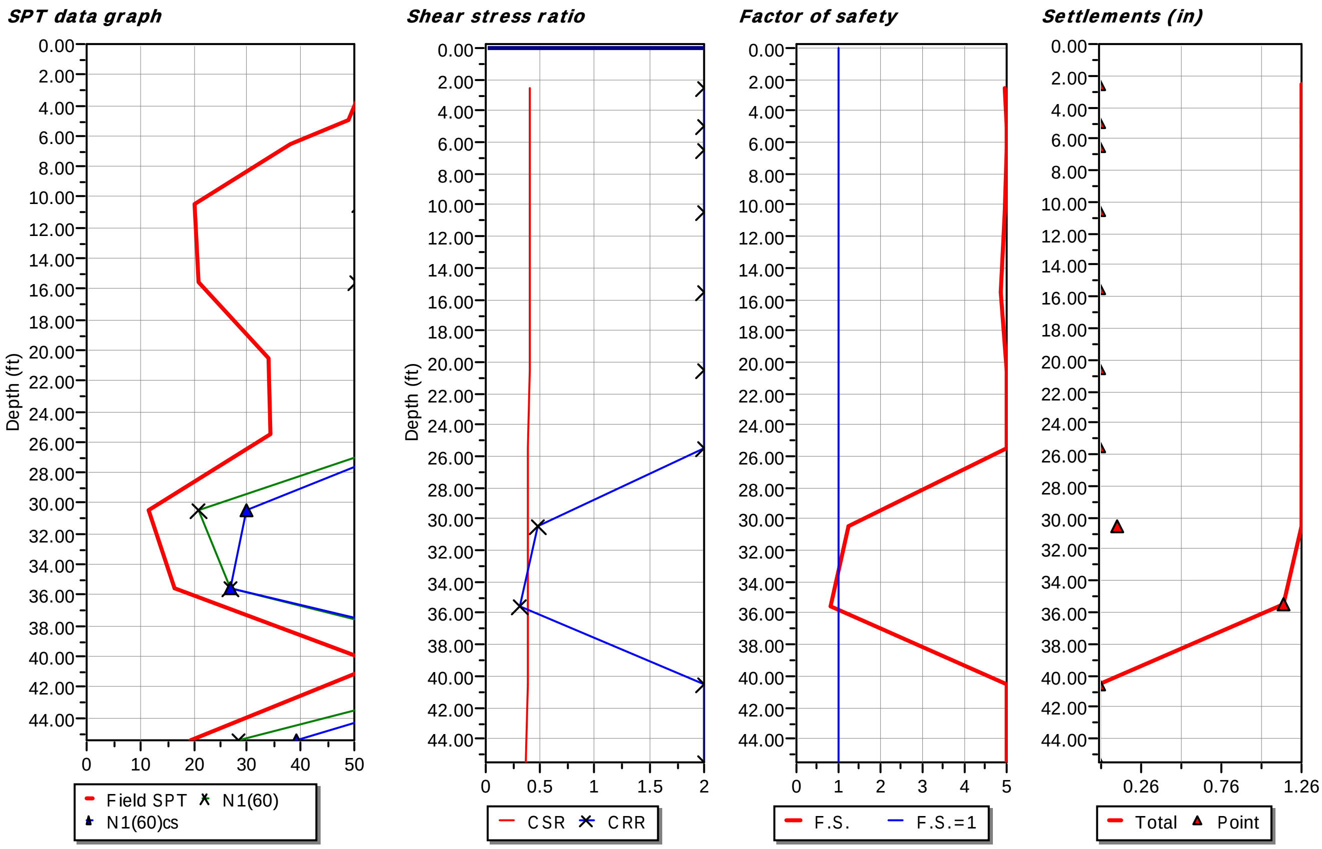
LIQUEFACTION ANALYSIS REPORT

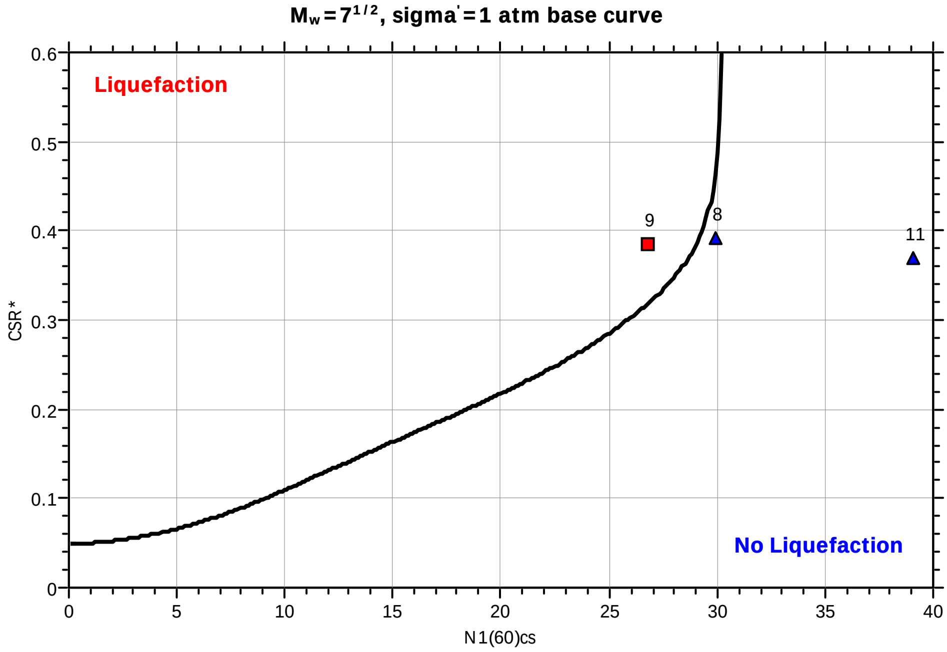
Project title : Almaden Lake Improvements

Project subtitle : LB-4

Input parameters and analysis data

In-situ data type:	Standard Penetration Test	Depth to water table:	0.00 ft
Analysis type:	Deterministic	Earthquake magnitude M_w:	6.82
Analysis method:	NCEER 1998	Peak ground accelaration:	0.44 g
Fines correction method:	Idriss & Seed	User defined F.S.:	1.00





:: Field input data ::

Point ID	Depth (ft)	Field N_{SPT} (blows/feet)	Unit weight (pcf)	Fines content (%)
1	2.50	52.00	140.00	15.00
2	5.00	48.80	140.00	15.00
3	6.50	38.00	135.00	15.00
4	10.50	20.00	130.00	11.00
5	15.50	20.80	124.00	39.00
6	20.50	33.80	139.00	15.00
7	25.50	34.50	146.00	10.00
8	30.50	11.70	128.00	64.00
9	35.50	16.30	137.00	5.00
10	40.50	54.60	140.00	10.00
11	45.50	19.50	128.00	65.00

Depth : Depth from free surface, at which SPT was performed (ft)
Field SPT : SPT blows measured at field (blows/feet)
Unit weight : Bulk unit weight of soil at test depth (pcf)
Fines content : Percentage of fines in soil (%)

:: Cyclic Stress Ratio calculation (CSR fully adjusted and normalized) ::

Point ID	Depth (ft)	Sigma (tsf)	u (tsf)	Sigma' (tsf)	r_d	CSR	MSF	$CSR_{eq,M=7.5}$	K_{sigma}	CSR^*
1	2.50	0.18	0.08	0.10	0.99	0.51	1.28	0.40	1.00	0.40
2	5.00	0.35	0.16	0.19	0.99	0.51	1.28	0.40	1.00	0.40
3	6.50	0.45	0.20	0.25	0.98	0.51	1.28	0.40	1.00	0.40
4	10.50	0.71	0.33	0.38	0.98	0.52	1.28	0.41	1.00	0.41
5	15.50	1.02	0.48	0.54	0.96	0.52	1.28	0.41	1.00	0.41
6	20.50	1.37	0.64	0.73	0.95	0.51	1.28	0.40	1.00	0.40
7	25.50	1.73	0.80	0.94	0.94	0.50	1.28	0.39	1.00	0.39
8	30.50	2.05	0.95	1.10	0.93	0.49	1.28	0.39	0.99	0.39
9	35.50	2.40	1.11	1.29	0.89	0.47	1.28	0.37	0.96	0.39
10	40.50	2.75	1.26	1.48	0.85	0.45	1.28	0.35	0.93	0.38
11	45.50	3.07	1.42	1.65	0.80	0.43	1.28	0.34	0.91	0.37

Depth : Depth from free surface, at which SPT was performed (ft)
Sigma : Total overburden pressure at test point, during earthquake (tsf)
u : Water pressure at test point, during earthquake (tsf)
Sigma' : Effective overburden pressure, during earthquake (tsf)
r_d : Nonlinear shear mass factor
CSR : Cyclic Stress Ratio
MSF : Magnitude Scaling Factor
$CSR_{eq,M=7.5}$ CSR adjusted for M=7.5
K_{sigma} Effective overburden stress factor
CSR^* CSR fully adjusted

:: Cyclic Resistance Ratio calculation $CRR_{7.5}$ ::

Point ID	Field SPT	C_n	C_e	C_b	C_r	C_s	$N_{1(60)}$	DeltaN	$N_{1(60)cs}$	$CRR_{7.5}$
1	52.00	1.70	1.45	1.05	0.75	1.20	121.13	8.32	129.45	2.00
2	48.80	1.70	1.45	1.05	0.80	1.20	121.25	8.33	129.58	2.00
3	38.00	1.70	1.45	1.05	0.80	1.20	94.42	7.04	101.46	2.00
4	20.00	1.65	1.45	1.05	0.85	1.20	51.26	2.57	53.82	2.00
5	20.80	1.39	1.45	1.05	0.95	1.20	50.33	15.07	65.39	2.00
6	33.80	1.20	1.45	1.05	0.95	1.20	70.23	5.88	76.10	2.00
7	34.50	1.06	1.45	1.05	0.95	1.20	63.19	2.24	65.43	2.00
8	11.70	0.97	1.45	1.05	1.00	1.20	20.81	9.16	29.98	0.48
9	16.30	0.90	1.45	1.05	1.00	1.20	26.82	0.00	26.82	0.32
10	54.60	0.84	1.45	1.05	1.00	1.20	83.74	2.68	86.42	2.00
11	19.50	0.80	1.45	1.05	1.00	1.20	28.38	10.68	39.05	2.00

:: Cyclic Resistance Ratio calculation $CRR_{7.5}$ ::

Point ID	Field SPT	C_n	C_e	C_b	C_r	C_s	$N_{1(60)}$	DeltaN	$N_{1(60)cs}$	$CRR_{7.5}$

C_n : Overburden corretion factor
C_e : Energy correction factor
C_b : Borehole diameter correction factor
C_r : Rod length correction factor
C_s : Liner correction factor
$N_{1(60)}$: Corrected N_{SPT}
DeltaN : Addition to corrected N_{SPT} value due to the presence of fines
$N_{1(60)cs}$: Corected $N_{1(60)}$ value for fines
$CRR_{7.5)}$: Cyclic resistance ratio for M=7.5

:: Settlements calculation for saturated sands ::

Point ID	$N_{1(60)}$	N_1	FS_L	e_v (%)	Settle. (in)
1	129.45	107.88	4.97	0.00	0.00
2	129.58	107.99	5.00	0.00	0.00
3	101.46	84.55	4.98	0.00	0.00
4	53.82	44.85	4.93	0.00	0.00
5	65.39	54.49	4.87	0.00	0.00
6	76.10	63.42	4.99	0.00	0.00
7	65.43	54.52	5.00	0.00	0.00
8	29.98	24.98	1.23	0.19	0.11
9	26.82	22.35	0.83	1.92	1.15
10	86.42	72.02	5.00	0.00	0.00
11	39.05	32.55	5.00	0.00	0.00

Total settlement : 1.26

$N_{1,(60)}$: Stress normalized and corrected SPT blow count
N_1: Japanese equivalent corrected value
FS_L: Calculated factor of safety
e_v: Post-liquefaction volumentric strain (%)
Settle.: Calculated settlement (in)

:: Liquefaction potential according to Iwasaki ::

Point ID	F	w_z	I_L
1	0.00	9.62	0.00
2	0.00	9.24	0.00
3	0.00	9.01	0.00
4	0.00	8.40	0.00
5	0.00	7.64	0.00
6	0.00	6.88	0.00
7	0.00	6.11	0.00
8	0.00	5.35	0.00
9	0.17	4.59	1.21
10	0.00	3.83	0.00
11	0.00	3.07	0.00

Overall potential I_L : 1.21

I_L = 0.00 - No liquefaction
I_L between 0.00 and 5 - Liquefaction not probable
I_L between 5 and 15 - Liquefaction probable
I_L > 15 - Liquefaction certain

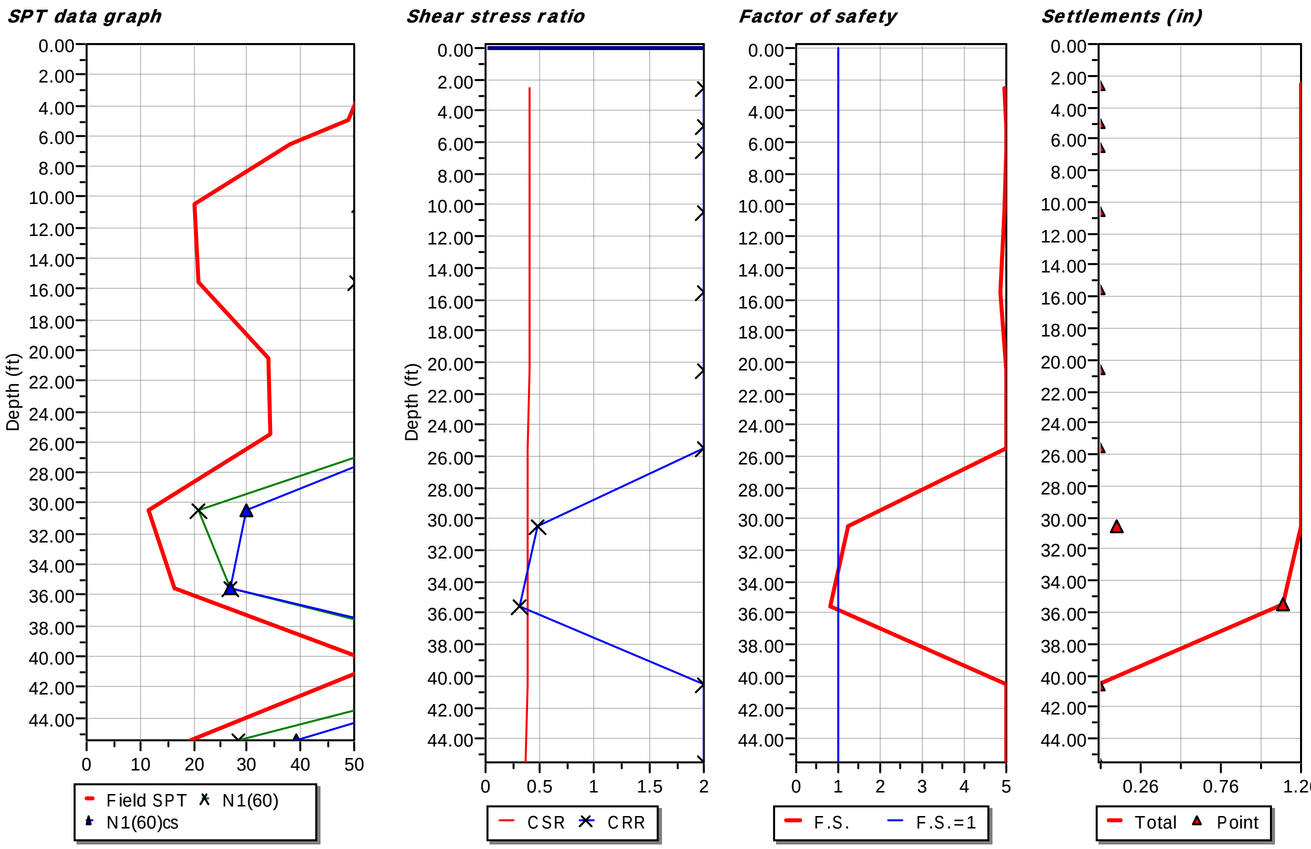
LIQUEFACTION ANALYSIS REPORT

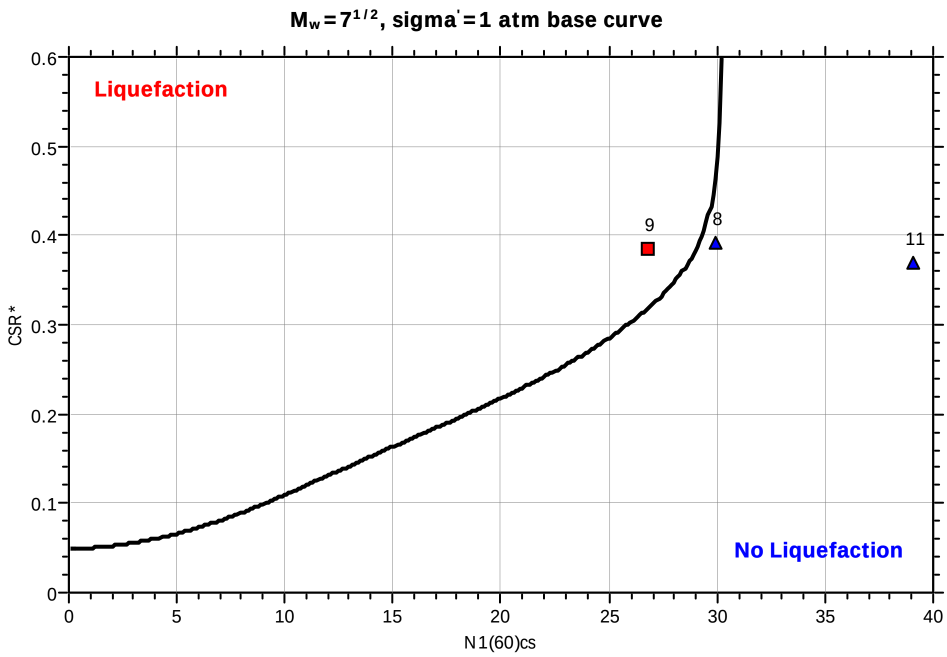
Project title : Almaden Lake Improvements

Project subtitle : LB-4

Input parameters and analysis data

In-situ data type:	Standard Penetration Test	Depth to water table:	0.00 ft
Analysis type:	Deterministic	Earthquake magnitude M_w:	6.82
Analysis method:	NCEER 1998	Peak ground accelaration:	0.44 g
Fines correction method:	Idriss & Seed	User defined F.S.:	1.00





:: Field input data ::

Point ID	Depth (ft)	Field N_{SPT} (blows/feet)	Unit weight (pcf)	Fines content (%)
1	2.50	52.00	140.00	15.00
2	5.00	48.80	140.00	15.00
3	6.50	38.00	135.00	15.00
4	10.50	20.00	130.00	11.00
5	15.50	20.80	124.00	39.00
6	20.50	33.80	139.00	15.00
7	25.50	34.50	146.00	10.00
8	30.50	11.70	128.00	64.00
9	35.50	16.30	137.00	5.00
10	40.50	54.60	140.00	10.00
11	45.50	19.50	128.00	65.00

Depth : Depth from free surface, at which SPT was performed (ft)
Field SPT : SPT blows measured at field (blows/feet)
Unit weight : Bulk unit weight of soil at test depth (pcf)
Fines content : Percentage of fines in soil (%)

:: Cyclic Stress Ratio calculation (CSR fully adjusted and normalized) ::

Point ID	Depth (ft)	Sigma (tsf)	u (tsf)	Sigma' (tsf)	r_d	CSR	MSF	$CSR_{eq,M=7.5}$	K_{sigma}	CSR^*
1	2.50	0.18	0.08	0.10	0.99	0.51	1.28	0.40	1.00	0.40
2	5.00	0.35	0.16	0.19	0.99	0.51	1.28	0.40	1.00	0.40
3	6.50	0.45	0.20	0.25	0.98	0.51	1.28	0.40	1.00	0.40
4	10.50	0.71	0.33	0.38	0.98	0.52	1.28	0.41	1.00	0.41
5	15.50	1.02	0.48	0.54	0.96	0.52	1.28	0.41	1.00	0.41
6	20.50	1.37	0.64	0.73	0.95	0.51	1.28	0.40	1.00	0.40
7	25.50	1.73	0.80	0.94	0.94	0.50	1.28	0.39	1.00	0.39
8	30.50	2.05	0.95	1.10	0.93	0.49	1.28	0.39	0.99	0.39
9	35.50	2.40	1.11	1.29	0.89	0.47	1.28	0.37	0.96	0.39
10	40.50	2.75	1.26	1.48	0.85	0.45	1.28	0.35	0.93	0.38
11	45.50	3.07	1.42	1.65	0.80	0.43	1.28	0.34	0.91	0.37

Depth : Depth from free surface, at which SPT was performed (ft)
Sigma : Total overburden pressure at test point, during earthquake (tsf)
u : Water pressure at test point, during earthquake (tsf)
Sigma' : Effective overburden pressure, during earthquake (tsf)
r_d : Nonlinear shear mass factor
CSR : Cyclic Stress Ratio
MSF : Magnitude Scaling Factor
$CSR_{eq,M=7.5}$ CSR adjusted for M=7.5
K_{sigma} Effective overburden stress factor
CSR^* CSR fully adjusted

:: Cyclic Resistance Ratio calculation $CRR_{7.5}$ ::

Point ID	Field SPT	C_n	C_e	C_b	C_r	C_s	$N_{1(60)}$	DeltaN	$N_{1(60)cs}$	$CRR_{7.5}$
1	52.00	1.70	1.45	1.05	0.75	1.20	121.13	8.32	129.45	2.00
2	48.80	1.70	1.45	1.05	0.80	1.20	121.25	8.33	129.58	2.00
3	38.00	1.70	1.45	1.05	0.80	1.20	94.42	7.04	101.46	2.00
4	20.00	1.65	1.45	1.05	0.85	1.20	51.26	2.57	53.82	2.00
5	20.80	1.39	1.45	1.05	0.95	1.20	50.33	15.07	65.39	2.00
6	33.80	1.20	1.45	1.05	0.95	1.20	70.23	5.88	76.10	2.00
7	34.50	1.06	1.45	1.05	0.95	1.20	63.19	2.24	65.43	2.00
8	11.70	0.97	1.45	1.05	1.00	1.20	20.81	9.16	29.98	0.48
9	16.30	0.90	1.45	1.05	1.00	1.20	26.82	0.00	26.82	0.32
10	54.60	0.84	1.45	1.05	1.00	1.20	83.74	2.68	86.42	2.00
11	19.50	0.80	1.45	1.05	1.00	1.20	28.38	10.68	39.05	2.00

:: Cyclic Resistance Ratio calculation $CRR_{7.5}$ ::

Point ID	Field SPT	C_n	C_e	C_b	C_r	C_s	$N_{1(60)}$	DeltaN	$N_{1(60)cs}$	$CRR_{7.5}$

C_n :	Overburden corretion factor
C_e :	Energy correction factor
C_b :	Borehole diameter correction factor
C_r :	Rod length correction factor
C_s :	Liner correction factor
$N_{1(60)}$:	Corrected N_{SPT}
DeltaN :	Addition to corrected N_{SPT} value due to the presence of fines
$N_{1(60)cs}$:	Corected $N_{1(60)}$ value for fines
$CRR_{7.5)}$:	Cyclic resistance ratio for M=7.5

:: Settlements calculation for saturated sands ::

Point ID	$N_{1(60)}$	N_1	FS_L	e_v (%)	Settle. (in)
1	129.45	107.88	4.97	0.00	0.00
2	129.58	107.99	5.00	0.00	0.00
3	101.46	84.55	4.98	0.00	0.00
4	53.82	44.85	4.93	0.00	0.00
5	65.39	54.49	4.87	0.00	0.00
6	76.10	63.42	4.99	0.00	0.00
7	65.43	54.52	5.00	0.00	0.00
8	29.98	24.98	1.23	0.19	0.11
9	26.82	22.35	0.83	1.92	1.15
10	86.42	72.02	5.00	0.00	0.00
11	39.05	32.55	5.00	0.00	0.00

Total settlement : 1.26

$N_{1,(60)}$:	Stress normalized and corrected SPT blow count
N_1:	Japanese equivalent corrected value
FS_L:	Calculated factor of safety
e_v:	Post-liquefaction volumentric strain (%)
Settle.:	Calculated settlement (in)

:: Liquefaction potential according to Iwasaki ::

Point ID	F	w_z	I_L
1	0.00	9.62	0.00
2	0.00	9.24	0.00
3	0.00	9.01	0.00
4	0.00	8.40	0.00
5	0.00	7.64	0.00
6	0.00	6.88	0.00
7	0.00	6.11	0.00
8	0.00	5.35	0.00
9	0.17	4.59	1.21
10	0.00	3.83	0.00
11	0.00	3.07	0.00

Overall potential I_L : 1.21

I_L = 0.00 - No liquefaction
I_L between 0.00 and 5 - Liquefaction not probable
I_L between 5 and 15 - Liquefaction probable
I_L > 15 - Liquefaction certain

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San Jose, CA 408.440.4542

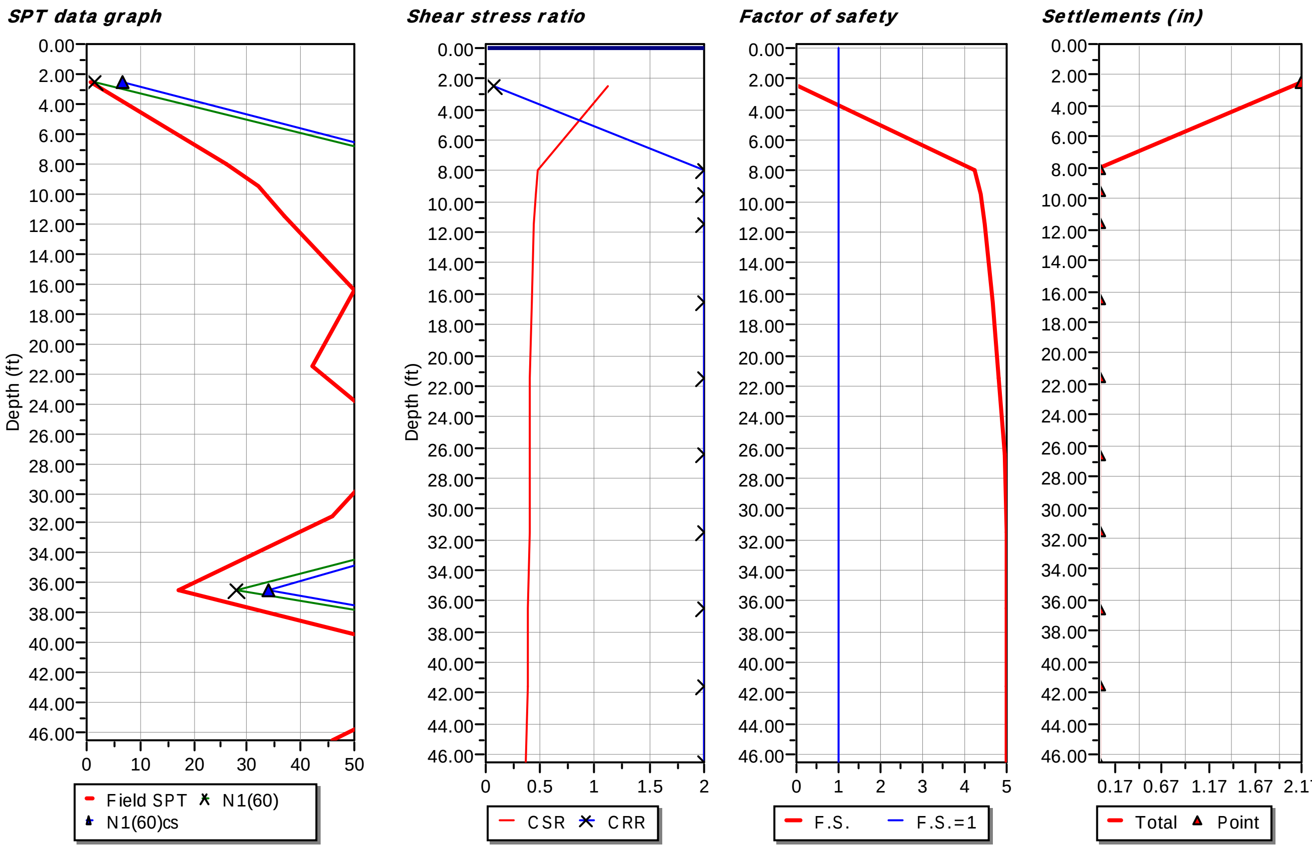
LIQUEFACTION ANALYSIS REPORT

Project title : Almaden Lake Improvements

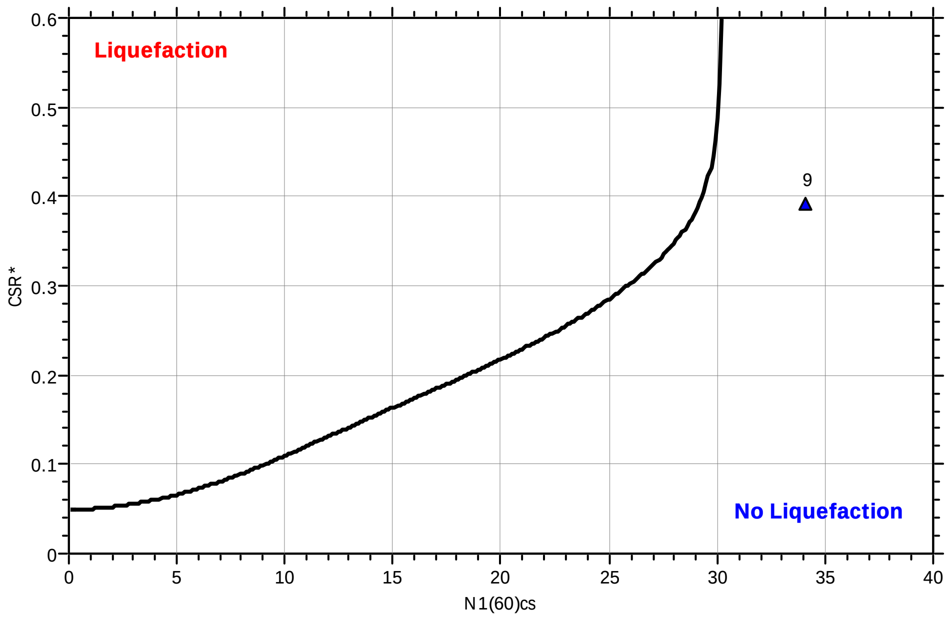
Project subtitle : WB-1

Input parameters and analysis data

In-situ data type:	Standard Penetration Test	Depth to water table:	0.00 ft
Analysis type:	Deterministic	Earthquake magnitude M_w:	6.82
Analysis method:	NCEER 1998	Peak ground accelaration:	0.44 g
Fines correction method:	Idriss & Seed	User defined F.S.:	1.00



$M_w=7^{1/2}$, sigma'=1 atm base curve



:: Field input data ::

Point ID	Depth (ft)	Field N_{SPT} (blows/feet)	Unit weight (pcf)	Fines content (%)
1	2.50	0.65	78.00	80.00
2	8.00	26.00	135.00	10.00
3	9.50	32.00	135.00	11.00
4	11.50	37.00	135.00	9.00
5	16.50	50.00	135.00	9.00
6	21.50	42.00	135.00	13.00
7	26.50	59.00	135.00	7.00
8	31.50	46.00	135.00	7.00
9	36.50	17.00	130.00	21.00
10	41.50	74.00	135.00	7.00
11	46.50	46.00	135.00	7.00

Depth : Depth from free surface, at which SPT was performed (ft)
Field SPT : SPT blows measured at field (blows/feet)
Unit weight : Bulk unit weight of soil at test depth (pcf)
Fines content : Percentage of fines in soil (%)

:: Cyclic Stress Ratio calculation (CSR fully adjusted and normalized) ::

Point ID	Depth (ft)	Sigma (tsf)	u (tsf)	Sigma' (tsf)	r_d	CSR	MSF	$CSR_{eq,M=7.5}$	K_{sigma}	CSR^*
1	2.50	0.10	0.08	0.02	0.99	1.43	1.28	1.12	1.00	1.12
2	8.00	0.47	0.25	0.22	0.98	0.60	1.28	0.47	1.00	0.47
3	9.50	0.57	0.30	0.27	0.98	0.58	1.28	0.46	1.00	0.46
4	11.50	0.71	0.36	0.35	0.97	0.57	1.28	0.44	1.00	0.44
5	16.50	1.04	0.52	0.53	0.96	0.54	1.28	0.43	1.00	0.43
6	21.50	1.38	0.67	0.71	0.95	0.53	1.28	0.41	1.00	0.41
7	26.50	1.72	0.83	0.89	0.94	0.52	1.28	0.41	1.00	0.41
8	31.50	2.06	0.98	1.07	0.92	0.50	1.28	0.40	0.99	0.40
9	36.50	2.38	1.14	1.24	0.88	0.48	1.28	0.38	0.97	0.39
10	41.50	2.72	1.30	1.42	0.84	0.46	1.28	0.36	0.94	0.38
11	46.50	3.06	1.45	1.60	0.80	0.43	1.28	0.34	0.92	0.37

Depth : Depth from free surface, at which SPT was performed (ft)
Sigma : Total overburden pressure at test point, during earthquake (tsf)
u : Water pressure at test point, during earthquake (tsf)
Sigma' : Effective overburden pressure, during earthquake (tsf)
r_d : Nonlinear shear mass factor
CSR : Cyclic Stress Ratio
MSF : Magnitude Scaling Factor
$CSR_{eq,M=7.5}$ CSR adjusted for M=7.5
K_{sigma} Effective overburden stress factor
CSR^* CSR fully adjusted

:: Cyclic Resistance Ratio calculation $CRR_{7.5}$ ::

Point ID	Field SPT	C_n	C_e	C_b	C_r	C_s	$N_{1(60)}$	DeltaN	$N_{1(60)cs}$	$CRR_{7.5}$
1	0.65	1.70	1.42	1.05	0.75	1.20	1.48	5.30	6.78	0.08
2	26.00	1.70	1.42	1.05	0.80	1.20	63.27	2.24	65.50	2.00
3	32.00	1.70	1.42	1.05	0.85	1.20	82.73	3.40	86.13	2.00
4	37.00	1.70	1.42	1.05	0.85	1.20	95.66	2.18	97.84	2.00
5	50.00	1.41	1.42	1.05	0.95	1.20	119.59	2.59	122.18	2.00
6	42.00	1.21	1.42	1.05	0.95	1.20	86.65	5.08	91.74	2.00
7	59.00	1.08	1.42	1.05	0.95	1.20	108.62	1.05	109.66	2.00
8	46.00	0.99	1.42	1.05	1.00	1.20	81.25	0.81	82.06	2.00
9	17.00	0.92	1.42	1.05	1.00	1.20	27.91	6.18	34.09	2.00
10	74.00	0.86	1.42	1.05	1.00	1.20	113.47	1.09	114.55	2.00
11	46.00	0.81	1.42	1.05	1.00	1.20	66.42	0.69	67.11	2.00

:: Cyclic Resistance Ratio calculation $CRR_{7.5}$ ::

Point ID	Field SPT	C_n	C_e	C_b	C_r	C_s	$N_{1(60)}$	DeltaN	$N_{1(60)cs}$	$CRR_{7.5}$

C_n : Overburden corretion factor
C_e : Energy correction factor
C_b : Borehole diameter correction factor
C_r : Rod length correction factor
C_s : Liner correction factor
$N_{1(60)}$: Corrected N_{SPT}
DeltaN : Addition to corrected N_{SPT} value due to the presence of fines
$N_{1(60)cs}$: Corected $N_{1(60)}$ value for fines
$CRR_{7.5)}$: Cyclic resistance ratio for M=7.5

:: Settlements calculation for saturated sands ::

Point ID	$N_{1(60)}$	N_1	FS_L	e_v (%)	Settle. (in)
1	6.78	5.65	0.07	4.53	2.17
2	65.50	54.59	4.24	0.00	0.00
3	86.13	71.78	4.37	0.00	0.00
4	97.84	81.54	4.50	0.00	0.00
5	122.18	101.82	4.69	0.00	0.00
6	91.74	76.45	4.82	0.00	0.00
7	109.66	91.39	4.93	0.00	0.00
8	82.06	68.38	5.00	0.00	0.00
9	34.09	28.41	5.00	0.00	0.00
10	114.55	95.46	5.00	0.00	0.00
11	67.11	55.92	5.00	0.00	0.00

Total settlement : 2.17

$N_{1,(60)}$: Stress normalized and corrected SPT blow count
N_1: Japanese equivalent corrected value
FS_L: Calculated factor of safety
e_v: Post-liquefaction volumentric strain (%)
Settle.: Calculated settlement (in)

:: Liquefaction potential according to Iwasaki ::

Point ID	F	w_z	I_L
1	0.93	9.62	6.81
2	0.00	8.78	0.00
3	0.00	8.55	0.00
4	0.00	8.25	0.00
5	0.00	7.49	0.00
6	0.00	6.72	0.00
7	0.00	5.96	0.00
8	0.00	5.20	0.00
9	0.00	4.44	0.00
10	0.00	3.68	0.00
11	0.00	2.91	0.00

Overall potential I_L : 6.81

I_L = 0.00 - No liquefaction
I_L between 0.00 and 5 - Liquefaction not probable
I_L between 5 and 15 - Liquefaction probable
I_L > 15 - Liquefaction certain

Cal Engineering & Geology
Oakland, CA 510.451.2350
Walnut Creek, CA 925.935.9771
San Jose, CA 408.440.4542

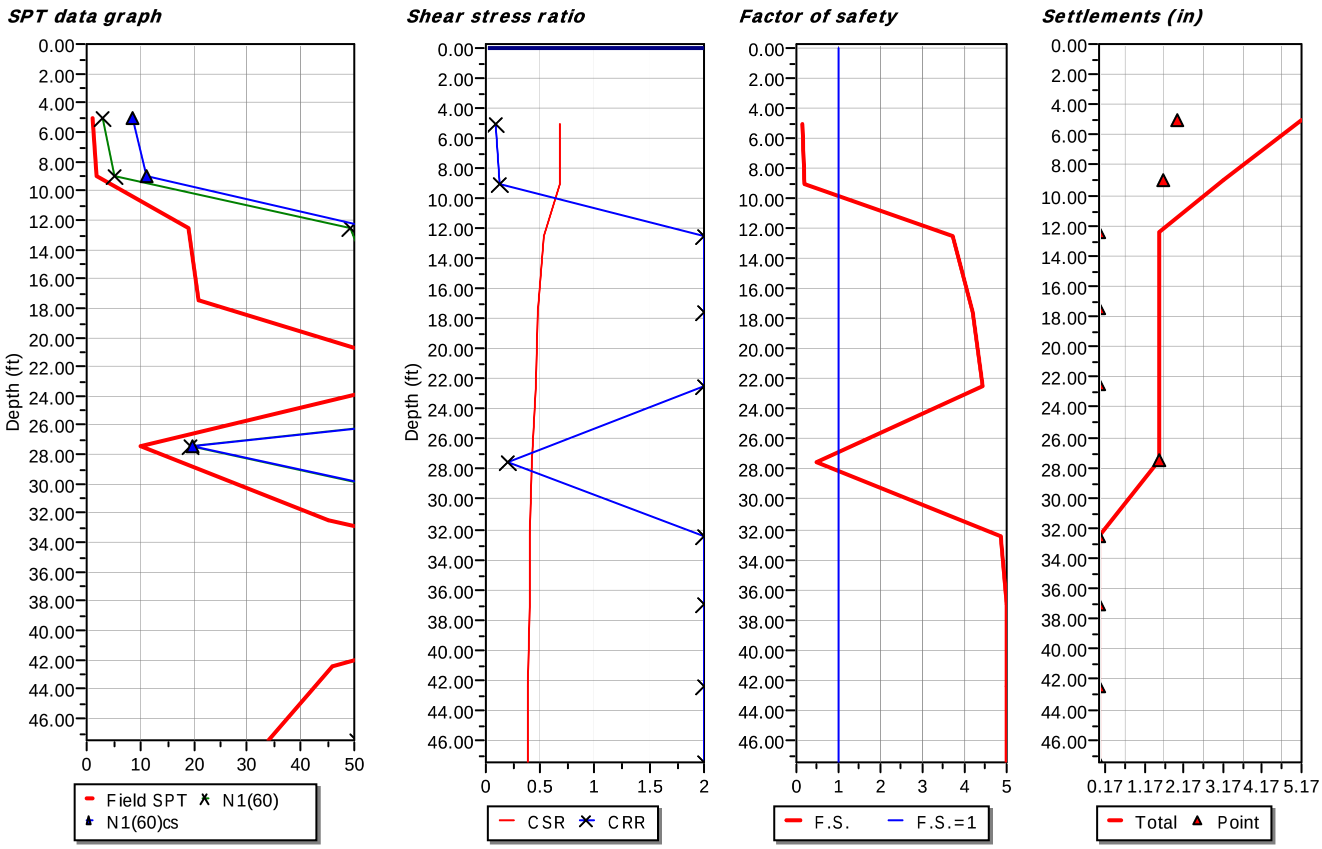
LIQUEFACTION ANALYSIS REPORT

Project title : Almaden Lake Improvements

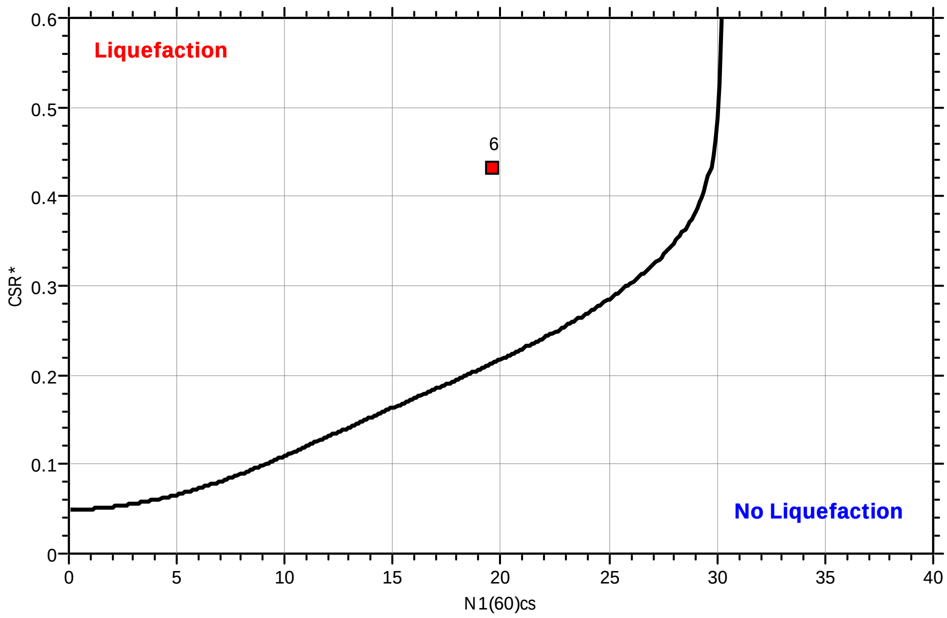
Project subtitle : WB-2

Input parameters and analysis data

In-situ data type:	Standard Penetration Test	Depth to water table:	0.00 ft
Analysis type:	Deterministic	Earthquake magnitude M_w:	6.82
Analysis method:	NCEER 1998	Peak ground accelaration:	0.44 g
Fines correction method:	Idriss & Seed	User defined F.S.:	1.00



$M_w=7^{1/2}$, sigma' = 1 atm base curve



10

:: Field input data ::

Point ID	Depth (ft)	Field N_{SPT} (blows/feet)	Unit weight (pcf)	Fines content (%)
1	5.00	1.25	93.00	42.00
2	9.00	1.95	93.00	90.00
3	12.50	19.00	135.00	14.00
4	17.50	21.00	135.00	22.00
5	22.50	66.00	135.00	6.00
6	27.50	10.00	135.00	7.00
7	32.50	45.00	135.00	7.00
8	37.00	100.00	135.00	7.00
9	42.50	46.00	135.00	9.00
10	47.50	34.00	135.00	10.00

Depth : Depth from free surface, at which SPT was performed (ft)
Field SPT : SPT blows measured at field (blows/feet)
Unit weight : Bulk unit weight of soil at test depth (pcf)
Fines content : Percentage of fines in soil (%)

:: Cyclic Stress Ratio calculation (CSR fully adjusted and normalized) ::

Point ID	Depth (ft)	Sigma (tsf)	u (tsf)	Sigma' (tsf)	r_d	CSR	MSF	$CSR_{eq,M=7.5}$	K_{sigma}	CSR^*
1	5.00	0.23	0.16	0.08	0.99	0.86	1.28	0.67	1.00	0.67
2	9.00	0.42	0.28	0.14	0.98	0.85	1.28	0.67	1.00	0.67
3	12.50	0.65	0.39	0.26	0.97	0.69	1.28	0.54	1.00	0.54
4	17.50	0.99	0.55	0.45	0.96	0.61	1.28	0.48	1.00	0.48
5	22.50	1.33	0.70	0.63	0.95	0.57	1.28	0.45	1.00	0.45
6	27.50	1.67	0.86	0.81	0.94	0.55	1.28	0.43	1.00	0.43
7	32.50	2.00	1.01	0.99	0.91	0.53	1.28	0.41	1.00	0.41
8	37.00	2.31	1.16	1.15	0.87	0.50	1.28	0.39	0.98	0.40
9	42.50	2.68	1.33	1.35	0.83	0.47	1.28	0.37	0.95	0.39
10	47.50	3.02	1.48	1.53	0.79	0.44	1.28	0.35	0.93	0.38

Depth : Depth from free surface, at which SPT was performed (ft)
Sigma : Total overburden pressure at test point, during earthquake (tsf)
u : Water pressure at test point, during earthquake (tsf)
Sigma' : Effective overburden pressure, during earthquake (tsf)
r_d : Nonlinear shear mass factor
CSR : Cyclic Stress Ratio
MSF : Magnitude Scaling Factor
$CSR_{eq,M=7.5}$ CSR adjusted for M=7.5
K_{sigma} Effective overburden stress factor
CSR^* CSR fully adjusted

:: Cyclic Resistance Ratio calculation $CRR_{7.5}$ ::

Point ID	Field SPT	C_n	C_e	C_b	C_r	C_s	$N_{1(60)}$	DeltaN	$N_{1(60)cs}$	$CRR_{7.5}$
1	1.25	1.70	1.42	1.05	0.80	1.20	3.04	5.61	8.65	0.10
2	1.95	1.70	1.42	1.05	0.85	1.20	5.04	6.01	11.05	0.12
3	19.00	1.70	1.42	1.05	0.85	1.20	49.12	4.29	53.41	2.00
4	21.00	1.53	1.42	1.05	0.95	1.20	54.63	9.02	63.64	2.00
5	66.00	1.29	1.42	1.05	0.95	1.20	144.74	0.71	145.45	2.00
6	10.00	1.14	1.42	1.05	0.95	1.20	19.32	0.28	19.60	0.21
7	45.00	1.03	1.42	1.05	1.00	1.20	82.69	0.82	83.51	2.00
8	100.00	0.95	1.42	1.05	1.00	1.20	170.25	1.57	171.82	2.00
9	46.00	0.88	1.42	1.05	1.00	1.20	72.31	1.79	74.09	2.00
10	34.00	0.82	1.42	1.05	1.00	1.20	50.19	1.95	52.14	2.00

:: Cyclic Resistance Ratio calculation $CRR_{7.5}$ ::

Point ID	Field SPT	C_n	C_e	C_b	C_r	C_s	$N_{1(60)}$	DeltaN	$N_{1(60)cs}$	$CRR_{7.5}$

C_n : Overburden corretion factor
C_e : Energy correction factor
C_b : Borehole diameter correction factor
C_r : Rod length correction factor
C_s : Liner correction factor
$N_{1(60)}$: Corrected N_{SPT}
DeltaN : Addition to corrected N_{SPT} value due to the presence of fines
$N_{1(60)cs}$: Corected $N_{1(60)}$ value for fines
$CRR_{7.5)}$: Cyclic resistance ratio for M=7.5

:: Settlements calculation for saturated sands ::

Point ID	$N_{1(60)}$	N_1	FS_L	e_v (%)	Settle. (in)
1	8.65	7.21	0.14	4.13	1.98
2	11.05	9.21	0.18	3.68	1.66
3	53.41	44.51	3.71	0.00	0.00
4	63.64	53.03	4.18	0.00	0.00
5	145.45	121.21	4.44	0.00	0.00
6	19.60	16.33	0.49	2.55	1.53
7	83.51	69.59	4.84	0.00	0.00
8	171.82	143.18	5.00	0.00	0.00
9	74.09	61.75	5.00	0.00	0.00
10	52.14	43.45	5.00	0.00	0.00

Total settlement : 5.17

$N_{1,(60)}$: Stress normalized and corrected SPT blow count
N_1: Japanese equivalent corrected value
FS_L: Calculated factor of safety
e_v: Post-liquefaction volumentric strain (%)
Settle.: Calculated settlement (in)

:: Liquefaction potential according to Iwasaki ::

Point ID	F	w_z	I_L
1	0.86	9.24	12.08
2	0.82	8.63	8.62
3	0.00	8.10	0.00
4	0.00	7.33	0.00
5	0.00	6.57	0.00
6	0.51	5.81	4.49
7	0.00	5.05	0.00
8	0.00	4.36	0.00
9	0.00	3.52	0.00
10	0.00	2.76	0.00

Overall potential I_L : 25.19

I_L = 0.00 - No liquefaction
I_L between 0.00 and 5 - Liquefaction not probable
I_L between 5 and 15 - Liquefaction probable
I_L > 15 - Liquefaction certain

APPENDIX D

Seepage Evaluation

CE&G
Cal Engineering & Geology

DOCUMENT REVIEW COVER SHEET

1. Project Name Almaden Lake Improvement Project	2. Project Number 140540
3. Document Title Appendix D Seepage Analysis	
4. Document Status Designation ☐ Preliminary ☒ Final ☐ Cancelled	
5. Notes/Comments The purpose of this calculation is to perform a steady state seepage analysis assuming the 100-year flood condition to detemine the critical exit gradient is in conformance with USACE guidelines (USACE, 2000).	

Attachments	Total No. of Pages
Seepage Analysis for Alternative 6 station 2+50 section	2
Seepage Analysis for Alternative 7 station 10+00 section	2
Seepage Analysis For Alternative 7 Station 12+00 Section	2

RECORD OF REVISIONS

6. No.	7. Reason For Revision	8. Tot. Pgs	10. Originator (Print/Sign/Date)	11. Checker (Print/Sign/Date)	12. QA/QC (Print/Sign/Date)	13. Apprvd./Accptd (Print/Sign)	14. Date (M/D/YY)
1	Final Issue	6	Eli Zane	Dan Peluso	Dan Peluso	Dan Peluso	4/30/15

Almaden Lake Improvements Project
Alternative 6 Station 2+50
Steady Seepage HWSE on Creek Side
Exit Gradient at Toe = 0.38

Name: Levee Fill
Model: Saturated / Unsaturated
K-Function: Levee Fill
Ky'/Kx' Ratio: 0.25

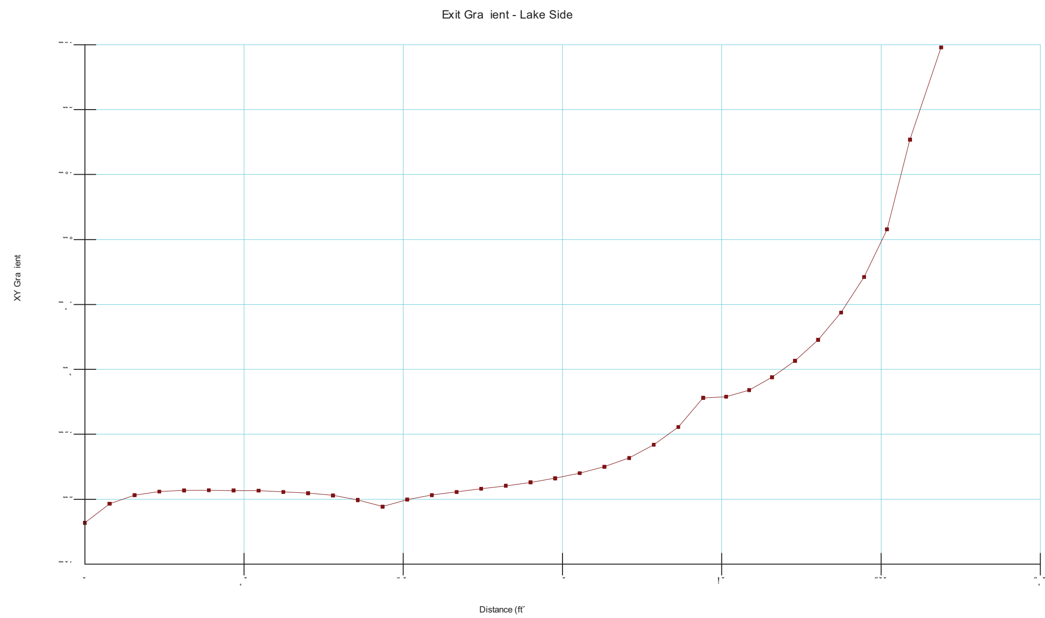
Name: Clay Cap
Model: Saturated / Unsaturated
K-Function: Clay Cap
Ky'/Kx' Ratio: 0.25

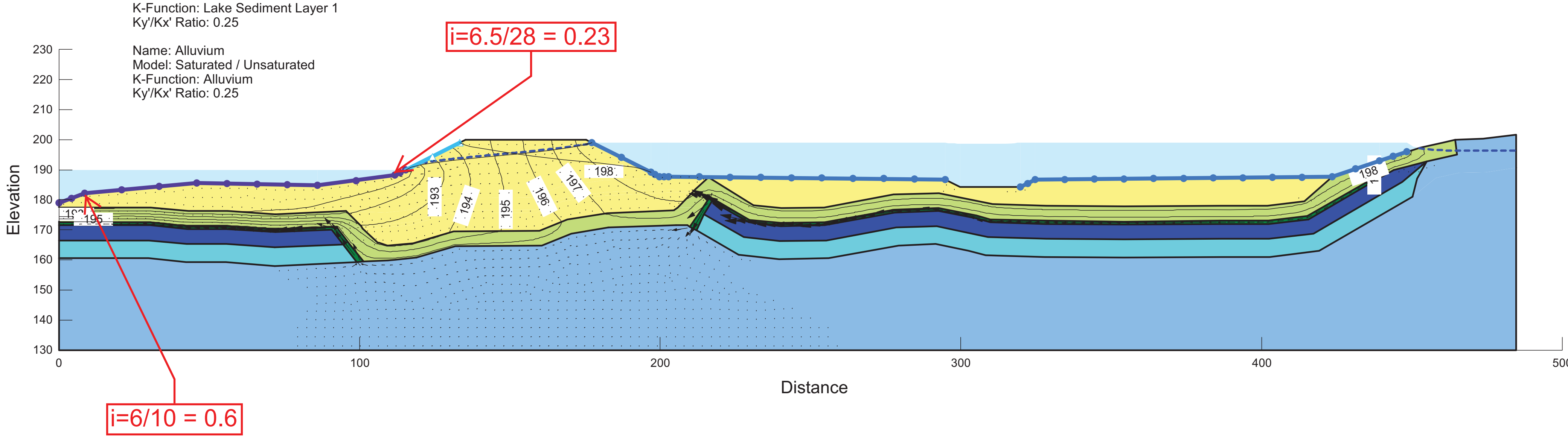
Name: Class 2 AB
Model: Saturated / Unsaturated
K-Function: Class 2 AB
Ky'/Kx' Ratio: 0.25

Name: Lake Sediment Layer 2
Model: Saturated / Unsaturated
K-Function: Lake Sediment Layer 2
Ky'/Kx' Ratio: 0.25

Name: Lake Sediment Layer 1
Model: Saturated / Unsaturated
K-Function: Lake Sediment Layer 1
Ky'/Kx' Ratio: 0.25

Name: Alluvium
Model: Saturated / Unsaturated
K-Function: Alluvium
Ky'/Kx' Ratio: 0.25





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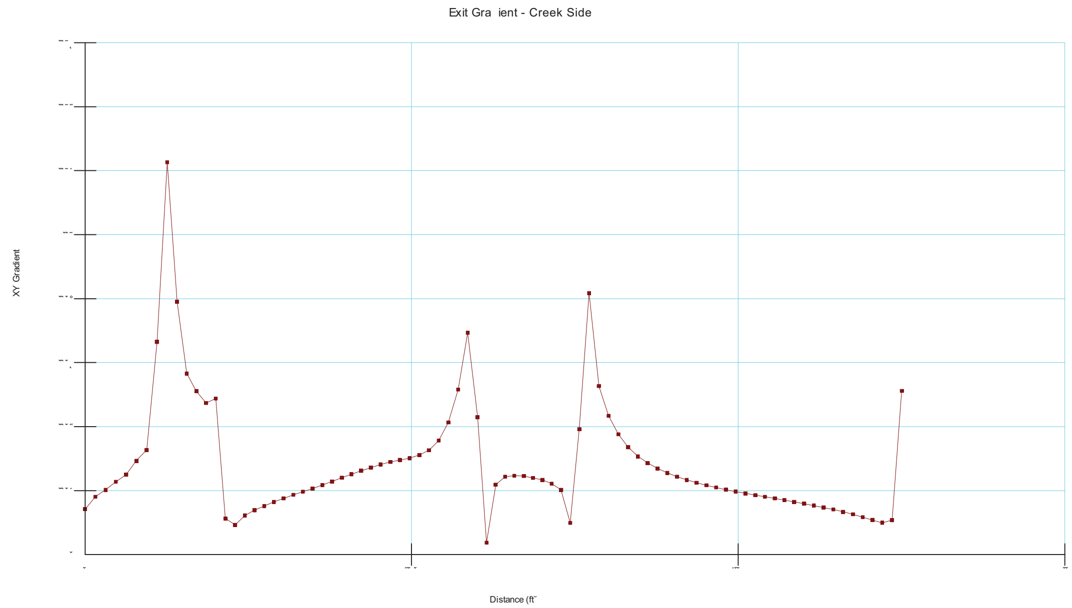


Almaden Lake Improvements Project
Alternative 6 Station 2+50
Steady Seepage HWSE on Lake Side
Exit Gradient at Toe = 0.12

Name: Levee Fill
Model: Saturated / Unsaturated
K-Function: Levee Fill
Ky'/Kx' Ratio: 0.25

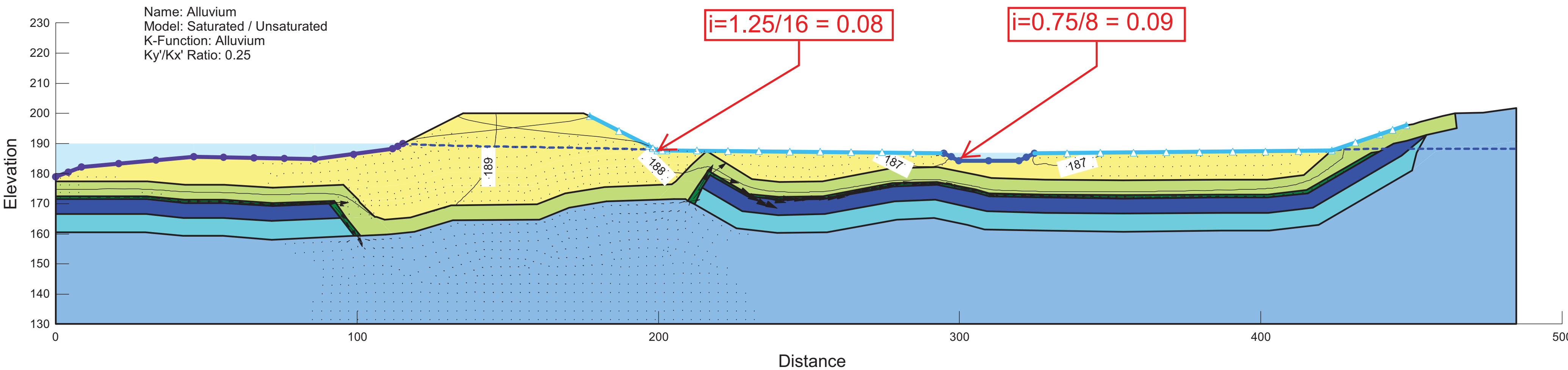
Name: Clay Cap
Model: Saturated / Unsaturated
K-Function: Clay Cap
Ky'/Kx' Ratio: 0.25

Name: Class 2 AB
Model: Saturated / Unsaturated
K-Function: Class 2 AB
Ky'/Kx' Ratio: 0.25

Name: Lake Sediment Layer 2
Model: Saturated / Unsaturated
K-Function: Lake Sediment Layer 2
Ky'/Kx' Ratio: 0.25

Name: Lake Sediment Layer 1
Model: Saturated / Unsaturated
K-Function: Lake Sediment Layer 1
Ky'/Kx' Ratio: 0.25

Name: Alluvium
Model: Saturated / Unsaturated
K-Function: Alluvium
Ky'/Kx' Ratio: 0.25



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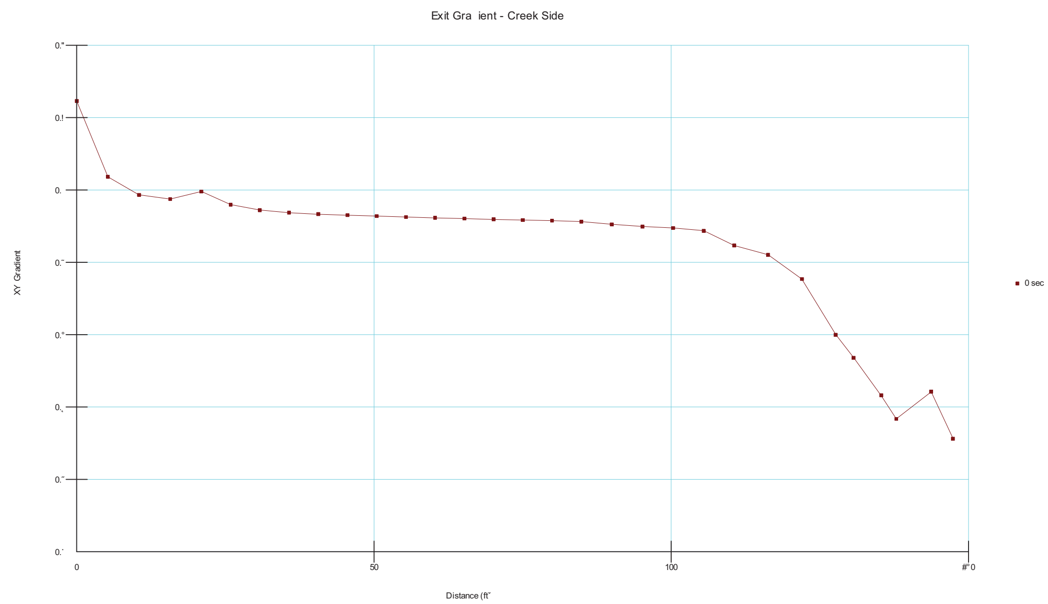


Almaden Lake Improvements Project
Alternative 7 Station 10+00
Steady Seepage HWSE on Creek Side
Exit Gradient at Toe = 0.42

Name: Levee Fill
Model: Saturated / Unsaturated
K-Function: Levee Fill
Ky'/Kx' Ratio: 0.25

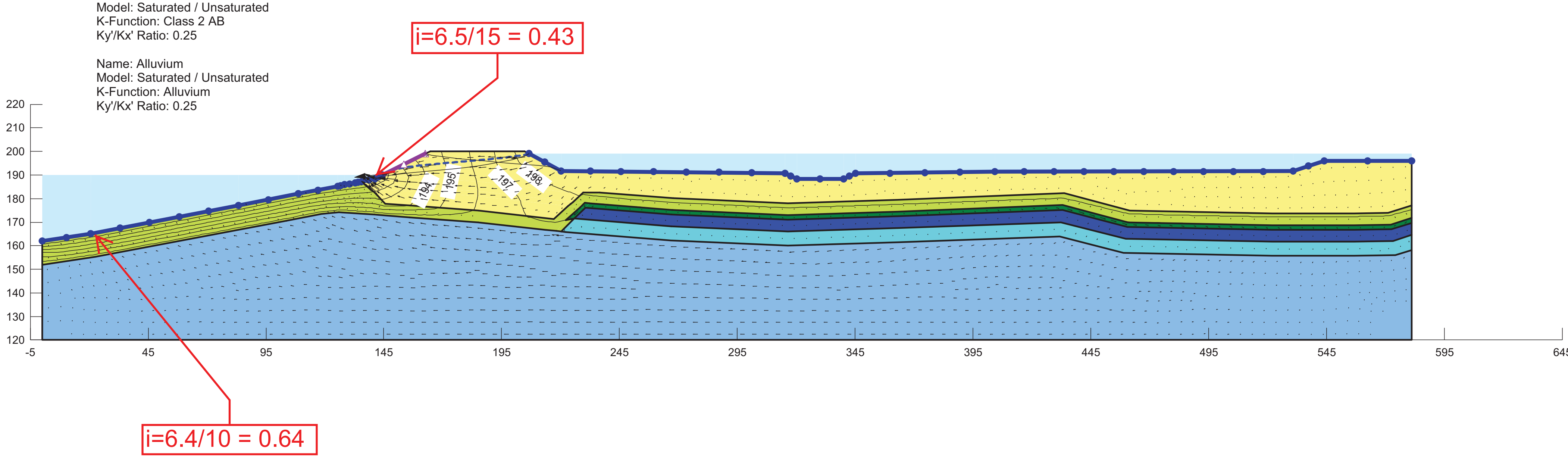
Name: Lake Sediment Layer 2
Model: Saturated / Unsaturated
K-Function: Lake Sediment Layer 2
Ky'/Kx' Ratio: 0.25

Name: Lake Sediment Layer 1
Model: Saturated / Unsaturated
K-Function: Lake Sediment Layer 1
Ky'/Kx' Ratio: 0.25

Name: Clay Cap
Model: Saturated / Unsaturated
K-Function: Clay Cap
Ky'/Kx' Ratio: 0.25

Name: Class 2 AB
Model: Saturated / Unsaturated
K-Function: Class 2 AB
Ky'/Kx' Ratio: 0.25

Name: Alluvium
Model: Saturated / Unsaturated
K-Function: Alluvium
Ky'/Kx' Ratio: 0.25



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Alternative 7 Station 10+00
Steady Seepage HWSE on Lake Side
Exit Gradient at Toe = 0.01

Name: Levee Fill
Model: Saturated / Unsaturated
K-Function: Levee Fill
Ky'/Kx' Ratio: 0.25

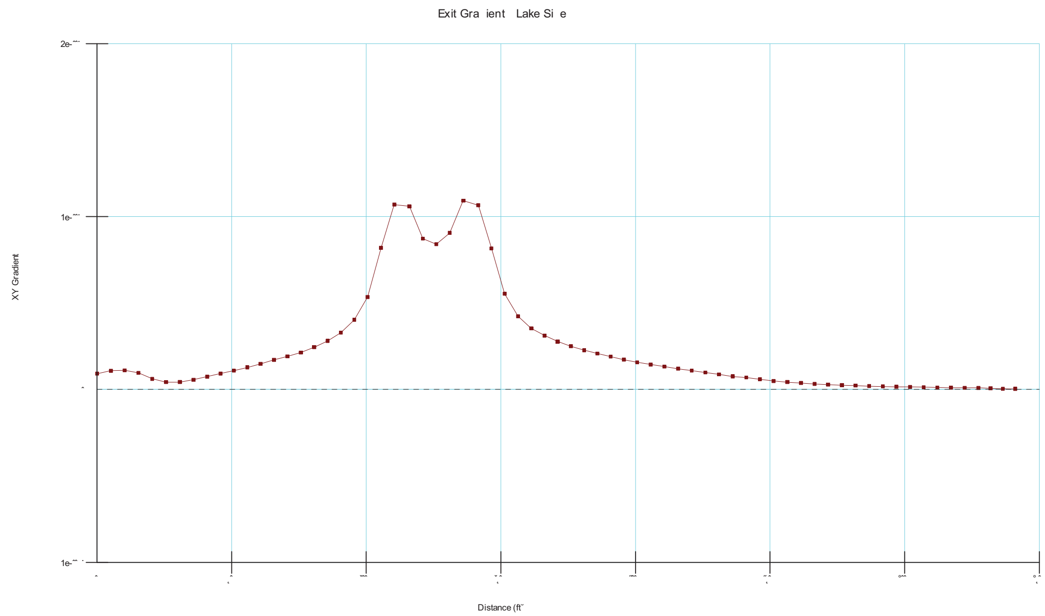
Name: Lake Sediment Layer 2
Model: Saturated / Unsaturated
K-Function: Lake Sediment Layer 2
Ky'/Kx' Ratio: 0.25

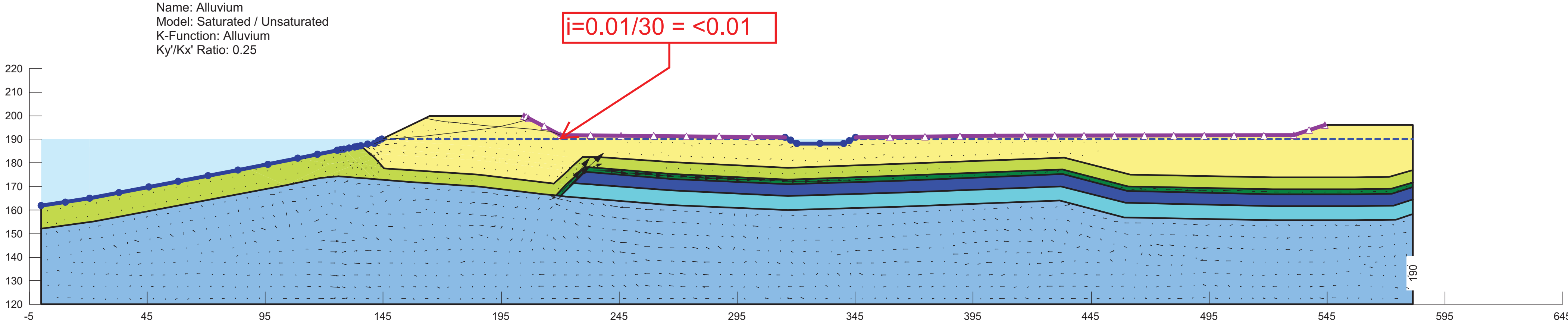
Name: Lake Sediment Layer 1
Model: Saturated / Unsaturated
K-Function: Lake Sediment Layer 1
Ky'/Kx' Ratio: 0.25

Name: Clay Cap
Model: Saturated / Unsaturated
K-Function: Clay Cap
Ky'/Kx' Ratio: 0.25

Name: Class 2 AB
Model: Saturated / Unsaturated
K-Function: Class 2 AB
Ky'/Kx' Ratio: 0.25

Name: Alluvium
Model: Saturated / Unsaturated
K-Function: Alluvium
Ky'/Kx' Ratio: 0.25





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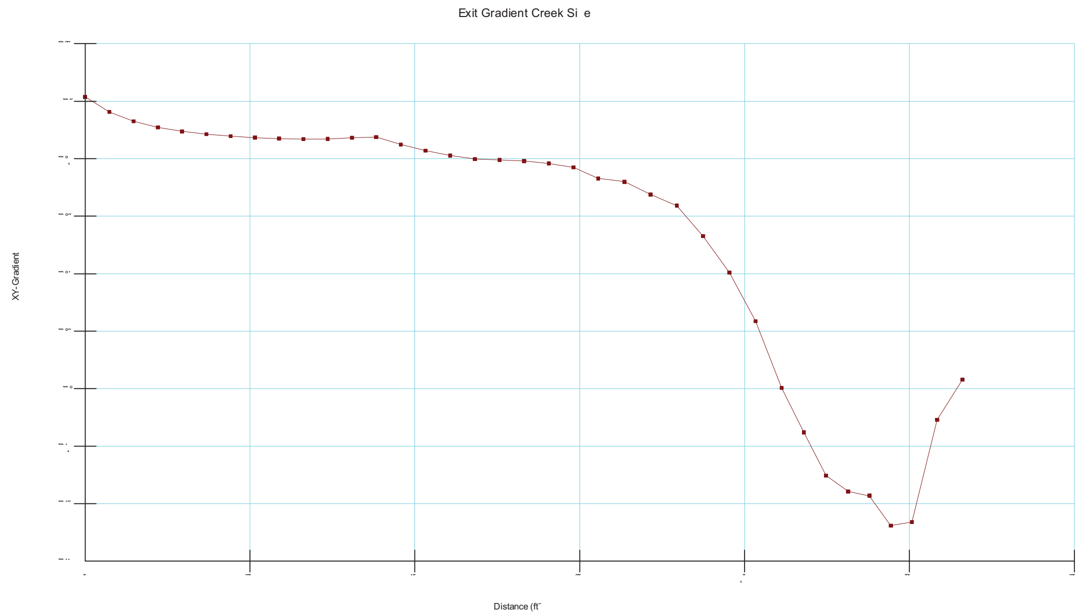


Almaden Lake Improvements Project
Alternative 7 Station 12+00
Steady Seepage HWSE on Creek Side
Exit Gradient at Toe = 0.49

Name: Levee Fill
Model: Saturated / Unsaturated
K-Function: Levee Fill
Ky'/Kx' Ratio: 0.25

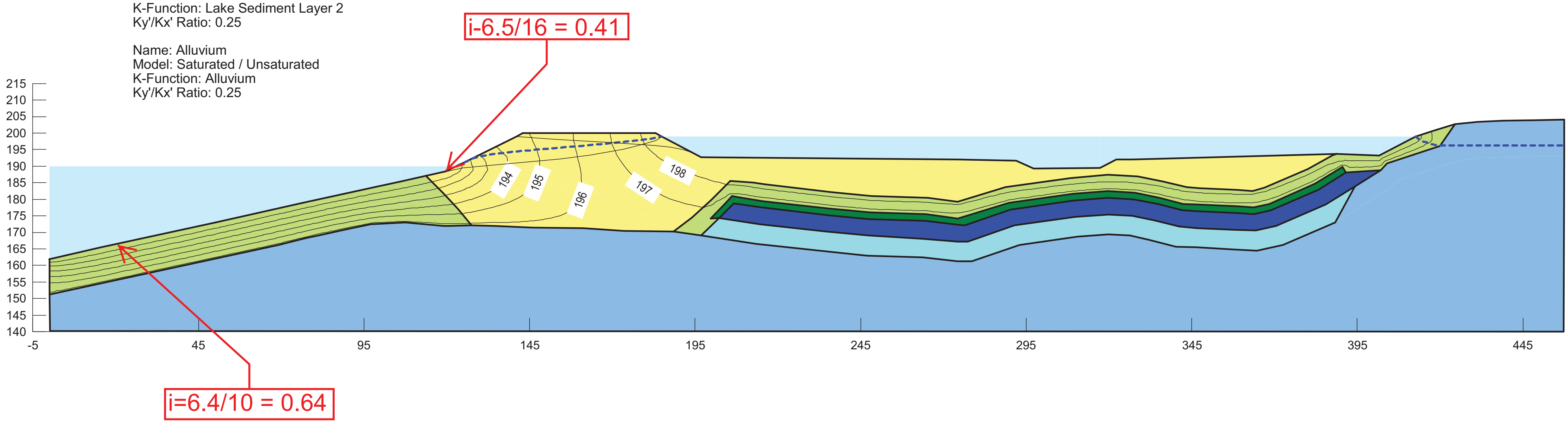
Name: Clay Cap
Model: Saturated / Unsaturated
K-Function: Clay Cap
Ky'/Kx' Ratio: 0.25

Name: Aggregate Base
Model: Saturated / Unsaturated
K-Function: Class 2 AB
Ky'/Kx' Ratio: 0.25

Name: Lake Sediment Layer 1
Model: Saturated / Unsaturated
K-Function: Lake Sediment Layer 1
Ky'/Kx' Ratio: 0.25

Name: Lake Sediment Layer 2
Model: Saturated / Unsaturated
K-Function: Lake Sediment Layer 2
Ky'/Kx' Ratio: 0.25

Name: Alluvium
Model: Saturated / Unsaturated
K-Function: Alluvium
Ky'/Kx' Ratio: 0.25



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Almaden Lake Improvements Project
Alternative 7 Station 12+00
Steady Seepage H! SE on Lake Side
"# it Gradient at Toe = 0.01

Name: Levee Fill
+ odel: Saturated / Unsaturated
K-Function: Levee Fill
/° 1-/# Ratio: 0.25

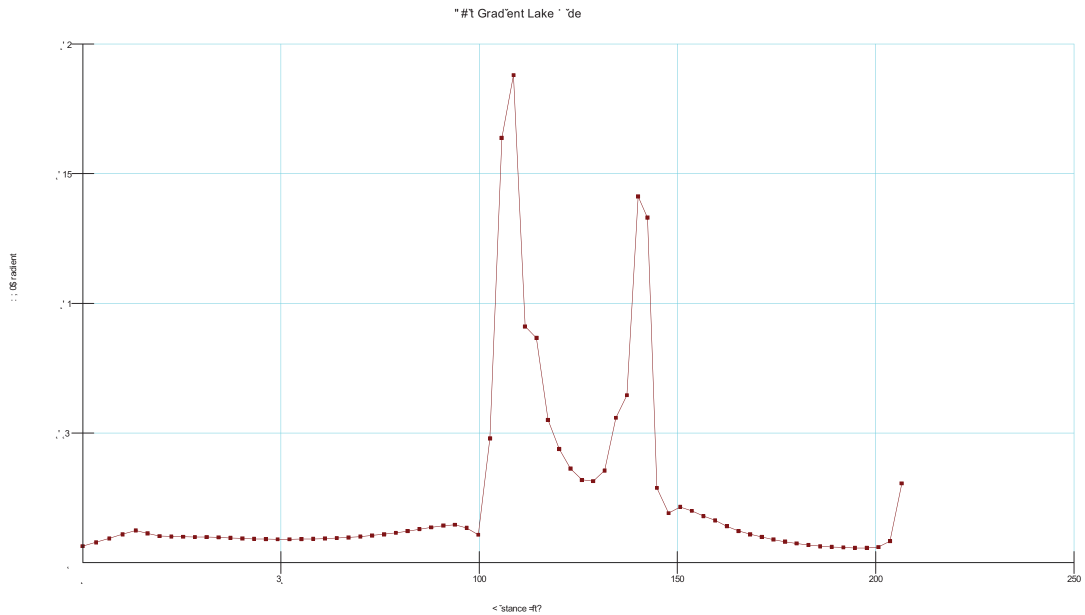
Name: Clay Cap
+ odel: Saturated / Unsaturated
K-Function: Clay Cap
/° 1-/# Ratio: 0.25

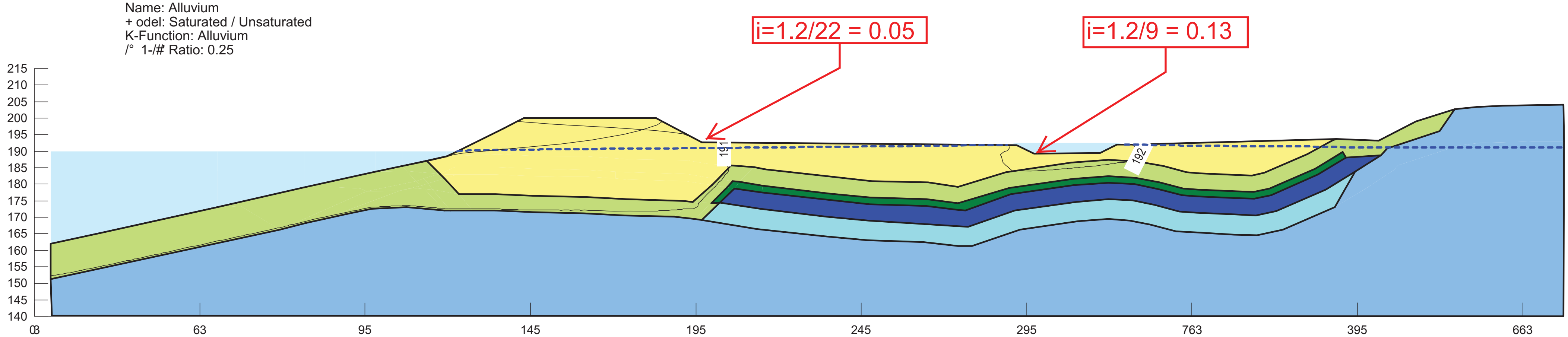
Name: Aggregate Base
+ odel: Saturated / Unsaturated
K-Function: Class 2 AB
/° 1-/# Ratio: 0.25

Name: Lake Sediment Layer 1
+ odel: Saturated / Unsaturated
K-Function: Lake Sediment Layer 1
/° 1-/# Ratio: 0.25

Name: Lake Sediment Layer 2
+ odel: Saturated / Unsaturated
K-Function: Lake Sediment Layer 2
/° 1-/# Ratio: 0.25

Name: Alluvium
+ odel: Saturated / Unsaturated
K-Function: Alluvium
/° 1-/# Ratio: 0.25





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APPENDIX E

Slope Stability Calculations

CE&G
CAL ENGINEERING & GEOLOGY

DOCUMENT REVIEW COVER SHEET

1. PROJECT NAME	2. PROJECT NUMBER
Almaden Lake Improvement Project	140540

3. DOCUMENT TITLE
Appendix E Slope Stability

4. DOCUMENT STATUS DESIGNATION

☐ Preliminary ☒ Final ☐ Cancelled

5. NOTES/COMMENTS
The purpose of this calculation is to perform slope stability analysis in conformance with USACE guidelines (USACE, 2000) for static conditions, end-of-construction condition, steady state seepage condition, rapid drawdown condition, and earthquake loading condition.

ATTACHMENTS	TOTAL NO. OF PAGES
USGS seismic deaggregation and SP117 analysis	2
Alternative 6 Station 2+50 Cross Section Stability Analysis Results	14
Alternative 6 Station 7+00 Cross Section Stability Analysis Results	3
Alternative 7 Station 10+00 Cross Section Stability Analysis Results	14
Alternative 7 Station 12+00 Cross Section Stability Analysis Results	14

RECORD OF REVISIONS

6. No.	7. Reason For Revision	8. Tot. Pgs	10. Originator (Print/Sign/Date)	11. Checker (Print/Sign/Date)	12. QA/QC (Print/Sign/Date)	13. Apprvd./Accptd (Print/Sign)	14. Date (M/D/YY)
1	Final Issue	47	Eli Zane	Dan Peluso	Dan Peluso	Dan Peluso	4/30/15

DOCUMENT REVIEW COVER SHEET

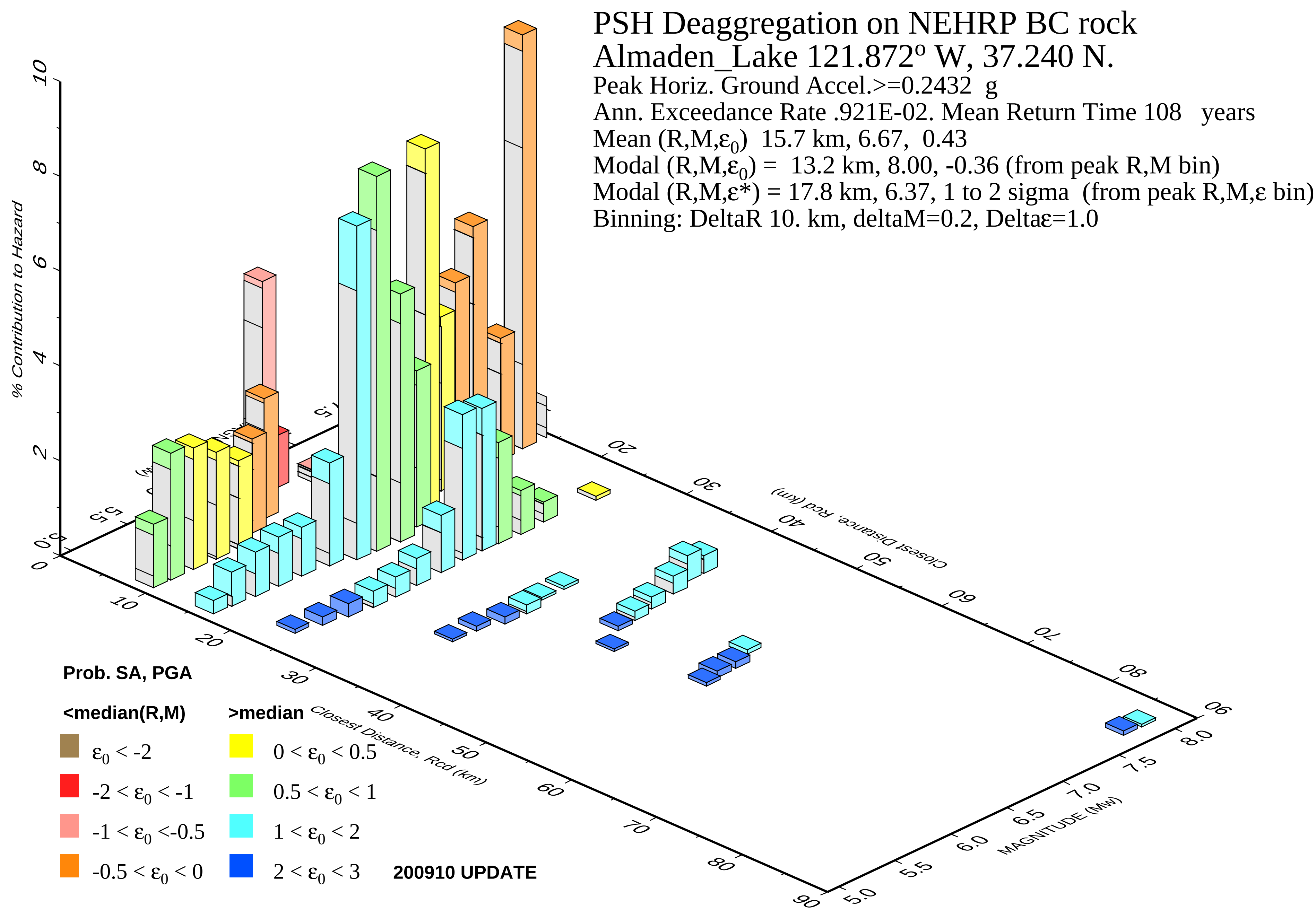
CE&G
Cal Engineering & Geology

1. Project Name Almaden Lake Improvement Project	2. Project Number 140540
3. Document Title Appendix E Slope Stability	
4. Document Status Designation ☐ Preliminary ☒ Final ☐ Cancelled	
5. Notes/Comments The purpose of this calculation is to perform slope stability analysis in conformance with USACE guidelines (USACE, 2000) for static conditions, end-of-construction condition, steady state seepage condition, rapid drawdown condition, and earthquake loading condition.	

Attachments	Total No. of Pages
USGS seismic deaggregation and SP117 analysis	2
Alternative 6 Station 2+50 Cross Section Stability Analysis Results	14
Alternative 6 Station 7+00 Cross Section Stability Analysis Results	3
Alternative 7 Station 10+00 Cross Section Stability Analysis Results	14
Alternative 7 Station 12+00 Cross Section Stability Analysis Results	14

RECORD OF REVISIONS

6. No.	7. Reason For Revision	8. Tot. Pgs	10. Originator (Print/Sign/Date)	11. Checker (Print/Sign/Date)	12. QA/QC (Print/Sign/Date)	13. Apprvd./Accptd (Print/Sign)	14. Date (M/D/YY)
1	Final Issue	13	Eli Zane	Dan Peluso	Dan Peluso	Dan Peluso	4/30/15



GMT 2015 Apr 8 17:05:09 Distance (R), magnitude (M), epsilon (E0,E) deaggregation for a site on rock with average vs= 760. m/s top 30 m. USGS CGHT PSHA2008 UPDATE Bins with lt 0.05% contrib. omitted

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where NRF is a factor that accounts for the nonlinear response of the materials above the slide plane; u is displacement; and D_{5-95} is the duration of strong shaking, a function of earthquake magnitude and distance.

Blake and others (2002) have simplified the process of estimating f_{eq} for ranges of magnitude and distance by preparing sets of curves for two displacement (u) values, 5 cm and 15 cm. These curves are reproduced in Figure 1.

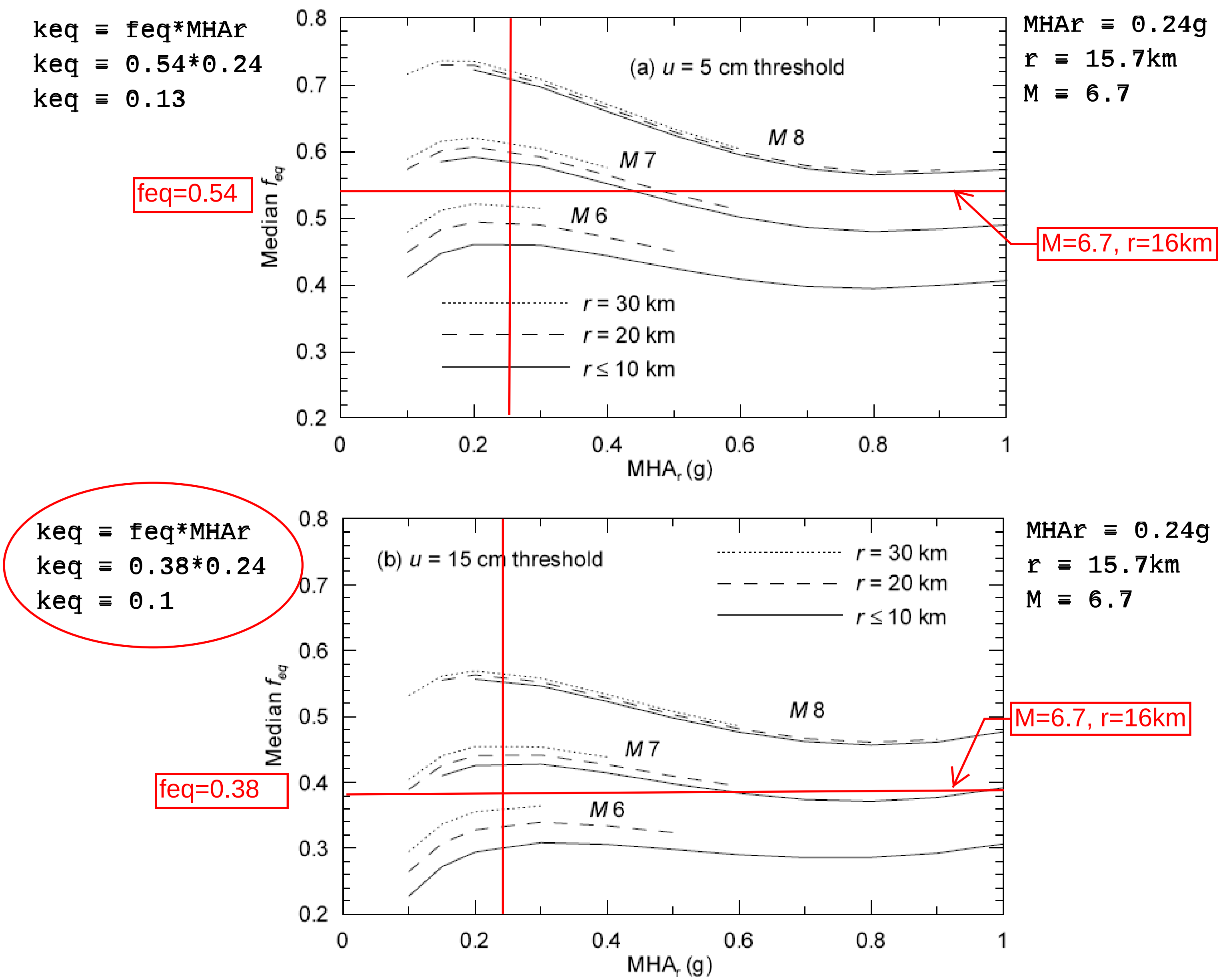


Figure 1. Values of f_{eq} as a Function of MHA_r, Magnitude and Distance for Threshold Displacements of (a) 5 cm and (b) 15 cm (Modified from Blake and others, 2002).

Almaden Lake Improvements Project
Alternative 6 Station 2+50
Static Left Side

Name: Levee Fill
Unit Weight: 127 pcf
Cohesion': 100 psf
Phi': 28 °

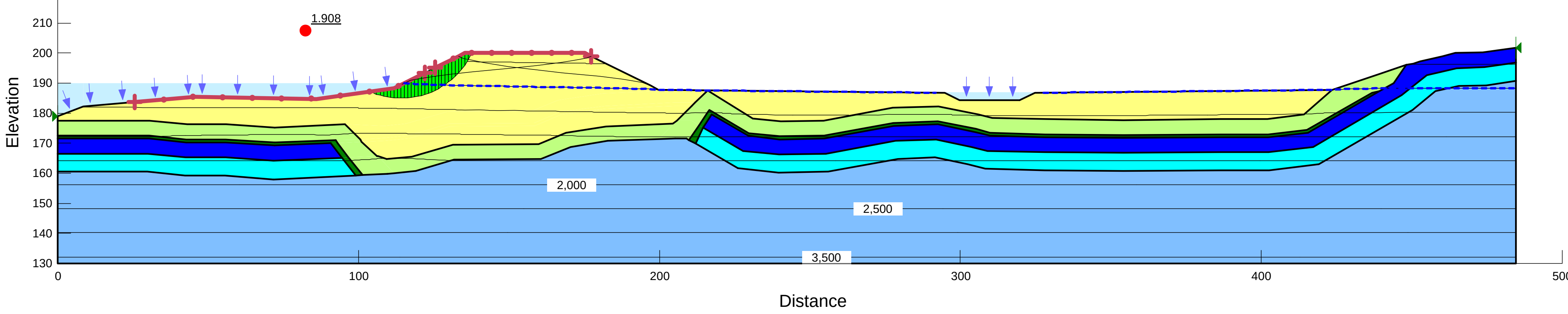
Name: Clay Cap
Unit Weight: 123 pcf
Cohesion': 300 psf
Phi': 20 °

Name: Class 2 AB
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 33 °

Name: Lake Sediment Layer 2
Unit Weight: 93 pcf
Cohesion': 300 psf
Phi': 1 °

Name: Lake Sediment Layer 1
Unit Weight: 93 pcf
Cohesion': 200 psf
Phi': 1 °

Name: Alluvium
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 35 °



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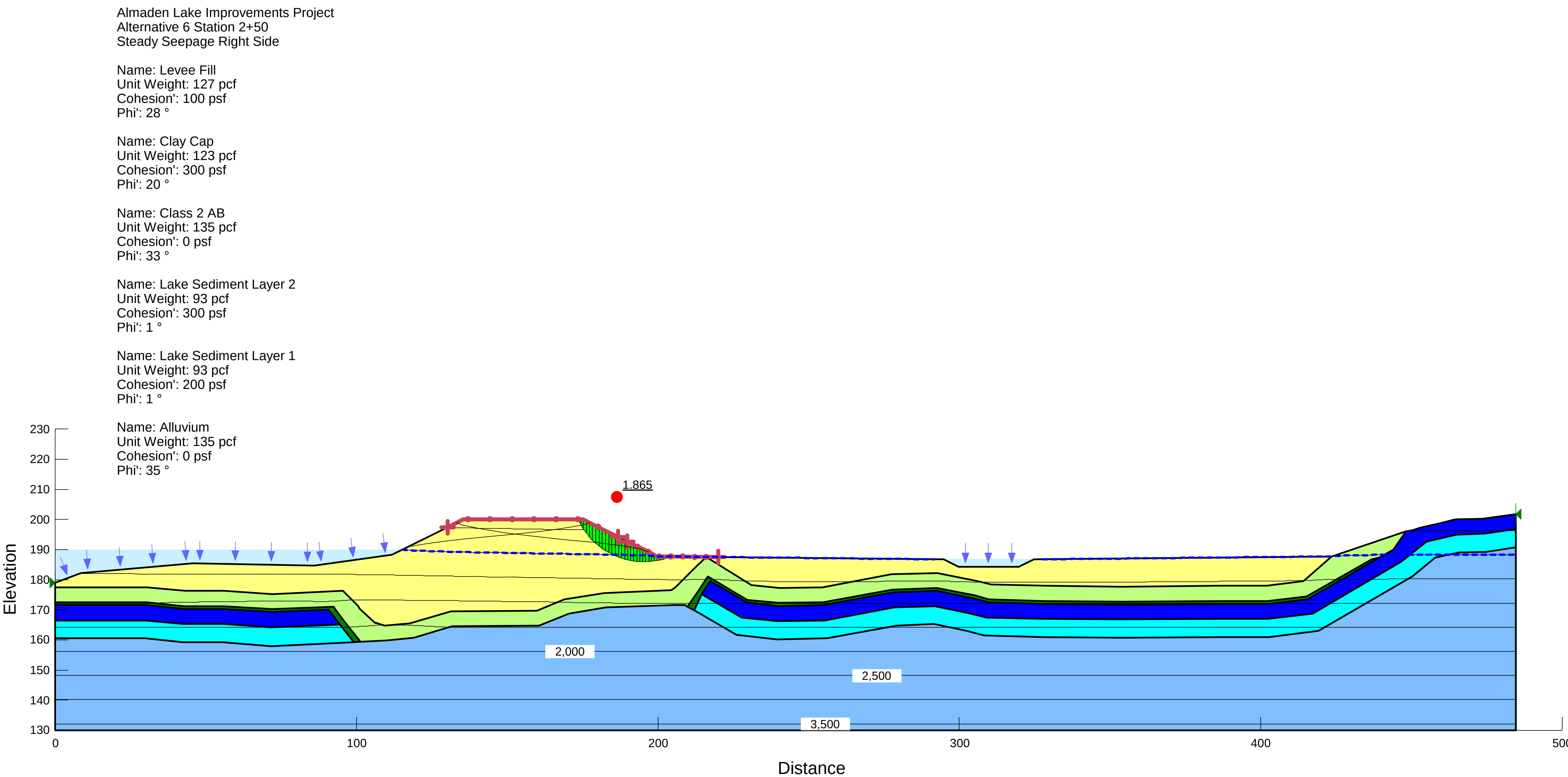

Almaden Lake Improvements Project
Alternative 6 Station 2+50
Steady Seepage Right Side

Name: Levee Fill
Unit Weight: 127 pcf
Cohesion': 100 psf
Phi': 28 °

Name: Clay Cap
Unit Weight: 123 pcf
Cohesion': 300 psf
Phi': 20 °

Name: Class 2 AB
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 33 °

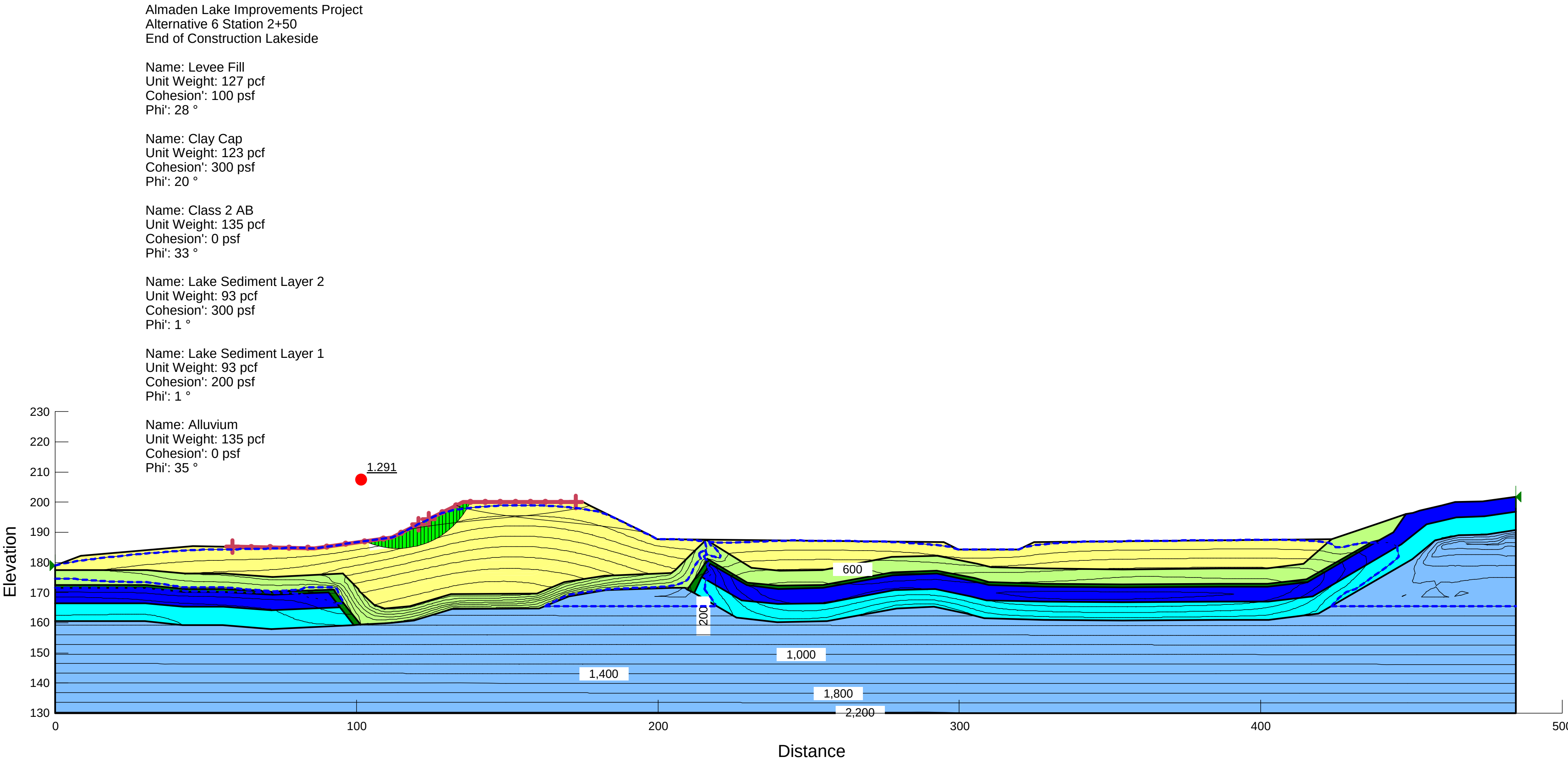
Name: Lake Sediment Layer 2
Unit Weight: 93 pcf
Cohesion': 300 psf
Phi': 1 °

Name: Lake Sediment Layer 1
Unit Weight: 93 pcf
Cohesion': 200 psf
Phi': 1 °

Name: Alluvium
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 35 °

1.865
2,000
2,500
3,500
Elevation
230
220
210
200
190
180
170
160
150
140
130
0
100
200
300
400
500
Distance

Page E-4


Almaden Lake Improvements Project
Alternative 6 Station 2+50
End of Construction Lakeside

Name: Levee Fill
Unit Weight: 127 pcf
Cohesion': 100 psf
Phi': 28 °

Name: Clay Cap
Unit Weight: 123 pcf
Cohesion': 300 psf
Phi': 20 °

Name: Class 2 AB
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 33 °

Name: Lake Sediment Layer 2
Unit Weight: 93 pcf
Cohesion': 300 psf
Phi': 1 °

Name: Lake Sediment Layer 1
Unit Weight: 93 pcf
Cohesion': 200 psf
Phi': 1 °

Name: Alluvium
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 35 °

1.291
600
200
1,000
1,400
1,800
2,200
Elevation
230
220
210
200
190
180
170
160
150
140
130
0
100
200
300
400
500
Distance

Almaden Lake Improvements Project
Alternative 6 Station 2+50
End of Construction Creekside

Name: Levee Fill
Unit Weight: 127 pcf
Cohesion': 100 psf
Phi': 28 °

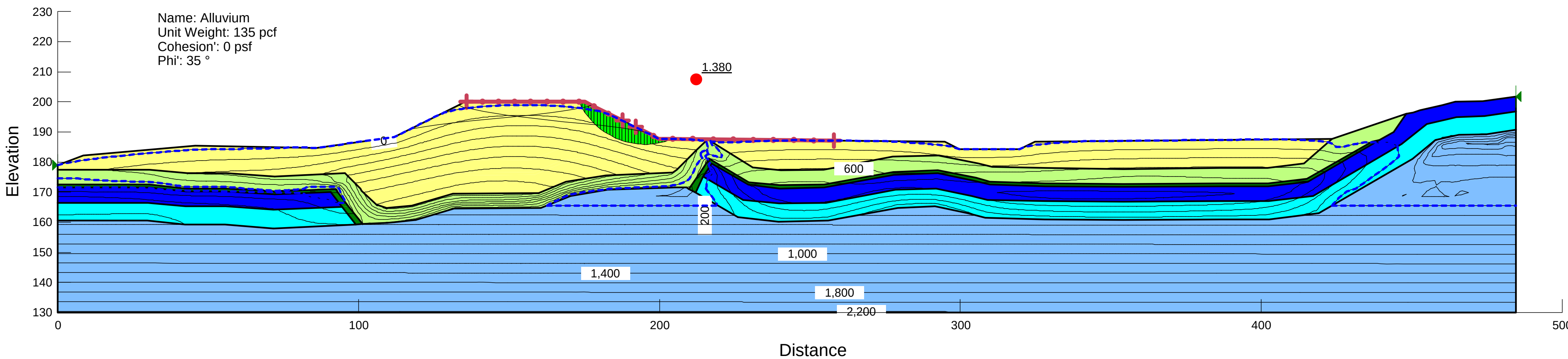
Name: Clay Cap
Unit Weight: 123 pcf
Cohesion': 300 psf
Phi': 20 °

Name: Class 2 AB
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 33 °

Name: Lake Sediment Layer 2
Unit Weight: 93 pcf
Cohesion': 300 psf
Phi': 1 °

Name: Lake Sediment Layer 1
Unit Weight: 93 pcf
Cohesion': 200 psf
Phi': 1 °

Name: Alluvium
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 35 °



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Almaden Lake Improvements Project
Alternative 6 Station 2+50
Steady Seepage Left Side

Name: Levee Fill
Unit Weight: 127 pcf
Cohesion': 100 psf
Phi': 28 °

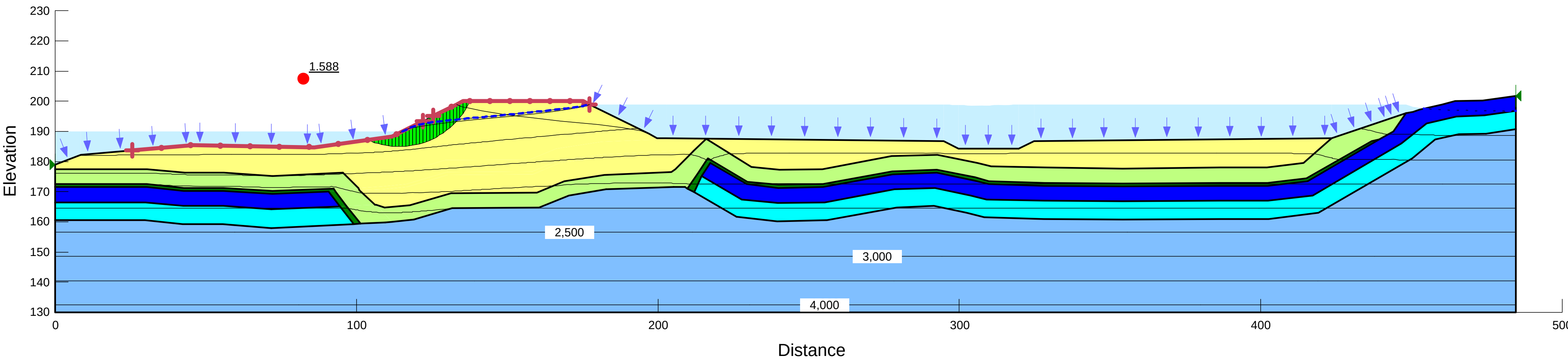
Name: Clay Cap
Unit Weight: 123 pcf
Cohesion': 300 psf
Phi': 20 °

Name: Class 2 AB
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 33 °

Name: Lake Sediment Layer 2
Unit Weight: 93 pcf
Cohesion': 300 psf
Phi': 1 °

Name: Lake Sediment Layer 1
Unit Weight: 93 pcf
Cohesion': 200 psf
Phi': 1 °

Name: Alluvium
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 35 °



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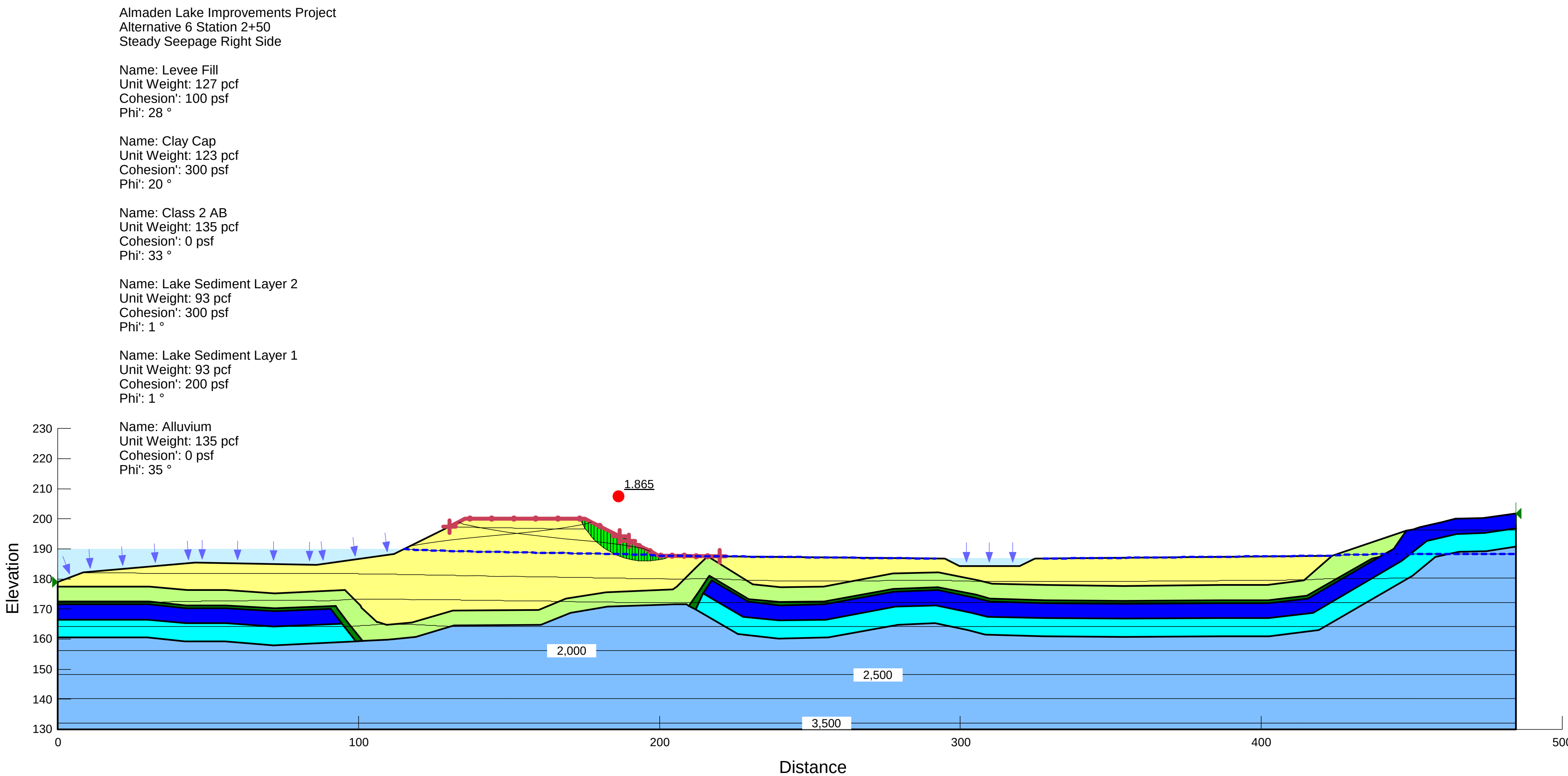

Almaden Lake Improvements Project
Alternative 6 Station 2+50
Steady Seepage Right Side

Name: Levee Fill
Unit Weight: 127 pcf
Cohesion': 100 psf
Phi': 28 °

Name: Clay Cap
Unit Weight: 123 pcf
Cohesion': 300 psf
Phi': 20 °

Name: Class 2 AB
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 33 °

Name: Lake Sediment Layer 2
Unit Weight: 93 pcf
Cohesion': 300 psf
Phi': 1 °

Name: Lake Sediment Layer 1
Unit Weight: 93 pcf
Cohesion': 200 psf
Phi': 1 °

Name: Alluvium
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 35 °

1.865
2,000
2,500
3,500
Elevation
230
220
210
200
190
180
170
160
150
140
130
0
100
200
300
400
500
Distance

Page E-8

Almaden Lake Improvements Project
Alternative 6 Station 2+50
Rapid Drawdown Left Side

Name: Levee Fill
Unit Weight: 127 pcf
Cohesion': 100 psf
Phi': 28 °
Total Cohesion: 2,000 psf
Total Phi: 0 °
Piezometric Line After Drawdown: 2

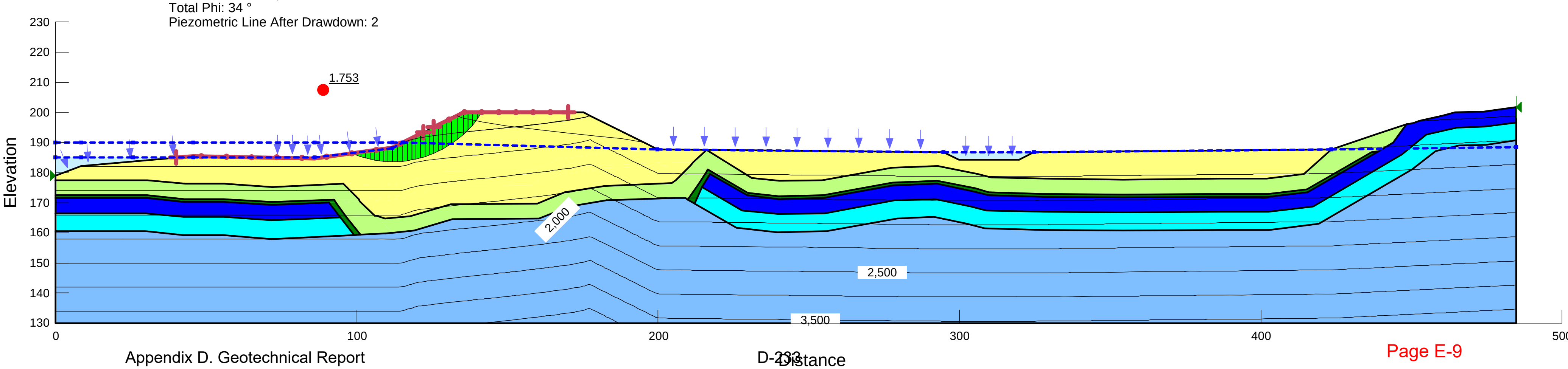
Name: Clay Cap
Unit Weight: 123 pcf
Cohesion': 300 psf
Phi': 20 °
Total Cohesion: 1,500 psf
Total Phi: 0 °
Piezometric Line After Drawdown: 2

Name: Class 2 AB
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 33 °
Total Cohesion: 1 psf
Total Phi: 32 °
Piezometric Line After Drawdown: 2

Name: Lake Sediment Layer 2
Unit Weight: 93 pcf
Cohesion': 300 psf
Phi': 1 °
Total Cohesion: 301 psf
Total Phi: 0 °
Piezometric Line After Drawdown: 2

Name: Lake Sediment Layer 1
Unit Weight: 93 pcf
Cohesion': 200 psf
Phi': 1 °
Total Cohesion: 201 psf
Total Phi: 0 °
Piezometric Line After Drawdown: 2

Name: Alluvium
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 35 °
Total Cohesion: 1 psf
Total Phi: 34 °
Piezometric Line After Drawdown: 2



Almaden Lake Improvements Project
Alternative 6 Station 2+50
Rapid Drawdown Left Side

Name: Levee Fill
Unit Weight: 127 pcf
Cohesion': 100 psf
Phi': 28 °

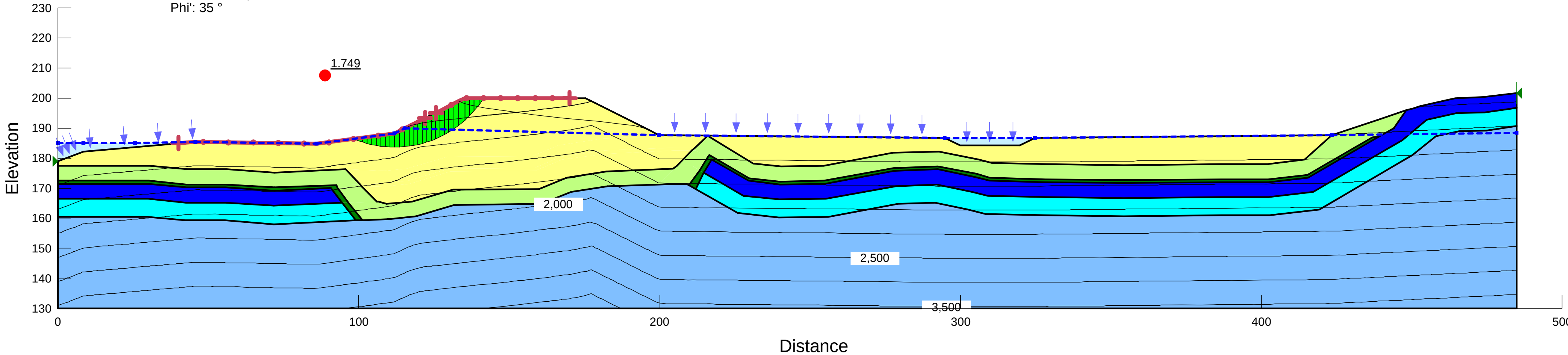
Name: Clay Cap
Unit Weight: 123 pcf
Cohesion': 300 psf
Phi': 20 °

Name: Class 2 AB
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 33 °

Name: Lake Sediment Layer 2
Unit Weight: 93 pcf
Cohesion': 300 psf
Phi': 0 °

Name: Lake Sediment Layer 1
Unit Weight: 93 pcf
Cohesion': 200 psf
Phi': 0 °

Name: Alluvium
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 35 °



Almaden Lake Improvements Project
Alternative 6 Station 2+50
Rapid Drawdown Right Side

Name: Levee Fill
Unit Weight: 127 pcf
Cohesion': 100 psf
Phi': 28 °
Total Cohesion: 2,000 psf
Total Phi: 0 °
Piezometric Line After Drawdown: 1

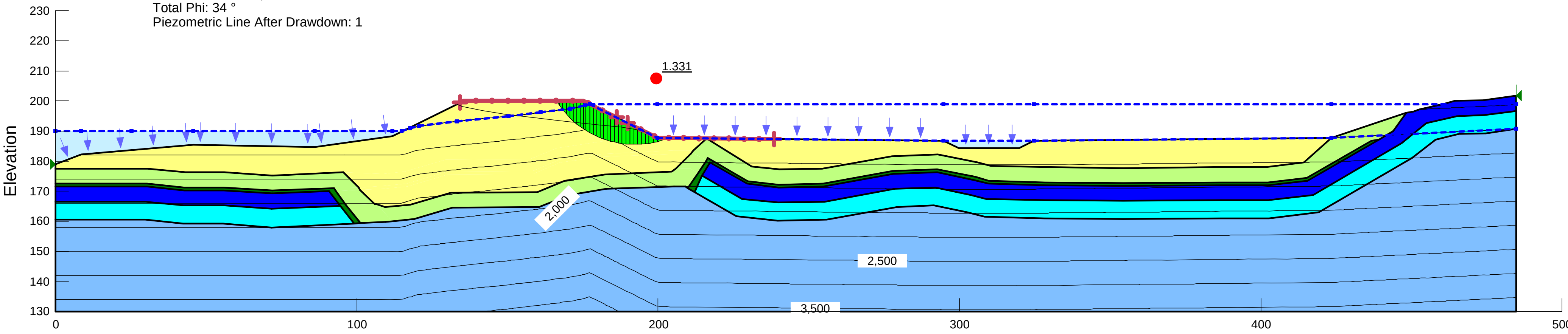
Name: Clay Cap
Unit Weight: 123 pcf
Cohesion': 300 psf
Phi': 20 °
Total Cohesion: 1,500 psf
Total Phi: 0 °
Piezometric Line After Drawdown: 1

Name: Class 2 AB
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 33 °
Total Cohesion: 1 psf
Total Phi: 32 °
Piezometric Line After Drawdown: 1

Name: Lake Sediment Layer 2
Unit Weight: 93 pcf
Cohesion': 300 psf
Phi': 1 °
Total Cohesion: 301 psf
Total Phi: 0 °
Piezometric Line After Drawdown: 1

Name: Lake Sediment Layer 1
Unit Weight: 93 pcf
Cohesion': 200 psf
Phi': 1 °
Total Cohesion: 201 psf
Total Phi: 0 °
Piezometric Line After Drawdown: 1

Name: Alluvium
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 35 °
Total Cohesion: 1 psf
Total Phi: 34 °
Piezometric Line After Drawdown: 1



Almaden Lake Improvements Project
Alternative 6 Station 2+50
Rapid Drawdown Right Side

Name: Levee Fill
Unit Weight: 127 pcf
Cohesion': 100 psf
Phi': 28 °

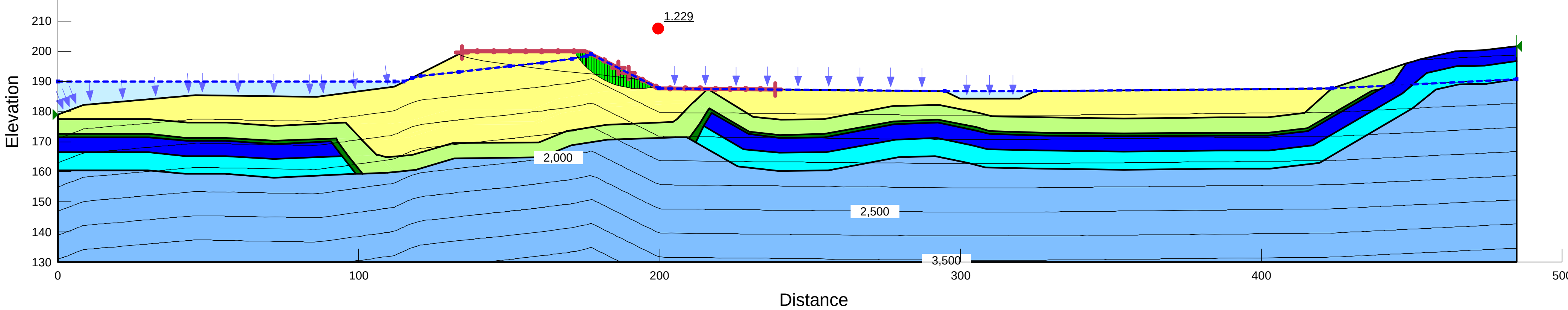
Name: Clay Cap
Unit Weight: 123 pcf
Cohesion': 300 psf
Phi': 20 °

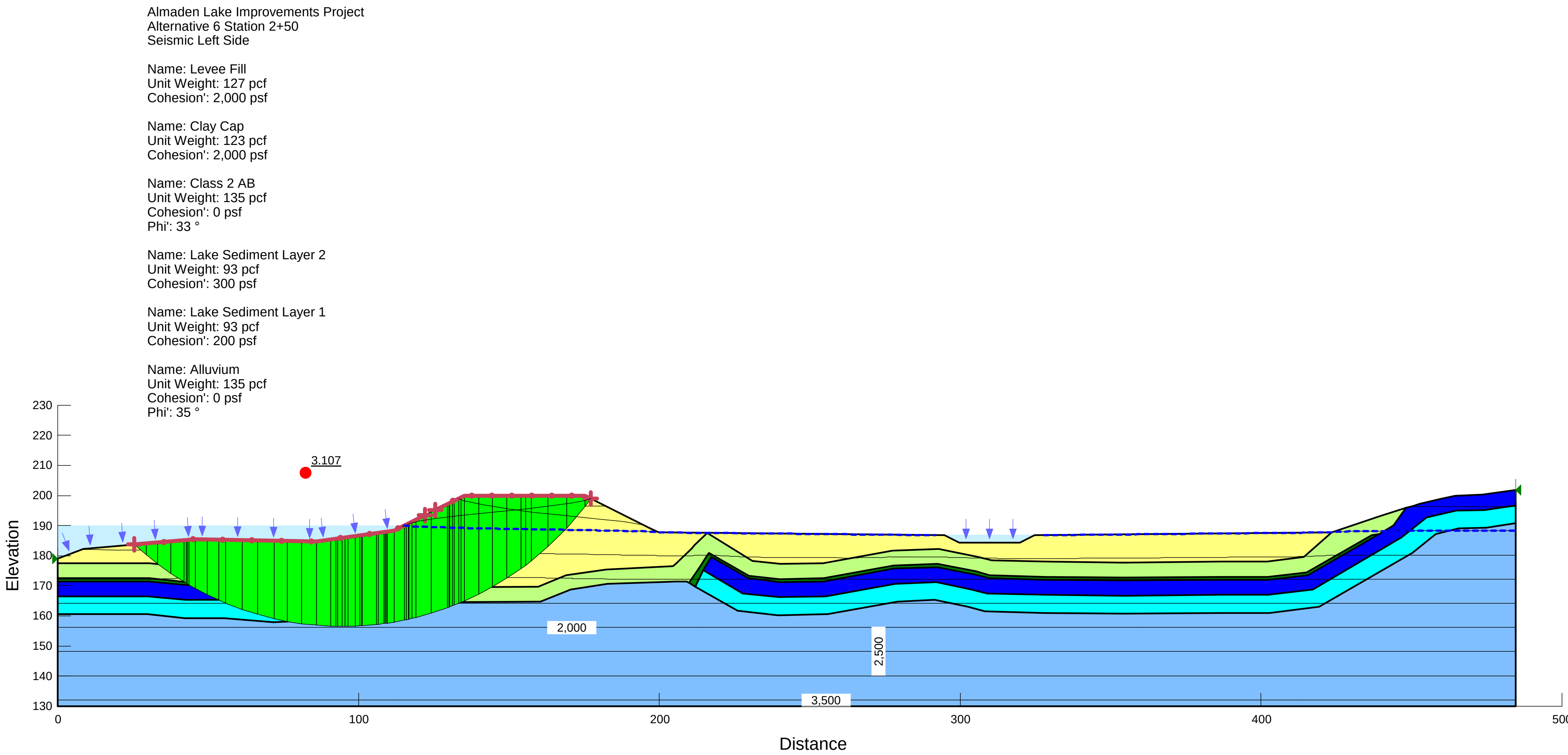
Name: Class 2 AB
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 33 °

Name: Lake Sediment Layer 2
Unit Weight: 93 pcf
Cohesion': 300 psf
Phi': 0 °

Name: Lake Sediment Layer 1
Unit Weight: 93 pcf
Cohesion': 200 psf
Phi': 0 °

Name: Alluvium
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 35 °




Almaden Lake Improvements Project
Alternative 6 Station 2+50
Seismic Left Side

Name: Levee Fill
Unit Weight: 127 pcf
Cohesion': 2,000 psf

Name: Clay Cap
Unit Weight: 123 pcf
Cohesion': 2,000 psf

Name: Class 2 AB
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 33 °

Name: Lake Sediment Layer 2
Unit Weight: 93 pcf
Cohesion': 300 psf

Name: Lake Sediment Layer 1
Unit Weight: 93 pcf
Cohesion': 200 psf

Name: Alluvium
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 35 °
3.107
2,000
2,500
3,500
Elevation
Distance
230
220
210
200
190
180
170
160
150
140
130
0
100
200
300
400
500

Almaden Lake Improvements Project
Alternative 6 Station 2+50
Seismic Left Side

Name: Levee Fill
Unit Weight: 127 pcf
Cohesion': 100 psf
Phi': 28 °

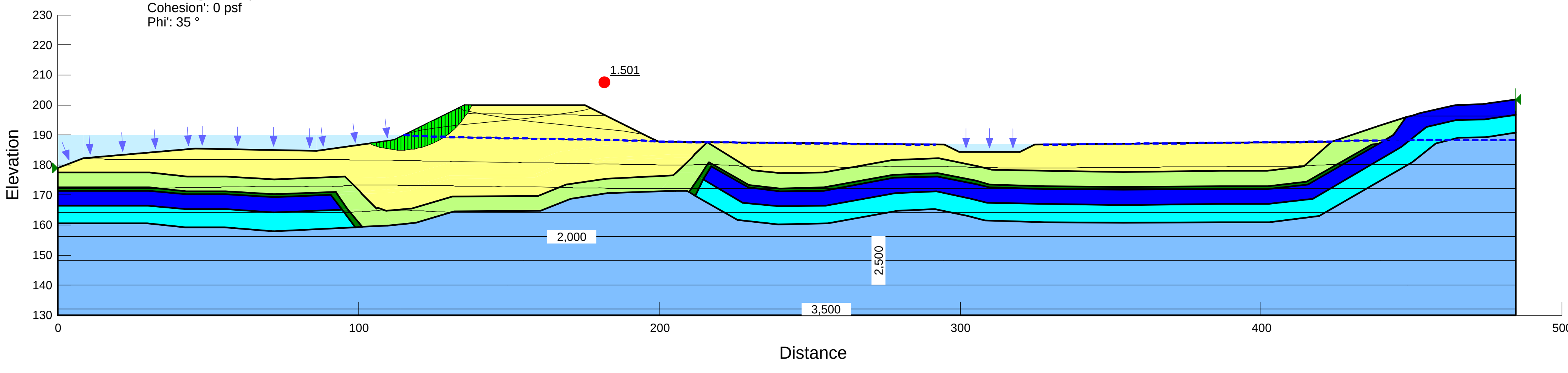
Name: Clay Cap
Unit Weight: 123 pcf
Cohesion': 300 psf
Phi': 20 °

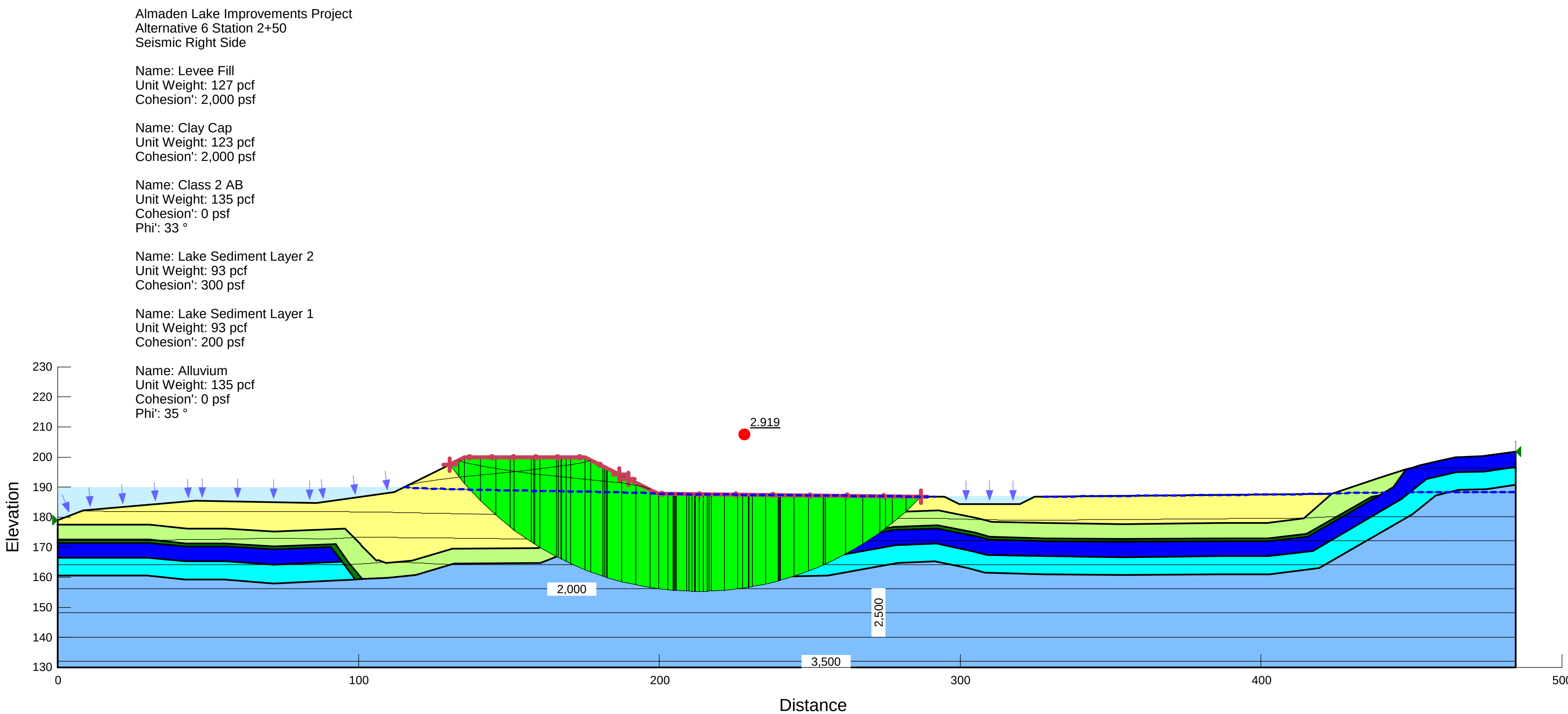
Name: Class 2 AB
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 33 °

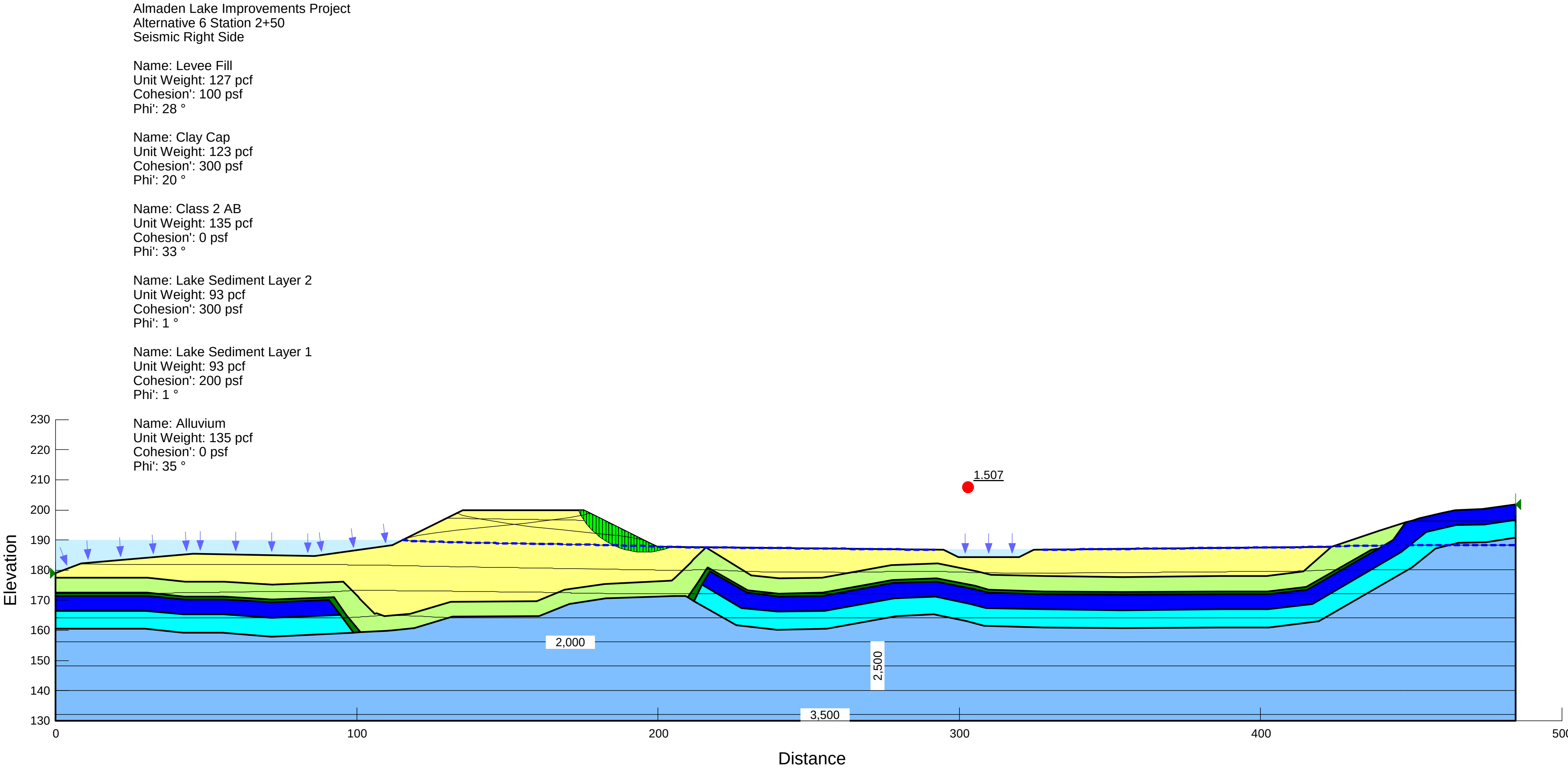
Name: Lake Sediment Layer 2
Unit Weight: 93 pcf
Cohesion': 300 psf
Phi': 1 °

Name: Lake Sediment Layer 1
Unit Weight: 93 pcf
Cohesion': 200 psf
Phi': 1 °

Name: Alluvium
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 35 °




Almaden Lake Improvements Project
Alternative 6 Station 2+50
Seismic Right Side
Name: Levee Fill
Unit Weight: 127 pcf
Cohesion': 2,000 psf
Name: Clay Cap
Unit Weight: 123 pcf
Cohesion': 2,000 psf
Name: Class 2 AB
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 33 °
Name: Lake Sediment Layer 2
Unit Weight: 93 pcf
Cohesion': 300 psf
Name: Lake Sediment Layer 1
Unit Weight: 93 pcf
Cohesion': 200 psf
Name: Alluvium
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 35 °
2.919
2,000
2,500
3,500
Elevation
230
220
210
200
190
180
170
160
150
140
130
0
100
200
300
400
500
Distance


Almaden Lake Improvements Project
Alternative 6 Station 2+50
Seismic Right Side

Name: Levee Fill
Unit Weight: 127 pcf
Cohesion': 100 psf
Phi': 28 °

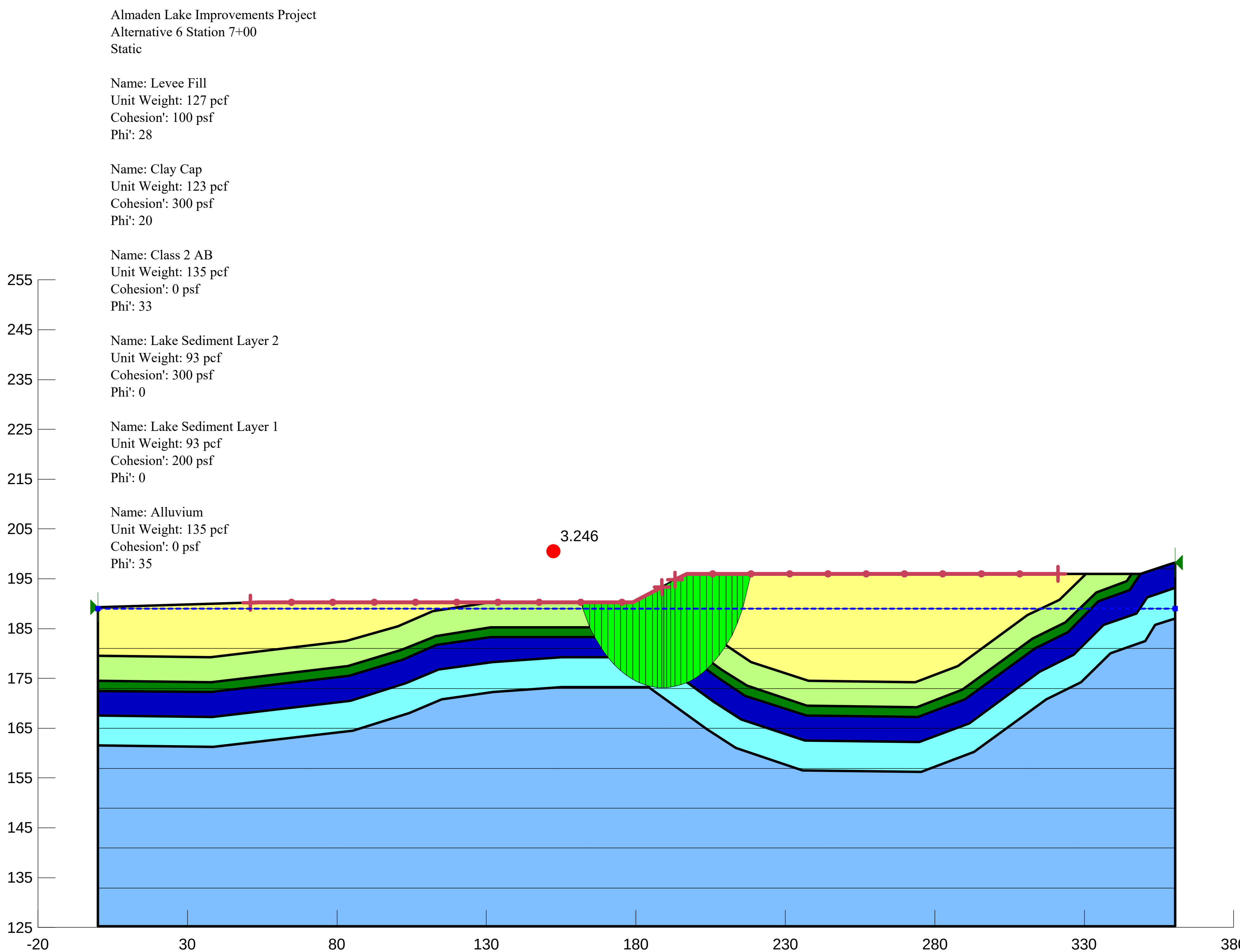
Name: Clay Cap
Unit Weight: 123 pcf
Cohesion': 300 psf
Phi': 20 °

Name: Class 2 AB
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 33 °

Name: Lake Sediment Layer 2
Unit Weight: 93 pcf
Cohesion': 300 psf
Phi': 1 °

Name: Lake Sediment Layer 1
Unit Weight: 93 pcf
Cohesion': 200 psf
Phi': 1 °

Name: Alluvium
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 35 °
1.507
2,000
2,500
3,500
Elevation
230
220
210
200
190
180
170
160
150
140
130
0
100
200
300
400
500
Distance



Almaden Lake Improvements Project
Alternative 6 Station 7+00
Static
Name: Levee Fill
Unit Weight: 127 pcf
Cohesion': 100 psf
Phi': 28
Name: Clay Cap
Unit Weight: 123 pcf
Cohesion': 300 psf
Phi': 20
Name: Class 2 AB
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 33
Name: Lake Sediment Layer 2
Unit Weight: 93 pcf
Cohesion': 300 psf
Phi': 0
Name: Lake Sediment Layer 1
Unit Weight: 93 pcf
Cohesion': 200 psf
Phi': 0
Name: Alluvium
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 35
3.246
255
245
235
225
215
205
195
185
175
165
155
145
135
125
-20
30
80
130
180
230
280
330
380

Almaden Lake Improvements Project
Alternative 6 Station 7+00
Rapid Drawdown

Name: Levee Fill
Unit Weight: 127 pcf
Cohesion': 100 psf
Total Stress Cohesion: 2000 psf
Phi': 28
Total Stress Phi: 0

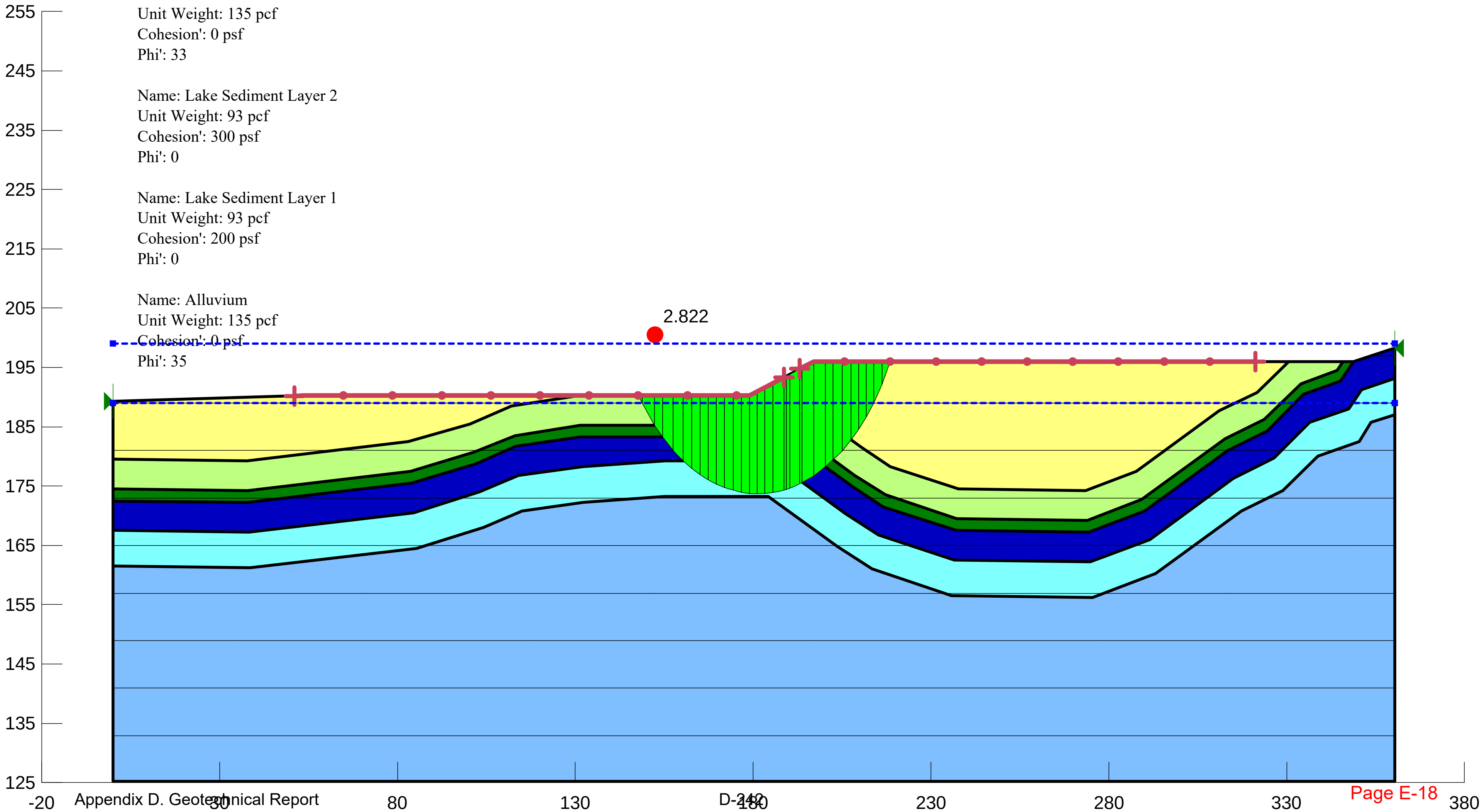
Name: Clay Cap
Unit Weight: 123 pcf
Cohesion': 300 psf
Total Stress Cohesion: 2000 psf
Phi': 20
Total Stress Phi: 0

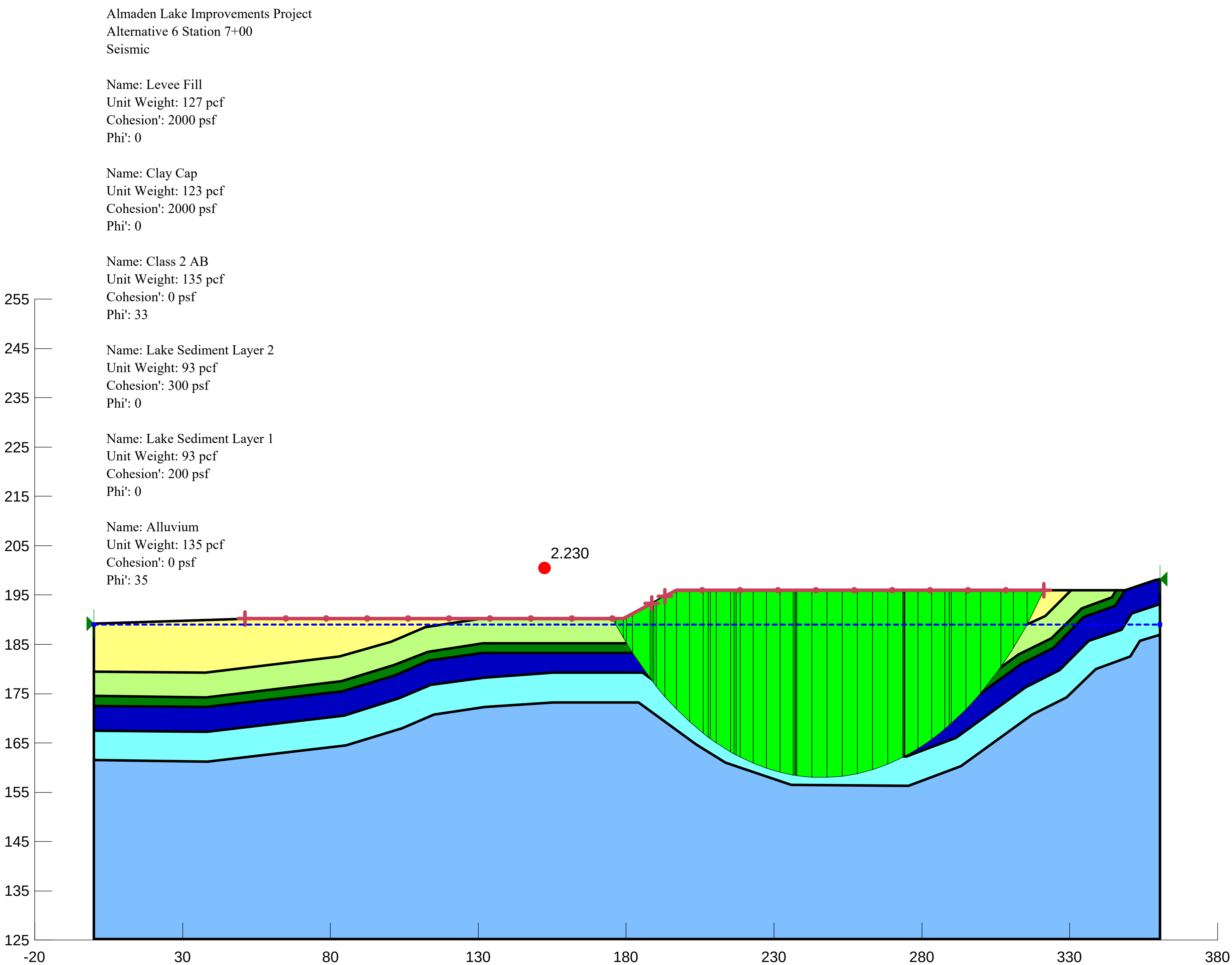
Name: Class 2 AB
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 33

Name: Lake Sediment Layer 2
Unit Weight: 93 pcf
Cohesion': 300 psf
Phi': 0

Name: Lake Sediment Layer 1
Unit Weight: 93 pcf
Cohesion': 200 psf
Phi': 0

Name: Alluvium
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 35




Almaden Lake Improvements Project
Alternative 6 Station 7+00
Seismic
Name: Levee Fill
Unit Weight: 127 pcf
Cohesion': 2000 psf
Phi': 0
Name: Clay Cap
Unit Weight: 123 pcf
Cohesion': 2000 psf
Phi': 0
Name: Class 2 AB
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 33
Name: Lake Sediment Layer 2
Unit Weight: 93 pcf
Cohesion': 300 psf
Phi': 0
Name: Lake Sediment Layer 1
Unit Weight: 93 pcf
Cohesion': 200 psf
Phi': 0
Name: Alluvium
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 35
2.230
255
245
235
225
215
205
195
185
175
165
155
145
135
125
-20
30
80
130
180
230
280
330
380

Almaden Lake Improvements Project
Alternative 7 Station 10+00
Static Left Side

Name: Levee Fill
Unit Weight: 127 pcf
Cohesion': 100 psf
Phi': 28 °

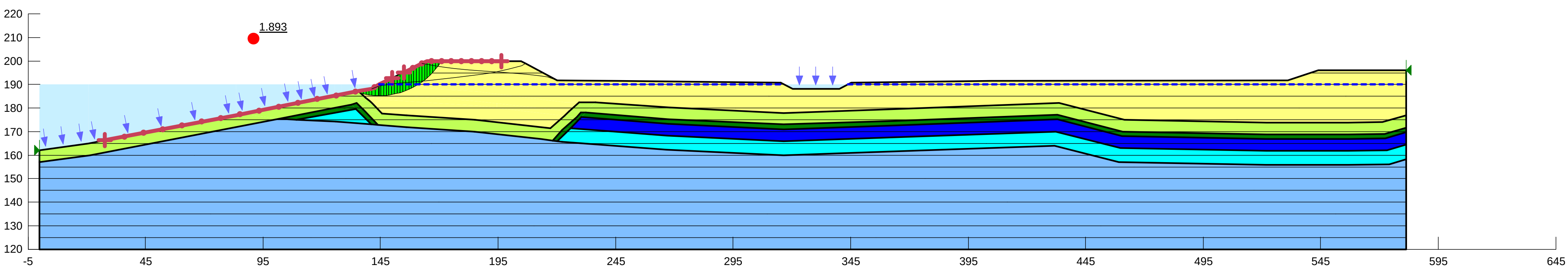
Name: Lake Sediment Layer 2
Unit Weight: 93 pcf
Cohesion': 300 psf
Phi': 0 °

Name: Lake Sediment Layer 1
Unit Weight: 93 pcf
Cohesion': 200 psf
Phi': 0 °

Name: Clay Cap
Unit Weight: 123 pcf
Cohesion': 300 psf
Phi': 20 °

Name: Class 2 AB
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 33 °

Name: Alluvium
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 35 °



Almaden Lake Improvements Project
Alternative 7 Station 10+00
Static Right Side

Name: Levee Fill
Unit Weight: 127 pcf
Cohesion': 100 psf
Phi': 28 °

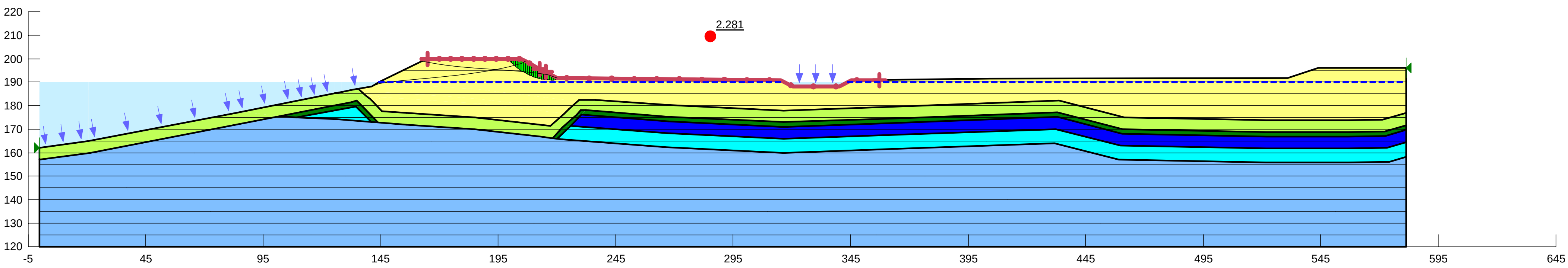
Name: Lake Sediment Layer 2
Unit Weight: 93 pcf
Cohesion': 300 psf
Phi': 0 °

Name: Lake Sediment Layer 1
Unit Weight: 93 pcf
Cohesion': 200 psf
Phi': 0 °

Name: Clay Cap
Unit Weight: 123 pcf
Cohesion': 300 psf
Phi': 20 °

Name: Class 2 AB
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 33 °

Name: Alluvium
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 35 °



Almaden Lake Improvements Project
Alternative 7 Station 10+00
End of Construction Lakeside

Name: Levee Fill
Unit Weight: 127 pcf
Cohesion': 100 psf
Phi': 28 °

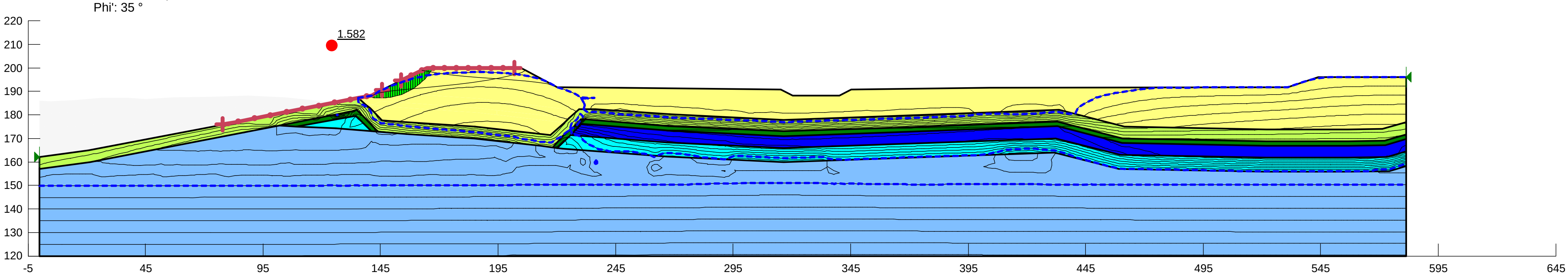
Name: Lake Sediment Layer 2
Unit Weight: 93 pcf
Cohesion': 300 psf
Phi': 0 °

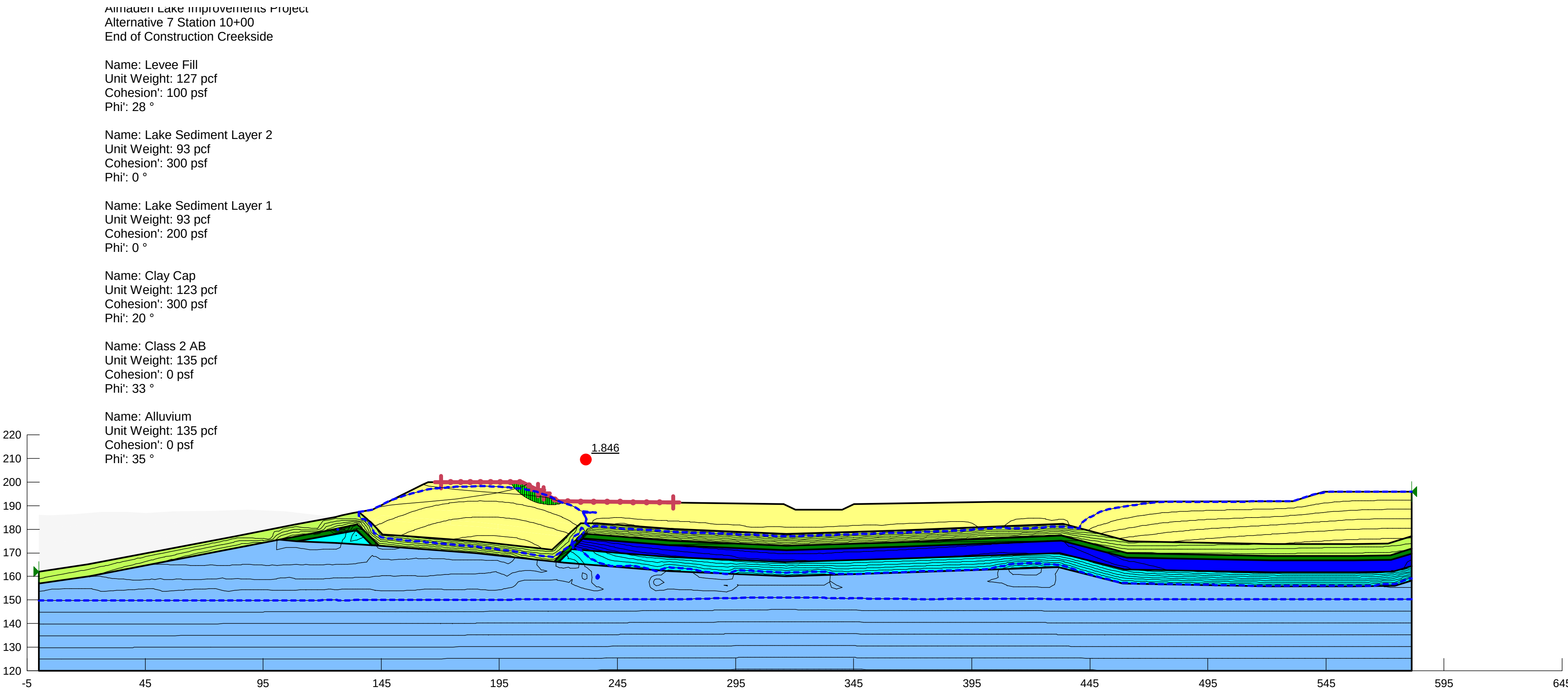
Name: Lake Sediment Layer 1
Unit Weight: 93 pcf
Cohesion': 200 psf
Phi': 0 °

Name: Clay Cap
Unit Weight: 123 pcf
Cohesion': 300 psf
Phi': 20 °

Name: Class 2 AB
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 33 °

Name: Alluvium
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 35 °




Almaden Lake Improvements Project
Alternative 7 Station 10+00
End of Construction Creekside

Name: Levee Fill
Unit Weight: 127 pcf
Cohesion': 100 psf
Phi': 28 °

Name: Lake Sediment Layer 2
Unit Weight: 93 pcf
Cohesion': 300 psf
Phi': 0 °

Name: Lake Sediment Layer 1
Unit Weight: 93 pcf
Cohesion': 200 psf
Phi': 0 °

Name: Clay Cap
Unit Weight: 123 pcf
Cohesion': 300 psf
Phi': 20 °

Name: Class 2 AB
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 33 °

Name: Alluvium
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 35 °

1.846
220
210
200
190
180
170
160
150
140
130
120
-5
45
95
145
195
245
295
345
395
445
495
545
595
645

Almaden Lake Improvements Project
Alternative 7 Station 10+00
Steady Seepage Left Side

Name: Levee Fill
Unit Weight: 127 pcf
Cohesion': 100 psf
Phi': 28 °

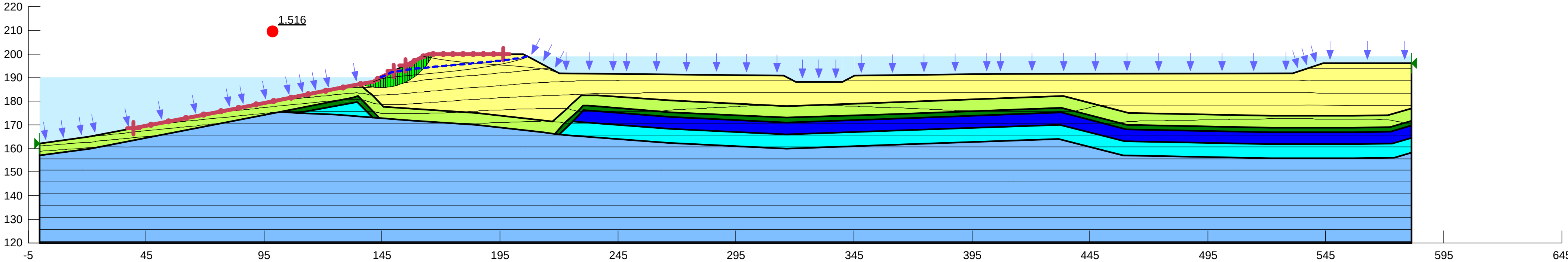
Name: Lake Sediment Layer 2
Unit Weight: 93 pcf
Cohesion': 300 psf
Phi': 0 °

Name: Lake Sediment Layer 1
Unit Weight: 93 pcf
Cohesion': 200 psf
Phi': 0 °

Name: Clay Cap
Unit Weight: 123 pcf
Cohesion': 300 psf
Phi': 20 °

Name: Class 2 AB
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 33 °

Name: Alluvium
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 35 °



Almaden Lake Improvements Project
Alternative 7 Station 10+00
Static Right Side

Name: Levee Fill
Unit Weight: 127 pcf
Cohesion': 100 psf
Phi': 28 °

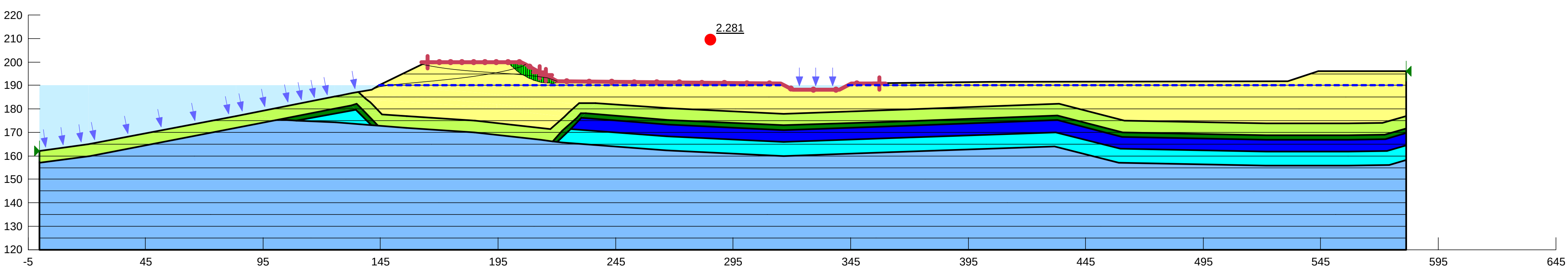
Name: Lake Sediment Layer 2
Unit Weight: 93 pcf
Cohesion': 300 psf
Phi': 0 °

Name: Lake Sediment Layer 1
Unit Weight: 93 pcf
Cohesion': 200 psf
Phi': 0 °

Name: Clay Cap
Unit Weight: 123 pcf
Cohesion': 300 psf
Phi': 20 °

Name: Class 2 AB
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 33 °

Name: Alluvium
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 35 °



Almaden Lake Improvements Project
Alternative 7 Station 10+00
Rapid Drawdown

Name: Levee Fill
Unit Weight: 127 pcf
Cohesion': 100 psf
Phi': 28 °
Total Cohesion: 2,000 psf
Total Phi: 0 °

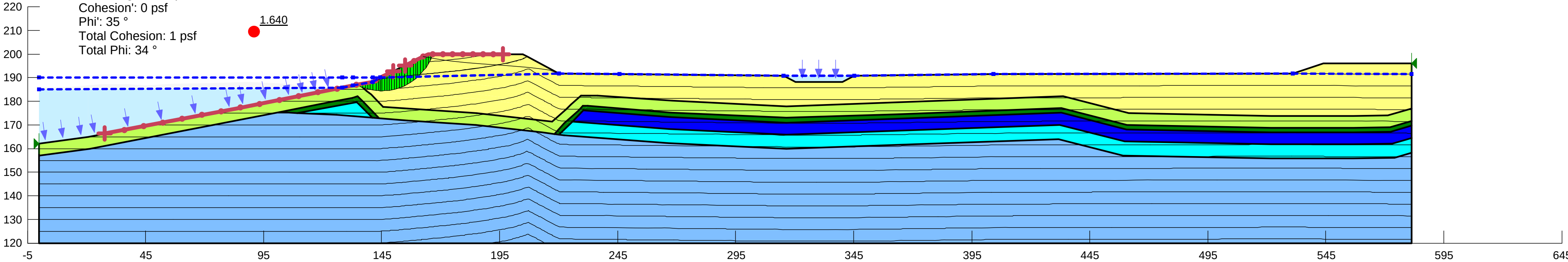
Name: Lake Sediment Layer 2
Unit Weight: 93 pcf
Cohesion': 300 psf
Phi': 1 °
Total Cohesion: 301 psf
Total Phi: 0 °

Name: Lake Sediment Layer 1
Unit Weight: 93 pcf
Cohesion': 200 psf
Phi': 1 °
Total Cohesion: 201 psf
Total Phi: 0 °

Name: Clay Cap
Unit Weight: 123 pcf
Cohesion': 300 psf
Phi': 20 °
Total Cohesion: 2,000 psf
Total Phi: 0 °

Name: Class 2 AB
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 33 °
Total Cohesion: 1 psf
Total Phi: 32 °

Name: Alluvium
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 35 °
Total Cohesion: 1 psf
Total Phi: 34 °



Almaden Lake Improvements Project
Alternative 7 Station 10+00
Rapid Drawdown Left Side

Name: Levee Fill
Unit Weight: 127 pcf
Cohesion': 100 psf
Phi': 28 °
Piezometric Line: 1

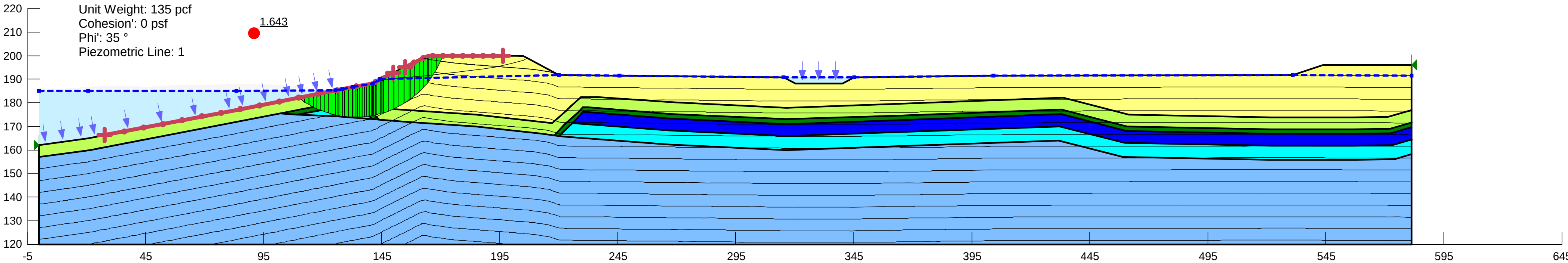
Name: Lake Sediment Layer 2
Unit Weight: 93 pcf
Cohesion': 300 psf
Phi': 0 °
Piezometric Line: 1

Name: Lake Sediment Layer 1
Unit Weight: 93 pcf
Cohesion': 200 psf
Phi': 0 °
Piezometric Line: 1

Name: Clay Cap
Unit Weight: 123 pcf
Cohesion': 300 psf
Phi': 20 °
Piezometric Line: 1

Name: Class 2 AB
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 33 °
Piezometric Line: 1

Name: Alluvium
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 35 °
Piezometric Line: 1



Almaden Lake Improvements Project
Alternative 7 Station 10+00
Rapid Drawdown Right Side

Name: Levee Fill
Unit Weight: 127 pcf
Cohesion': 100 psf
Phi': 28 °
Total Cohesion: 2,000 psf
Total Phi: 0 °
Piezometric Line: 2
Piezometric Line After Drawdown: 1

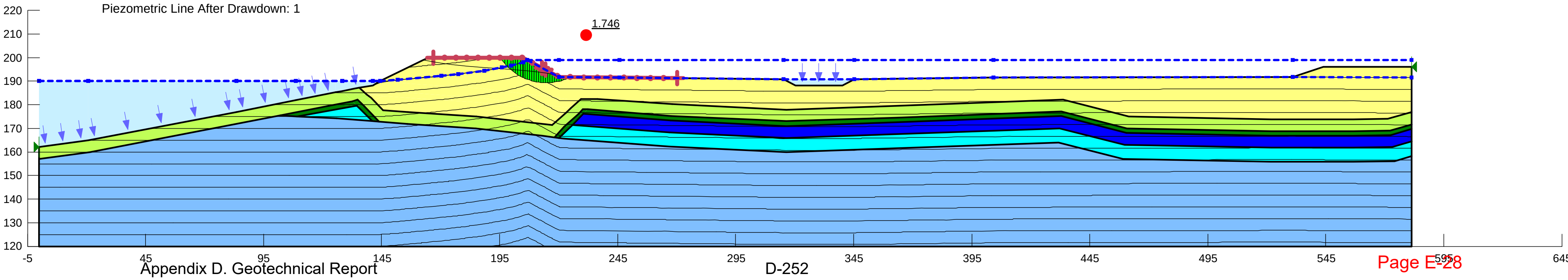
Name: Lake Sediment Layer 2
Unit Weight: 93 pcf
Cohesion': 300 psf
Phi': 1 °
Total Cohesion: 301 psf
Total Phi: 0 °
Piezometric Line: 2
Piezometric Line After Drawdown: 1

Name: Lake Sediment Layer 1
Unit Weight: 93 pcf
Cohesion': 200 psf
Phi': 1 °
Total Cohesion: 201 psf
Total Phi: 0 °
Piezometric Line: 2
Piezometric Line After Drawdown: 1

Name: Clay Cap
Unit Weight: 123 pcf
Cohesion': 300 psf
Phi': 20 °
Total Cohesion: 2,000 psf
Total Phi: 0 °
Piezometric Line: 2
Piezometric Line After Drawdown: 1

Name: Class 2 AB
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 33 °
Total Cohesion: 1 psf
Total Phi: 32 °
Piezometric Line: 2
Piezometric Line After Drawdown: 1

Name: Alluvium
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 35 °
Total Cohesion: 1 psf
Total Phi: 34 °
Piezometric Line: 2
Piezometric Line After Drawdown: 1



Almaden Lake Improvements Project
Alternative 7 Station 10+00
Rapid Drawdown Right Side

Name: Levee Fill
Unit Weight: 127 pcf
Cohesion': 100 psf
Phi': 28 °
Piezometric Line: 1

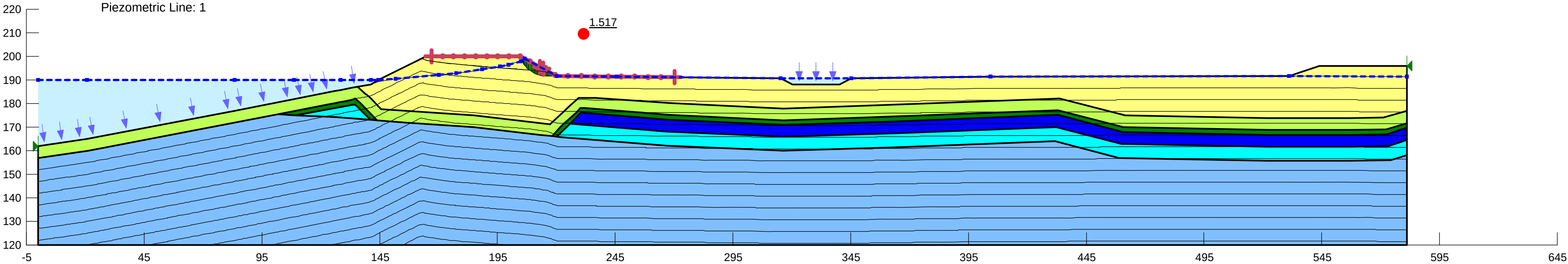
Name: Lake Sediment Layer 2
Unit Weight: 93 pcf
Cohesion': 300 psf
Phi': 0 °
Piezometric Line: 1

Name: Lake Sediment Layer 1
Unit Weight: 93 pcf
Cohesion': 200 psf
Phi': 0 °
Piezometric Line: 1

Name: Clay Cap
Unit Weight: 123 pcf
Cohesion': 300 psf
Phi': 20 °
Piezometric Line: 1

Name: Class 2 AB
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 33 °
Piezometric Line: 1

Name: Alluvium
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 35 °
Piezometric Line: 1



Alternative 7 Station 10+00
Seismic Left Side

Name: Levee Fill
Unit Weight: 127 pcf
Cohesion': 2,000 psf

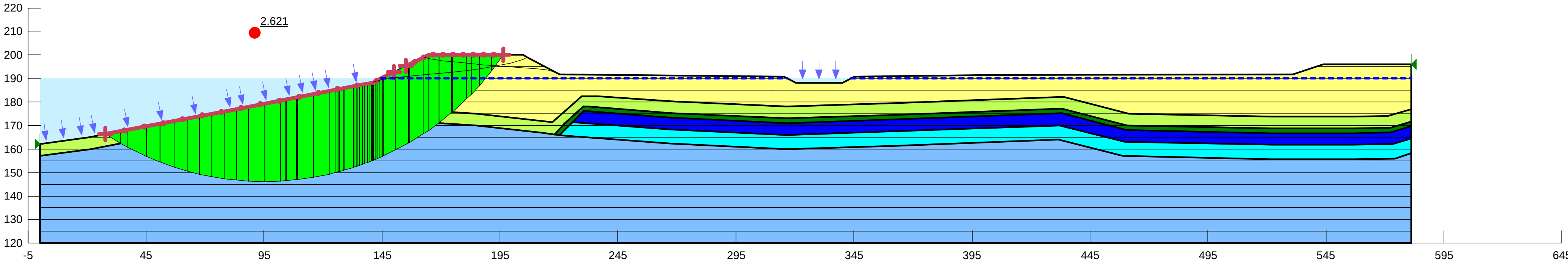
Name: Lake Sediment Layer 2
Unit Weight: 93 pcf
Cohesion': 300 psf

Name: Lake Sediment Layer 1
Unit Weight: 93 pcf
Cohesion': 200 psf

Name: Clay Cap
Unit Weight: 123 pcf
Cohesion': 2,000 psf

Name: Class 2 AB
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 33 °

Name: Alluvium
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 35 °



Alternative 7 Station 10+00
Seismic Left Side

Name: Levee Fill
Unit Weight: 127 pcf
Cohesion': 100 psf
Phi': 28 °

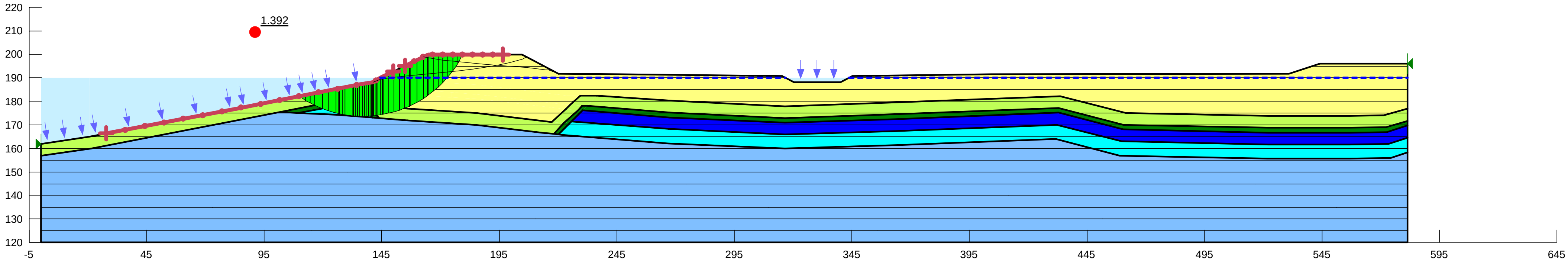
Name: Lake Sediment Layer 2
Unit Weight: 93 pcf
Cohesion': 300 psf
Phi': 0 °

Name: Lake Sediment Layer 1
Unit Weight: 93 pcf
Cohesion': 200 psf
Phi': 0 °

Name: Clay Cap
Unit Weight: 123 pcf
Cohesion': 300 psf
Phi': 20 °

Name: Class 2 AB
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 33 °

Name: Alluvium
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 35 °



Alternative 7 Station 10+00
Seismic Right Side

Name: Levee Fill
Unit Weight: 127 pcf
Cohesion': 2,000 psf

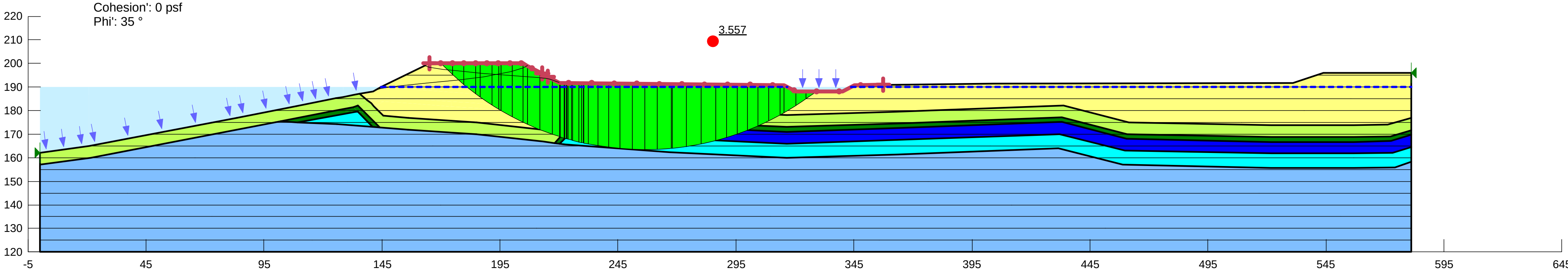
Name: Lake Sediment Layer 2
Unit Weight: 93 pcf
Cohesion': 300 psf

Name: Lake Sediment Layer 1
Unit Weight: 93 pcf
Cohesion': 200 psf

Name: Clay Cap
Unit Weight: 123 pcf
Cohesion': 2,000 psf

Name: Class 2 AB
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 33 °

Name: Alluvium
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 35 °



Alternative 7 Station 10+00
Seismic Right Side

Name: Levee Fill
Unit Weight: 127 pcf
Cohesion': 100 psf
Phi': 28 °

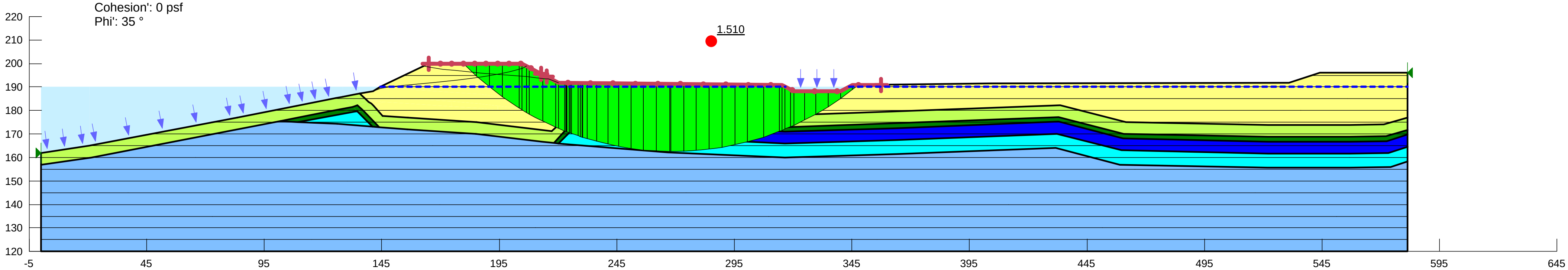
Name: Lake Sediment Layer 2
Unit Weight: 93 pcf
Cohesion': 300 psf
Phi': 0 °

Name: Lake Sediment Layer 1
Unit Weight: 93 pcf
Cohesion': 200 psf
Phi': 0 °

Name: Clay Cap
Unit Weight: 123 pcf
Cohesion': 300 psf
Phi': 20 °

Name: Class 2 AB
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 33 °

Name: Alluvium
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 35 °



Almaden Lake Improvements Project
Alternative 7 Station 12+00
Static Left Side

Name: Levee Fill
Unit Weight: 127 pcf
Cohesion': 100 psf
Phi': 28 °

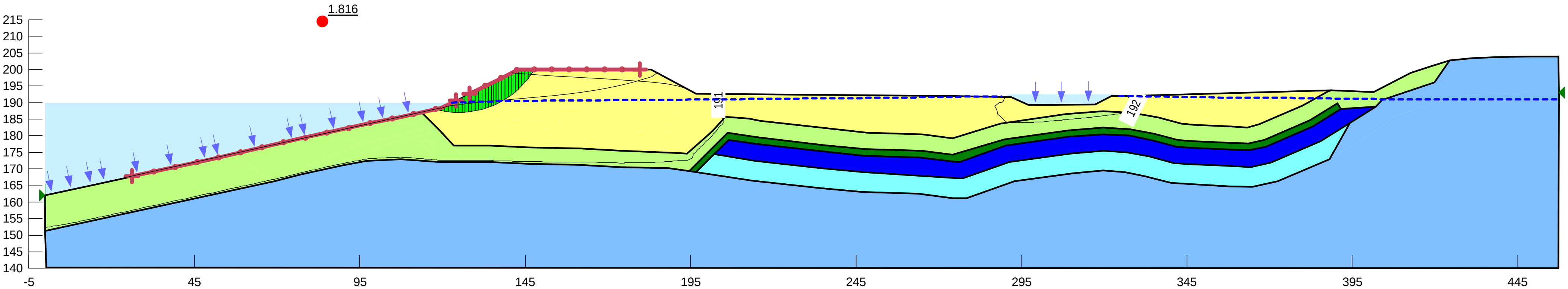
Name: Clay Cap
Unit Weight: 123 pcf
Cohesion': 300 psf
Phi': 20 °

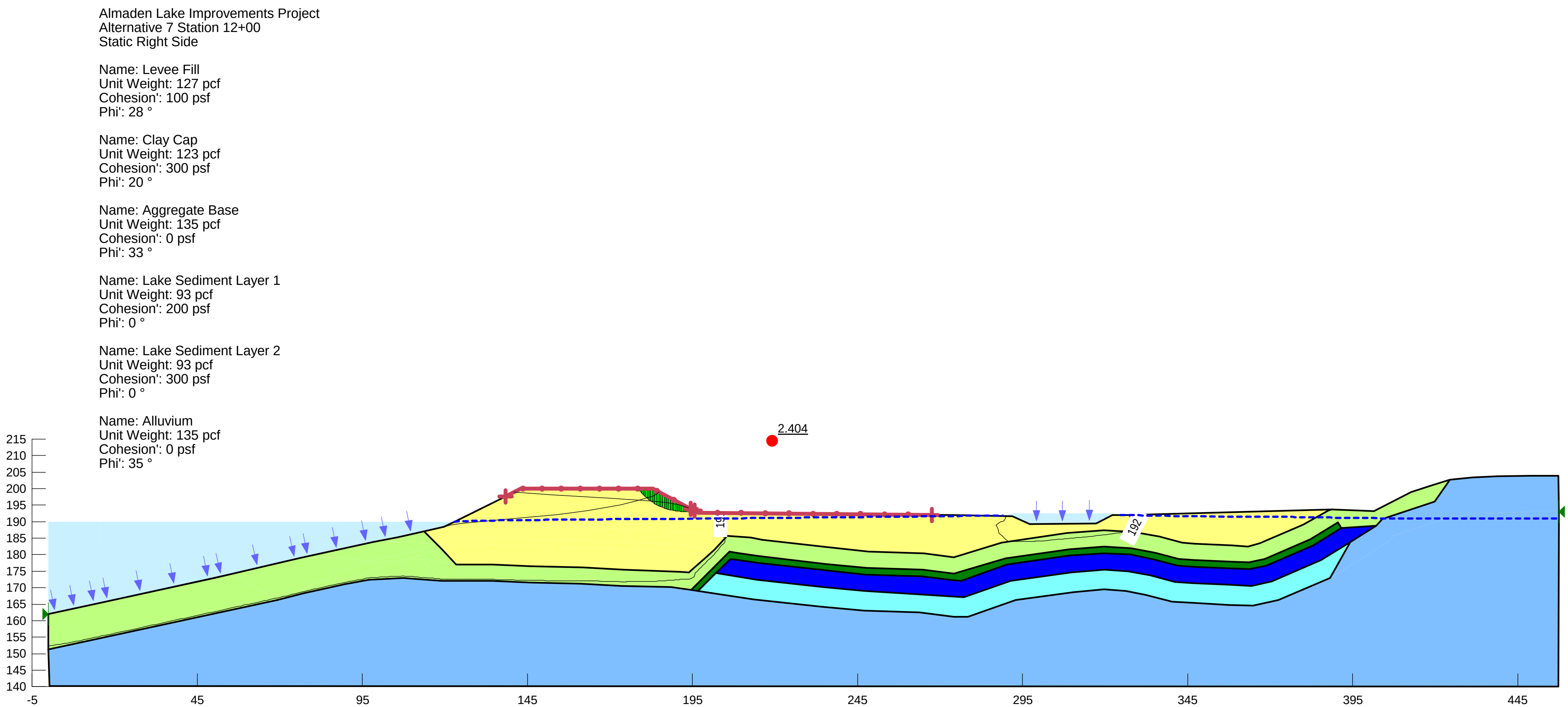
Name: Aggregate Base
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 33 °

Name: Lake Sediment Layer 1
Unit Weight: 93 pcf
Cohesion': 200 psf
Phi': 0 °

Name: Lake Sediment Layer 2
Unit Weight: 93 pcf
Cohesion': 300 psf
Phi': 0 °

Name: Alluvium
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 35 °




Almaden Lake Improvements Project
Alternative 7 Station 12+00
Static Right Side

Name: Levee Fill
Unit Weight: 127 pcf
Cohesion': 100 psf
Phi': 28 °

Name: Clay Cap
Unit Weight: 123 pcf
Cohesion': 300 psf
Phi': 20 °

Name: Aggregate Base
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 33 °

Name: Lake Sediment Layer 1
Unit Weight: 93 pcf
Cohesion': 200 psf
Phi': 0 °

Name: Lake Sediment Layer 2
Unit Weight: 93 pcf
Cohesion': 300 psf
Phi': 0 °

Name: Alluvium
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 35 °

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Almaden Lake Improvements Project
Alternative 7 Station 12+00
End of Construction Lakeside

Name: Levee Fill
Unit Weight: 127 pcf
Cohesion': 100 psf
Phi': 28 °

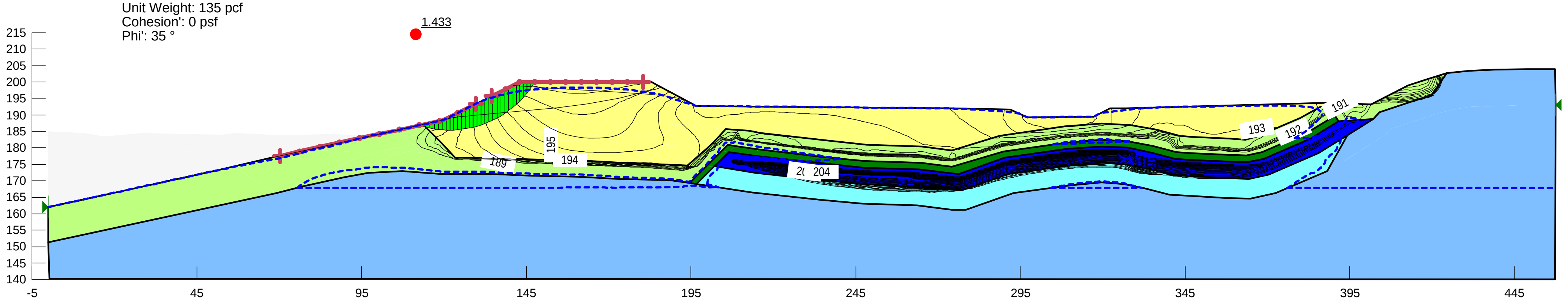
Name: Clay Cap
Unit Weight: 123 pcf
Cohesion': 300 psf
Phi': 20 °

Name: Aggregate Base
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 33 °

Name: Lake Sediment Layer 1
Unit Weight: 93 pcf
Cohesion': 200 psf
Phi': 0 °

Name: Lake Sediment Layer 2
Unit Weight: 93 pcf
Cohesion': 300 psf
Phi': 0 °

Name: Alluvium
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 35 °



Almaden Lake Improvements Project
Alternative 7 Station 12+00
End of Construction Creekside

Name: Levee Fill
Unit Weight: 127 pcf
Cohesion': 100 psf
Phi': 28 °

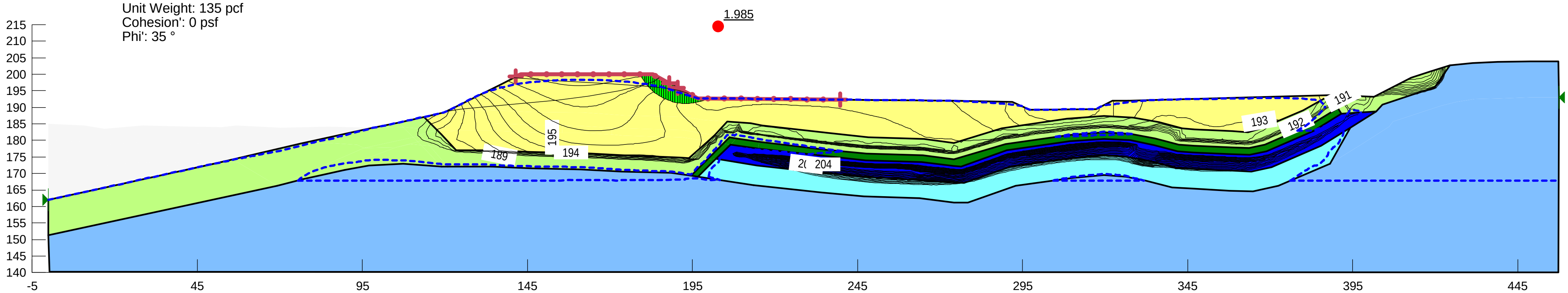
Name: Clay Cap
Unit Weight: 123 pcf
Cohesion': 300 psf
Phi': 20 °

Name: Aggregate Base
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 33 °

Name: Lake Sediment Layer 1
Unit Weight: 93 pcf
Cohesion': 200 psf
Phi': 0 °

Name: Lake Sediment Layer 2
Unit Weight: 93 pcf
Cohesion': 300 psf
Phi': 0 °

Name: Alluvium
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 35 °



Almaden Lake Improvements Project
Alternative 7 Station 12+00
Steady Seepage Left Side

Name: Levee Fill
Unit Weight: 127 pcf
Cohesion': 100 psf
Phi': 28 °

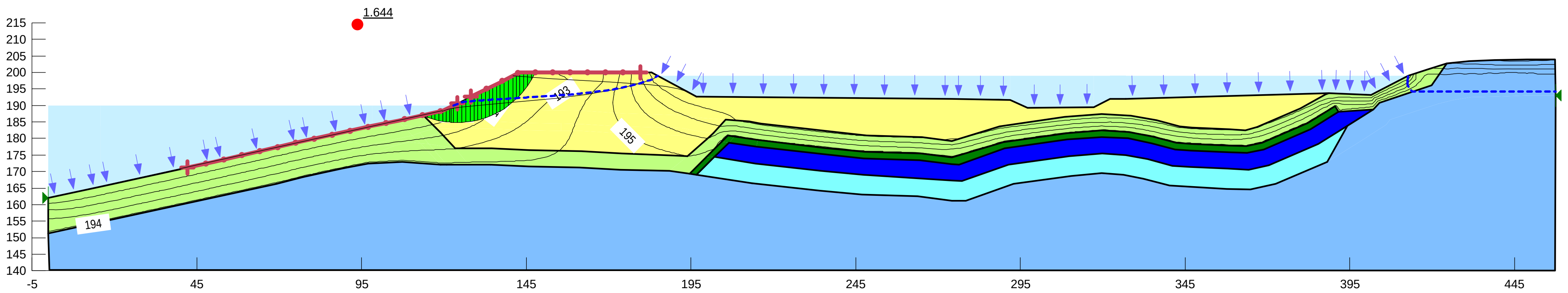
Name: Clay Cap
Unit Weight: 123 pcf
Cohesion': 300 psf
Phi': 20 °

Name: Aggregate Base
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 33 °

Name: Lake Sediment Layer 1
Unit Weight: 93 pcf
Cohesion': 200 psf
Phi': 0 °

Name: Lake Sediment Layer 2
Unit Weight: 93 pcf
Cohesion': 300 psf
Phi': 0 °

Name: Alluvium
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 35 °



Almaden Lake Improvements Project
Alternative 7 Station 12+00
Static Right Side

Name: Levee Fill
Unit Weight: 127 pcf
Cohesion': 100 psf
Phi': 28 °

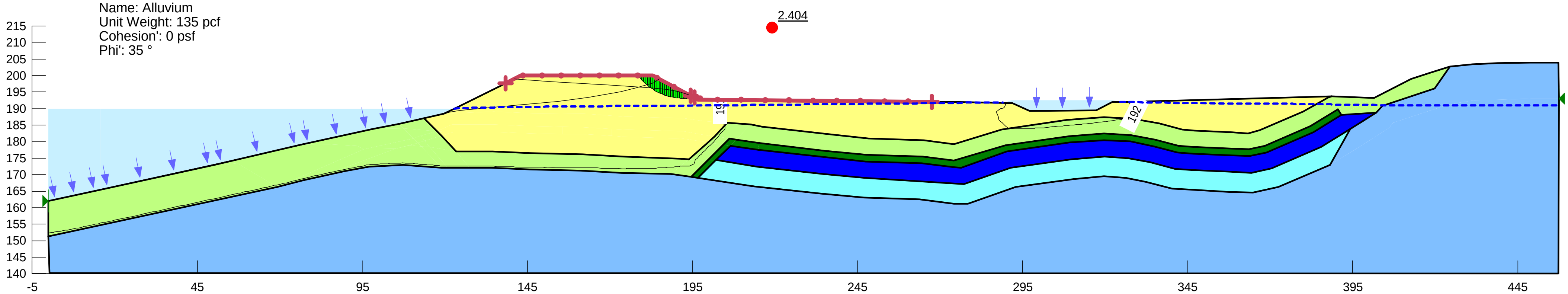
Name: Clay Cap
Unit Weight: 123 pcf
Cohesion': 300 psf
Phi': 20 °

Name: Aggregate Base
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 33 °

Name: Lake Sediment Layer 1
Unit Weight: 93 pcf
Cohesion': 200 psf
Phi': 0 °

Name: Lake Sediment Layer 2
Unit Weight: 93 pcf
Cohesion': 300 psf
Phi': 0 °

Name: Alluvium
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 35 °



Almaden Lake Improvements Project
Alternative 7 Station 12+00
Rapid Drawdown Left Side

Name: Levee Fill
Unit Weight: 127 pcf
Cohesion': 100 psf
Phi': 28 °
Total Cohesion: 200 psf
Total Phi: 0 °
Piezometric Line: 2
Piezometric Line After Drawdown: 1

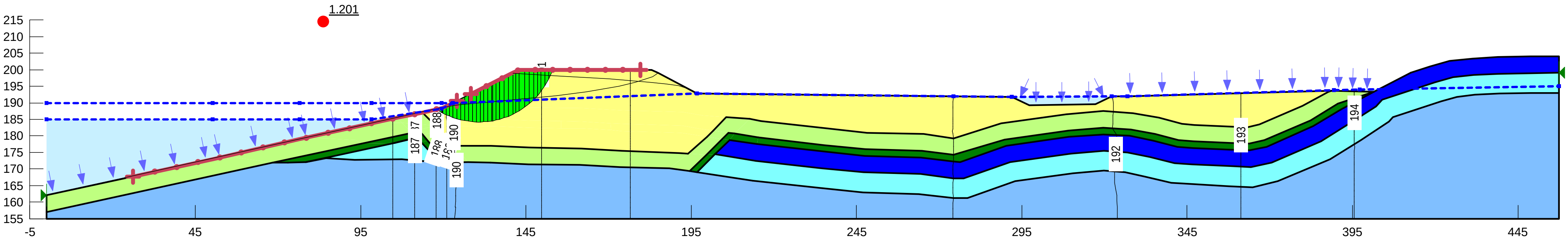
Name: Clay Cap
Unit Weight: 123 pcf
Cohesion': 300 psf
Phi': 20 °
Total Cohesion: 2,000 psf
Total Phi: 0 °
Piezometric Line: 2
Piezometric Line After Drawdown: 1

Name: Aggregate Base
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 33 °
Total Cohesion: 1 psf
Total Phi: 32 °
Piezometric Line: 2
Piezometric Line After Drawdown: 1

Name: Lake Sediment Layer 1
Unit Weight: 93 pcf
Cohesion': 200 psf
Phi': 1 °
Total Cohesion: 201 psf
Total Phi: 0 °
Piezometric Line: 2
Piezometric Line After Drawdown: 1

Name: Lake Sediment Layer 2
Unit Weight: 93 pcf
Cohesion': 300 psf
Phi': 1 °
Total Cohesion: 301 psf
Total Phi: 0 °
Piezometric Line: 2
Piezometric Line After Drawdown: 1

Name: Alluvium
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 35 °
Total Cohesion: 1 psf
Total Phi: 34 °
Piezometric Line: 2
Piezometric Line After Drawdown: 1



Almaden Lake Improvements Project
Alternative 7 Station 12+00
Rapid Drawdown Left Side

Name: Levee Fill
Unit Weight: 127 pcf
Cohesion': 100 psf
Phi': 28 °
Piezometric Line: 1

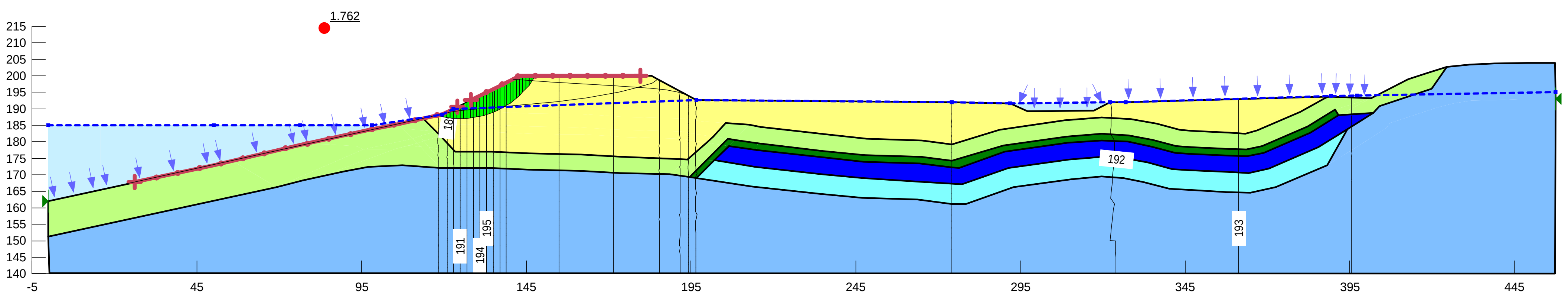
Name: Clay Cap
Unit Weight: 123 pcf
Cohesion': 300 psf
Phi': 20 °
Piezometric Line: 1

Name: Aggregate Base
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 33 °
Piezometric Line: 1

Name: Lake Sediment Layer 1
Unit Weight: 93 pcf
Cohesion': 200 psf
Phi': 0 °
Piezometric Line: 1

Name: Lake Sediment Layer 2
Unit Weight: 93 pcf
Cohesion': 300 psf
Phi': 0 °
Piezometric Line: 1

Name: Alluvium
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 35 °
Piezometric Line: 1



Almaden Lake Improvements Project
Alternative 7 Station 12+00
Rapid Drawdown Right Side

Name: Levee Fill
Unit Weight: 127 pcf
Cohesion': 100 psf
Phi': 28 °
Total Cohesion: 200 psf
Total Phi: 0 °
Piezometric Line: 2
Piezometric Line After Drawdown: 1

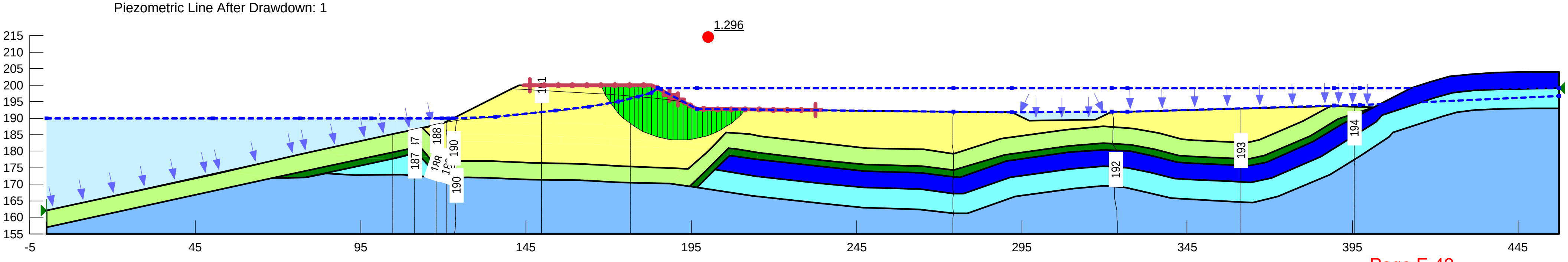
Name: Clay Cap
Unit Weight: 123 pcf
Cohesion': 300 psf
Phi': 20 °
Total Cohesion: 2,000 psf
Total Phi: 0 °
Piezometric Line: 2
Piezometric Line After Drawdown: 1

Name: Aggregate Base
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 33 °
Total Cohesion: 1 psf
Total Phi: 32 °
Piezometric Line: 2
Piezometric Line After Drawdown: 1

Name: Lake Sediment Layer 1
Unit Weight: 93 pcf
Cohesion': 200 psf
Phi': 1 °
Total Cohesion: 201 psf
Total Phi: 0 °
Piezometric Line: 2
Piezometric Line After Drawdown: 1

Name: Lake Sediment Layer 2
Unit Weight: 93 pcf
Cohesion': 300 psf
Phi': 1 °
Total Cohesion: 301 psf
Total Phi: 0 °
Piezometric Line: 2
Piezometric Line After Drawdown: 1

Name: Alluvium
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 35 °
Total Cohesion: 1 psf
Total Phi: 34 °
Piezometric Line: 2
Piezometric Line After Drawdown: 1



Almaden Lake Improvements Project
Alternative 7 Station 12+00
Rapid Drawdown Right Side

Name: Levee Fill
Unit Weight: 127 pcf
Cohesion': 100 psf
Phi': 28 °
Piezometric Line: 1

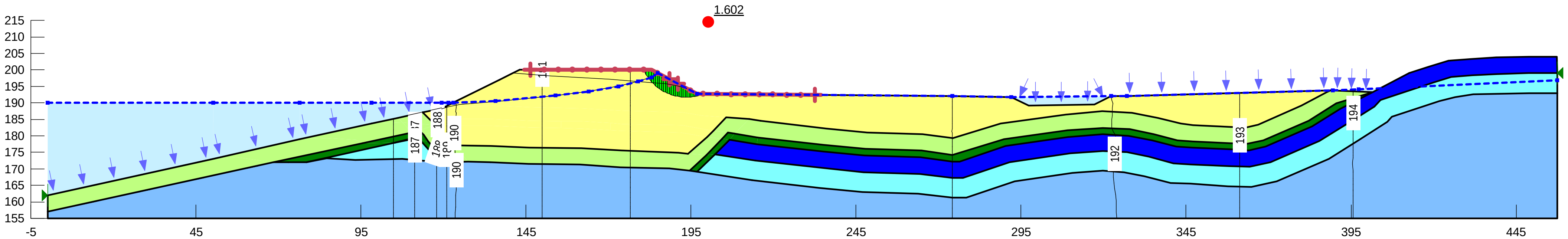
Name: Clay Cap
Unit Weight: 123 pcf
Cohesion': 300 psf
Phi': 20 °
Piezometric Line: 1

Name: Aggregate Base
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 33 °
Piezometric Line: 1

Name: Lake Sediment Layer 1
Unit Weight: 93 pcf
Cohesion': 200 psf
Phi': 0 °
Piezometric Line: 1

Name: Lake Sediment Layer 2
Unit Weight: 93 pcf
Cohesion': 300 psf
Phi': 0 °
Piezometric Line: 1

Name: Alluvium
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 35 °
Piezometric Line: 1



Almaden Lake Improvements Project
Alternative 7 Station 12+00
Seismic Left Side

Name: Levee Fill
Unit Weight: 127 pcf
Cohesion': 2,000 psf

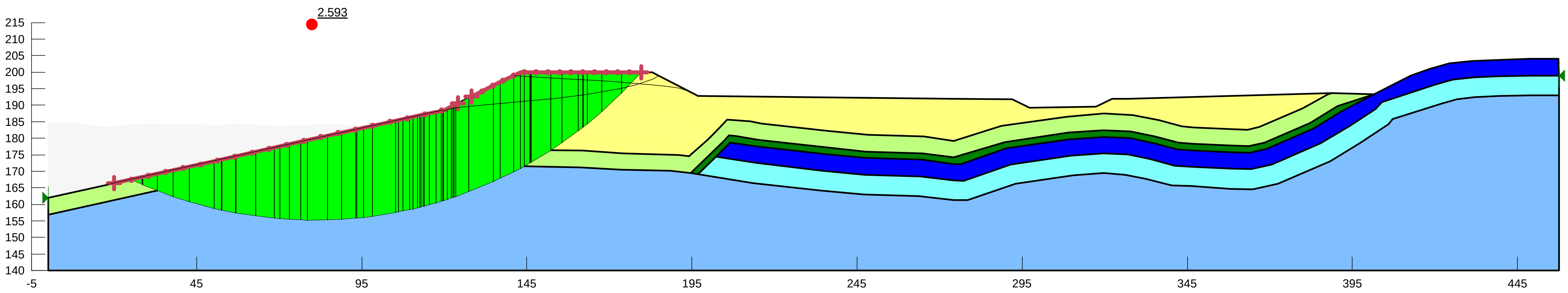
Name: Clay Cap
Unit Weight: 123 pcf
Cohesion': 2,000 psf

Name: Aggregate Base
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 33 °

Name: Lake Sediment Layer 1
Unit Weight: 93 pcf
Cohesion': 200 psf

Name: Lake Sediment Layer 2
Unit Weight: 93 pcf
Cohesion': 300 psf

Name: Alluvium
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 35 °



Almaden Lake Improvements Project
Alternative 7 Station 12+00
Seismic Left Side

Name: Levee Fill
Unit Weight: 127 pcf
Cohesion': 100 psf
Phi': 28 °

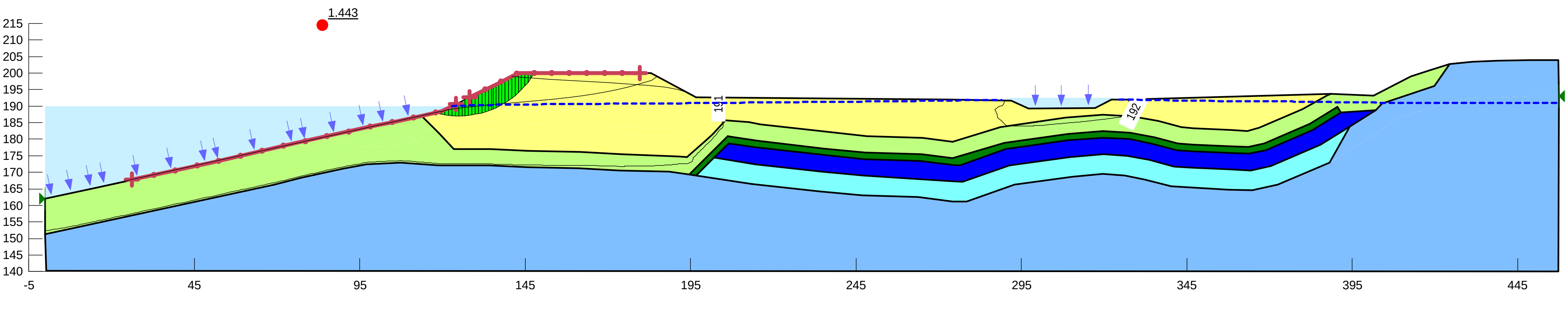
Name: Clay Cap
Unit Weight: 123 pcf
Cohesion': 300 psf
Phi': 20 °

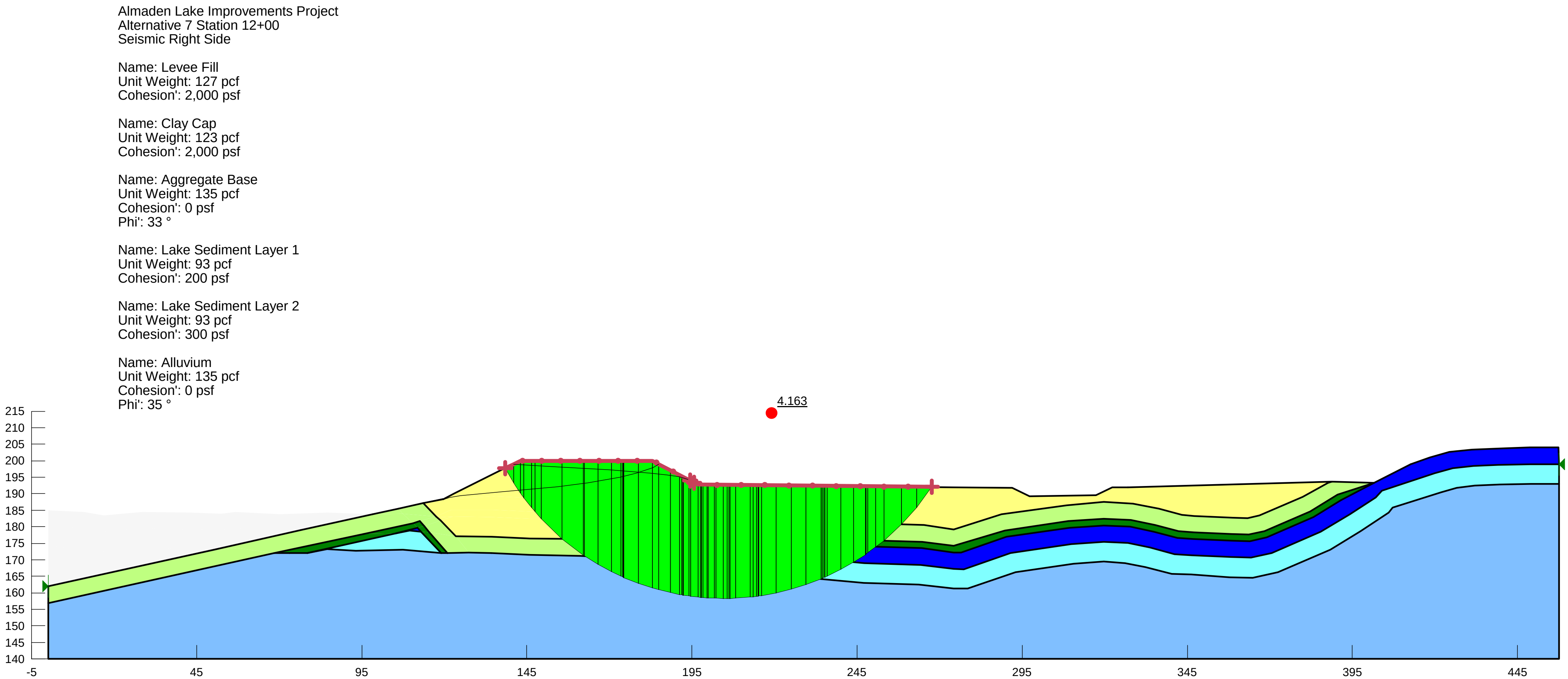
Name: Aggregate Base
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 33 °

Name: Lake Sediment Layer 1
Unit Weight: 93 pcf
Cohesion': 200 psf
Phi': 0 °

Name: Lake Sediment Layer 2
Unit Weight: 93 pcf
Cohesion': 300 psf
Phi': 0 °

Name: Alluvium
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 35 °




Almaden Lake Improvements Project
Alternative 7 Station 12+00
Seismic Right Side

Name: Levee Fill
Unit Weight: 127 pcf
Cohesion': 2,000 psf

Name: Clay Cap
Unit Weight: 123 pcf
Cohesion': 2,000 psf

Name: Aggregate Base
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 33 °

Name: Lake Sediment Layer 1
Unit Weight: 93 pcf
Cohesion': 200 psf

Name: Lake Sediment Layer 2
Unit Weight: 93 pcf
Cohesion': 300 psf

Name: Alluvium
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 35 °

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Almaden Lake Improvements Project
Alternative 7 Station 12+00
Seismic Right Side

Name: Levee Fill
Unit Weight: 127 pcf
Cohesion': 100 psf
Phi': 28 °

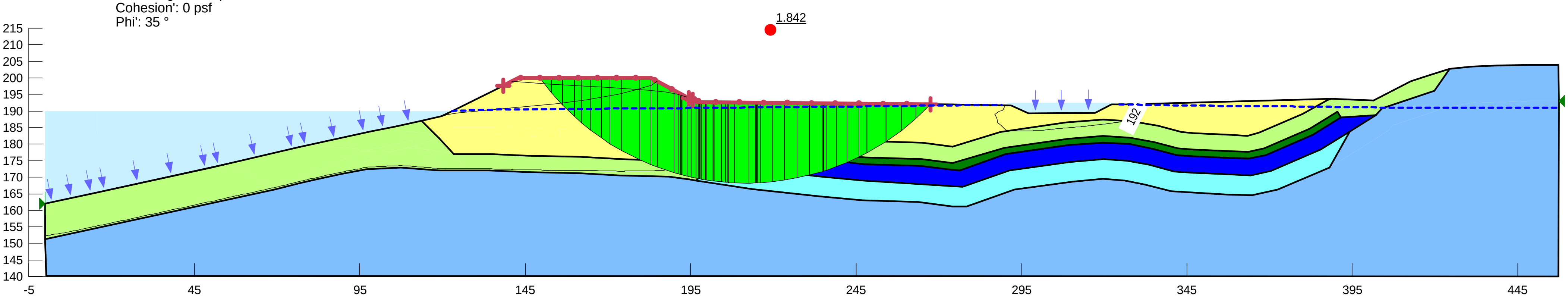
Name: Clay Cap
Unit Weight: 123 pcf
Cohesion': 300 psf
Phi': 20 °

Name: Aggregate Base
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 33 °

Name: Lake Sediment Layer 1
Unit Weight: 93 pcf
Cohesion': 200 psf
Phi': 0 °

Name: Lake Sediment Layer 2
Unit Weight: 93 pcf
Cohesion': 300 psf
Phi': 0 °

Name: Alluvium
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 35 °



APPENDIX F

Settlement Calculations

CE&G
Cal Engineering & Geology

DOCUMENT REVIEW COVER SHEET

1. Project Name Almaden Lake Improvement Project	2. Project Number 140540
3. Document Title Appendix F Settlement Analysis	
4. Document Status Designation ☐ Preliminary ☒ Final ☐ Cancelled	
5. Notes/Comments The purpose of this calculation is to perform a settlement analysis in conformance with USACE guidelines (USACE, 2000).	

Attachments	Total No. of Pages
Excel Calculation of Anticipated Settlement at the Crest of the Levee	1
SIGMA/W Calculation of Settlement Profile along each Cross Section	3
Hand Calculation For Time To Reach 95% Consolidation	1
Wb-1 Cc, Cr, And Cv Determination	13
Wb-1 Cc, Cr, And Cv Determination	11

RECORD OF REVISIONS

6. No.	7. Reason For Revision	8. Tot. Pgs	10. Originator (Print/Sign/Date)	11. Checker (Print/Sign/Date)	12. QA/QC (Print/Sign/Date)	13. Apprvd./Accptd (Print/Sign)	14. Date (M/D/YY)
1	Final Issue	29	Eli Zane	Dan Peluso	Dan Peluso	Dan Peluso	4/30/15

	Sublayer Properties						Sublayer Depth			Sublayer Thickness	Effective Stress	Preconsolidation Pressure	Pressure Change	X times initial effective	Final Pressure	Void Ratio	Compression Ratio		Recompression Vertical Strain	Virgin Vertical Strain	Total Vertical Strain	Change in Thickness (in)
Layer #	Soil Type (USCS)	γ_d (lb/ft^3)	ω (%)	γ (lb/ft^3)	γ_w (lb/ft^3)	γ' (lb/ft^3)	Top (ft)	Bottom (ft)	Average (ft)	H_o (ft)	σ'_{vo} (lb/ft^2)	σ'_p (lb/ft^2)	Δ_P (lb.ft^2)		P_f (lb/ft^2)	e_0	Recompression $C_{\varepsilon r}$	Virgin $C_{\varepsilon C}$	$\varepsilon_r{*}_z$	$\varepsilon_v{*}_z$	$\varepsilon_t{*}_z$	$\varepsilon_z H_0 = \Delta H$
1	Lake Sed	49	74	93	62.4	31	0.0	1.0	0.5	1.0	15	430	2,738	179.0	2,753	2.09	0.060	0.180	0.0281	0.1452	0.1733	2.08
2	Lake Sed	49	74	93	62.4	31	1.0	2.0	1.5	1.0	46	430	2,738	59.7	2,784	2.09	0.060	0.180	0.0189	0.1460	0.1649	1.98
3	Lake Sed	49	74	93	62.4	31	2.0	3.0	2.5	1.0	77	430	2,738	35.8	2,815	2.09	0.060	0.180	0.0146	0.1469	0.1614	1.94
4	Lake Sed	49	74	93	62.4	31	3.0	4.0	3.5	1.0	107	430	2,738	25.6	2,845	2.09	0.060	0.180	0.0117	0.1477	0.1594	1.91
5	Lake Sed	49	74	93	62.4	31	4.0	5.0	4.5	1.0	138	430	2,738	19.9	2,876	2.09	0.060	0.180	0.0096	0.1486	0.1582	1.90
6	Lake Sed	49	74	93	62.4	31	5.0	6.0	5.5	1.0	168	430	2,738	16.3	2,906	2.09	0.060	0.180	0.0079	0.1494	0.1573	1.89
7	Lake Sed	49	74	93	62.4	31	6.0	7.0	6.5	1.0	199	630	2,738	13.8	2,937	2.09	0.020	0.220	0.0032	0.1471	0.1503	1.80
8	Lake Sed	49	74	93	62.4	31	7.0	8.0	7.5	1.0	230	630	2,738	11.9	2,968	2.09	0.020	0.220	0.0028	0.1481	0.1509	1.81
9	Lake Sed	49	74	93	62.4	31	8.0	9.0	8.5	1.0	260	630	2,738	10.5	2,998	2.09	0.020	0.220	0.0025	0.1491	0.1515	1.82
10	Lake Sed	49	74	93	62.4	31	9.0	10.0	9.5	1.0	291	630	2,738	9.4	3,029	2.09	0.020	0.220	0.0022	0.1500	0.1522	1.83
11	Lake Sed	49	74	93	62.4	31	10.0	11.0	10.5	1.0	321	630	2,738	8.5	3,059	2.09	0.020	0.220	0.0019	0.1510	0.1529	1.83
																					Total =	20.8

Page F-1

Almaden Lake Improvements Project
Alternative 6 Station 2+50
Settlement Profile

Name: Levee Fill
Model: Linear Elastic (w/ PWP Change)
Effective Young's Modulus (E'): 280,000 psf
Unit Weight: 127 pcf
Poisson's Ratio: 0.35

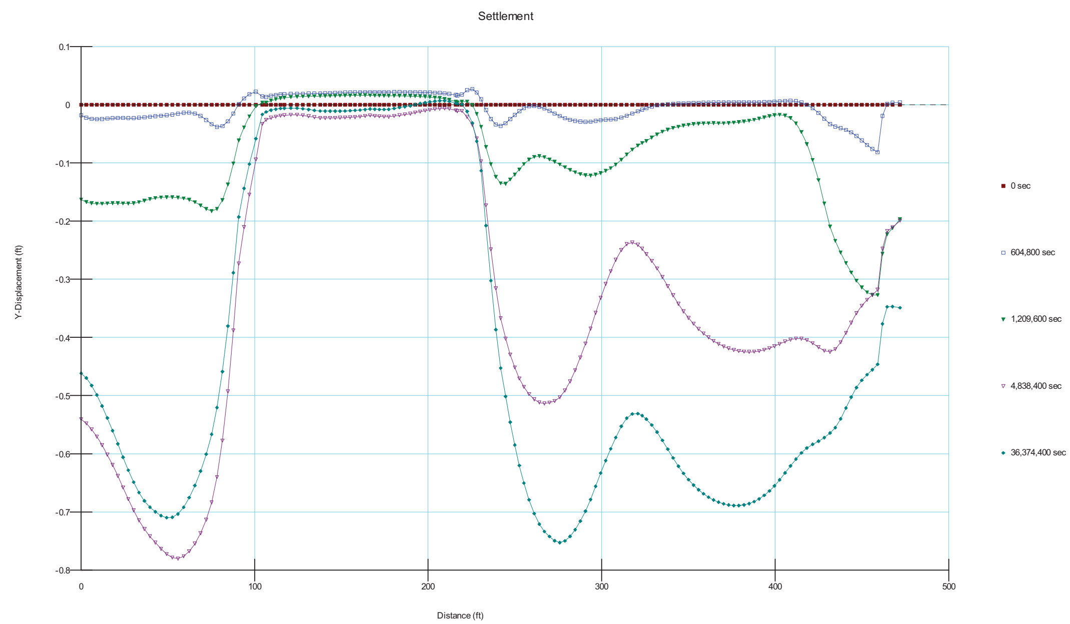
Name: Clay Cap
Model: Linear Elastic (w/ PWP Change)
Effective Young's Modulus (E'): 200,000 psf
Unit Weight: 123 pcf
Poisson's Ratio: 0.35

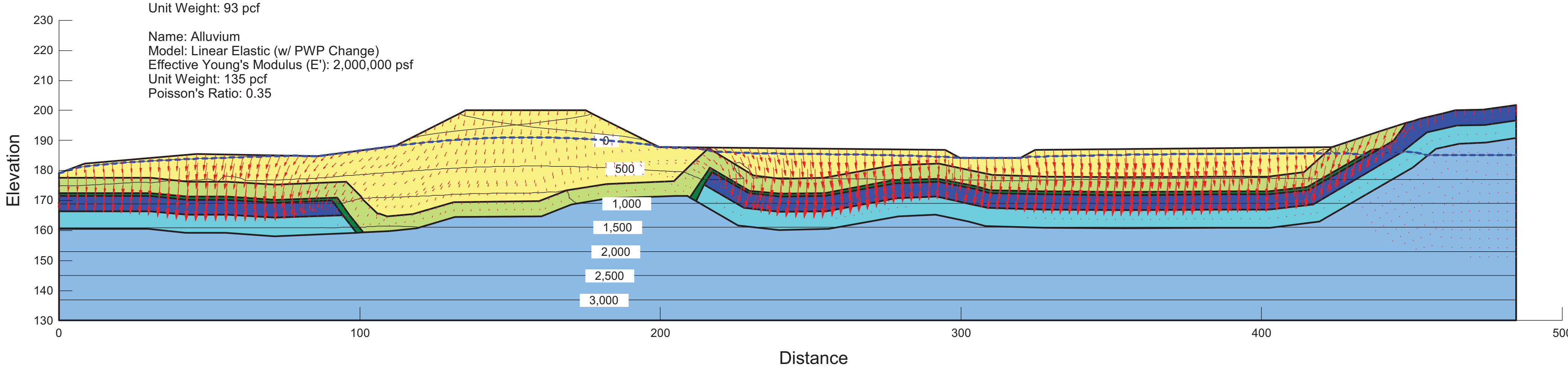
Name: Class 2 AB
Model: Linear Elastic (w/ PWP Change)
Effective Young's Modulus (E'): 1,500,000 psf
Unit Weight: 135 pcf
Poisson's Ratio: 0.35

Name: Lake Sediment Layer 2
Model: Soft Clay (MCC w/ PWP Change)
O.C. Ratio: 2.7
Poisson's Ratio: 0.33
Lambda: 0.28
Kappa: 0.022
Initial Void Ratio: 2
Unit Weight: 93 pcf

Name: Lake Sediment Layer 1
Model: Soft Clay (MCC w/ PWP Change)
O.C. Ratio: 3
Poisson's Ratio: 0.33
Lambda: 0.24
Kappa: 0.08
Initial Void Ratio: 2.06
Unit Weight: 93 pcf

Name: Alluvium
Model: Linear Elastic (w/ PWP Change)
Effective Young's Modulus (E'): 2,000,000 psf
Unit Weight: 135 pcf
Poisson's Ratio: 0.35





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Almaden Lake Improvements Project
Alternative 7 Station 10+00
Settlement Profile

Name: Levee Fill
Model: Linear Elastic (w/ PWP Change)
Effective Young's Modulus (E'): 280,000 psf
Unit Weight: 127 pcf
Poisson's Ratio: 0.35

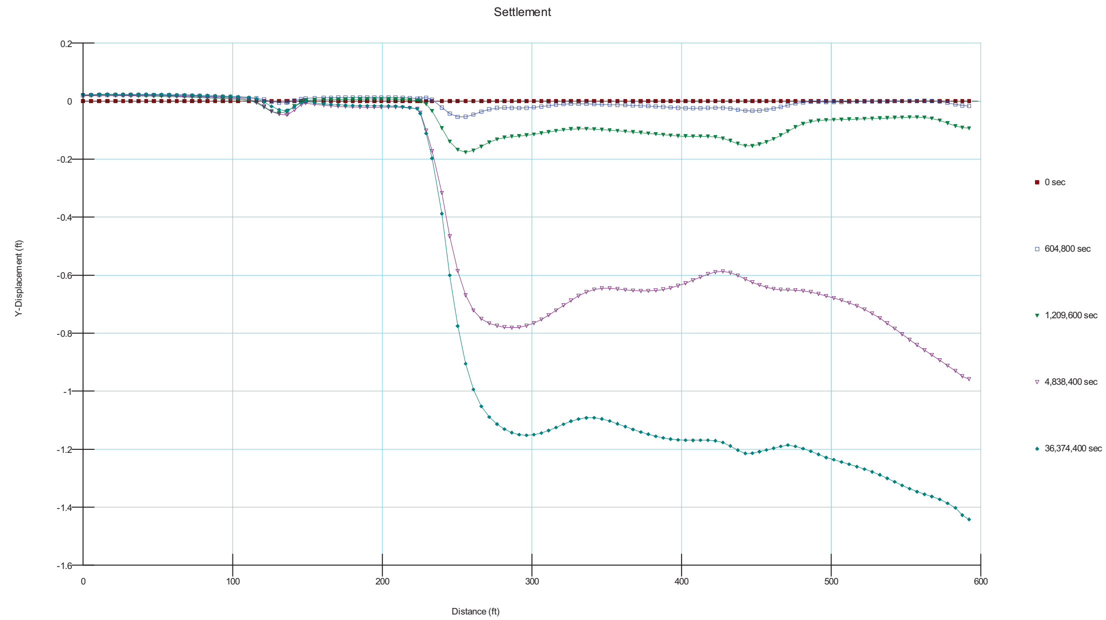
Name: Lake Sediment Layer 2
Model: Soft Clay (MCC w/ PWP Change)
O.C. Ratio: 2.7
Poisson's Ratio: 0.33
Lambda: 0.28
Kappa: 0.022
Initial Void Ratio: 2
Unit Weight: 93 pcf

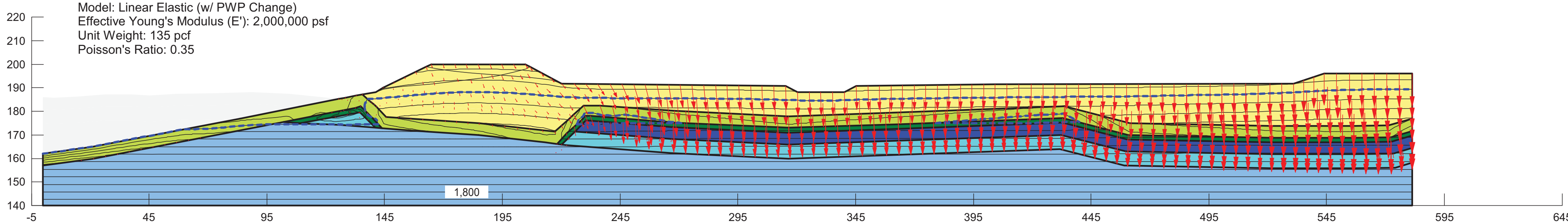
Name: Lake Sediment Layer 1
Model: Soft Clay (MCC w/ PWP Change)
O.C. Ratio: 3
Poisson's Ratio: 0.33
Lambda: 0.24
Kappa: 0.08
Initial Void Ratio: 2.06
Unit Weight: 93 pcf

Name: Clay Cap
Model: Linear Elastic (w/ PWP Change)
Effective Young's Modulus (E'): 200,000 psf
Unit Weight: 123 pcf
Poisson's Ratio: 0.35

Name: Class 2 AB
Model: Linear Elastic (w/ PWP Change)
Effective Young's Modulus (E'): 1,500,000 psf
Unit Weight: 135 pcf
Poisson's Ratio: 0.35

Name: Alluvium
Model: Linear Elastic (w/ PWP Change)
Effective Young's Modulus (E'): 2,000,000 psf
Unit Weight: 135 pcf
Poisson's Ratio: 0.35





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Almaden Lake Improvements Project
Alternative 7 Station 12+00
Settlement Profile

Name: Levee Fill
Model: Linear Elastic (w/ PWP Change)
Effective Young's Modulus (E'): 280,000 psf
Unit Weight: 127 pcf
Poisson's Ratio: 0.35

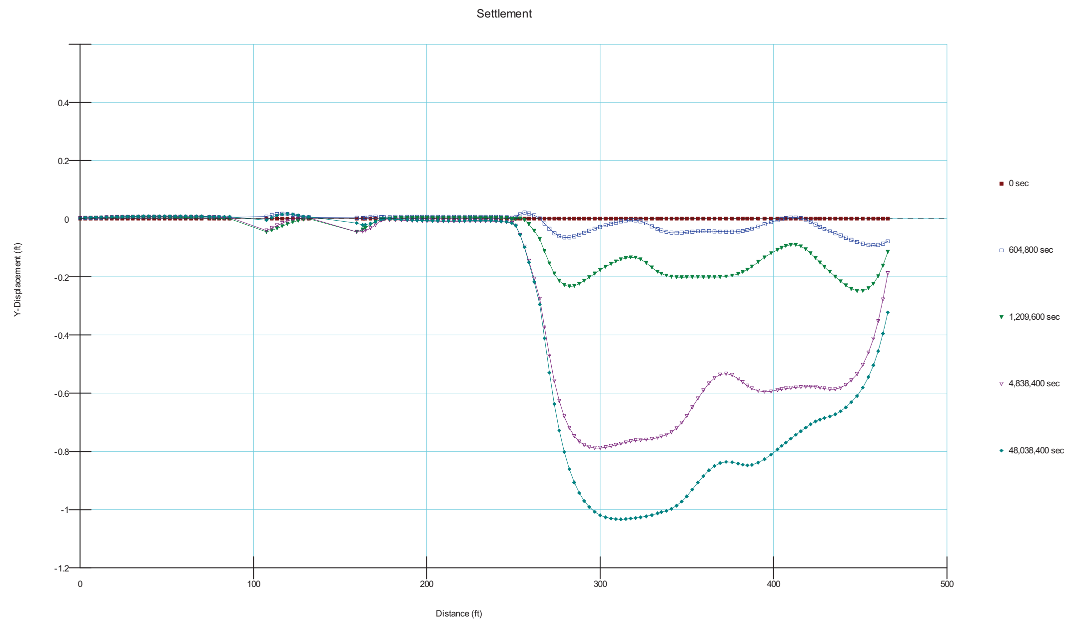
Name: Clay Cap
Model: Linear Elastic (w/ PWP Change)
Effective Young's Modulus (E'): 200,000 psf
Unit Weight: 123 pcf
Poisson's Ratio: 0.35

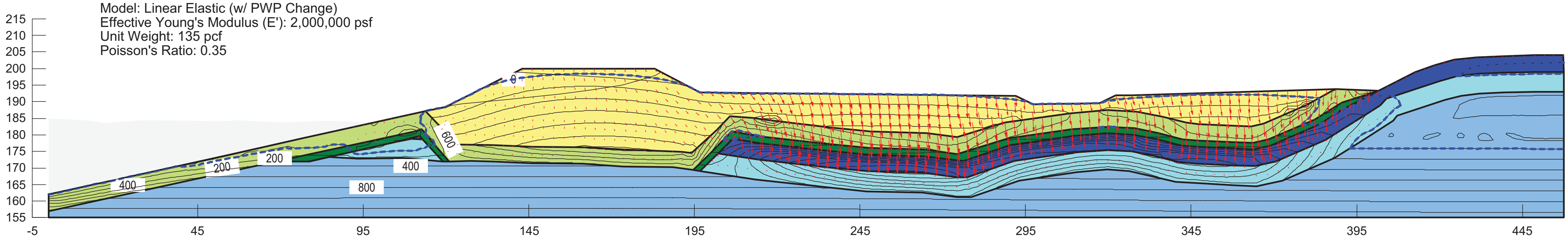
Name: Aggregate Base
Model: Linear Elastic (w/ PWP Change)
Effective Young's Modulus (E'): 1,500,000 psf
Unit Weight: 135 pcf
Poisson's Ratio: 0.35

Name: Lake Sediment Layer 1
Model: Soft Clay (MCC w/ PWP Change)
O.C. Ratio: 3
Poisson's Ratio: 0.33
Lambda: 0.24
Kappa: 0.08
Initial Void Ratio: 2.06
Unit Weight: 93 pcf

Name: Lake Sediment Layer 2
Model: Soft Clay (MCC w/ PWP Change)
O.C. Ratio: 2.7
Poisson's Ratio: 0.33
Lambda: 0.28
Kappa: 0.022
Initial Void Ratio: 2
Unit Weight: 93 pcf

Name: Alluvium
Model: Linear Elastic (w/ PWP Change)
Effective Young's Modulus (E'): 2,000,000 psf
Unit Weight: 135 pcf
Poisson's Ratio: 0.35





CE&G CAL ENGINEERING & GEOLOGY

Project: Almaden Lake Improvements | Project No.: 140546 | Sheet: ___ of ___
Item: Time rate of Settlement Double Drainage | Designer: E. Zaw | Date: 12/16/14
Checker: ___ | Date: ___

Lake Sediment Time until 95% settlement due to Consolidation

$T_v = \frac{C_v t}{H^2}$

$T_v = 1.129$ for 95%

$H = 11'$

$C_{v_{WB-1L}} = 14.86 \ \frac{ft^2}{yr}$

$C_{v_{WB-1U}} = 75.42 \ \frac{ft^2}{yr}$

$C_{v_{WB-2L}} = 166 \ \frac{ft^2}{yr}$

$C_{v_{WB-2U}} = 283 \ \frac{ft^2}{yr}$

WB-1

$t = \frac{T_v H^2}{C_v}$

$t_L = \frac{1.129(5.5^2)}{14.86} = 2.3$ yrs 0.47

$t_U = \frac{1.129(5.5^2)}{75.42} = 0.45$ yrs 0.09

WB-2

$t_L = \frac{1.129(5.5)^2}{166} = 0.21$ yrs 0.06

$t_U = \frac{1.129(5.5)^2}{283} = 0.12$ yrs 0.036

0.53 – 6.5 month

0.126 – 1.5 month

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WB-1

$$C_c = \frac{\varepsilon_2 - \varepsilon_1}{(\log \sigma'_z)_2 - (\log \sigma'_z)_1}(1 + e_o) = \text{compression index}$$

$$= \frac{0.3252 - 0.1376}{\log(8{,}800) - \log(800)}(1 + 2.064) = 0.552$$

$$\boxed{C_c = 0.552}$$

$$C_c = \frac{PI}{74} = \frac{19}{74}$$

$$\boxed{C_c = 0.257}$$

$$C_c' = \frac{C_c}{1 + e_o} = \text{compression ratio}$$

$$\boxed{C_c' = 0.18}$$

$$C_r = \frac{\varepsilon_2 - \varepsilon_1}{(\log \sigma'_z)_2 - (\log \sigma'_z)_1}(1 + e_o) = \text{recompression index}$$

$$= \frac{0.0596 - 0.0314}{\log(150) - \log(50)}(1 + 2.064)$$

$$\boxed{C_r = 0.181}$$

$$C_r = \frac{I_p}{370} = \frac{19}{370}$$

$$\boxed{C_r = 0.05}$$

$$C_r' = \frac{C_r}{1 + e_o} = \text{recompression ratio}$$

$$\boxed{C_r' = 0.059}$$

$C_v \Rightarrow$ See Cooper Testing Spreadsheet (Data Entry Tab)

Load #	Load (psf)	C_v ($\frac{ft^2}{yr}$)
6	1,100	34.01 ✓
7	1,600	38.74 ✓
8	2,200	14.86 ✓
9	4,400	38.07 ✓
10	8,800	56.38 ✓
11	17,600	75.42 ✓

WB-1
LL = 45
PL = 26
PI = 19

LL %	C_v $\frac{ft^2}{yr}$
30	20 to 360
40	12 to 230 ✓
50	8 to 150
60	5 to 90
70	3 to 58

Terzaghi & Peck, 1967

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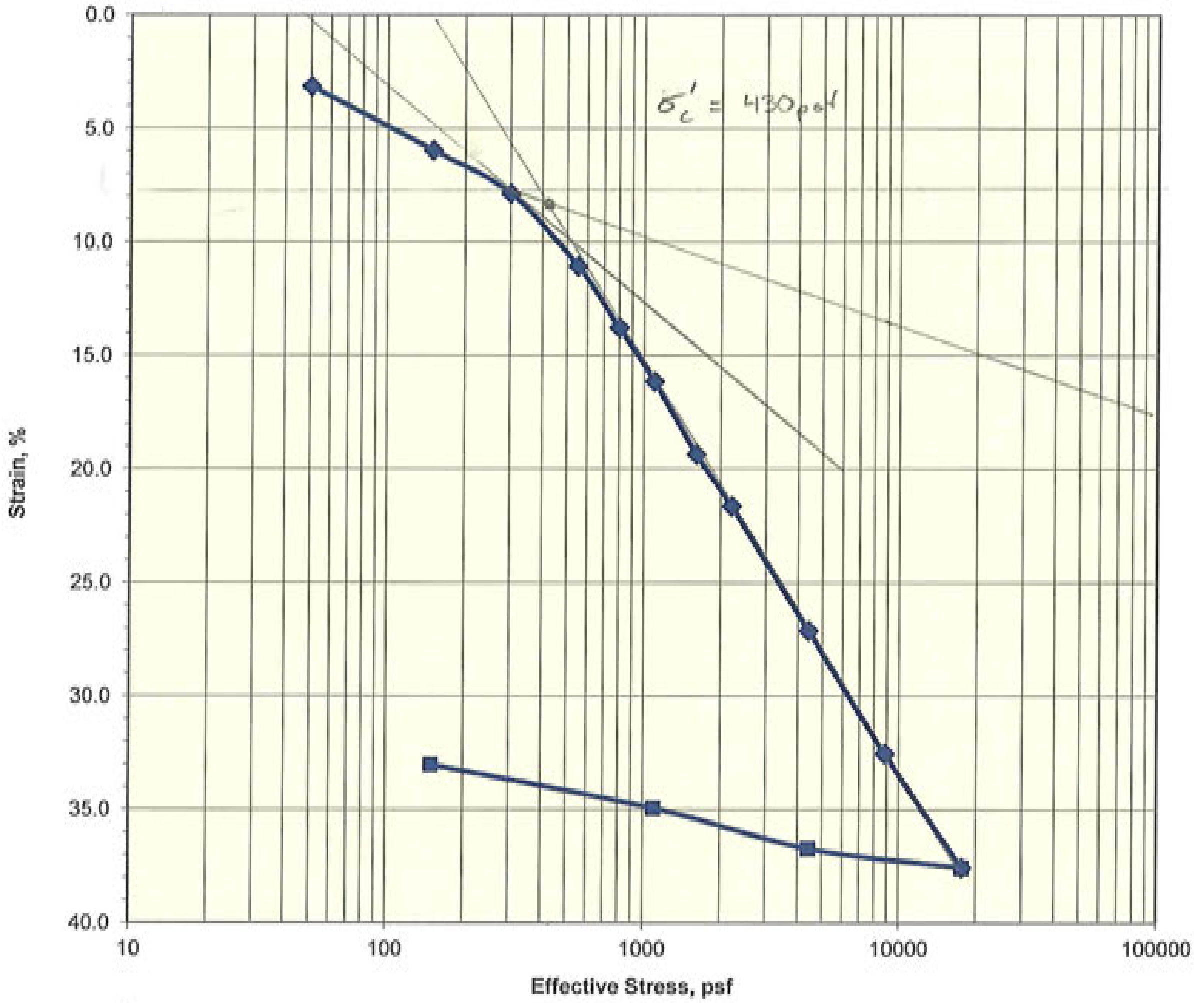
Consolidation Test
ASTM D2435

Job No.:	471-120	**Boring:**	WB-1	**Run By:**	MD
Client:	Cal Engineering & Geology	**Sample:**	1-3	**Reduced:**	PJ
Project:	Almaden - 140540	**Depth, ft.:**	5(Tip-5")	**Checked:**	PJ/DC
Soil Type:	Dark Gray Lean CLAY w/ Sand			**Date:**	11/4/2014

Strain-Log-P Curve



Assumed Gs 2.7	Initial	Final
Moisture %:	71.7	35.9
Dry Density, pcf:	55.0	85.5
Void Ratio:	2.064	0.971
% Saturation:	93.8	100.0

Remarks:

$C_c = 0.552$ $C_c' = 0.18$ $C_v = 0.004 \rightarrow 0.021$

$C_r = 0.181$ $C_r' = 0.059$

$OCR = \frac{430}{138} = 3$ = Lightly overconsolidated

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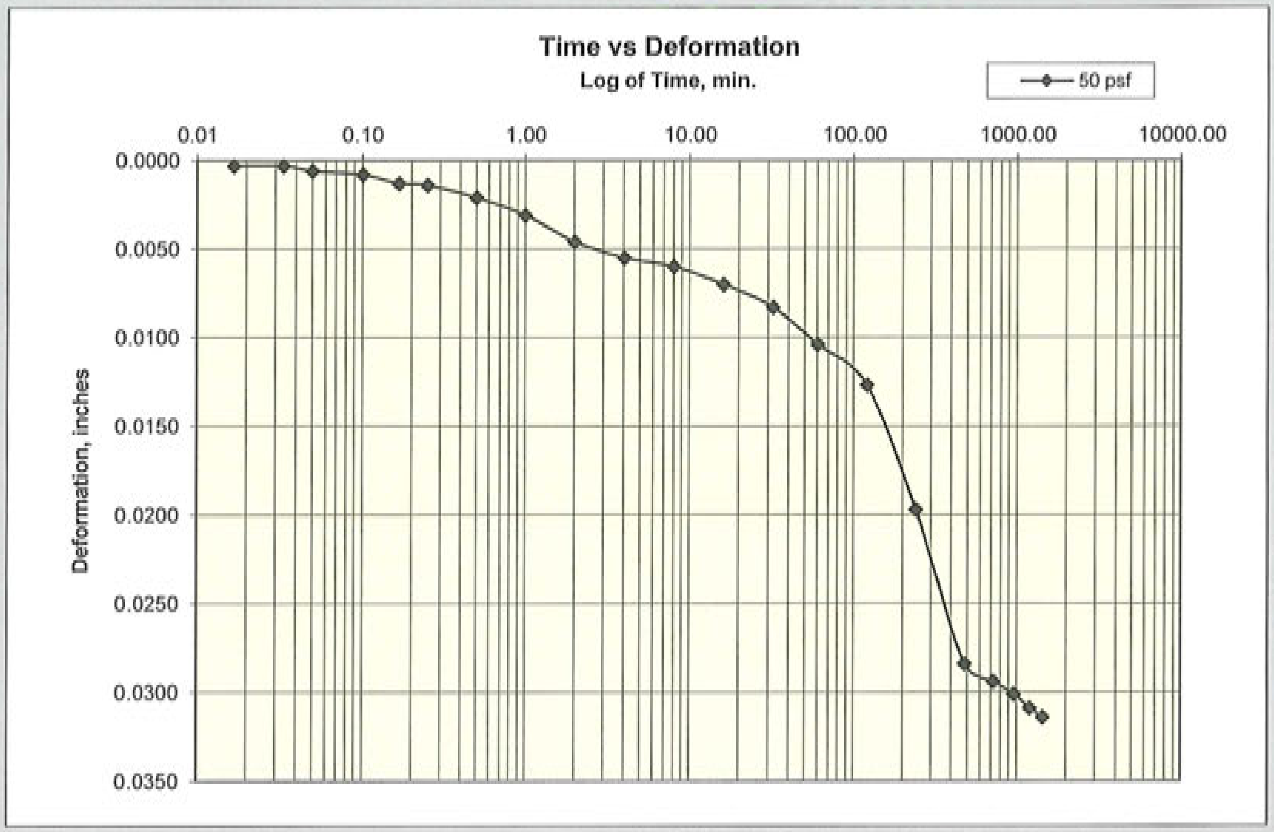
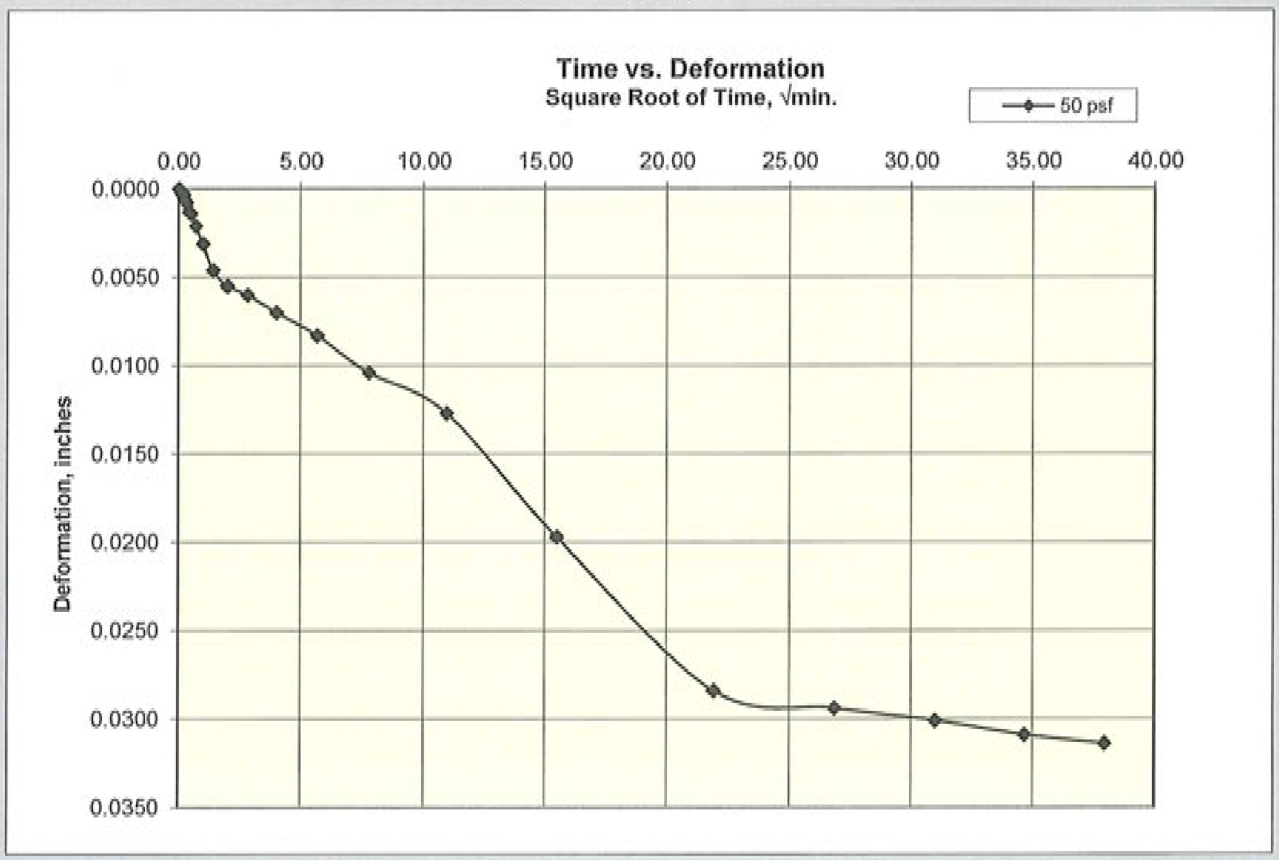
Cooper Testing Labs, Inc.

Load 1 | 50 psf

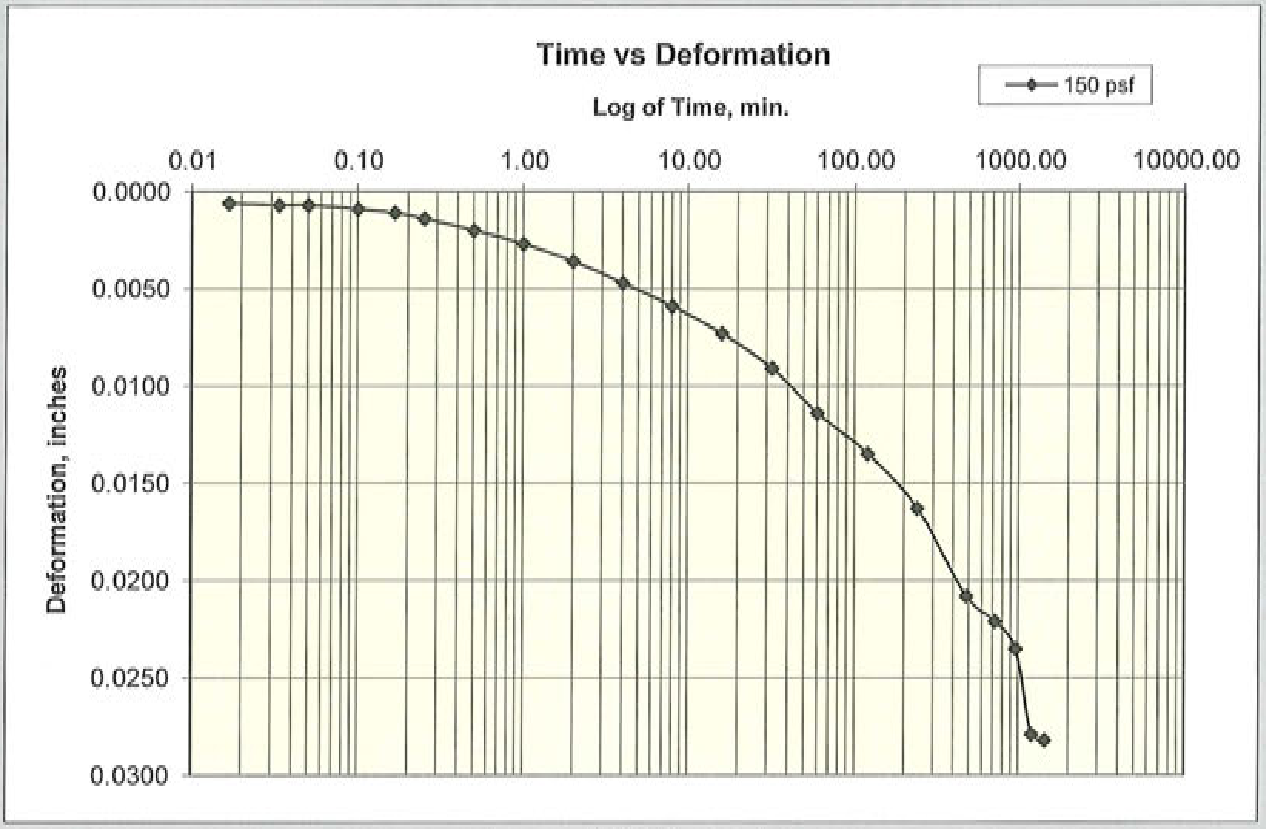


50 psf

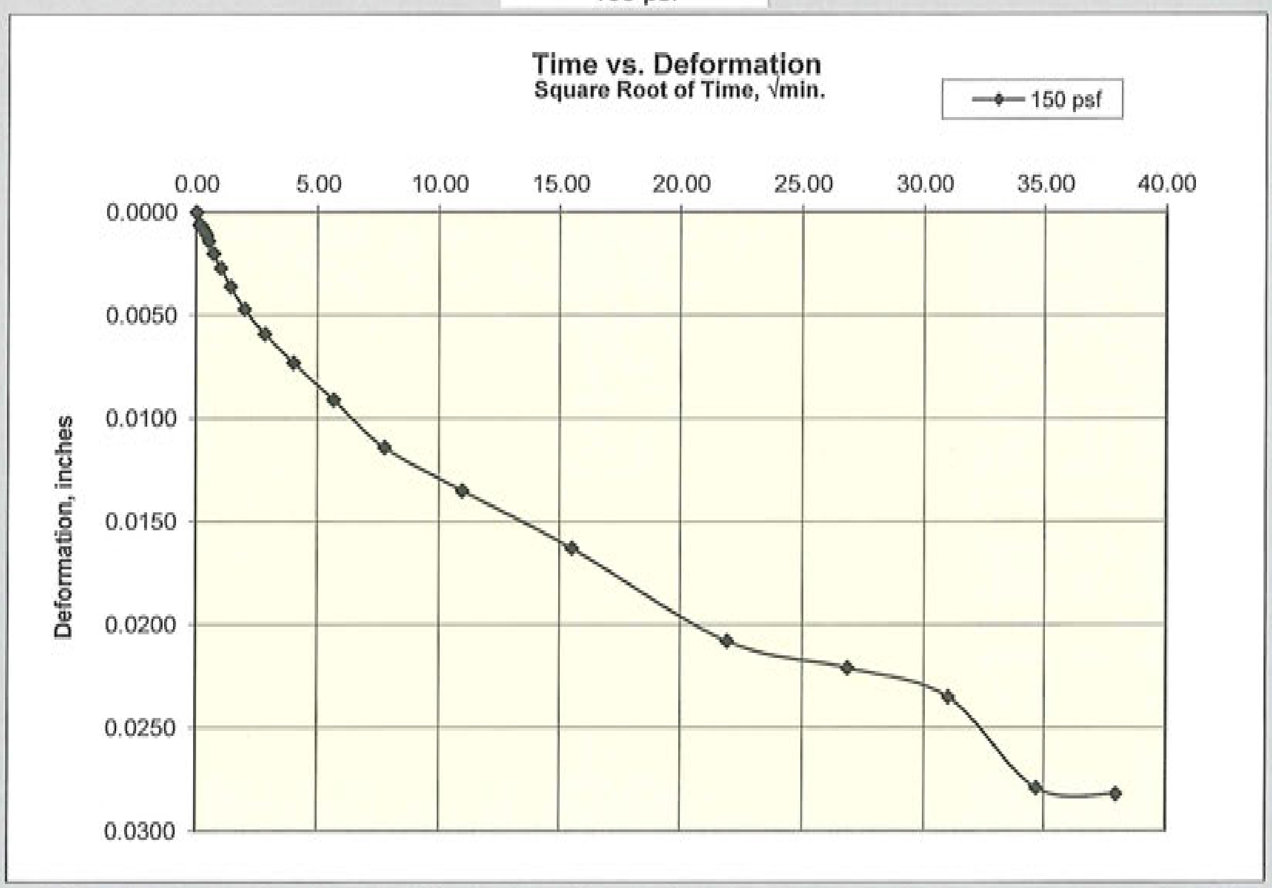


Cooper Testing Labs, Inc.

Load 2 | 150 psf



150 psf



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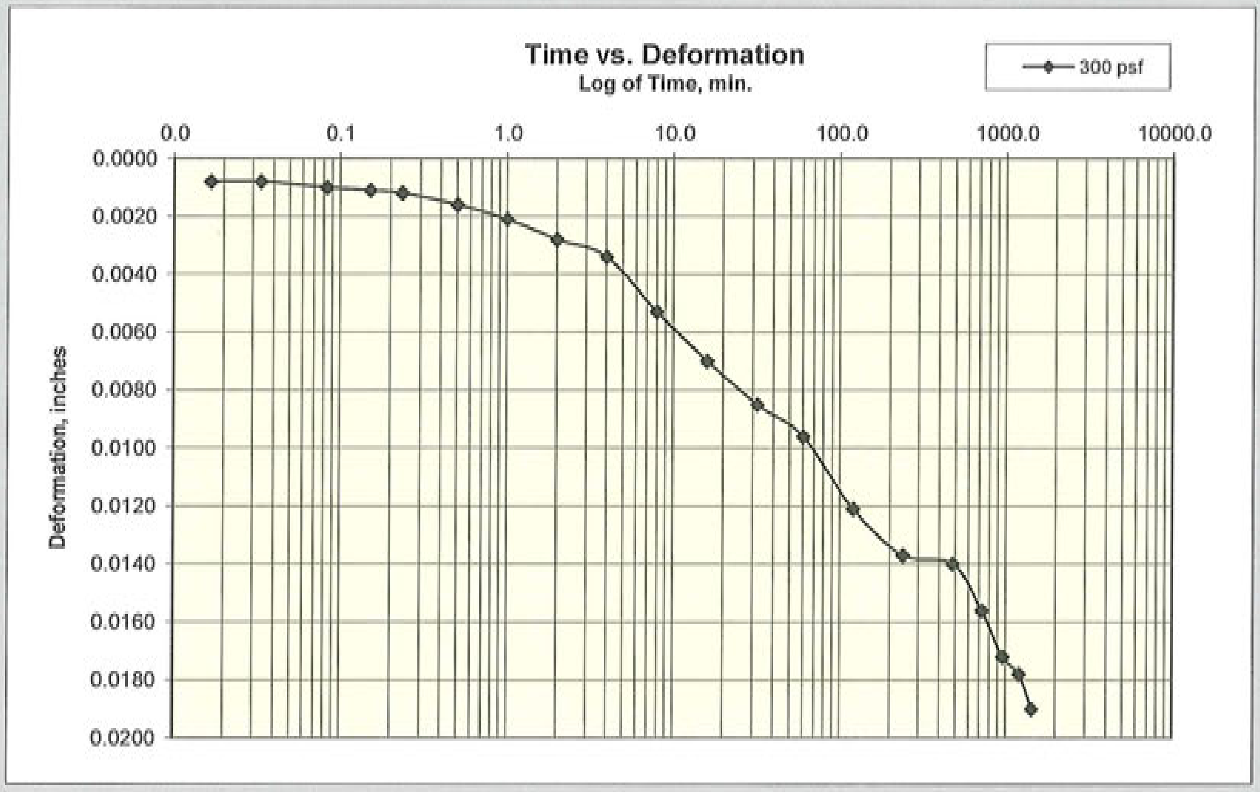
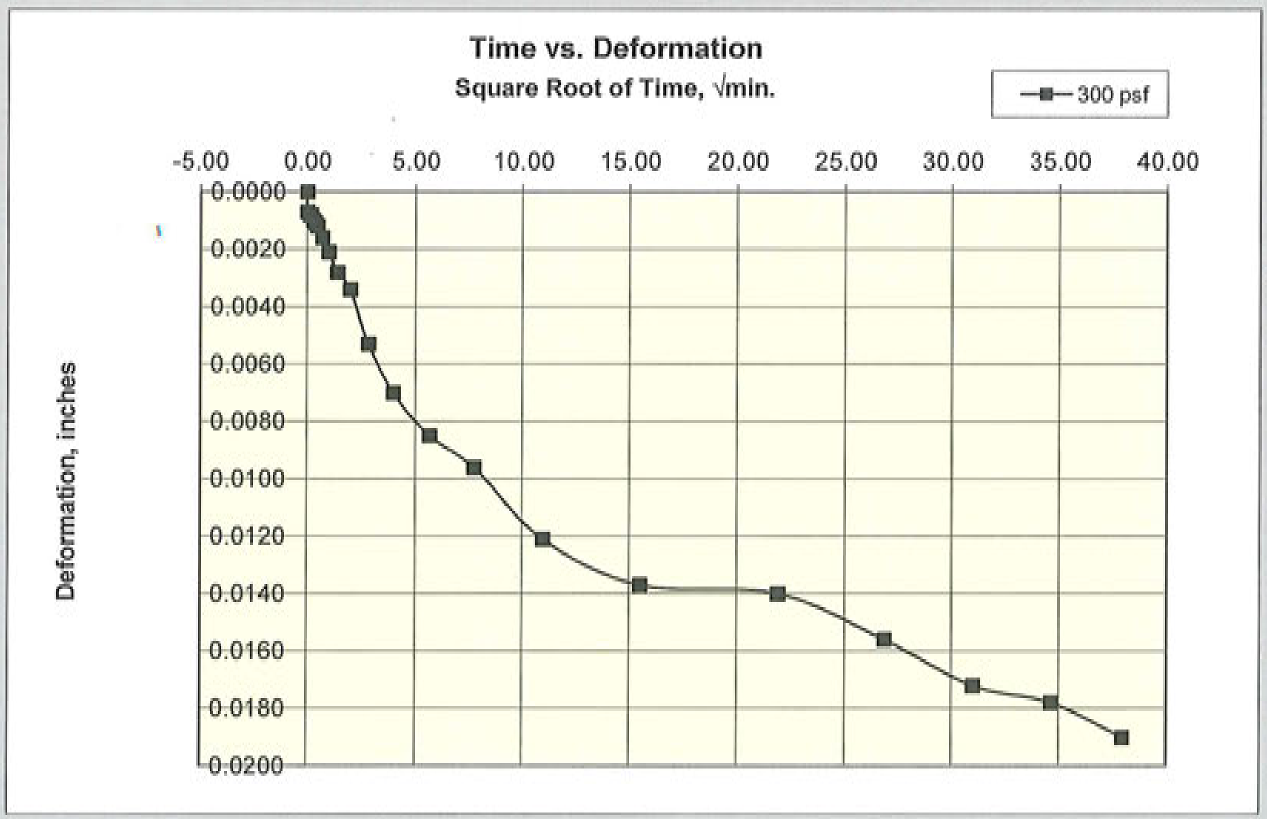
Load 3 300 psf



300 psf



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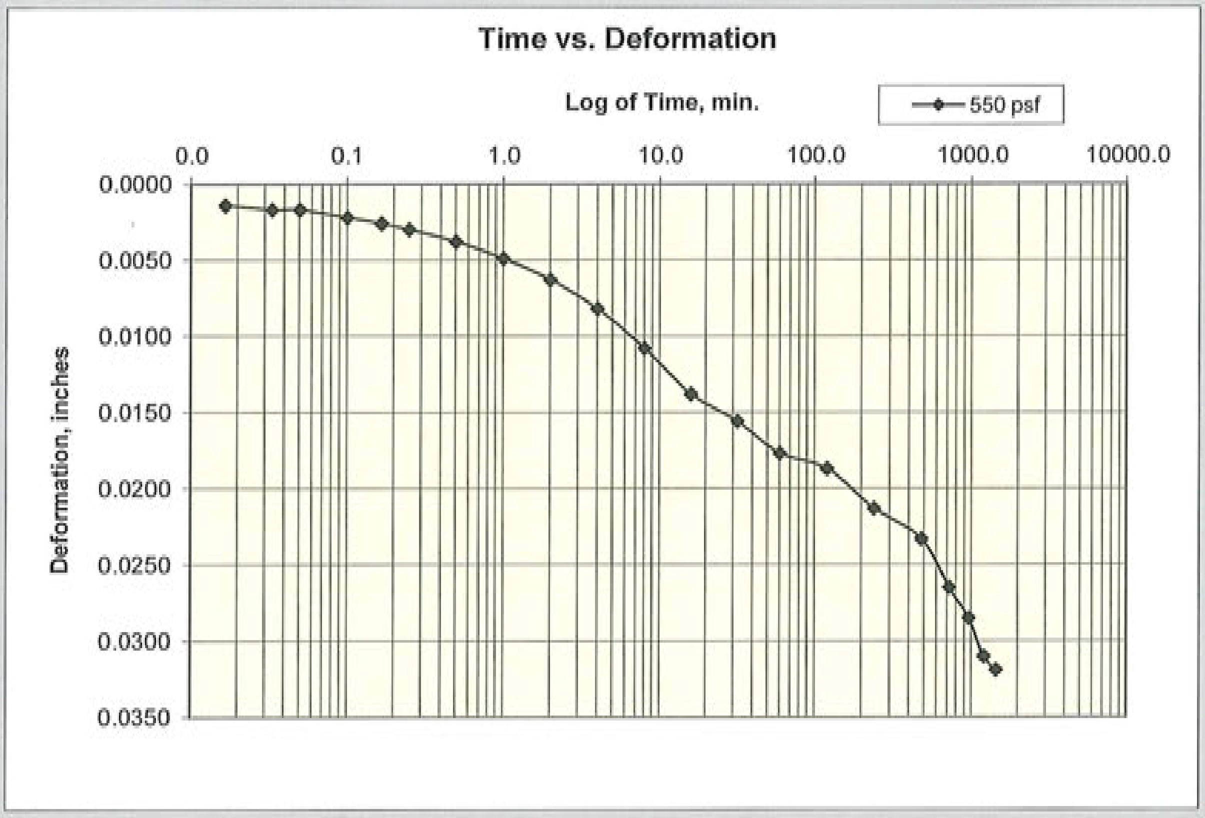
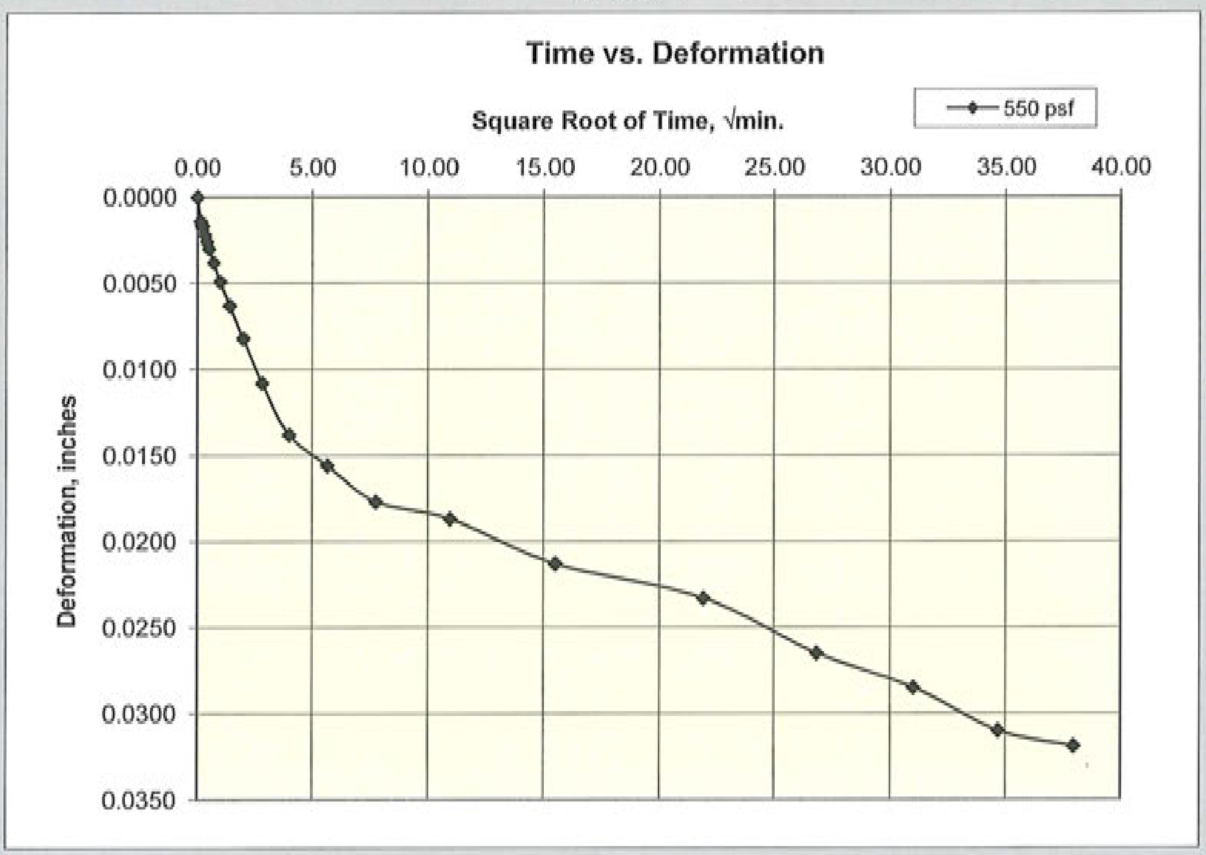
Cooper Testing Labs, Inc.

Load 4

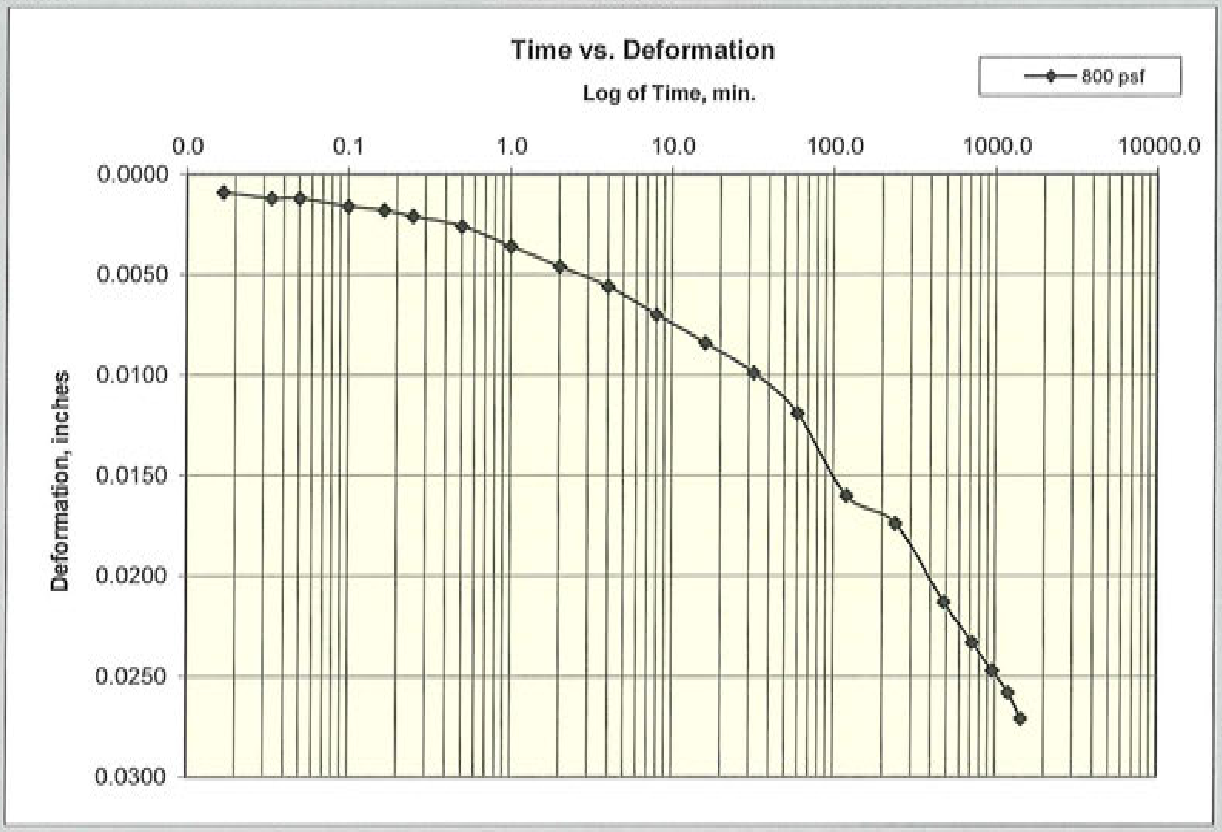
550 psf



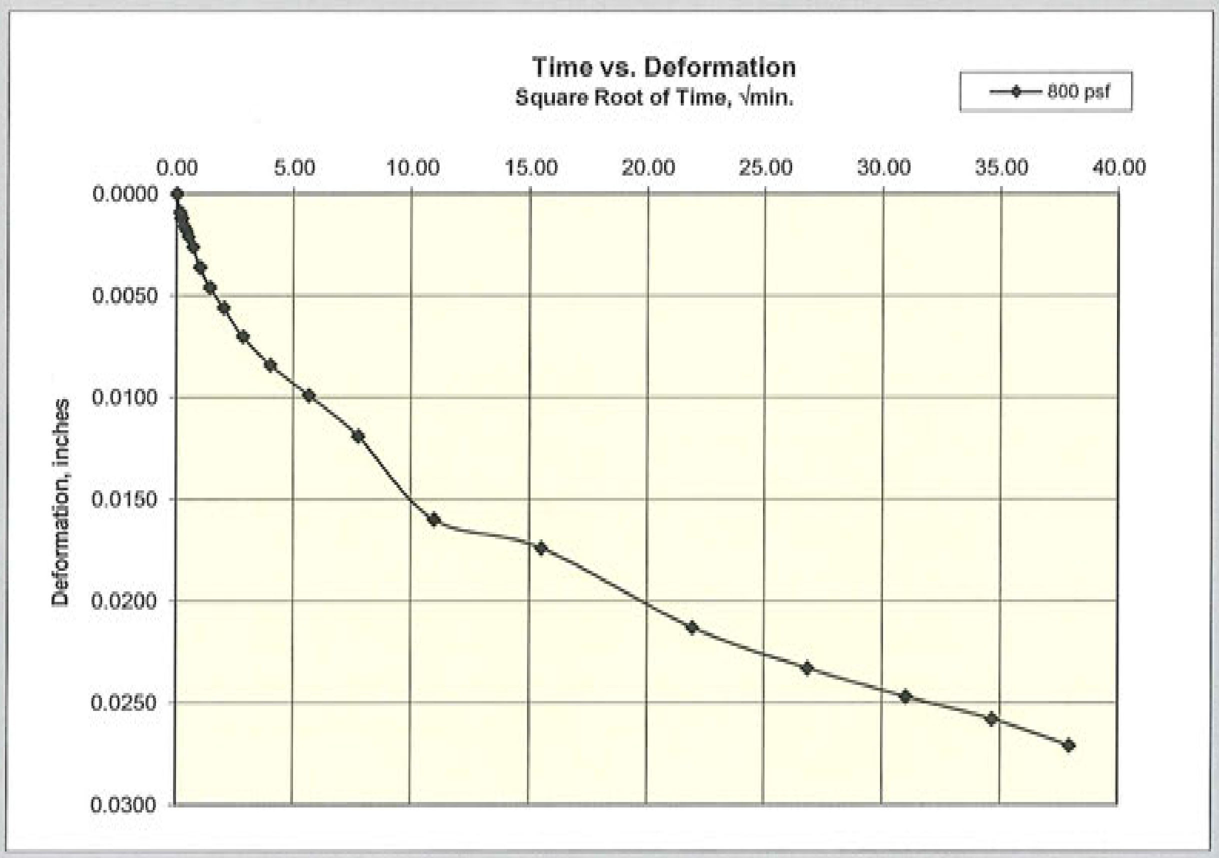
550 psf



Load 5 800 psf

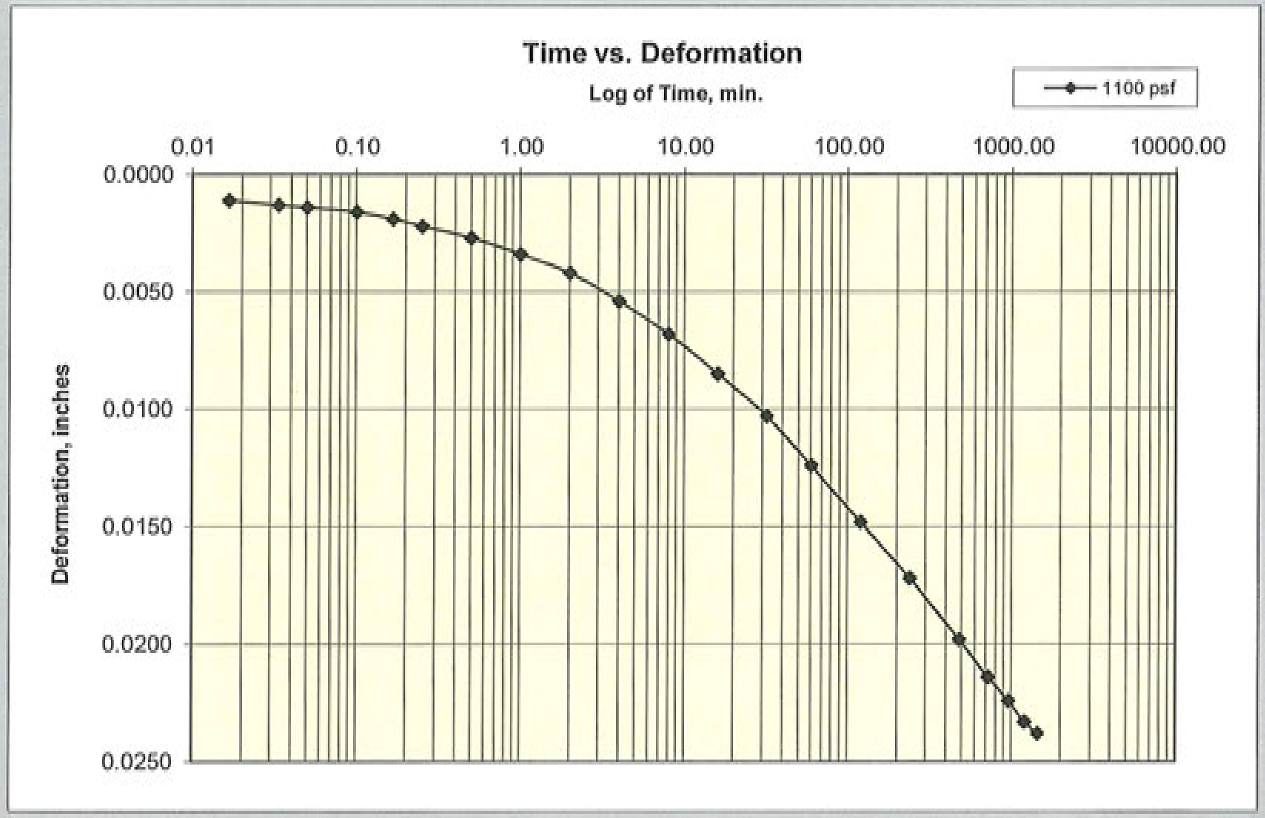


800 psf

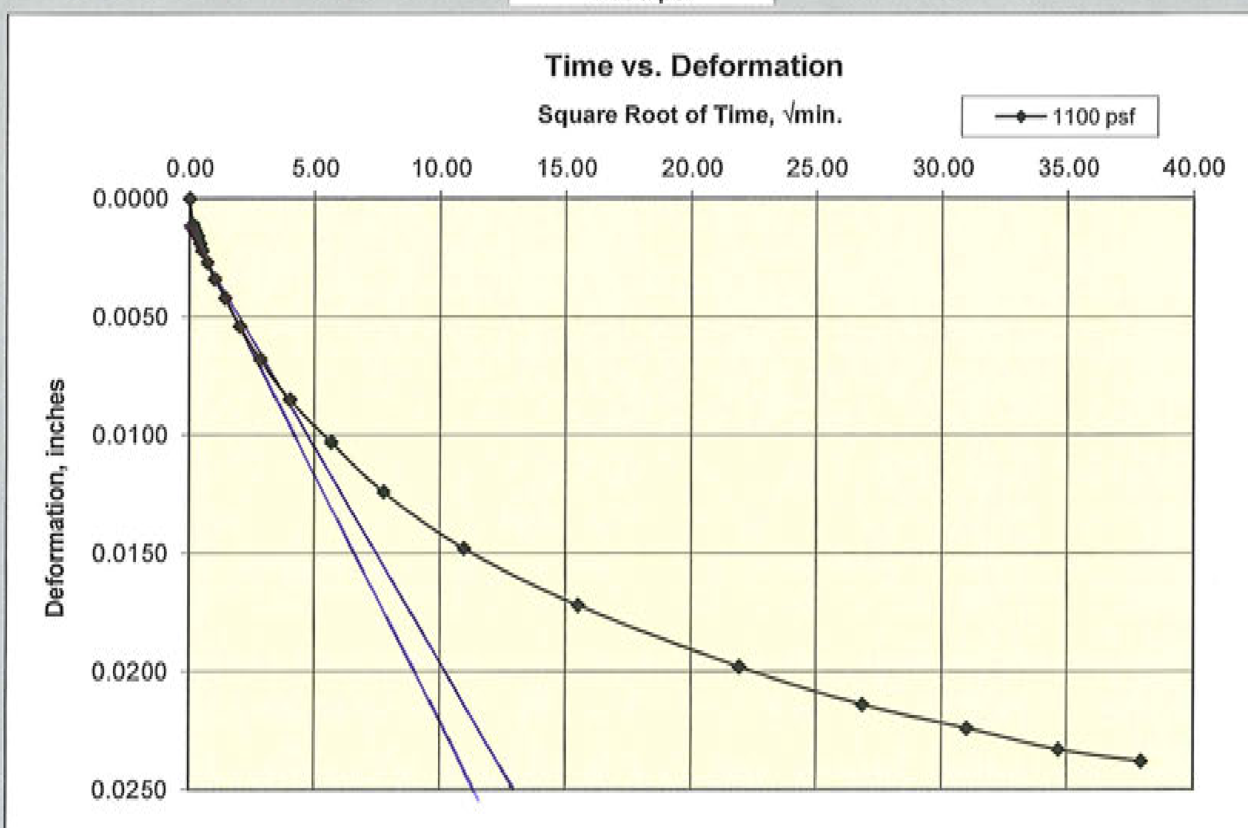


Cooper Testing Labs, Inc.

Load 6 — 1100 psf



1100 psf



$\sqrt{t_{90}} = \sqrt{4}$

$t_{90} = 16 \text{ min}$

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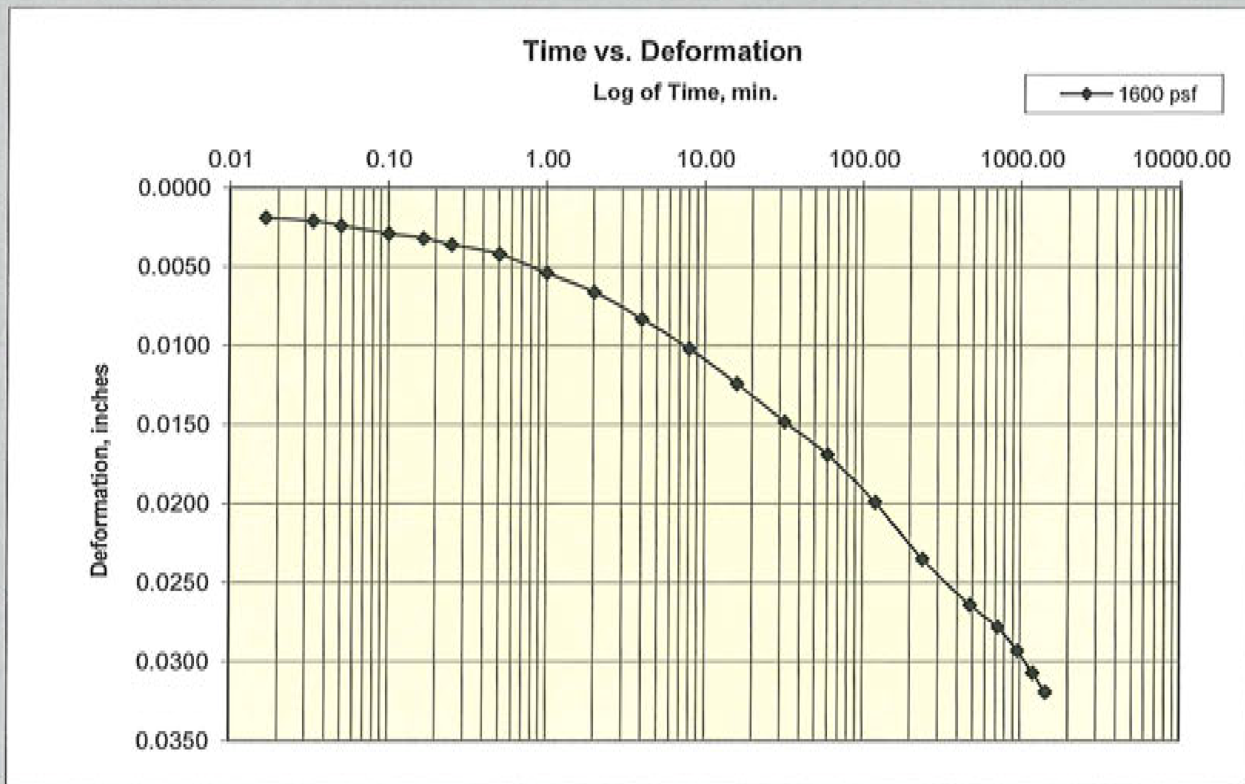
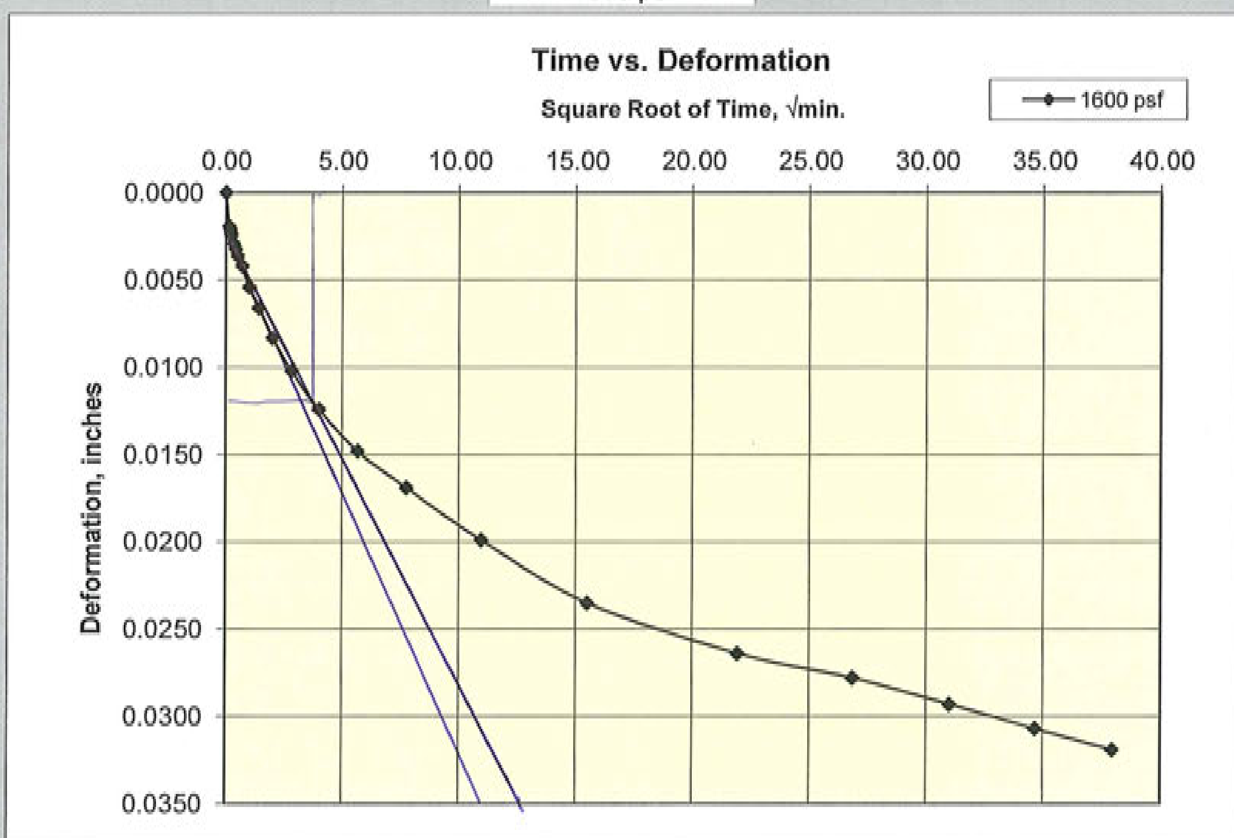
Cooper Testing Labs, Inc.

Load 7

1600 psf



1600 psf

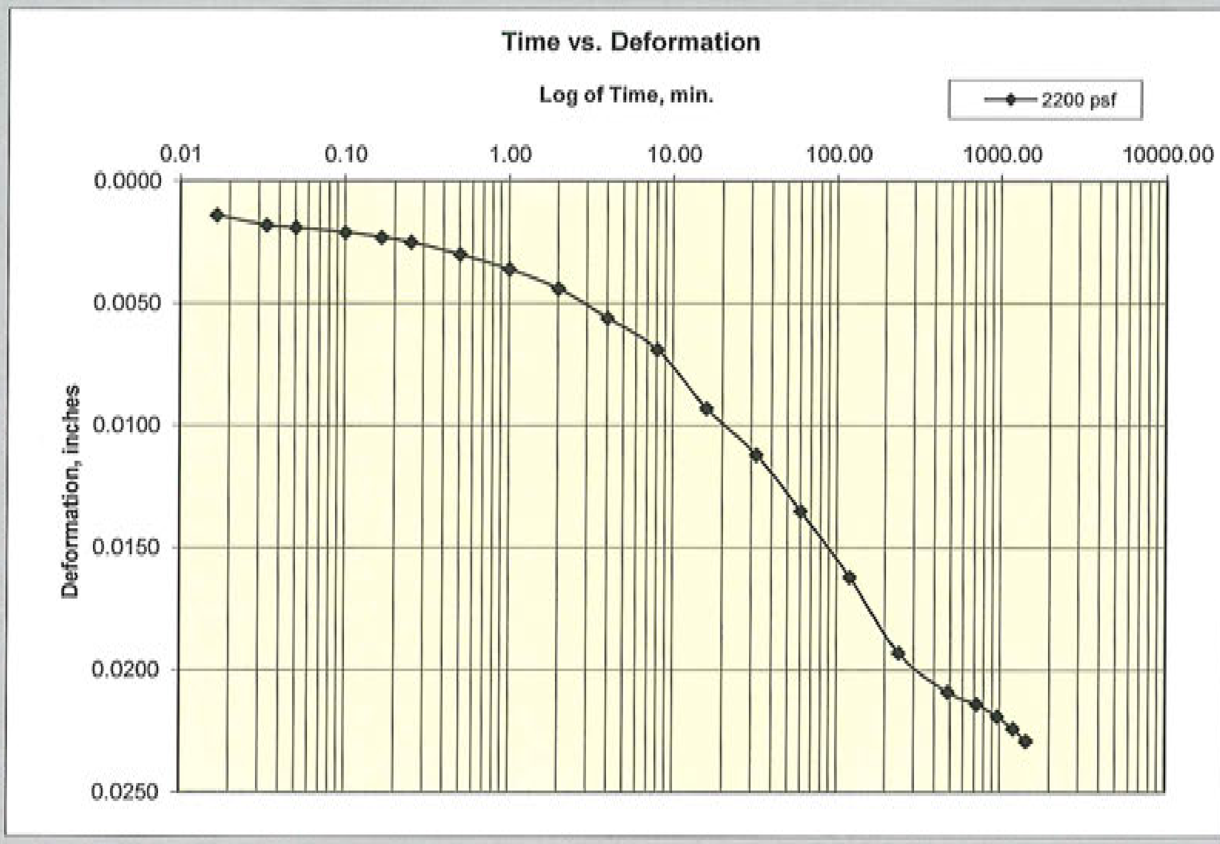


$\sqrt{t_{90}} = \sqrt{3.6 \text{ min}}$

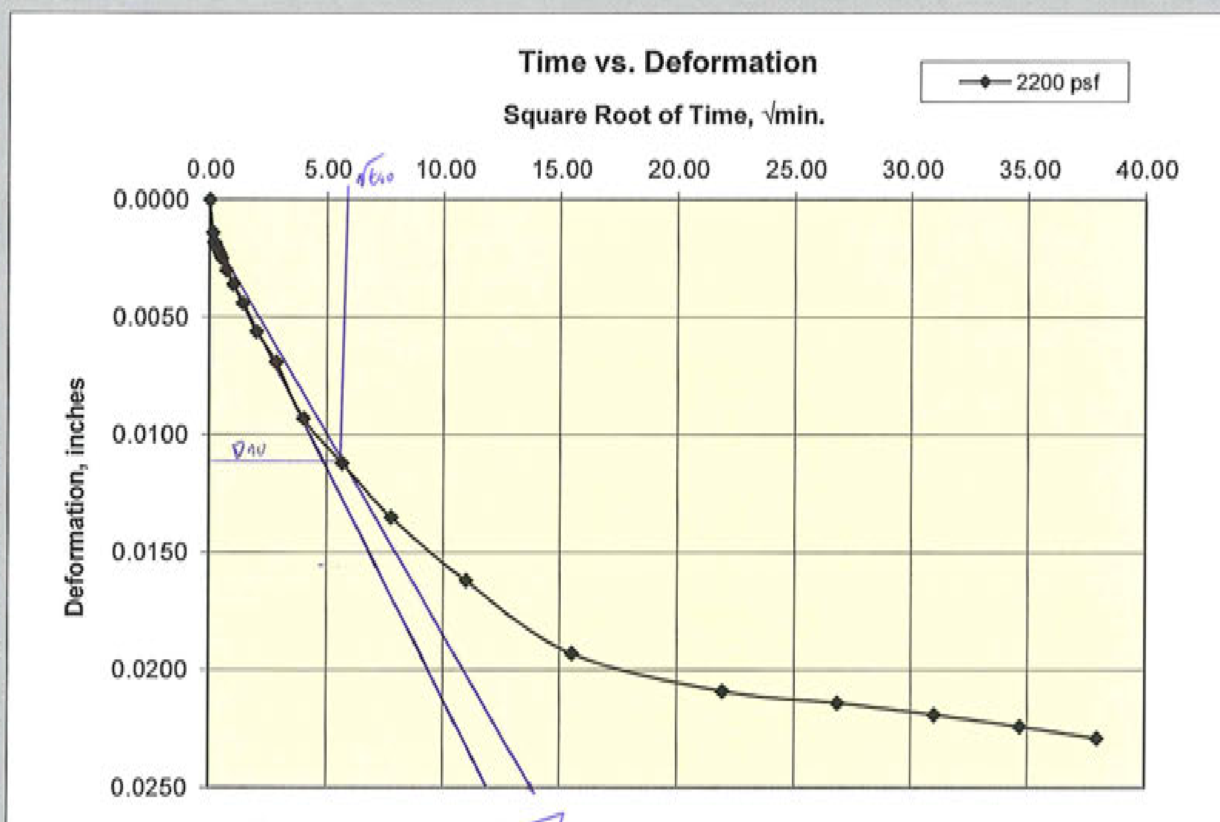
$t_{90} = 13$ min

Load 8

2200 psf



2200 psf



$\sqrt{t_{10}} = \sqrt{5.6}$

$t_{10} = 32$ min

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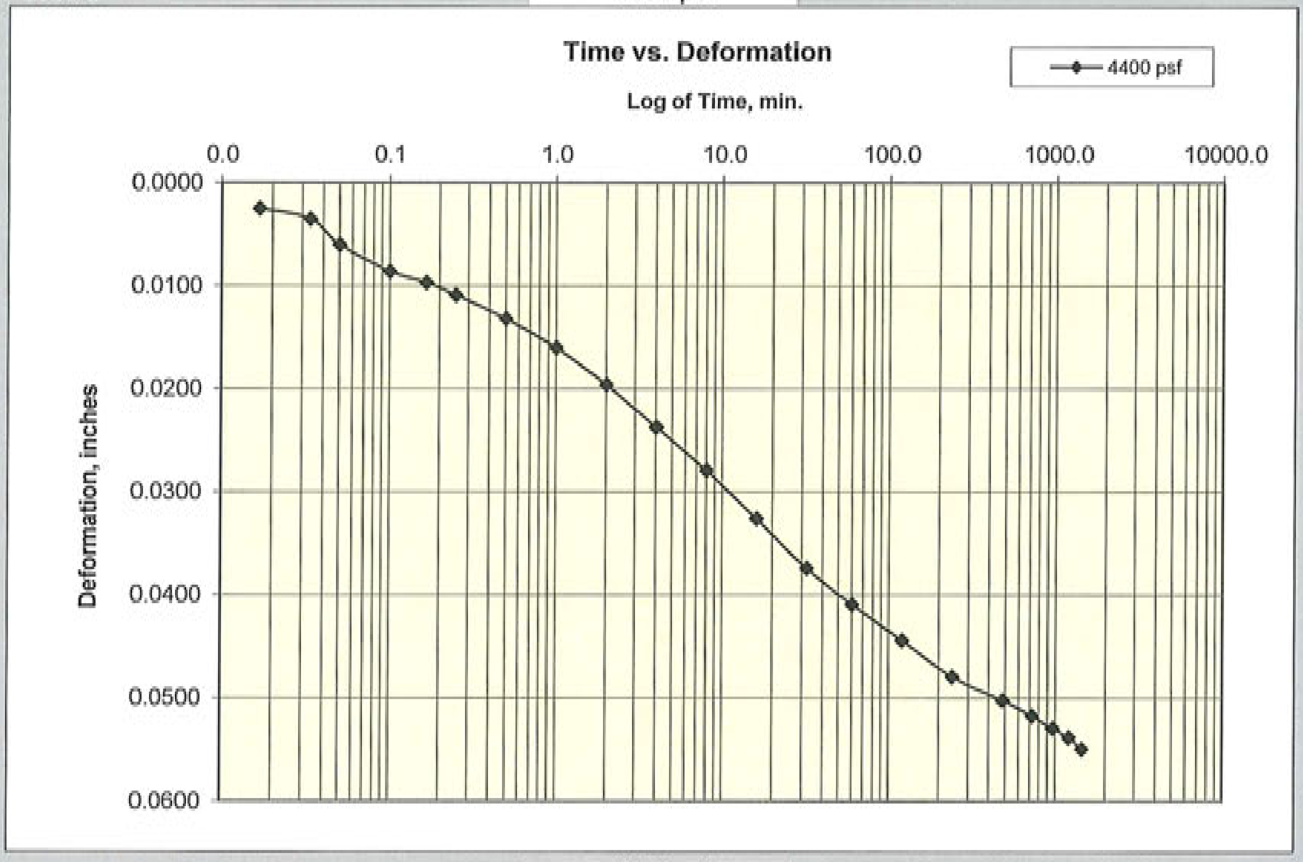
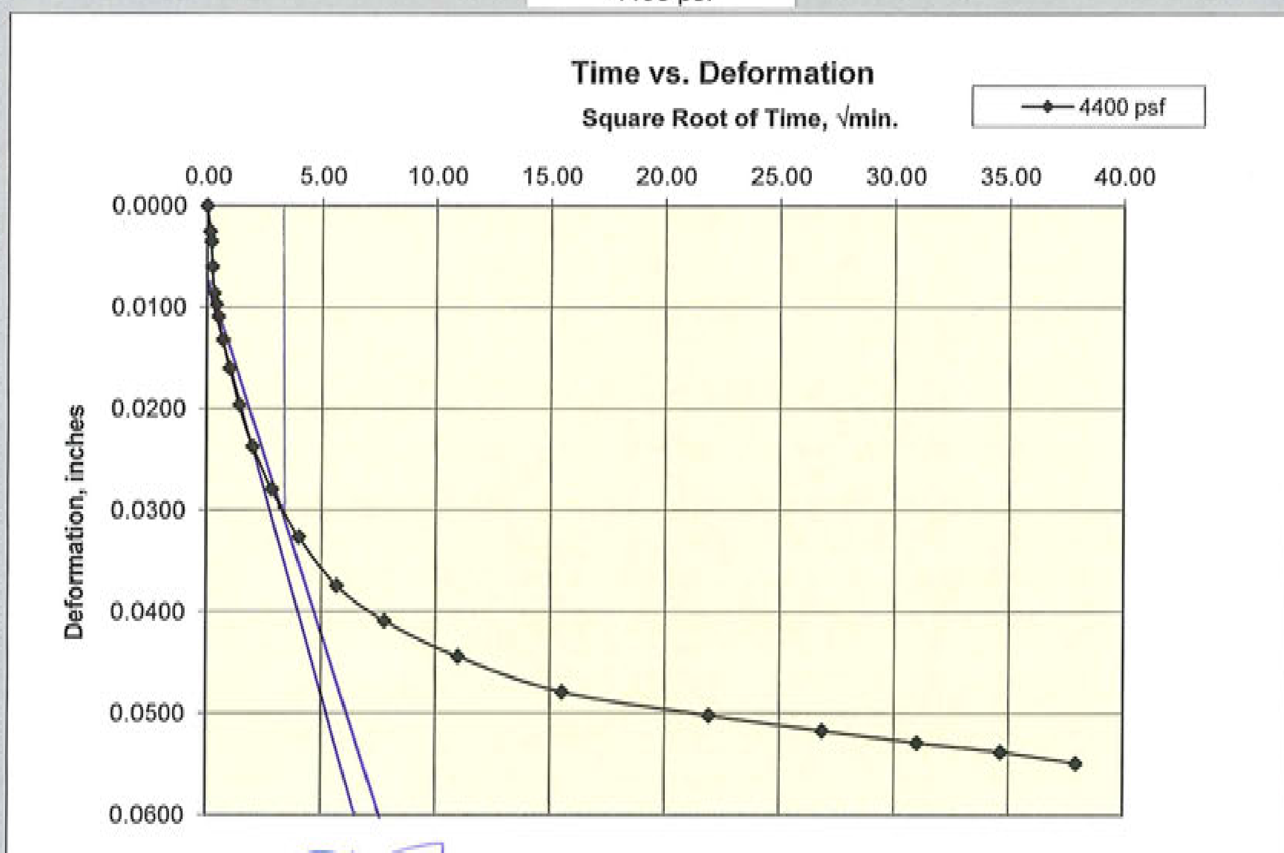
Cooper Testing Labs, Inc.

Load 9 | 4400 psf



4400 psf



$\sqrt{t_{90}} = 3.3$

$\boxed{t_{90} = 10.8 \text{ min}}$

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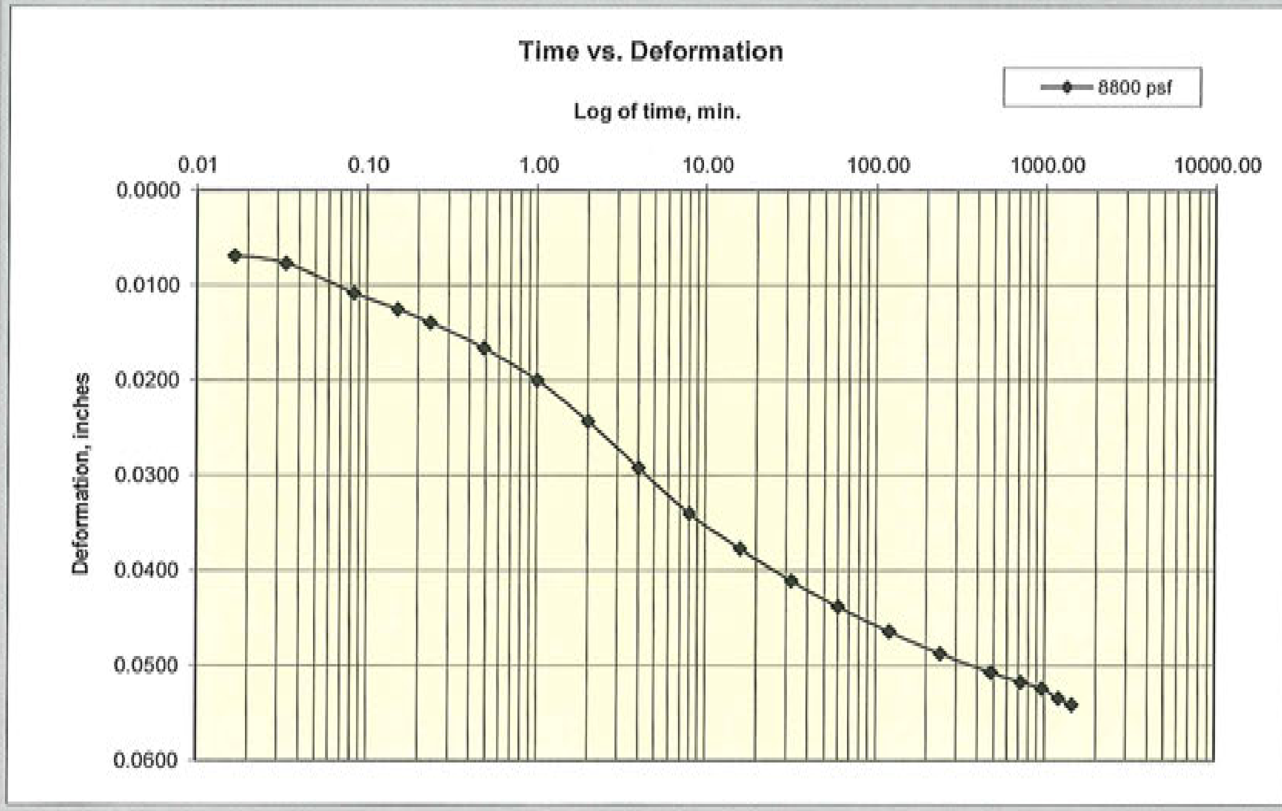
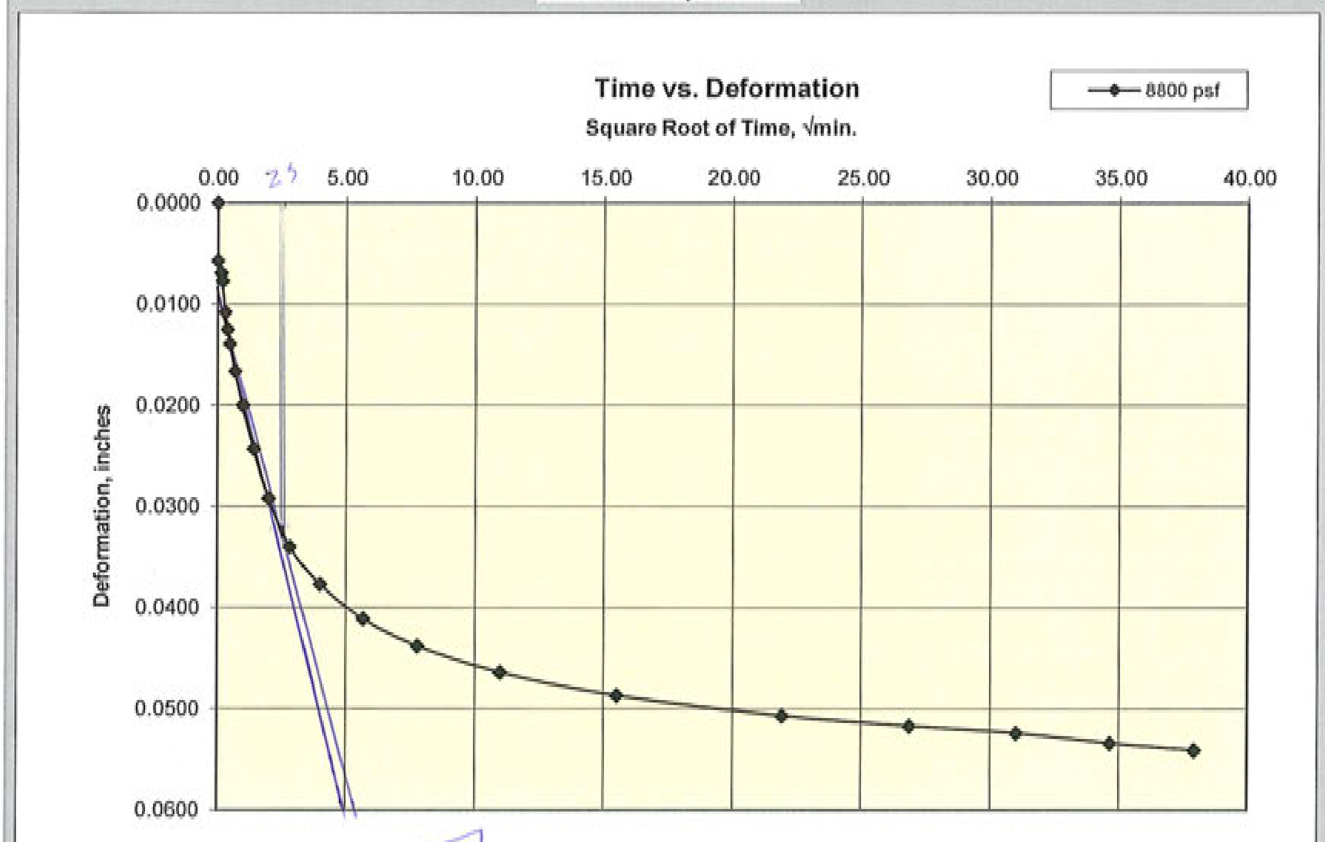
Cooper Testing Labs, Inc.

Load 10 | 8800 psf



8800 psf

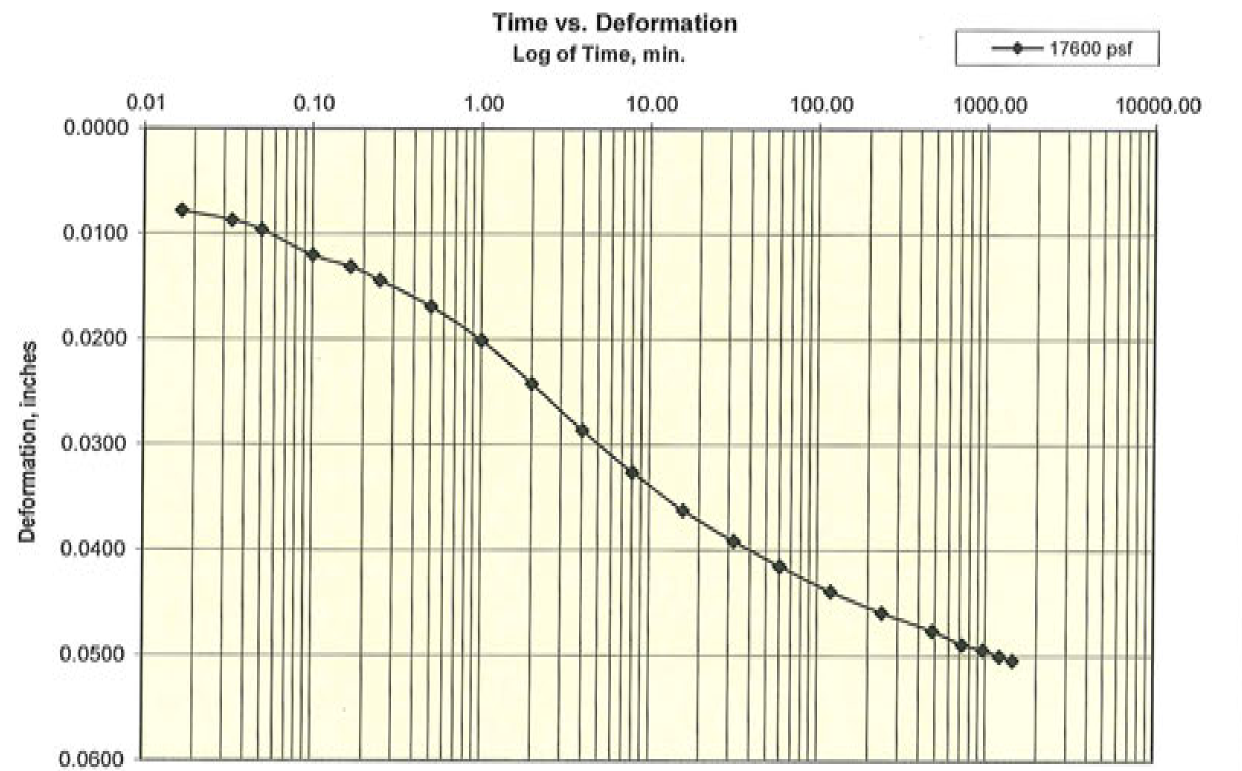


$\boxed{\sqrt{t_{90}} = \sqrt{2.5}}$

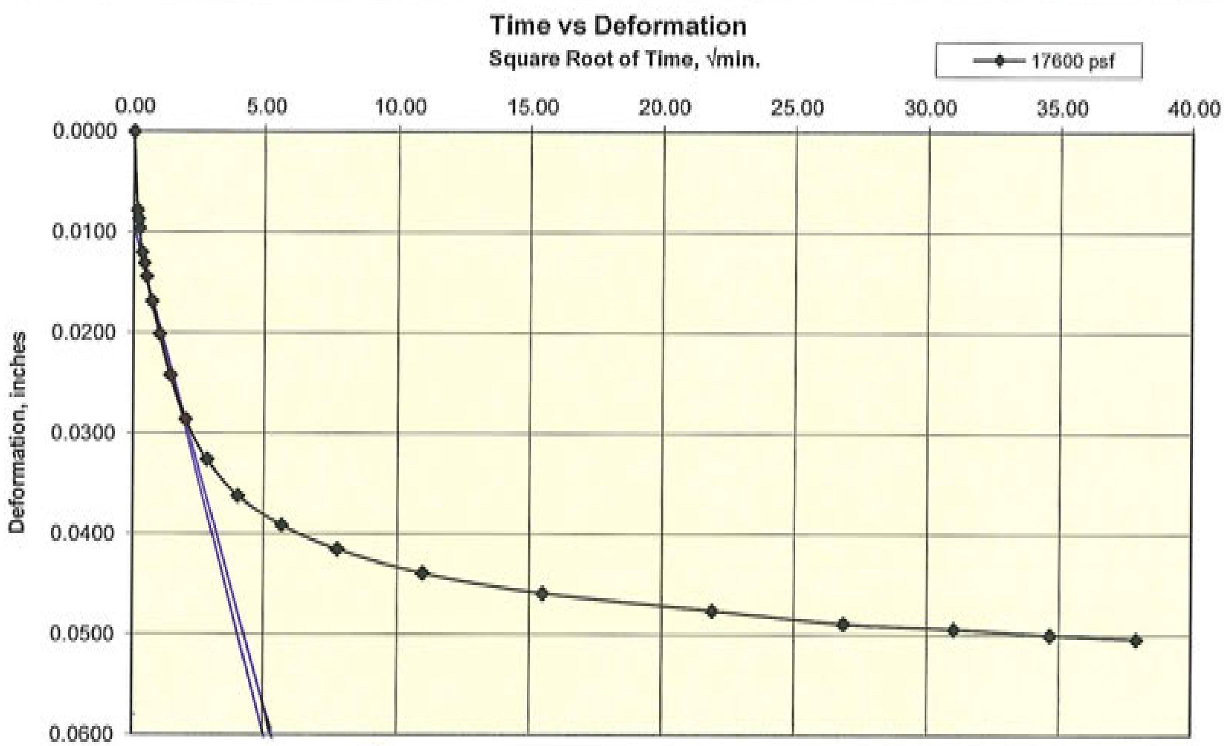
$\boxed{t_{90} = 6.25 \text{ min}}$

Cooper Testing Labs, Inc.

Load 11 | 17600 psf



17600 psf



$\sqrt{t_{90}} = \sqrt{2\,min}$

$t_{90} = 4\,min$

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WB-2

$$C_c = \frac{\varepsilon_2 - \varepsilon_1}{(\log \sigma'_z)_2 - (\log \sigma'_z)_1}(1+e_0) = \text{compression index}$$

$$= \frac{0.2709 - 0.1410}{\log(8{,}800\text{psf}) - \log(2{,}200\text{psf})}(1+1.998)$$

$$\boxed{C_c = 0.647}$$

$$C_c = \frac{PI}{74} = \frac{10}{74}$$

$$\boxed{C_c = 0.135}$$

$$C_c' = \frac{C_c}{1+e_0} = \text{compression ratio}$$

$$\boxed{C_c' = 0.216}$$

$$C_r = \frac{\varepsilon_2 - \varepsilon_1}{(\log \sigma'_z)_2 - (\log \sigma'_z)_1}(1+e_0) = \text{recompression index}$$

$$= \frac{0.0088 - 0.0035}{\log(150) - \log(50)}(1+1.998)$$

$$\boxed{C_r = 0.052}$$

$$C_r = \frac{PI}{370} = \frac{10}{370}$$

$$\boxed{C_r = 0.027}$$

$$C_r' = \frac{C_r}{1+e_0} = \text{recompression ratio}$$

$$\boxed{C_r' = 0.0174}$$

$C_v \Rightarrow$ See Cooper Testing Spreadsheet (Data Entry Tab)

Load #	Load (psf)	C_v $\frac{ft^2}{yr}$	
5	1,100	639	X
6	2,200	283	✓
7	4,400	166	✓
8	8,800	281	✓
9	17,600	342	?

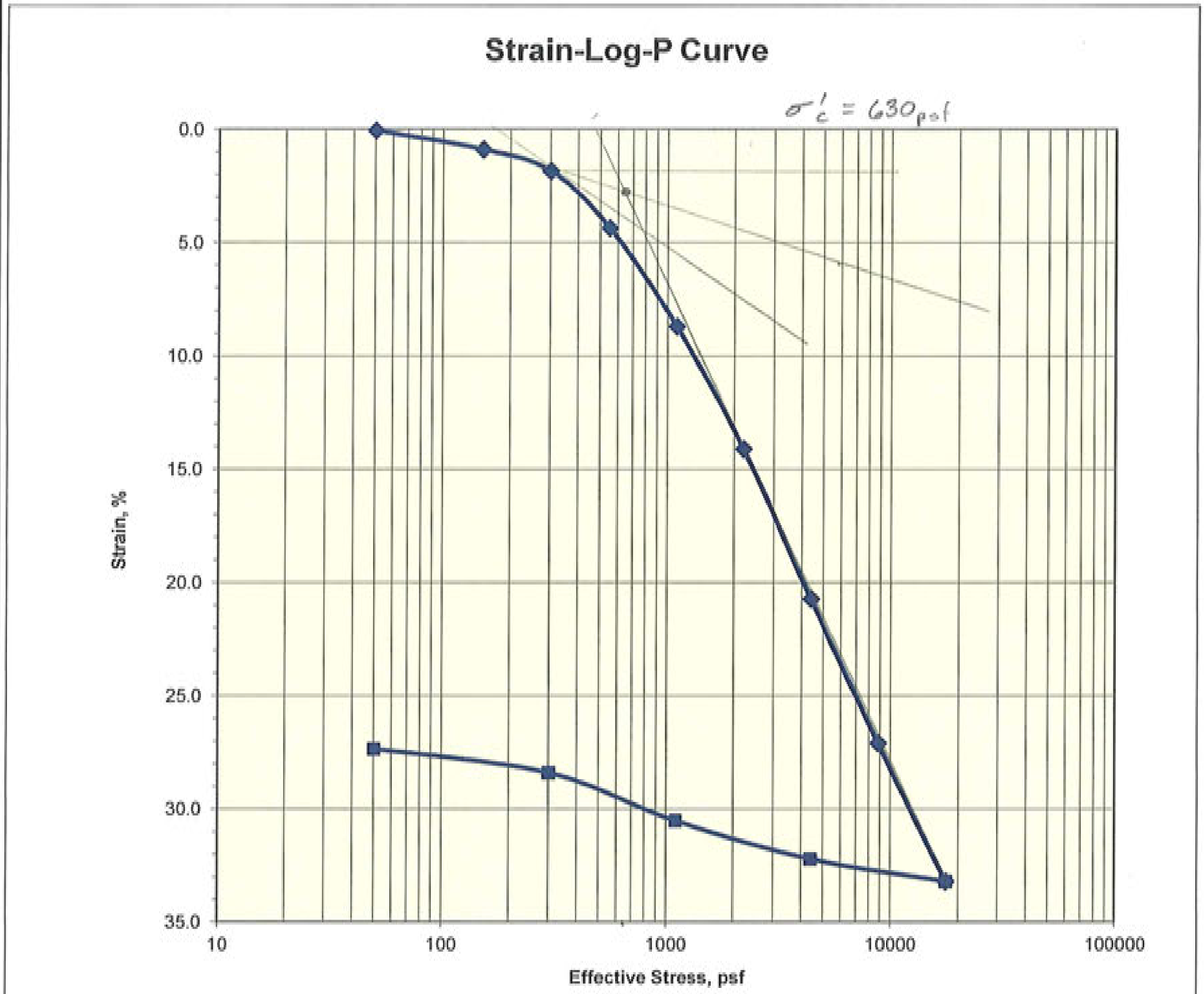
WB-2 LL = 37
PL = 27
PI = 10

LL %	C_v (ft²/yr)
30	20 to 360
40	12 to 230
50	8 to 150
60	5 to 90
70	3 to 58
80	2 to 36
90	1 to 23

Terzaghi & Peck 1967

Consolidation Test
ASTM D2435

Job No.:	471-120	**Boring:**	WB-2	**Run By:**	MD
Client:	Cal Engineering & Geology	**Sample:**	2-3	**Reduced:**	PJ
Project:	Almaden - 140540	**Depth, ft.:**	6-8 8-10(Tip-4")	**Checked:**	PJ/DC
Soil Type:	Dark Gray Organic Silty SAND			**Date:**	11/3/2014



Assumed Gs 2.65	Initial	Final
Moisture %:	68.9	40.4
Dry Density, pcf:	55.2	79.9
Void Ratio:	1.998	1.071
% Saturation:	91.4	100.0

Remarks:

$C_c = 0.647$ $C_c' = 0.216$ $C_v = 0.045 \rightarrow 0.175$

$C_r = 0.052$ $C_r' = 0.0174$

$\boxed{OCR = \frac{630}{230} = 2.7}$ lightly overconsolidated

Cooper Testing Labs, Inc.

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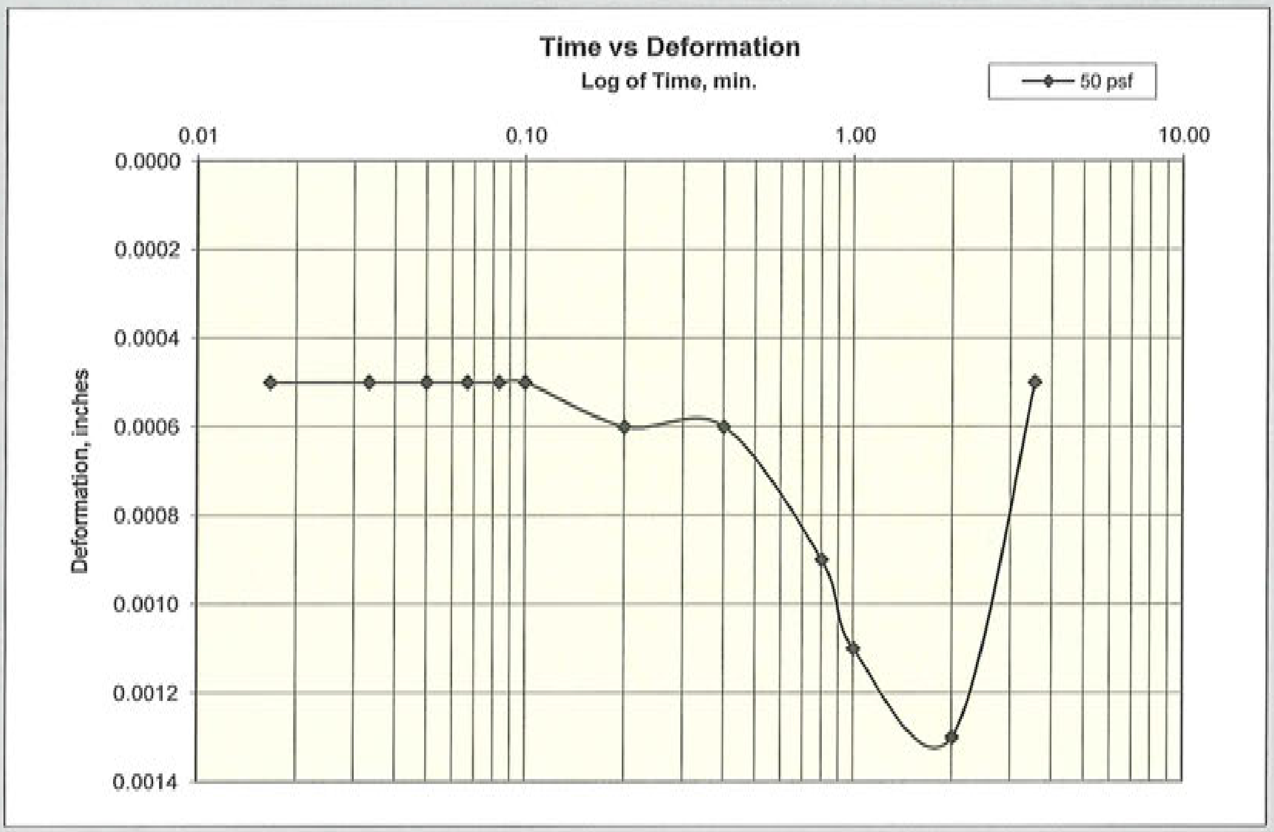

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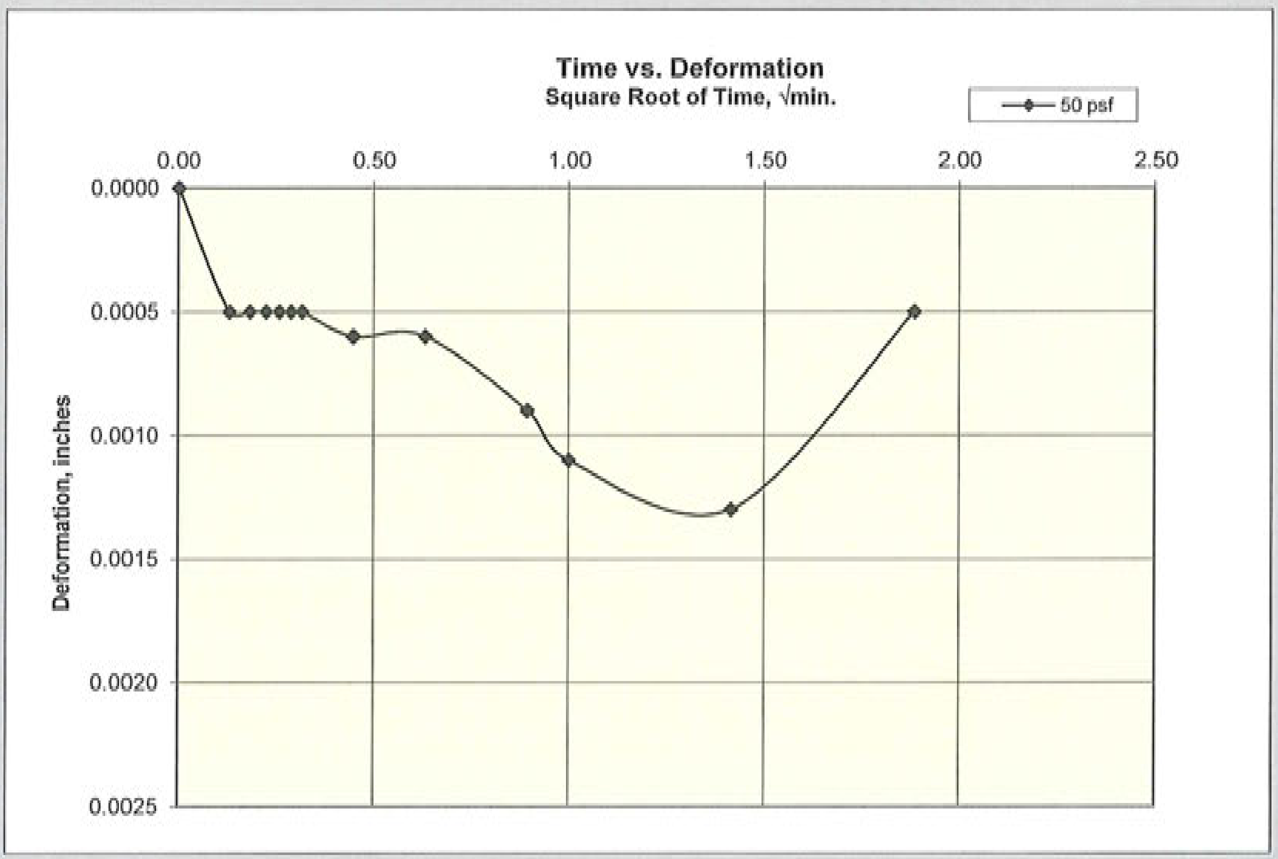

Cooper Testing Labs, Inc.

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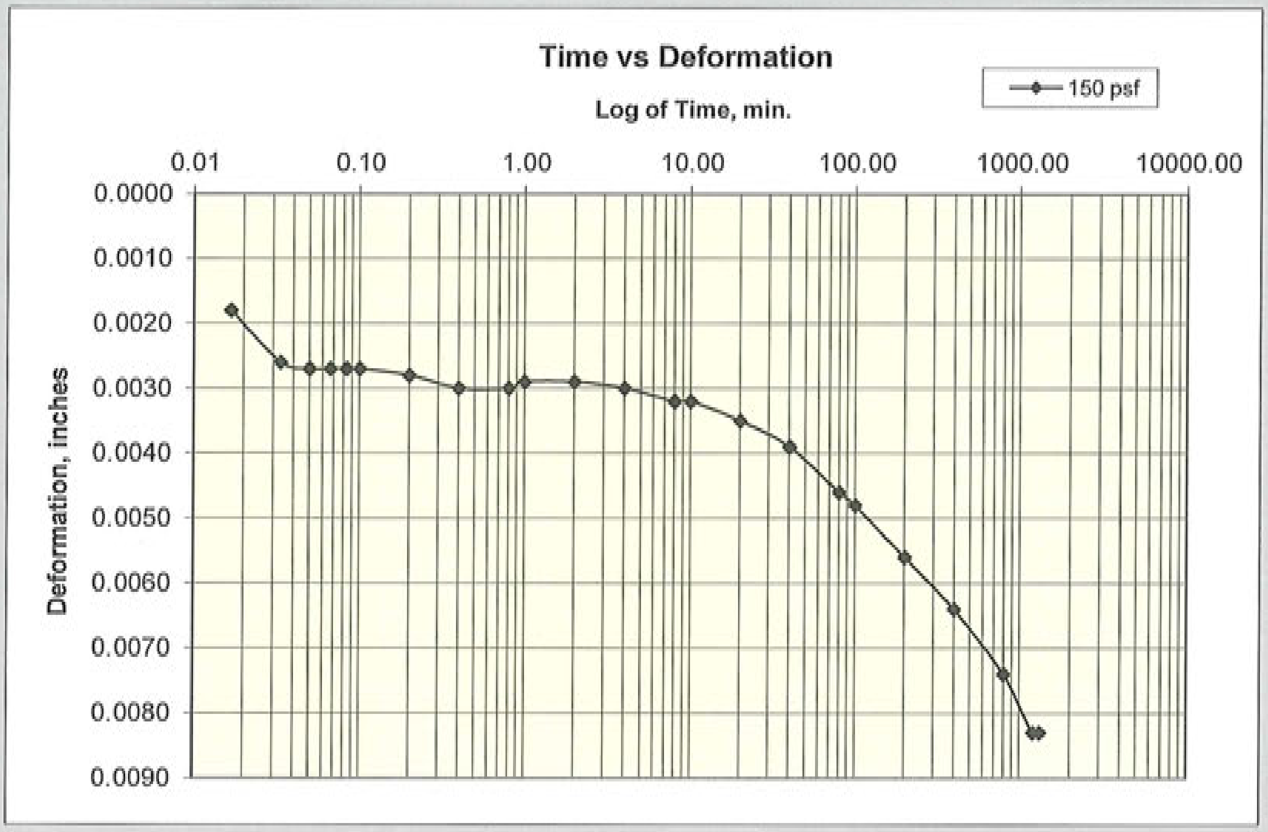

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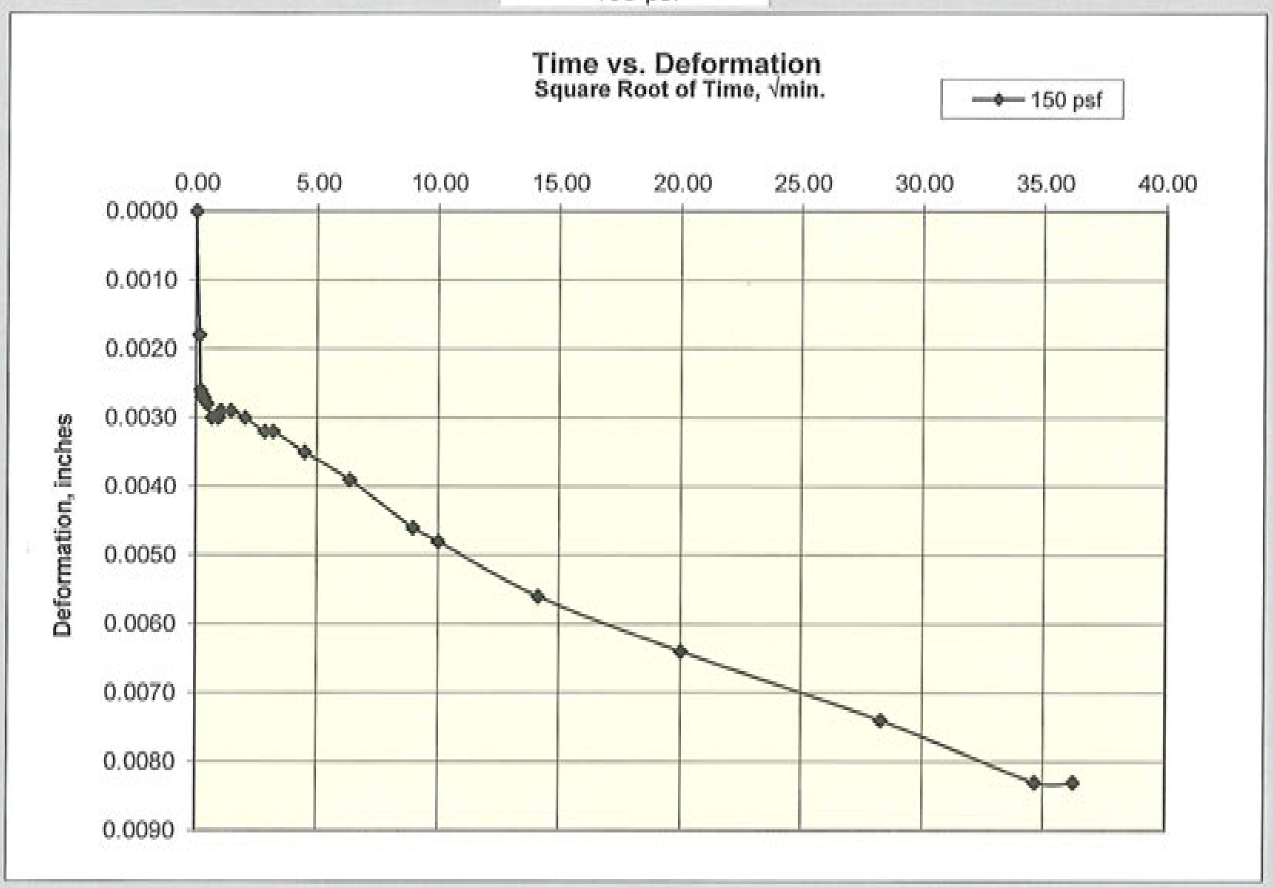

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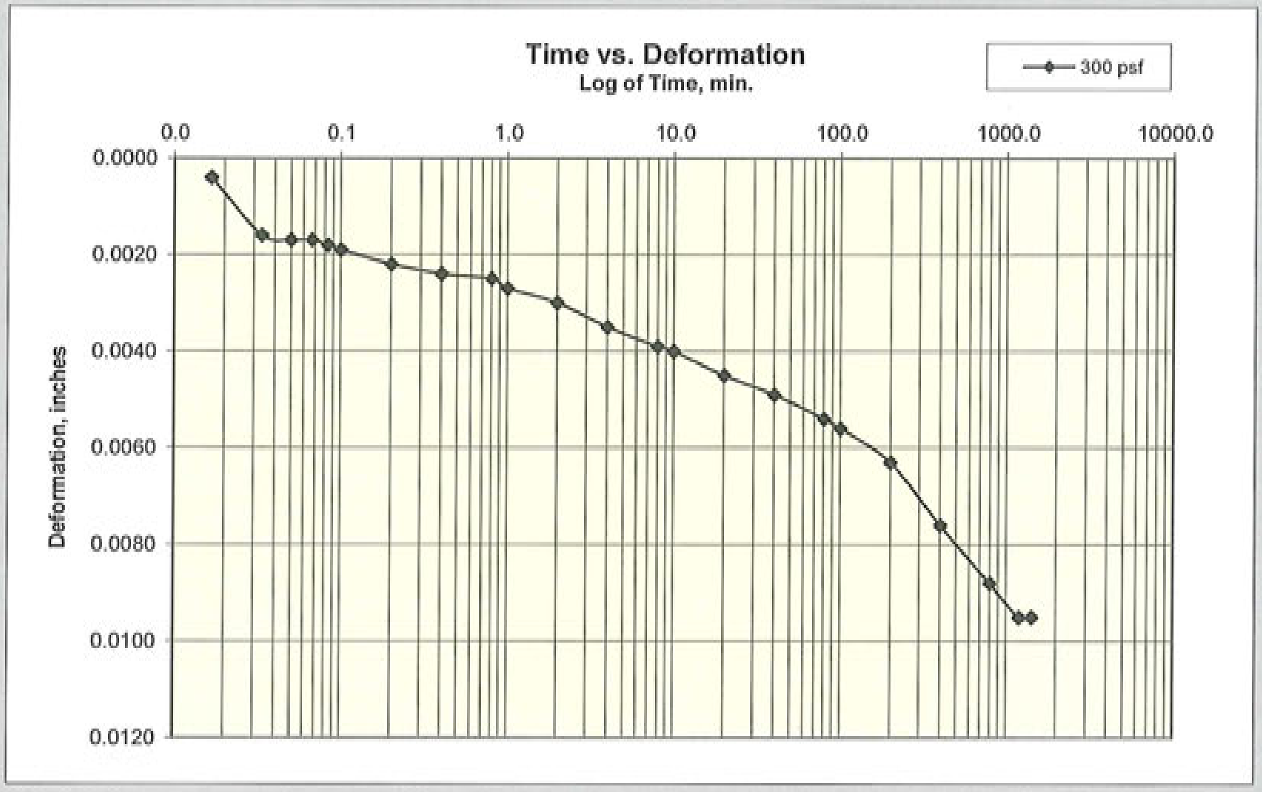

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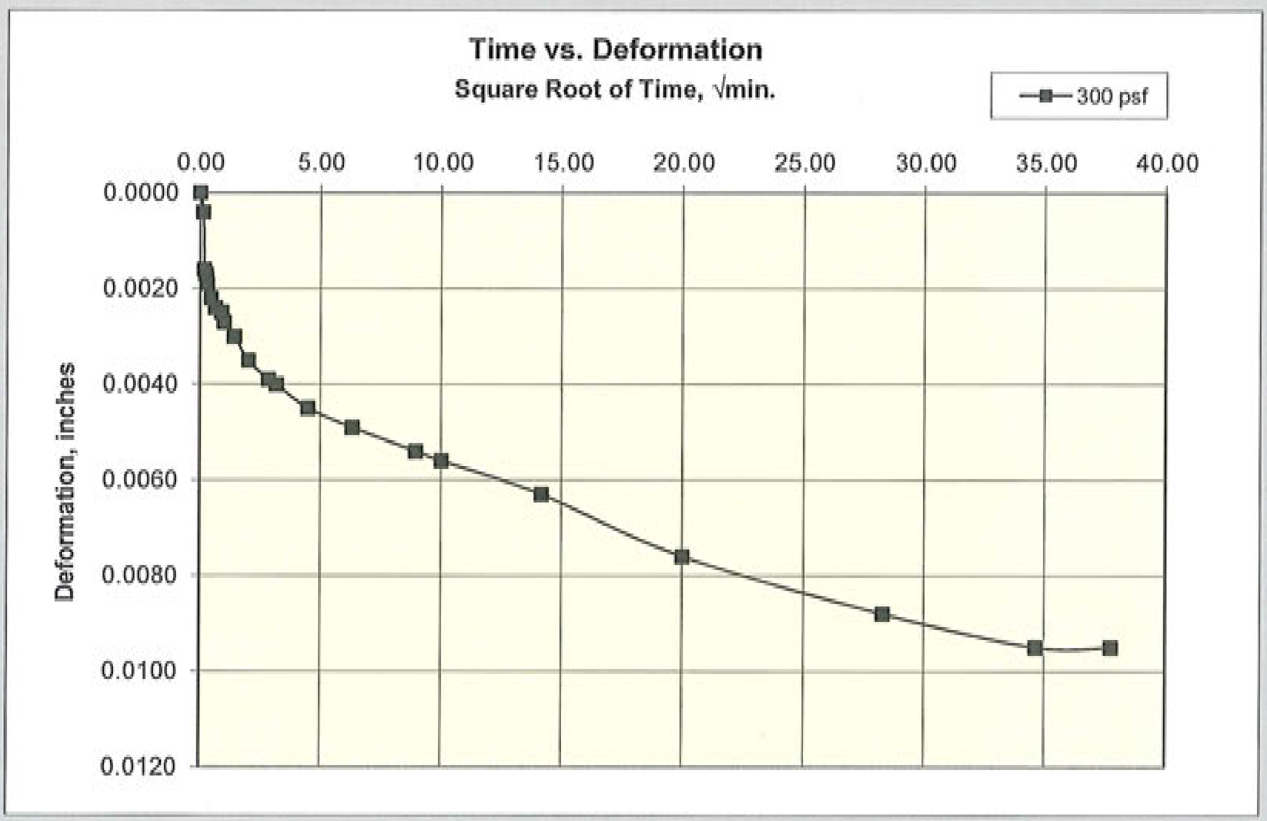

Cooper Testing Labs, Inc.

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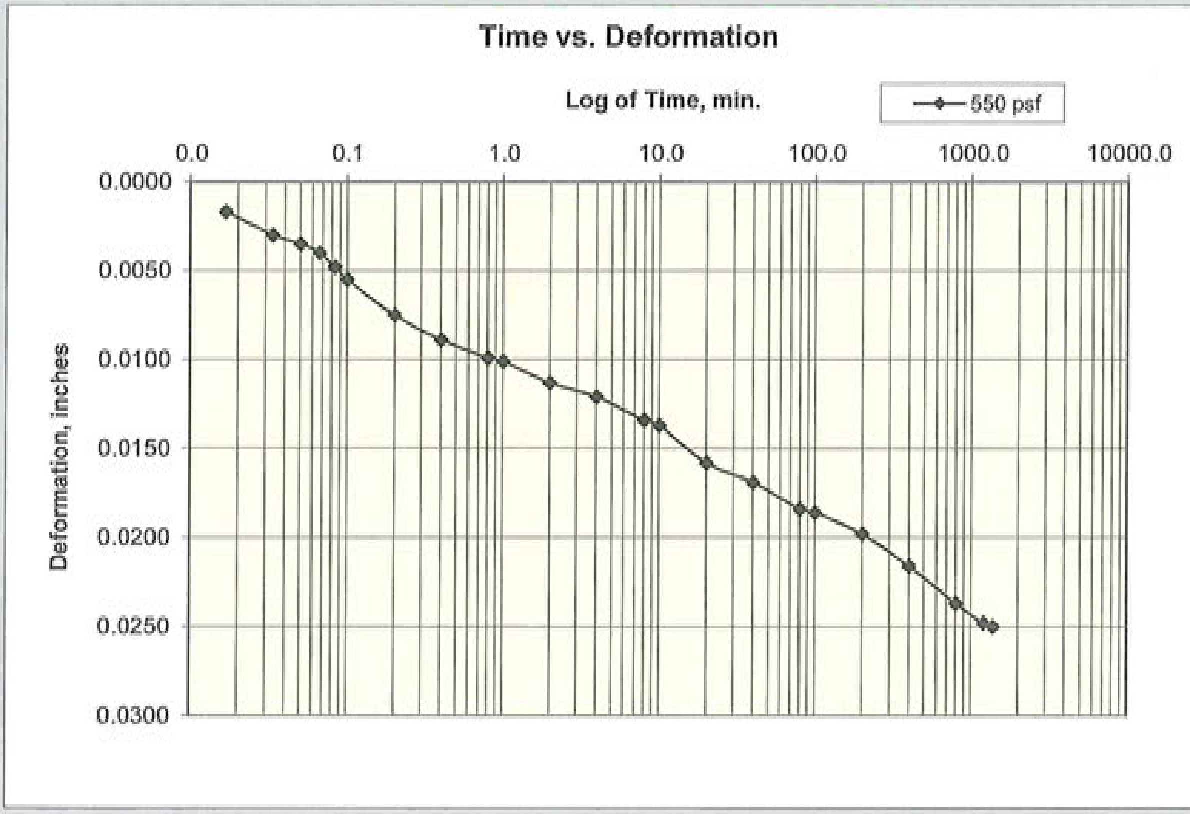

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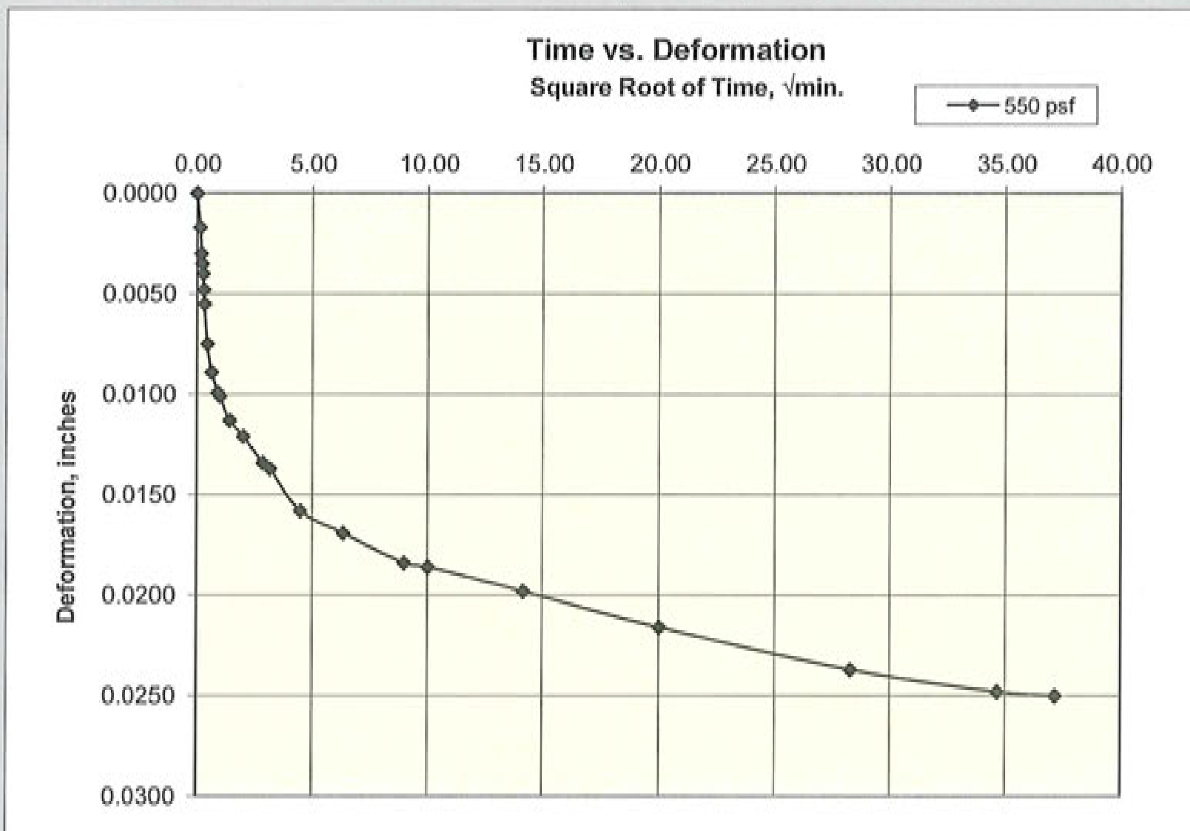

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Cooper Testing Labs, Inc.

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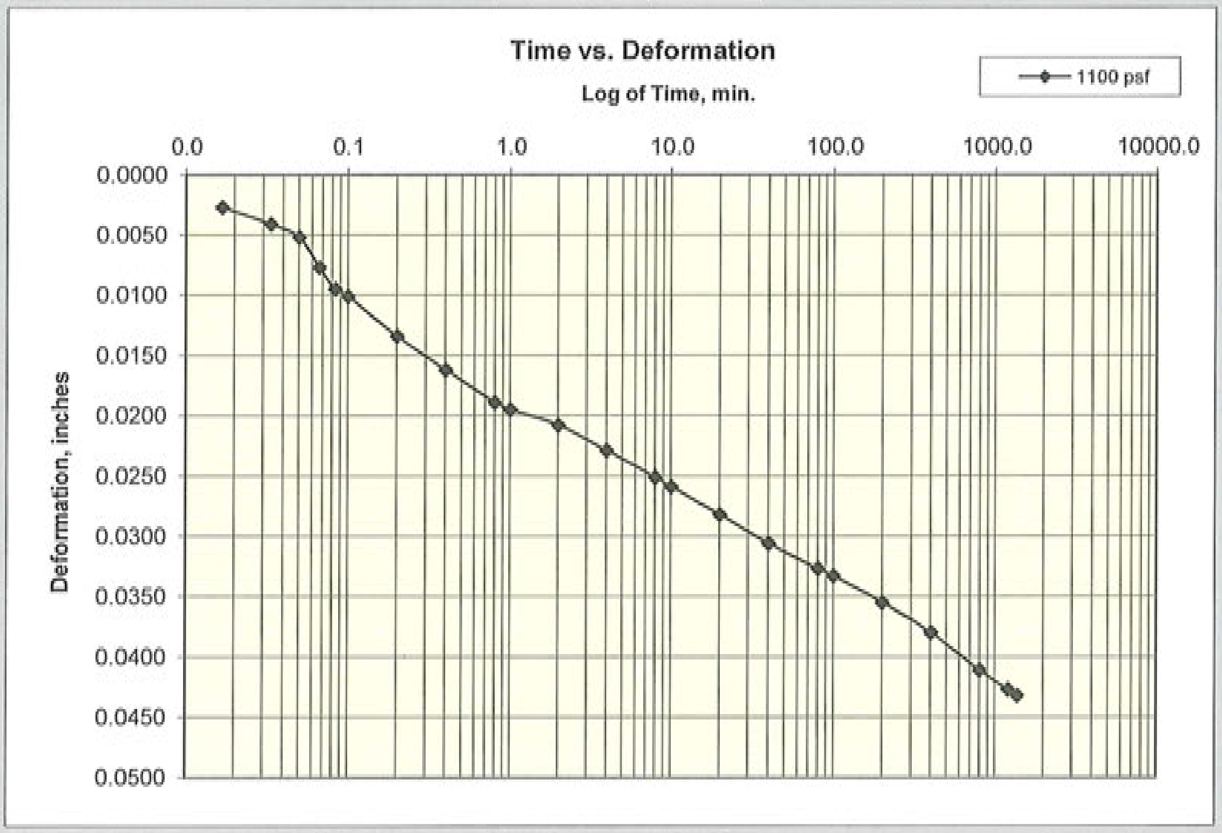

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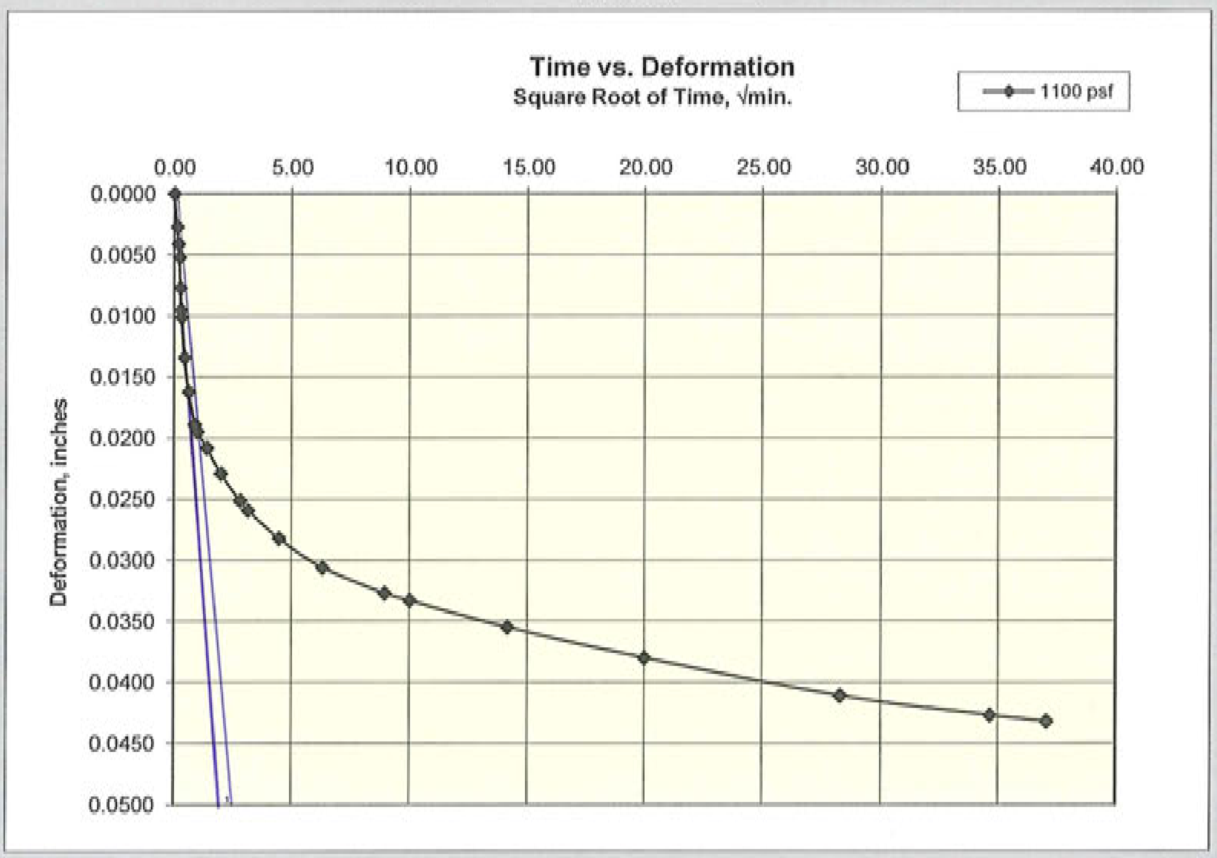

$\sqrt{t_{90}} = 1 = 1$ min

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Cooper Testing Labs, Inc.

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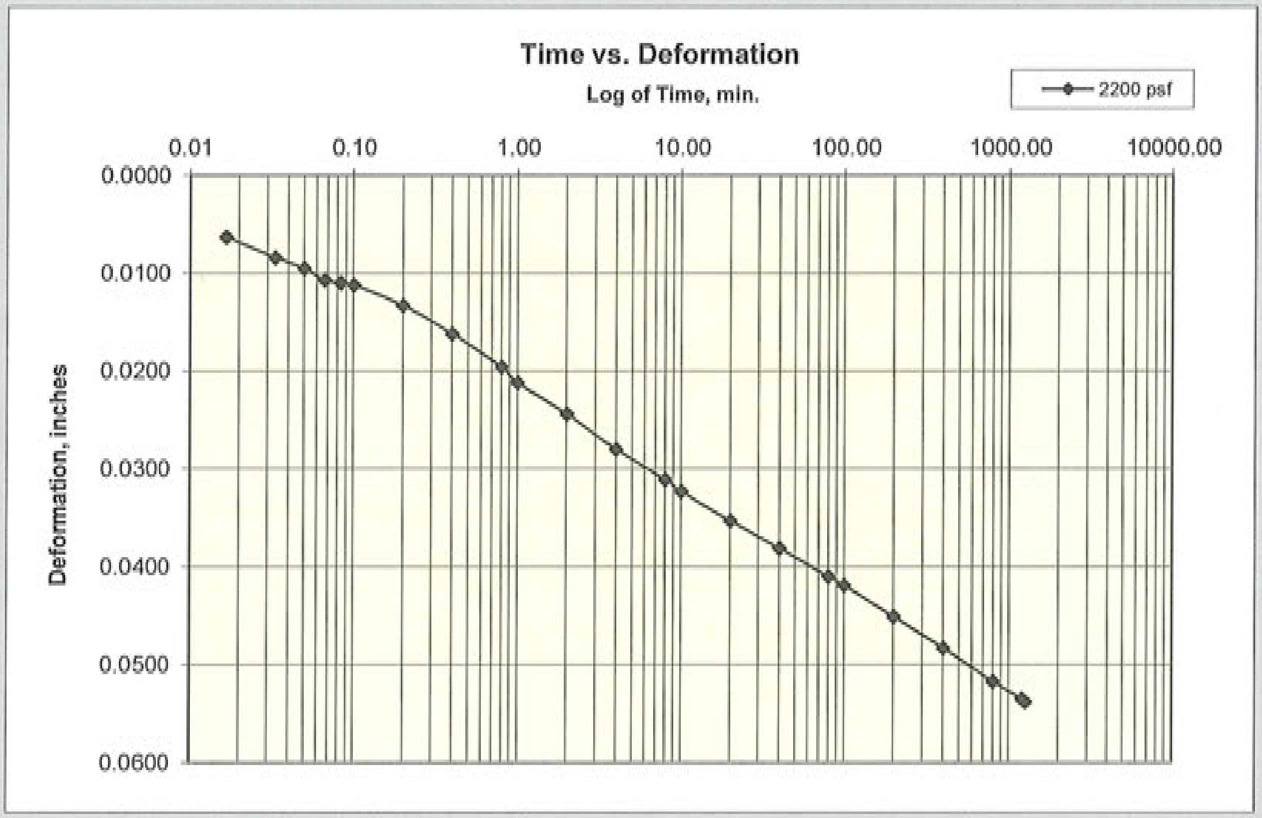

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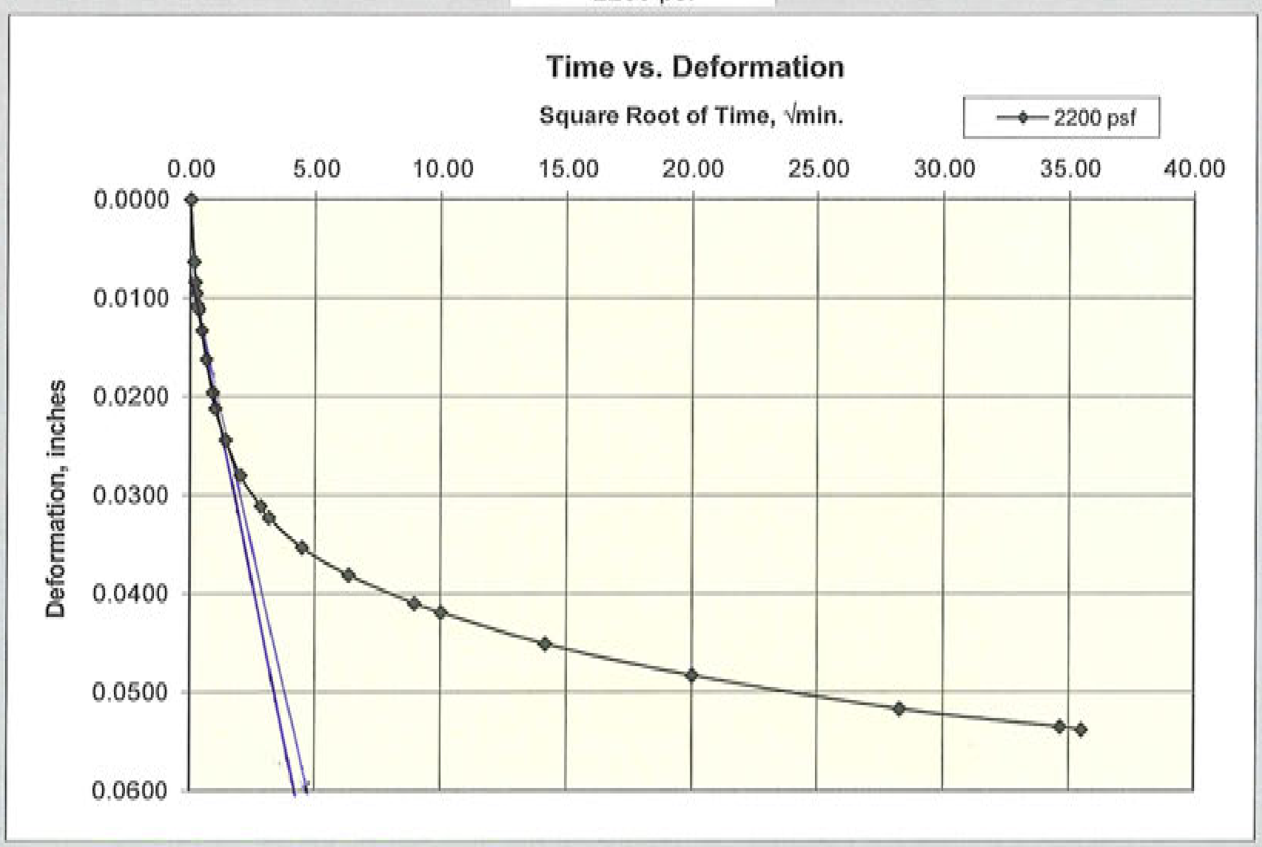

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$t_{90} = 2$ min

Cooper Testing Labs, Inc.

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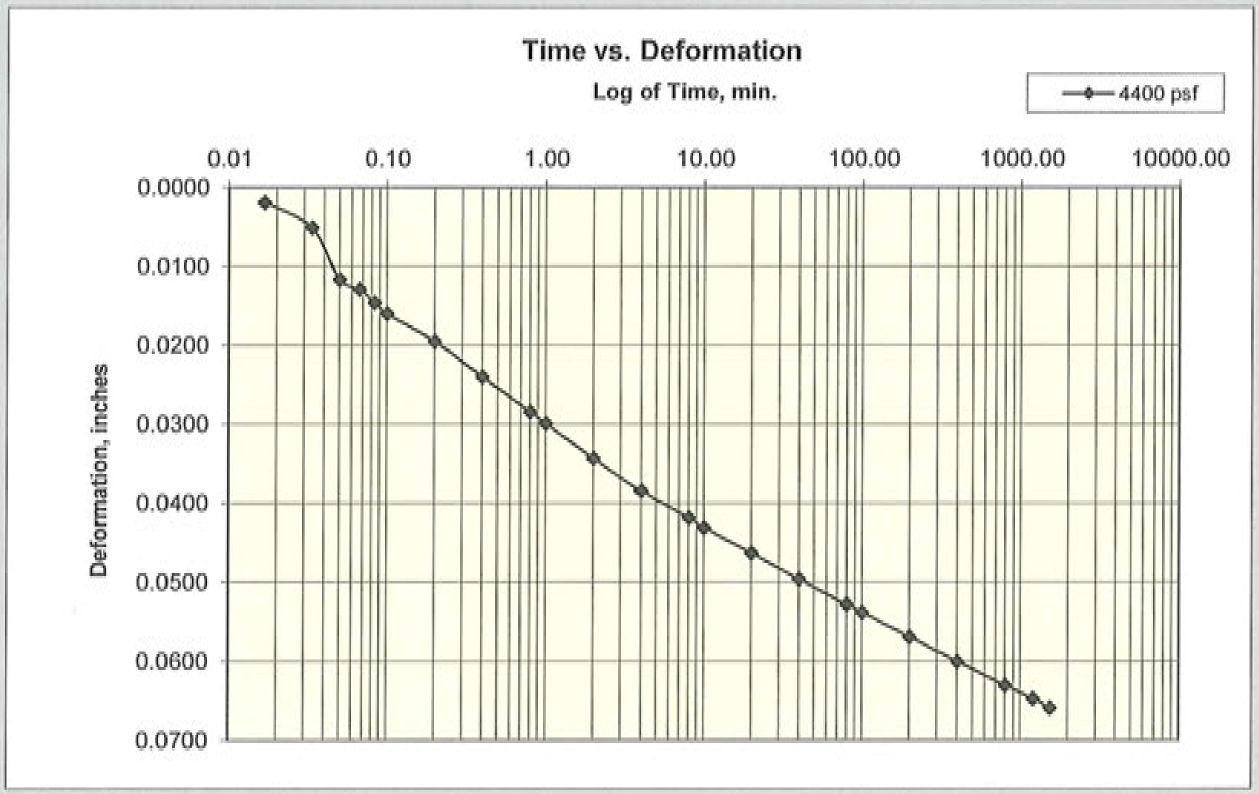

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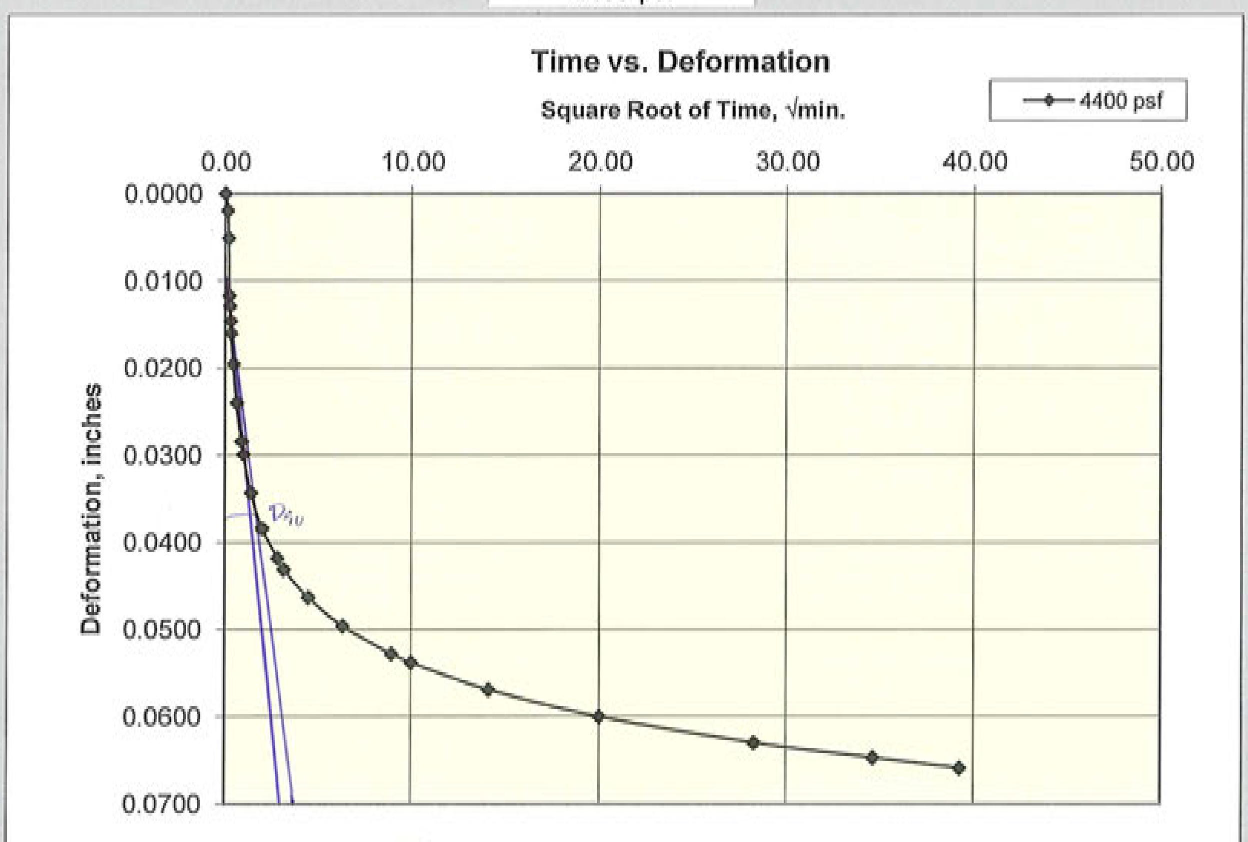

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$t_{90} = 2.9$ min

Cooper Testing Labs, Inc.

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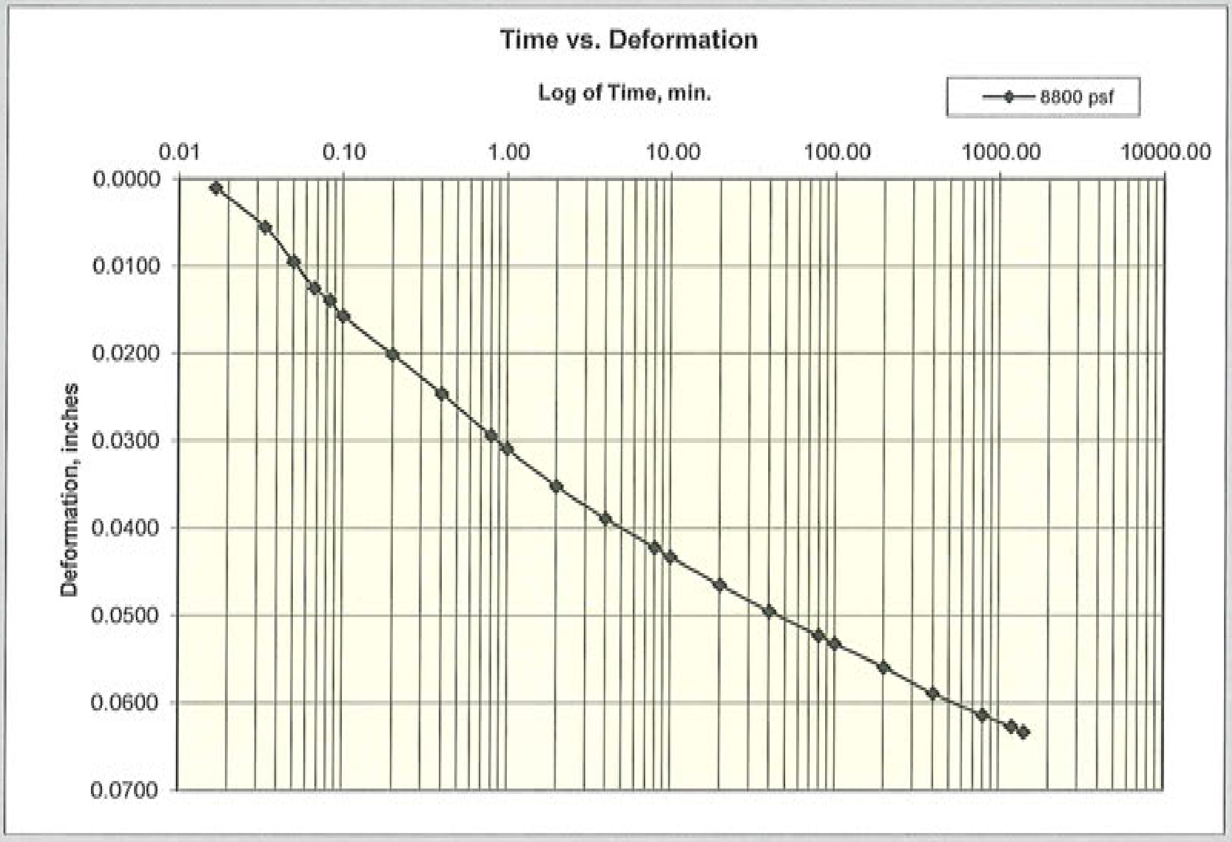

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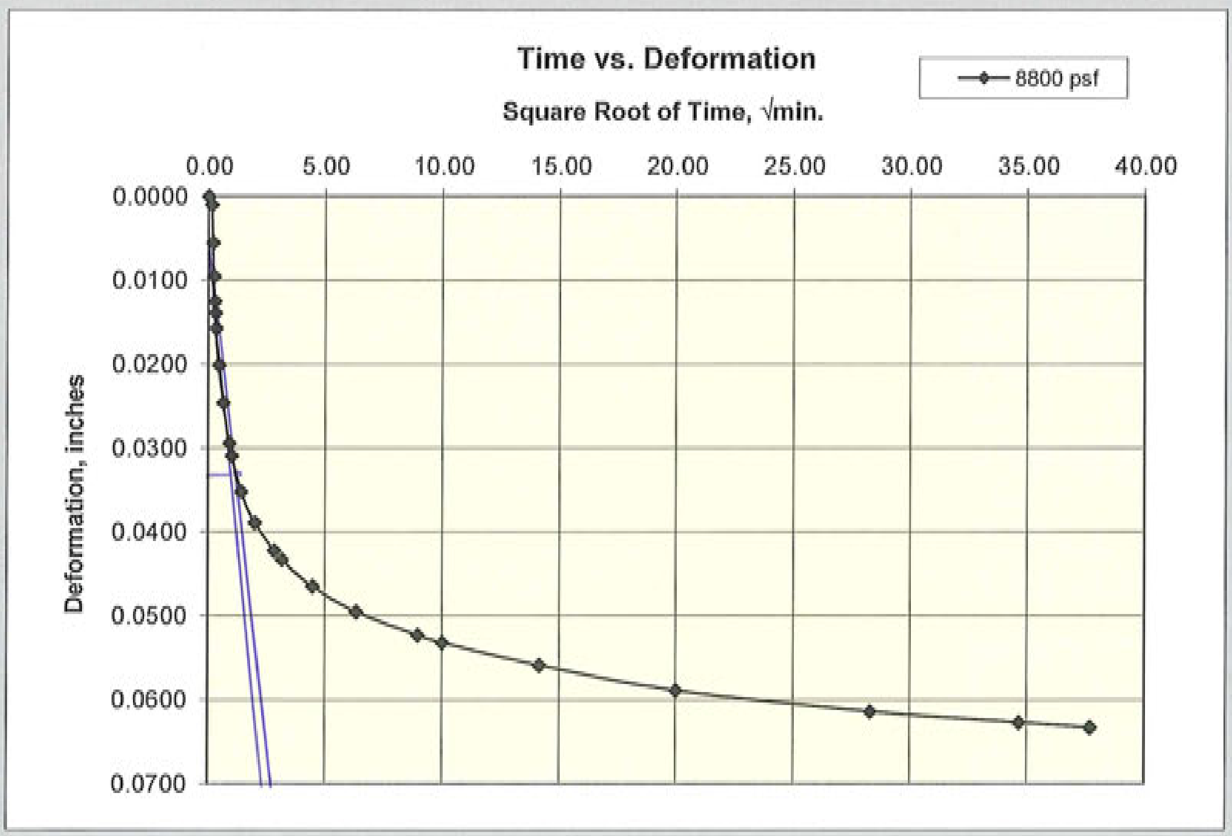

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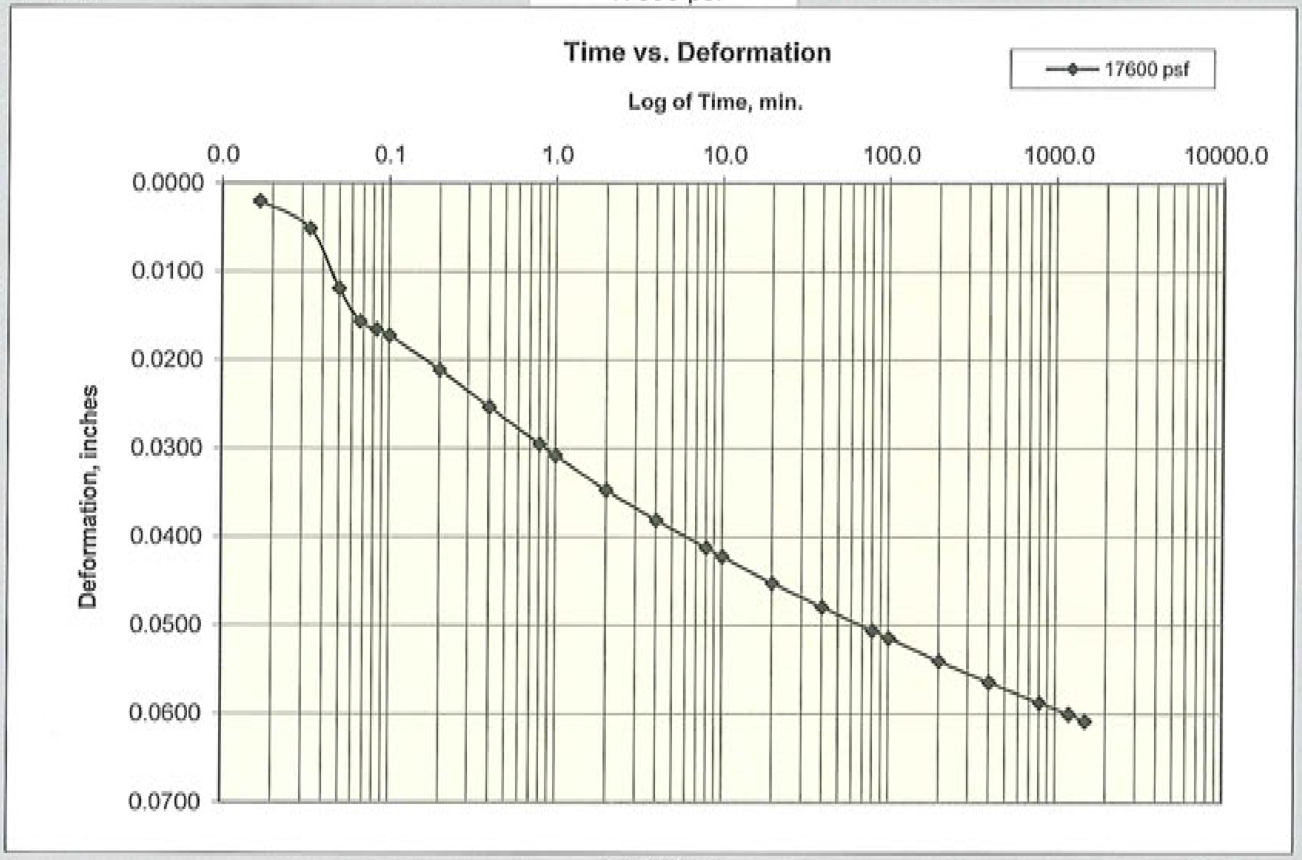
$\boxed{t_{90} = 1.45 \text{ min}}$

Cooper Testing Labs, Inc.

Load 9 | 17600 psf



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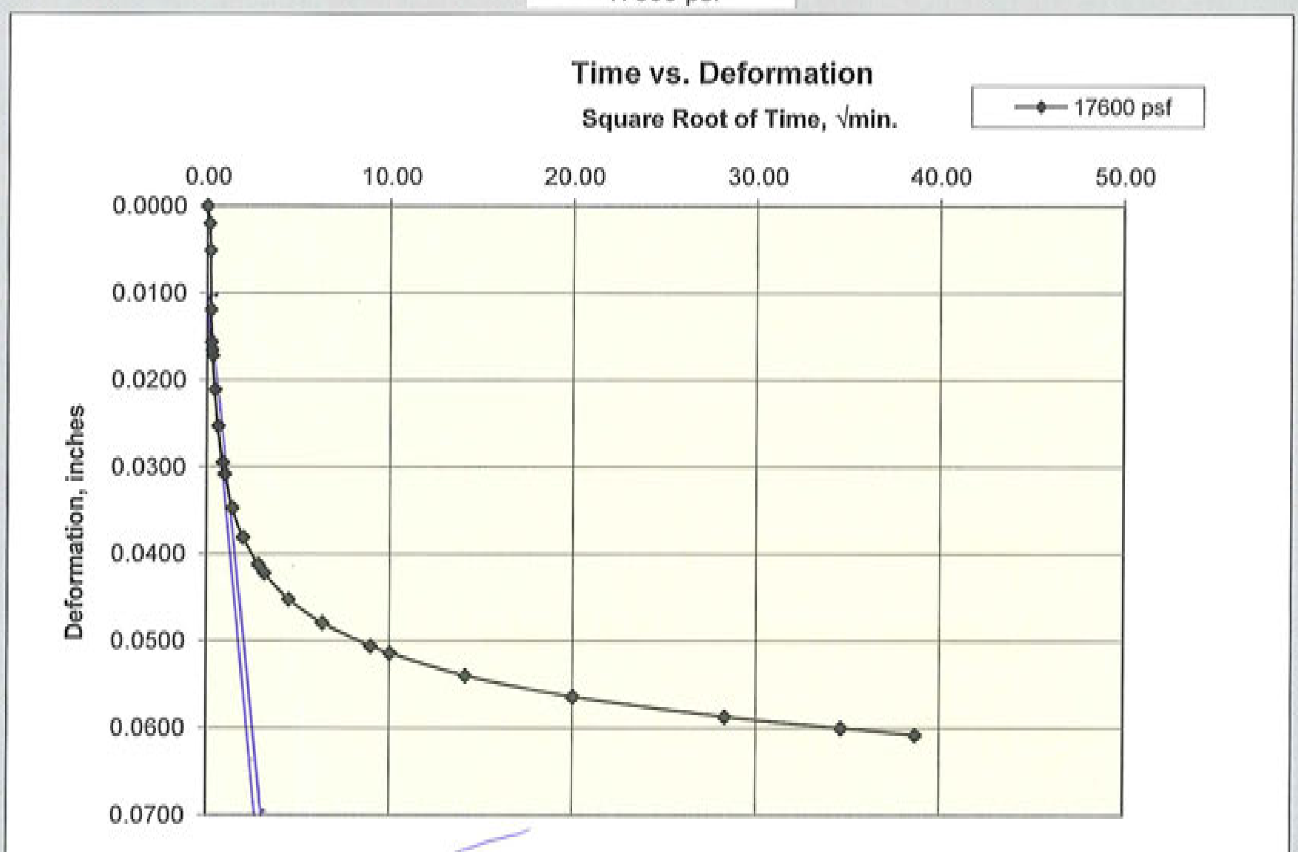

$\sqrt{t_{90}} = \sqrt{1 \text{ min}}$

$t_{90} = 1 \text{ min}$

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APPENDIX G

Rock Slope Protection Analysis

CE&G
CAL ENGINEERING & GEOLOGY

DOCUMENT REVIEW COVER SHEET

1. PROJECT NAME Almaden Lake Improvement Project	2. PROJECT NUMBER 140540
3. DOCUMENT TITLE Appendix G Rock Slope Protection Analysis	
4. DOCUMENT STATUS DESIGNATION ☐ Preliminary ☒ Final ☐ Cancelled	
5. NOTES/COMMENTS The purpose of this calculation is to determine the thickness of rock slope protection needed for impinging flow and parallel flow according to the California Bank and Shore Rock Slope Design Manual produced by Caltrans	

ATTACHMENTS	TOTAL NO. OF PAGES
Rock Slope Protection Design	2

RECORD OF REVISIONS

6. No.	7. Reason For Revision	8. Tot. Pgs	10. Originator (Print/Sign/Date)	11. Checker (Print/Sign/Date)	12. QA/QC (Print/Sign/Date)	13. Apprvd./Accptd (Print/Sign)	14. Date (M/D/YY)
1	Final Issue	2	Eli Zane	Dan Peluso	Dan Peluso	Dan Peluso	4/30/15

Rock Slope Protection Design

$$W = \frac{0.00002 \cdot V^6 \cdot SG}{(SG - 1)^3 \cdot \sin(r - a)^3}$$

Equation 1 from FHWA-CA-TL-95-10

W = theoretical minimum rock mass (size or weight) which resists forces of flowing water and remains on slope of stream or river bank, POUNDS

V = velocity to which bank is exposed (ft/s)
for PARALLEL flow multiply average channel velocity by 0.67
for IMPINGING flow multiply average channel velocity by 1.33

SG = specific gravity of rock

r = 70 degrees

a = outside slope face angle with horizontal, (Degrrees)

Input Parameters

$$V_I := 8 \ \frac{ft}{s}$$

$$SG := 2.65$$

$$r := 70 \cdot \frac{\pi}{180}$$

$$a := 26.6 \cdot \frac{\pi}{180}$$

Determine Minimum Stone Weight for Impinging Flow

$$W_I := \frac{0.00002 \cdot \left(1.33 V_I\right)^6 \cdot SG}{(SG - 1)^3 \cdot \sin(r - a)^3}$$

$$W_I = 52.78$$

Determine Minimum Stone Weight for Parallel Flow

$$W_P := \frac{0.00002 \cdot \left(0.67 V_I\right)^6 \cdot SG}{(SG - 1)^3 \cdot \sin(r - a)^3}$$

$$W_P = 0.86$$

Determine RSP Class of Outside Layer (Impinging Flow)

From Table 5-1 using W = 53 lbs and gradation 50-100
Use Caltrans Facing Class or Backing No.1

Determine RSP Class of Outside Layer (Parallel Flow)

From Table 5-1 using W = 0.86 lbs and gradation 90-100
Use Caltrans Backing No. 3

Determine the Required Layers of RSP (Impinging Flow)

For Caltrans Facing class in Table 5-2
*Inner layer = None
*Backing Class = None
*RSP-Fabric Type A

Determine the Required Layers of RSP (Parallel Flow)

For Caltrans Facing class in Table 5-2
*Inner layer = None
*Backing Class = None
*RSP-Fabric Type A

Determine the Minimum Thickness of RSP (Impinging Flow)

From Table 5-3 the minimum thicknesses are
*Facing Class = 1.8 feet
*Inner layer = 0 feet
*Backing Class = 0 feet
*RSP-Fabric Type A
Total RSP Thickness = 1.8 feet

Determine the Minimum Thickness of RSP (Parallel Flow)

From Table 5-3 the minimum thicknesses are
*Backing No. 3 = 0.75 feet
*Inner layer = 0 feet
*Backing Class = 0 feet
*RSP-Fabric Type A
Total RSP Thickness = 0.75 feet

Appendix E
Methyl Mercury Report

TECHNICAL MEMO

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(530) 220-3165

sam@mccenv.com

December, 2016

Subject: Almaden Lake environmental conditions relative to mercury

Introduction

The purpose of this technical memorandum is to describe the available knowledge relative to mercury issues at Almaden Lake. This description provides a basis for the analysis to be presented in the Environmental Impact Report for the Almaden Lake Project being undertaken by the Santa Clara Valley Water District (District).

A primary objective of the Project is to improve mercury conditions. Thus, although an environmental evaluation is typically focused on the potential negative impacts that a project could impart, this memo often describes conditions which are already impacting the environment and which the Project will improve. Furthermore, although the focus here is on mercury, other conditions that influence mercury cycling in the environment and which may be changed by the Project are also discussed.

This memo is organized around two broad conditions: physical and legal. The remainder of this section provides background information relevant to those conditions. To facilitate public review of this technical memo, **Appendix A** includes definitions and acronyms used in this document.

Mercury Contamination is Widespread

In the U.S., mercury pollution has contaminated 18 million acres of lakes, estuaries, and wetlands, and 1.4 million river miles (NRDC 2014). In California, 74 of the 350 reservoirs recently sampled are now identified as mercury-impaired. The actual number of mercury-impaired reservoirs is likely substantially higher—reservoirs will be added as more data are collected (SWRCB 2013).

The primary environmental concern with mercury is exposure to methyl mercury (MeHg). Exposure to MeHg comes predominately from eating fish and shellfish that have accumulated it through their food web. Microscopic algae can concentrate dissolved MeHg in the water column to levels approximately 100,000-fold greater, making this a critical step in the biomagnification process (Watras et al. 1994). The primary route of MeHg exposure in humans and wildlife is fish consumption. In turn, human consumption of contaminated fish and wildlife poses significant health risks (USEPA 2009). MeHg is linked to developmental problems in fetuses and children and to nervous system effects in adults (USEPA 2001). Similar developmental and nervous system effects have been observed in wildlife globally (Weiner et al. 2003) and in Bay Area birds (Ackerman et al. 2008).

Mercury Cycling is Complex

During summer, lakes tend to stratify, with warmer surface water essentially floating on colder, denser water below. The zones or water layers are referred to as the epilimnion (surface layer mixed by wind and daily temperature cycles), metalimnion (transitional, with the most rapid change in density), and hypolimnion (profundal, isolated, dark zone).

During periods of stratification, anoxia in the hypolimnion is primarily caused by microbial degradation of organic matter, or by utilization of nutrients in the water column. Typically after many years of operation of a reservoir or lake, there is a build-up of organic matter at the bottom (sometimes termed sediment oxygen demand) that would continue to cause anoxia even if all inputs of new organic matter and nutrients were eliminated. After dissolved oxygen is utilized, anaerobic digestion of organic matter produces ammonia, which is an important nutrient for the production of algae. This is why late summer algae blooms are common in temperate-climate lakes. In some waterbodies, the seasonal production of algae becomes the dominant source of organic matter that settles to the bottom, adding to the build-up of organic matter (Horne and Goldman 1994).

Mercury becomes methylated in aquatic environments as a by-product of bacterial iron and sulfate reduction (Reg. Wtr. Qual. Ctrl. Bd. – San Francisco Bay 2008a). Despite much literature on the topic, the production and transformation mechanisms of MeHg in aquatic environment remain poorly quantifiable (USEPA, 2006; Ullrich et al., 2001). Knowledge is also lacking about the many chemicals (sulfides and dissolved organic carbon) and biological processes (bacterial activity) that control mercury methylation and bioaccumulation in aquatic environment, particularly at the sediment-water-interface (de Wit et al., 2012; Ullrich et al. 2001).

The mercury cycle includes a complex set of biogeochemical processes, of which methylation is ecotoxicologically important. Waters with low dissolved oxygen concentrations promote the activity of sulfate-reducing bacteria and therefore sulfide production. Sulfide production enhances the solubility of particulate mercury both in the sediments and suspended in the water column. The sulfate-reducing bacteria take up the solubilized mercury and form MeHg, as shown in **Figure 1** below (Reg. Wtr. Qual. Ctrl. Bd. – San Francisco Bay 2008a).

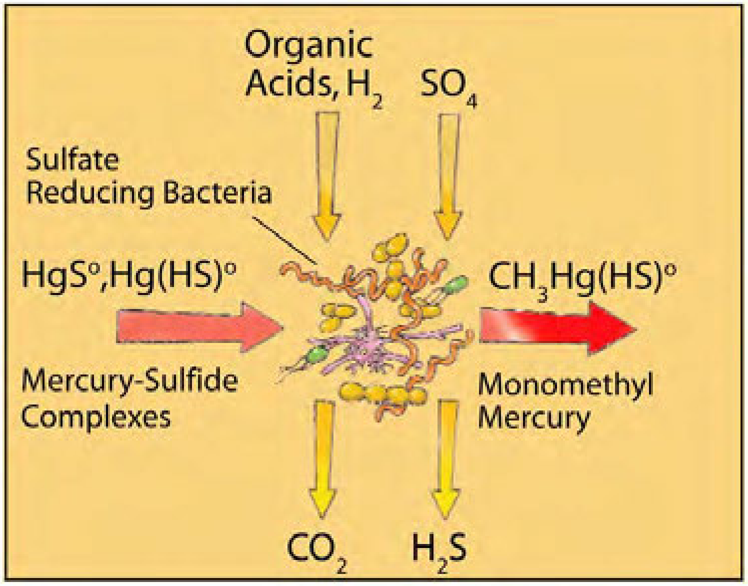


Figure 1. Mercury Methylation by Sulfate-Reducing Bacteria (Source: Tetra Tech. 2005)

MeHg is readily bioaccumulated and transferred in food webs, and can biomagnify to high concentrations in predatory fish and wildlife. Biotic exposure to MeHg in the ecosystem is strongly influenced by the net balance between processes that yield MeHg and make it available to aquatic biota versus processes that degrade MeHg or decrease its bioavailability for uptake.

Rates of mercury methylation in water, sediments, and aquatic organisms depend upon numerous environmental factors, including type and abundance of microorganisms and organic matter, pH, temperature, redox potential, sulfate concentration, and mercury concentration (D'Itri 1990). Concentrations in fish are influenced by their size, diet, sex, and trophic position as well as water chemistry and mercury methylation rates (Weiner et al. 2003). Many studies in the literature have attempted to find correlations between fish concentration and physical and chemical characteristics and a number of parameters have been found to be of primary importance in different locations. For example, the most important factors found to control fish mercury levels among 20 reservoirs in the state of Maryland were water MeHg and sulfate concentration and lake morphology (Mason and Sveinsdóttir 2003). Water quality regulators in California are currently working to develop such linkages between fish mercury concentrations and their environmental conditions[1].

Mercury Cycling in Lakes

Reservoir creation has been known for years to lead to elevated MeHg in fish (Rosenberg et al. 1997). Kuwabara and colleagues (2005) measured exceedingly high bioaccumulation rates of MeHg in the phytoplankton and zooplankton of Almaden Lake over a decade ago. Stewart et al. (2008) suggest that the difference in MeHg bioaccumulation among food

[1] For more information: www.waterboards.ca.gov/water_issues/programs/mercury/.

webs in a reservoir in the legacy gold mining region of the Sierra Nevada is influenced by the characteristics of a given food web.

Because of the higher rates of methylation in lakes, and the efficiency with which biota take up MeHg, wastes that have been transported to lakes are of particular significance with respect to mercury bioaccumulation. Several investigators have shown that the introduction of MeHg produced in the hypolimnion during stratification and its uptake by phytoplankton represents an important internal source of MeHg in lakes or reservoirs, and also a significant entry point of mercury into the food web (Herrin et al. 1998; Gorski et al. 1999; Sellers et al. 2001; Slotton et al. 1995). In addition to biological uptake, MeHg can be lost from the water column as it adsorbs to settling particles or degrades in sunlight ("photodemethylates").

Lake Mercury Management Options

Based on current understanding of MeHg cycling, lake managers can generally consider three types of activities to address their mercury impairment, as discussed by Davis and colleagues (2012): watershed mercury source controls (reduce inputs), reservoir (or in this case lake) operations (reduce methylation and bioaccumulation), and fisheries management (reduce biomagnification). Maintaining oxic conditions in the hypolimnion is a promising in-lake operational strategy in general for improving water quality (Beutel and Horne 1999) and is promising for addressing mercury impairment (Beutel et al. 2014).

Project Objectives and Alternatives

The proposed Project will address issues related to mercury and anadromous fish (i.e., those fish that migrate upstream from saltwater to freshwater to spawn, such as steelhead and salmon, also known as migratory fish). Major Project <u>objectives</u> are as follows:

- Separate Alamitos Creek from Almaden Lake using a proposed levee;
- Re-contour the remaining lake bottom and cap it with clean fill;
- Expand the Park area into a small portion of the existing lake at the beach area;
- Stabilize the existing island and construct a new additional island;
- Establish vegetation along the banks of the restored Alamitos Creek channel, new lake edge and the islands;
- Provide water to the lake from either the creek or recycled water [as described below]; and
- Add a pipeline connection between the lake and the Alamitos Percolation Pond, which is a groundwater recharge pond operated by the District.

The preferred Project is expected to include the following <u>elements</u>:

- Isolating Alamitos Creek in an approximately 210-foot wide channel separated from the remaining lake to its east with a new levee. The new levee would be approximately 40-feet wide with dual use as a maintenance road and trail.
- Re-contouring the bottom of the lake to a more level surface and capping the existing mercury laden sediment with at least two and a half feet of clean fill. The lake would be approximately 28 feet deep (compared to 30 feet currently) and approximately 16 acres in area (compared to 32 acres currently). Thus, the ratio of depth to area will approximately double.
- Expanding the open park area to the west of the lake by approximately two acres into the existing lake and beach area.
- Expanding and reshaping the existing island and stabilizing its banks, and establishing a second island up to 0.75 acres in area.
- Installing riparian vegetation along both banks of the new channel and islands.
- Installing a pipeline connection from the remaining lake to the Alamitos Percolation Pond.

Two possible water sources could fill Almaden Lake in the future:

- Water from Alamitos Creek would flow into Almaden Lake through a diversion structure through the levee at the upstream end of the lake. The diversion structure would be screened to prevent native fish in the creek from entering the lake. During the dry season, water diversion from the creek into the lake may require the 5 feet of head created when the Alamitos Flashboard Dam is installed (in summer months) near the Coleman Avenue Bridge. Water from Alamitos Creek would flow into the lake at rate of 0-5 cfs, depending on the outlet structure geometry and the difference in water surface elevations.
- Under the recycled water option, 200 feet of gravity pipe would deliver water from the future San Jose Water Company Recycled Water Pipeline to the lake. The lake would be operated as a closed-loop system such that water in the lake would not comingle with water in the creek.

The following activities would be part of the overall lake management program:

- The four SolarBee devices (10000 or 7500 series) already in the lake would be re-installed in deeper areas to pump water from the bottom of the lake to the surface, which will help to mix the entire water column. Three additional SolarBee devices (smaller 5000 series) would be installed in shallower areas to mix just the surface water where undesirable algae can proliferate.
- Algaecide or dye may also be added to the lake to control eutrophication in the lake.
- Sediment within the channel will be excavated if/when the accumulated depth exceeds two feet.

Physical Setting

Almaden Lake, which is managed by the District, was developed from a former gravel quarry in Alamitos Creek that began in the 1940s and expanded outward. Almaden Lake Park was opened in 1982 (City of San Jose 2004). Currently, the lake is approximately 40 acres in area, with a maximum depth of 13 meters (43 feet), and is used for boating, swimming, and fishing. Off-stream percolation ponds were constructed downstream of the Project area, downstream of the confluence of Alamitos and Guadalupe Creeks, in 1976. The Alamitos Drop Structure was built to impound water to fill the percolation ponds. A fish ladder at the Alamitos Drop Structure was added in 1999.

In broad terms, inorganic particulate mercury from sources upstream in the Guadalupe River Watershed is transported by storm flows in the wet season while mercury methylation by naturally occurring bacteria occurs predominately in the dry season (Reg. Wtr. Qual. Ctrl. Bd. – San Francisco Bay 2008a). This section describes the current physical conditions of the Project area insofar as they relate to mercury and other water quality conditions.

Geology

The Guadalupe River Watershed can be divided into three geologic regions: 1) an upland region with bedrock outcrops, 2) an alluvial plain, and 3) a baylands region. Sedimentary and metamorphic rocks underlie most of the upland region, chiefly belonging to the Franciscan Formation. The formation includes common sedimentary rock types laid down on ancient seafloors, such as sandstone, shale, greywacke, limestone, and conglomerates, and common metamorphic and volcanic rocks, such as chert, serpentinite, greenstone, basalt, and schist. The river's alluvial plain—the area where it has long flowed, flooded, and deposited sediments—overlies a deep structural basin filled with up to 1,500 feet of Plio-Pleistocene and Quaternary unconsolidated alluvial materials. The alluvial deposits consist of well-graded, interbedded fine sands and silts with some gravels (Tetra Tech, 2005). Almaden Lake lies in the upper alluvial plain. The major topographic features and waterbodies are identified in **Figure 2**.

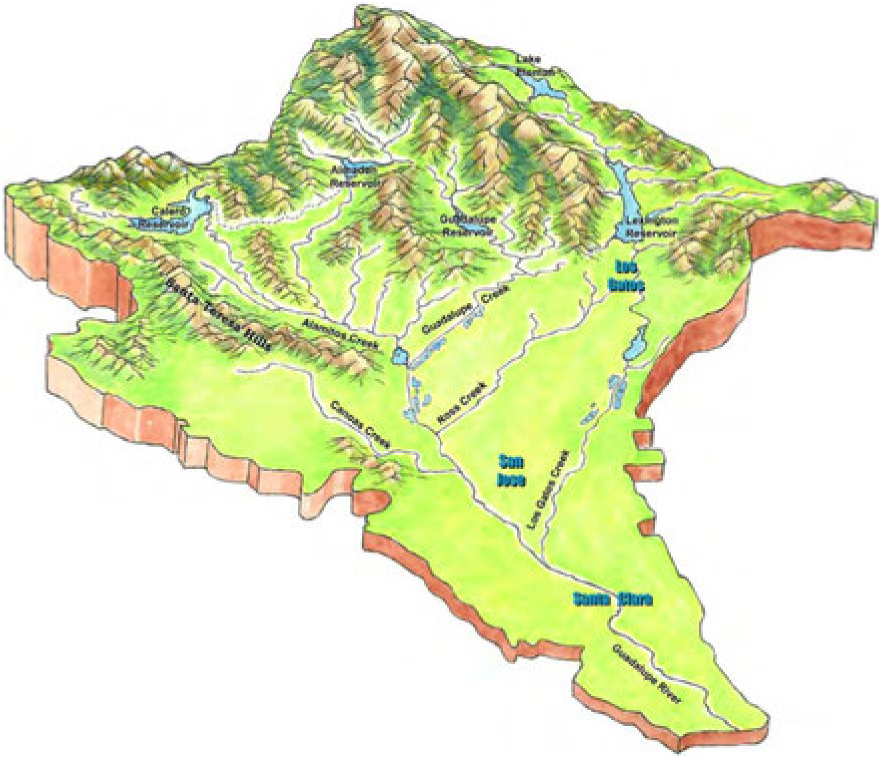


Figure 2. General topography of Guadalupe River Watershed. (Source: Tetra Tech. 2005)

Soils overlying the silica carbonate deposits have elevated total mercury. Five soil sampling areas in the former upland mining area had total mercury concentrations ranging from 3.2 to 570 mg/kg; the median total mercury concentrations were 17 to 200 mg/kg (Dames and Moore 1989). Other rock types that had some cinnabar in a few locations, as noted in the report on the New Almaden Mining District (Bailey and Everhart 1964) include greywacke and shale in the Harry area and altered greenstone or tuff in the nearby upper Cora Blanca and Los Angeles areas of the New Almaden Mining District (Tetra Tech 2005).

Mercury Sources into Almaden Lake

Approximately 38 million kilograms of mercury was produced in the New Almaden Mining District upstream of Almaden Lake; about 70 percent of the production came before 1875, and about 80 percent before 1935. Prior to the mining era, there were no lakes or other large natural impoundments in the Guadalupe River Watershed (Reg. Wtr. Qual. Ctrl. Bd. – San Francisco Bay 2008a). Prior to construction of the Guadalupe and Almaden Reservoirs in 1935, roasted mine wastes, called calcines, and other mine wastes were disposed in or near the creeks so that the materials would be transported downstream by winter flows. Calcines and other mine wastes are still present in and along the banks of Alamitos Creek (Tetra Tech 2005). In addition to the legacy mercury mines and debris in the watershed, additional mercury sources include (roughly in order of greater contributions first): natural mineral springs and native soils, abandoned gold mines and remnant hydraulic mining debris in the Sierra Nevada[2], urban runoff with mercury-containing waste, and atmospheric deposition.

Gehrke and colleagues (2011) found that the mercury in South San Francisco Bay sediments is primarily a result of mercury released from historical Coast Range mercury mines (primarily the same ones upstream of Almaden Lake), which exhibits a distinct stable isotopic "fingerprint." Because a large quantity of mining waste was present in the creek canyons within the New Almaden Mining District prior to construction of Almaden and Guadalupe reservoirs, the bottom sediments in these reservoirs are likely the same dominant sources of mercury as in the bay downstream. In addition, particulate and dissolved mercury loads continue to be transported to Almaden Lake during each wet season.

New Almaden is of significant concern relative to California's other mercury and gold mines due to its much larger area that was mined historically and MeHg production and bioaccumulation rates currently. On the other hand, conditions at New Almaden are alkaline, hence the acid mine drainage problems associated with other mercury mines in the Coast Range do not occur at New Almaden (Reg. Wtr. Qual. Ctrl. Bd. – San Francisco Bay 2008a).

Flood Control

Modifications to control flooding in the Alamitos Creek Watershed have occurred since about 1866, which affect sediment transport and locations where mercury-laden sediment accumulates (Reg. Wtr. Qual. Ctrl. Bd. – San Francisco Bay 2008a). In the late 1970s, flood control engineers built levees along Alamitos Creek from the Harry Road bridge to the confluence with Almaden Lake. Some of these flood control projects may have decreased the extent of erosion along stream banks by installing bank protection and changing the energy gradient to reduce water velocity in fast-flowing segments. Others may have shifted erosion and associated sediments and mercury to elsewhere in stream corridors.

Flood control measures have included the removal of sediment for routine maintenance from the drop structures and flood control structures from various parts of the Guadalupe River Watershed (see Table 2-1 in Tetra Tech 2005*)* and bank protection projects to prevent erosion. Sediment removal removes mercury and prevents it from reaching San Francisco Bay.

Inflow and Outflow Mercury Concentrations

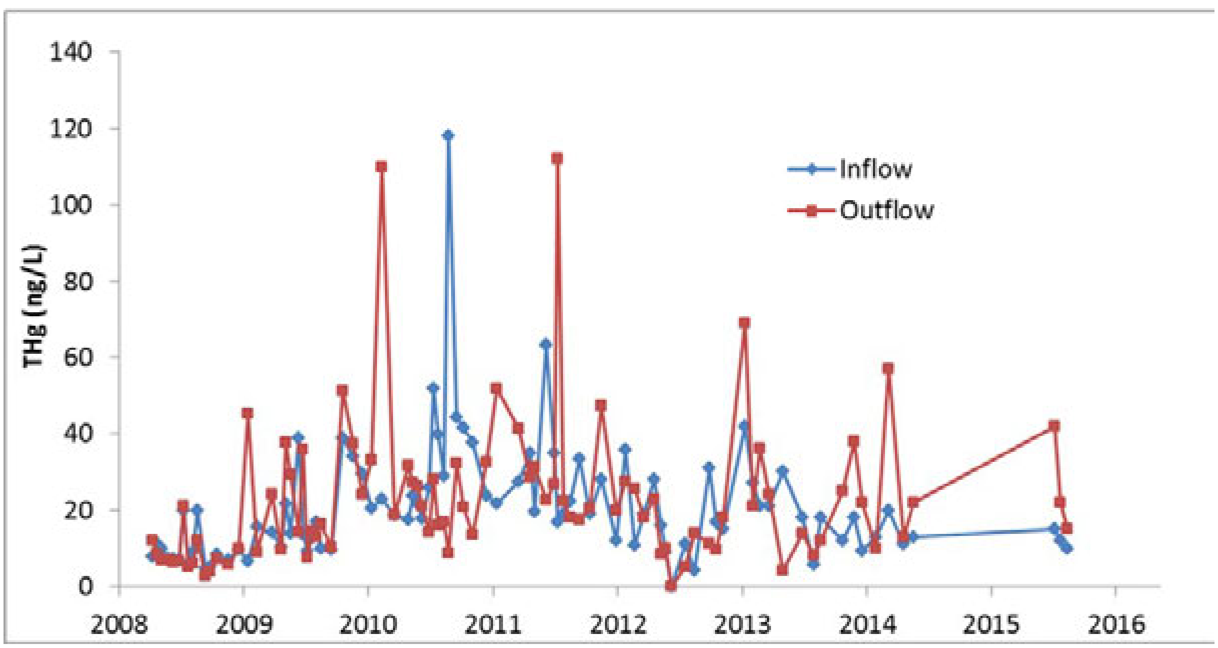
Inflow and outflow concentrations of total mercury and MeHg in years 2008-2015 are shown in **Figure 3**. However, these total mercury concentrations are not statistically significantly different (t-Test for Paired Two Sample for Means, two-tailed p value = 0.39). MeHg concentrations are statistically significantly lower in outflows (t-Test for Paired Two Sample for Means, two-tailed p value = 0.03).

---

[2] Santa Clara Valley Water District imports water from the State Water Project, which delivers water from several reservoirs in former gold mining areas. and can be delivered to Calero Reservoir upstream of the Project area.

Flow rates into and out of Almaden Lake are not monitored. The best available approximation is the sum of flow data for gages "Golf Creek near McAbee" and "Alamitos Creek at Greystone," representing two major tributaries (albeit not all tributaries) in the lake's watershed. Raw data were downloaded from WISKI (2/18/2016 by Emily Zedler, Associate Engineer for the District) at 15-minute intervals and converted to daily averages. Neither total mercury nor MeHg, in inflows or outflows from the lake, appear related to flow rate into the lake (**Figure 4**). Given that lake releases are uncontrolled, inflow and outflow rates are approximately equivalent, Almaden Lake appears to have no effect on total mercury loads in Alamitos Creek while significantly decreasing its MeHg loads.

These findings contrast with reports for lakes in other climates and with less-contaminated sediments. For example, Wildman (2016) found that mercury concentrations in Grand Lake (Oklahoma) were driven by inflow when inflows were high but that during low inflows, biogeochemistry controlled the enrichment of MeHg in specific locations of the anoxic bottom water and sequestered total mercury and MeHg.

a) 

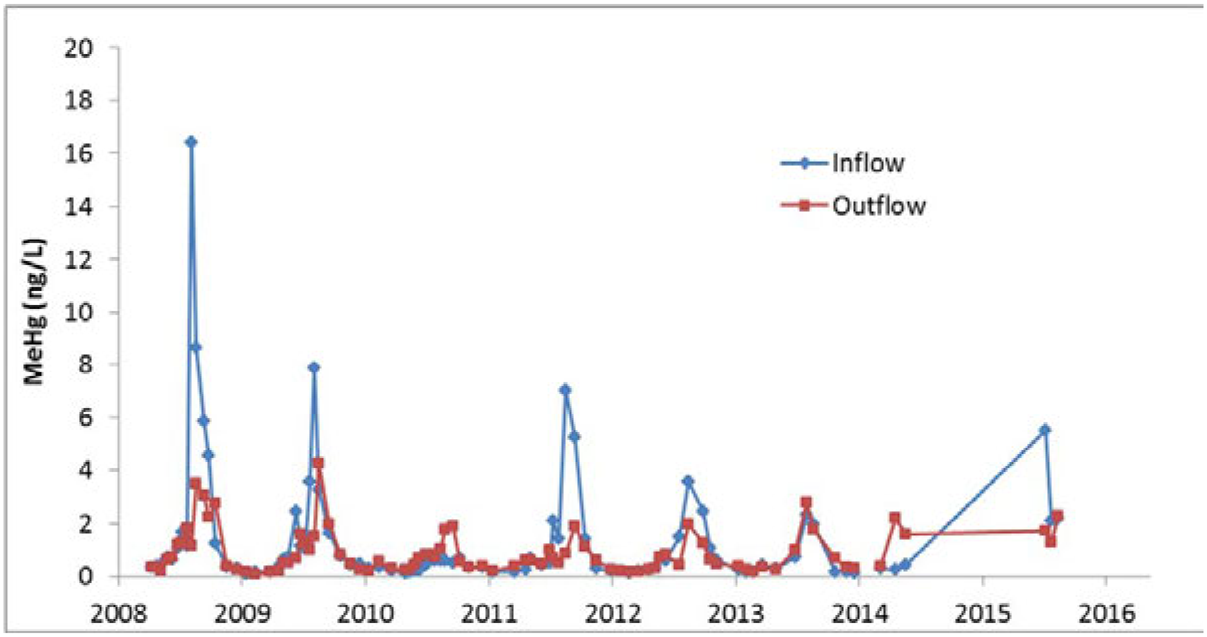
b) 

Figure 3. Almaden Lake inflow and outflow concentrations, 2008-2015 for a) total mercury and b) MeHg.

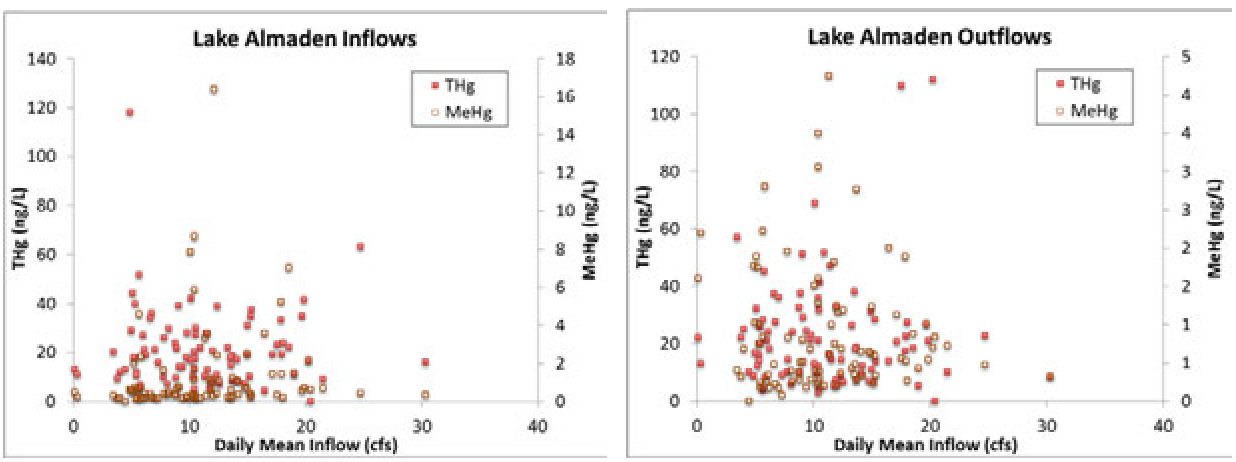


Figure 4. Almaden Lake inflows compared to total mercury (THg) and MeHg concentrations at the lake's inlet (left) and outlet (right).

Lake Stratification

Like most deep, quiescent waterbodies, Almaden Lake becomes thermally stratified between late spring and early fall (June - September, although the exact timing varies annually). The stratification period is characterized by an upper layer (epilimnion) of uniformly warm (20° - 26 ° C), well-mixed water exposed to wind, heat and sunlight. The deeper layer (hypolimnion) is colder (11° - 23° C) and thus more dense. Currently, dry season inflows from Alamitos Creek are also warm, such that the water mixes into the upper layer while its sediment settles to the bottom. Dissolved oxygen becomes depleted by the bacterial decomposition of organic matter in the water column and at the sediment-water interface. Thermal stratification strength increases over the dry season leading to dissolved oxygen depletion in the hypolimnion. During thermal stratification, fish are largely restricted to the epilimnion. A number of studies elsewhere have shown noteworthy increases in MeHg concentrations in the hypolimnion during stratification (Herrin et al. 1998; Sellers et al. 2001; Watras & Bloom 1992). The vertical mixers (discussed below) reduce—but do not eliminate—the stratification and loss of oxygen in the hypolimnion, and tend to warm the hypolimnion.

There are four distinct areas of significant depth in the lake. The two deepest areas (maximum depths of 13 [Site 1] and 11 meters [Site 2]) are separated from each other and from the portion of the lake through which Los Alamitos Creek enters and exits by remnant dike material that ranges 1 to 2 meters below the surface (SCVWD 2015).

Mercury Contamination in Almaden Lake

In March 2015, four (4) discrete sediment samples were collected from a barge on Almaden Lake from depths between 3 feet to 10 feet below top of sediment. Mercury concentrations ranged from 4.5 to 29 (average 19) mg/kg total mercury. These values are generally high relative to the most commonly used environmental screening level of 1.3 mg/kg (Reg. Wtr. Qual. Ctrl. Bd. – San Francisco Bay 2016) and the California thresholds for hazardous waste classification (Total Threshold Limit Concentrations) of 20 mg/kg (California Code of Regulations, Title 22, Chapter 11, Article 3). Every sample also exceeded the TMDL allocation that applies to Alamitos Creek of 0.2 mg/kg in suspended sediment (dry weight, annual median) (Reg. Wtr. Qual. Ctrl. Bd. – San Francisco Bay 2008b).

Fish downstream of the New Almaden Mining District have extremely high concentrations of mercury in their tissues. As of 2004, Guadalupe Reservoir had the highest recorded fish mercury concentrations in California—about 20 times higher than the U.S. Environmental Protection Agency (EPA) MeHg criterion. More recently, monitoring of sportfish in 273 reservoirs throughout California identified Almaden Lake as the most contaminated lake, having 2.15 ppm in largemouth bass. Almaden Lake was also notably contaminated for legacy contaminates dichlorodiphenyltrichloroethane (DDT) and chlordanes in common carp (Davis et al. 2010).

To protect the health of humans who consume fish that may be contaminated by mercury, in 1987 Santa Clara County issued a fish consumption advisory warning people not to eat any fish from Guadalupe, Almaden and Calero reservoirs, Guadalupe and Alamitos creeks, the Guadalupe River, and percolation ponds along the river and creeks. The Office of Environmental Health Hazard Assessment (OEHHA) provides fish advisories for guide people in safely consuming local fish. Currently, OEHHA continues to suggest that no one consumes fish from the Guadalupe River Watershed waters because elevated mercury concentrations are unsafe for any individuals (Office of Environmental Health Hazard Assessment 2009).

Lake Mercury Control Tests

The District is pioneering the application of watershed improvement projects, as well as vertical mixers and hypolimnetic oxygenation in reservoirs to address MeHg bioaccumulation. If such projects prove to be useful controls on mercury bioaccumulation in fish, then there are potentially many California lakes, streams, reservoirs, and sloughs where this could be applied to improve the fishability of State waters. Additional benefits of applying such tools include decreased sediment release of nutrients (orthophosphate and ammonia) that exacerbate eutrophication, reduced metals (particularly iron and manganese) that complicate potable water treatment, and compounds toxic to aquatic biota (ammonium and hydrogen sulfide).

The District installed and operates solar-powered circulators in Almaden Lake. The lake currently has three 7500-series and one 5000-series SolarBee® circulators. The first was installed in 2006, a second in 2007, and two more in 2009.

Circulation using solar power is carbon neutral in itself (produces as much energy without producing carbon dioxide as the amount of carbon dioxide produced to generate energy used to manufacture the device), requires trivial infrastructure (cable anchors) and operates solely on solar power. The device draws water through a vertical pipe open at the desired depth to the surface, where it is oxygenated by contact with air and then falls back through the water column, mixing with the ambient water as it descends to its level of neutral buoyancy.

The hypotheses tested by operating the circulators and monitoring conditions in Almaden Lake are:

- Hypolimnetic circulation will reduce MeHg production and accelerate digestion of accumulated organic matter.
- As a result of this action, fish tissue concentrations of MeHg will decrease as compared to previous data.

Data collected since 2006 shows that the circulators in Almaden Lake appear to have affected the seasonal cycling of MeHg most effectively when the intake is set at the bottom. The intake of the circulator near Site 1 was originally set at one meter above the bottom for operation in 2006 and 2007; it was reset at the bottom in early 2008. The intake of the circulator near Site 3 and Site 4 was originally set to circulate the epilimnion but was changed after two years to take water from the bottom. Now all the circulators near Sites 2, 3 and 5 are set at the bottom. In 2009, the circulator at Site 2 malfunctioned and did not provide sufficient circulation to affect MeHg concentrations in the deepest regions of the hypolimnion, which reverted to the pre-circulator seasonal maxima, but it was able to maintain mid-depth concentrations low compared to pre-circulation data (SCVWD 2015).

Effects of In-lake Mercury Controls

The District had found by 2011 that circulation has significant effects on water column MeHg concentration in Almaden Lake but not those in the four studied reservoirs (Drury 2011). Annual maximum concentrations in the hypolimnion vary, and were obviously affected by the circulator after it was set at the bottom in 2008. Focusing on monitoring

Site 1 over the deepest area of the lake (**Figure 5**), in 2005-2007 the annual maximum MeHg concentration in the hypolimnion was about 60 ng/l; in 2009-2013, it was about 15 ng/l, and in 2014-2015 the maximum concentrations were less than 3 ng/l. Nonetheless, even the most recent results continue to exceed the hypolimnetic seasonal maxima concentration target (1.5 ng/l) for several months annually (SCVWD 2015). MeHg concentrations in the epilimnion have not changed significantly over the past decade.

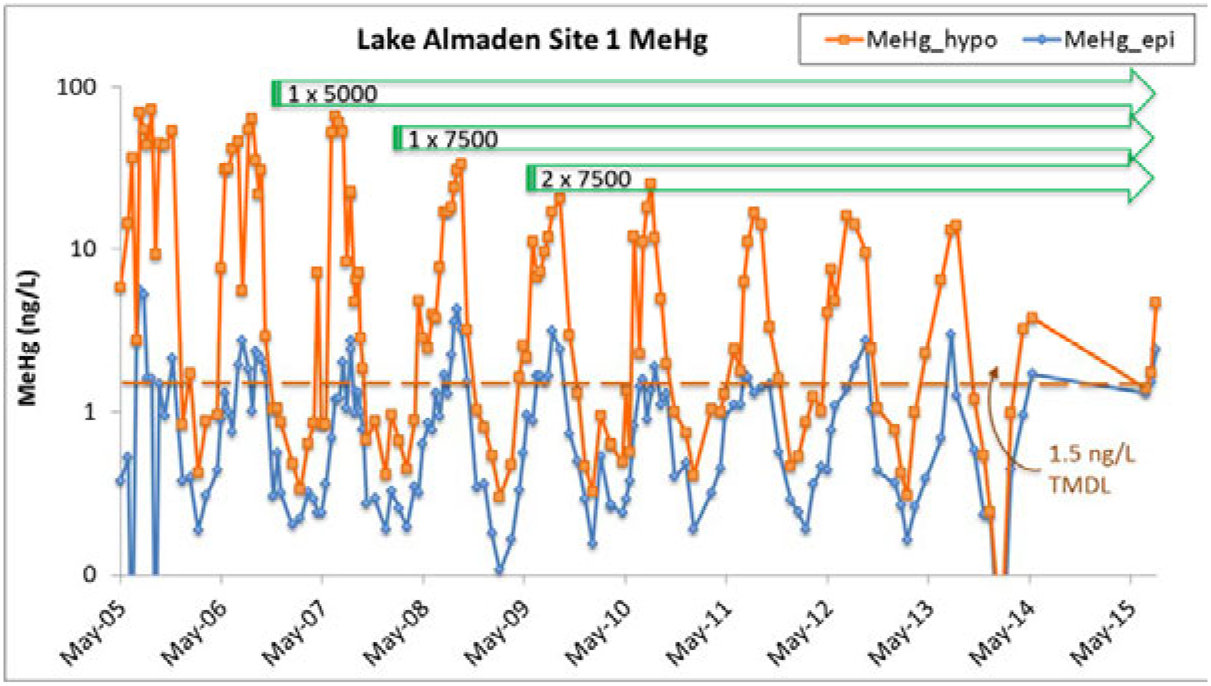


Figure 5. Almaden Lake MeHg concentrations in the epilimnion and hypolimnion, May 2005 - May 2015. Green arrows indicate operating times of vertical mixers. The horizontal dashed line applies to the hypolimnion.

Total mercury and MeHg concentrations in the epilimnion have not changed significantly over the 2005-2015 period (**Figure 6**). Concentrations of total mercury typically exceed the statewide criterion of 50 ng/l as a 30-day average (California Toxics Rule, or CTR; discussed below in section Regulatory Setting). Furthermore, there is no relationship between total mercury and MeHg to indicate that reductions in total mercury would lead directly to commensurate reductions in MeHg (**Figure 7**). These data suggest that the vertical mixers have diluted the highly concentrated hypolimnetic water into the overlying water column without substantially reducing the MeHg concentration exposed to aquatic biota in the epilimnion.

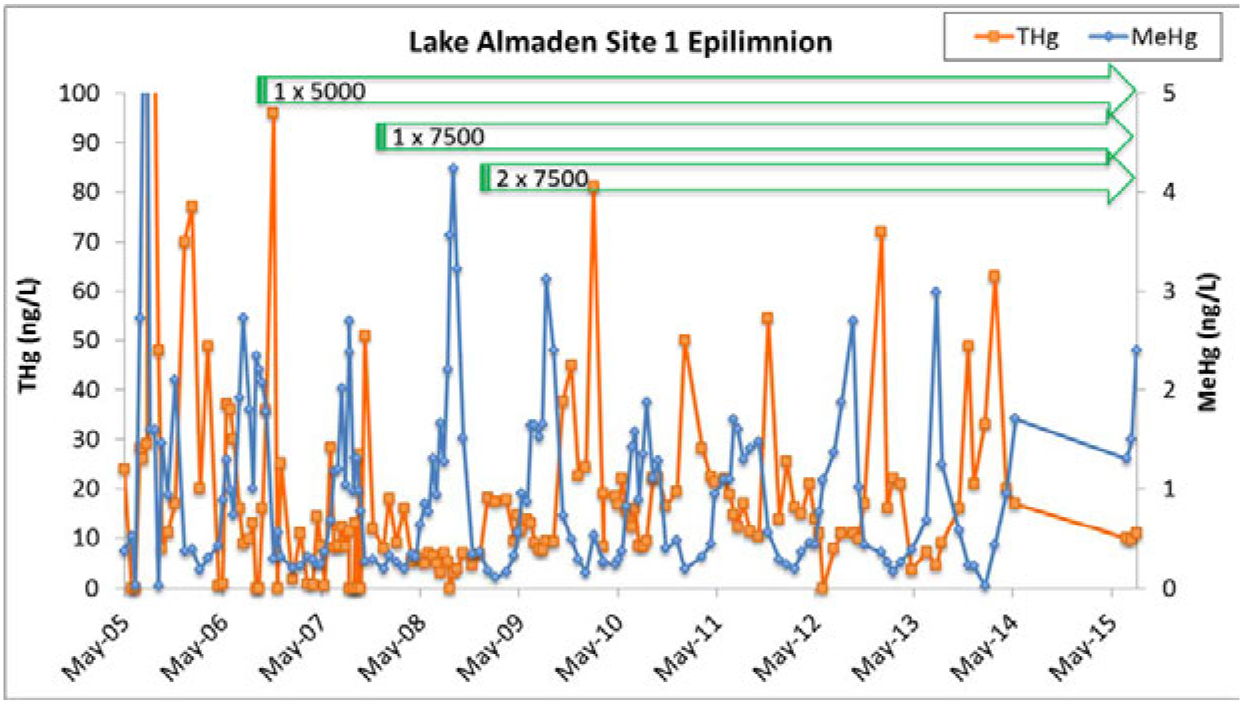


Figure 6. Almaden Lake total mercury (THg) and MeHg concentrations in the epilimnion, May 2005 - May 2015. Green arrows indicate operating times of vertical mixers.

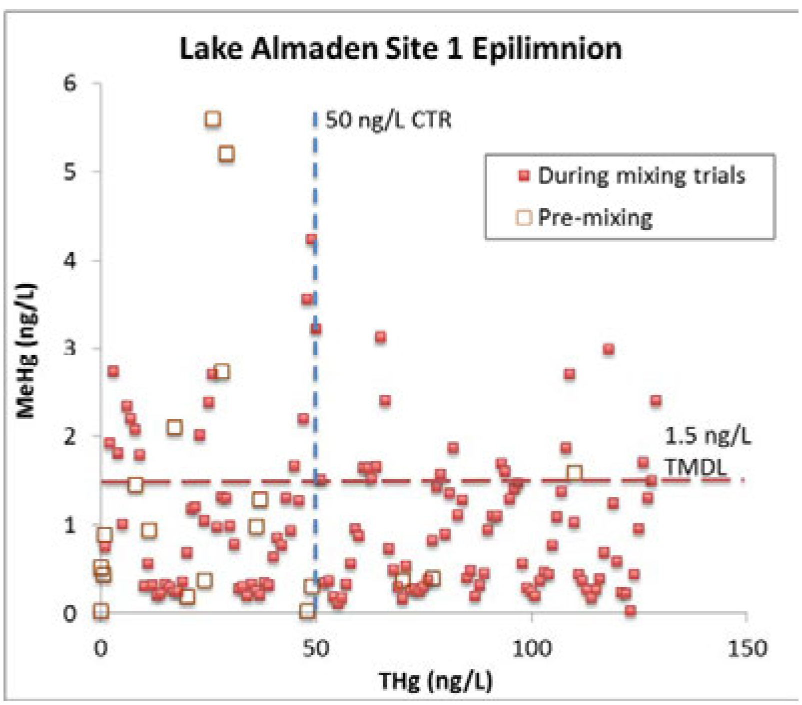


Figure 7. Almaden Lake total mercury (THg) and MeHg concentrations in the epilimnion, May 2005 - May 2015.

As of 2012, reductions in fish tissue mercury concentrations have not been observed (**Figure 8** and SCVWD 2015). Mercury concentrations in both large and small fish continue to exceed their respective TMDL objectives. While MeHg concentrations in both the epilimnion and hypolimnion decreased during vertical mixing compared to 2005 data, fish tissue concentrations did not respond (**Figure 9**). It is also noteworthy that the rate of MeHg bioaccumulation in Almaden Lake fish is much less than the national average rate (USEPA 2001).

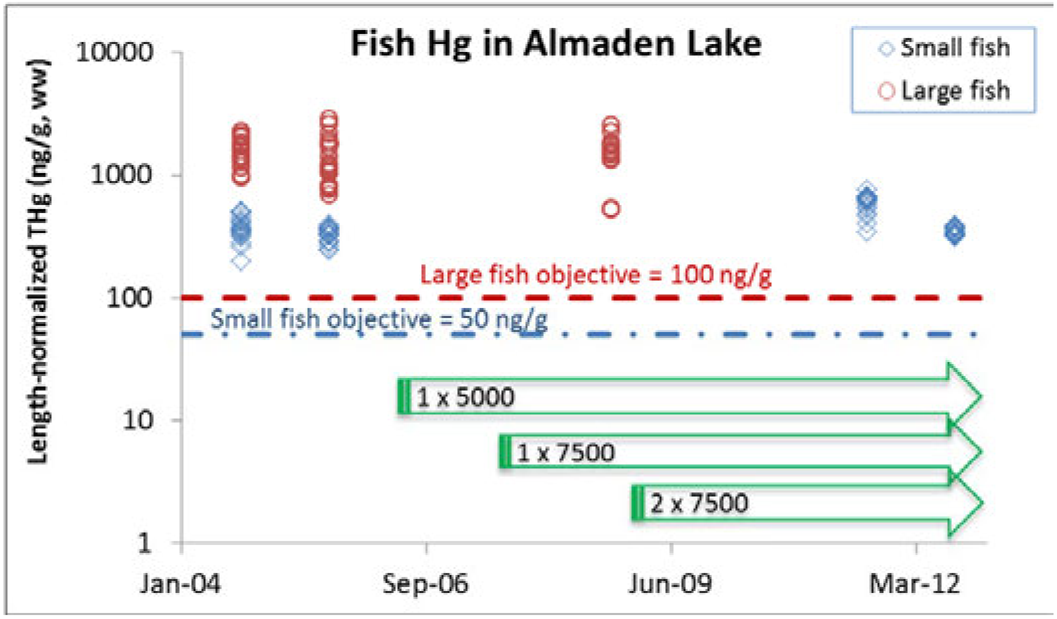


Figure 8. Almaden Lake time series of fish mercury concentrations, compared to TMDL objectives (Reg. Wtr. Qual. Ctrl. Bd. – San Francisco Bay 2008b) and vertical mixer operation periods.

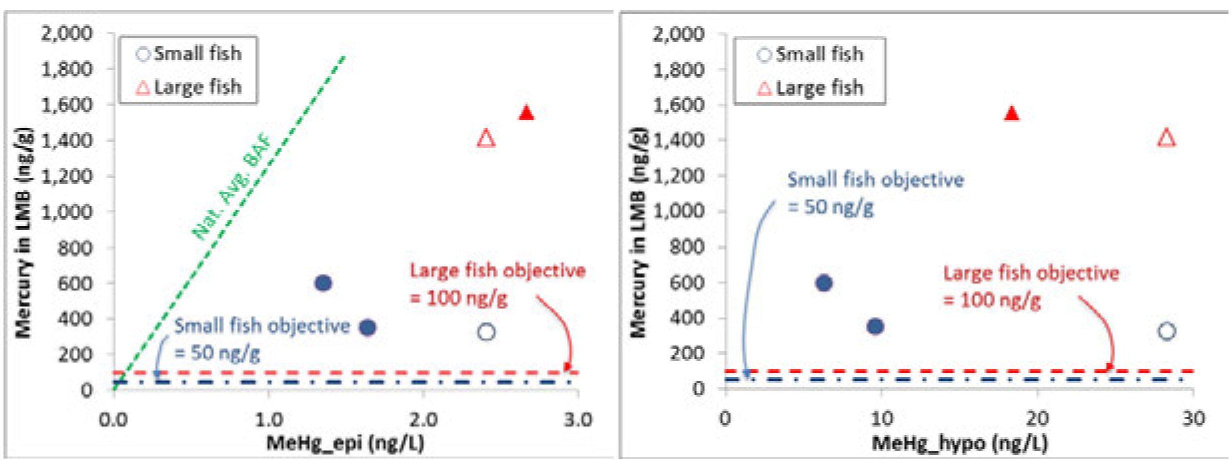


Figure 9. Almaden Lake total mercury concentrations in small and large fish tissue compared to MeHg concentrations in the layers of water: the epilimnion (left) and hypolimnion (right). Open markers are from 2005 prior to operation of mixers; solid markers are during operation of mixers. National average bioaccumulation factor (USEPA 2001) and the TMDL objectives (Reg. Wtr. Qual. Ctrl. Bd. – San Francisco Bay 2008b) are indicated for reference.

Vertical profiles of temperature (which drives stratification) and dissolved oxygen (which drives methylation) are only available for certain months in 2014 and 2015 (**Figure 10**). The two years of data are not directly comparable because measurements are from different seasons (winter-spring in 2014; summer-fall in 2015). Regardless, the pattern is consistent in that while vertical mixer operations maintain a very weakly stratified water column, it does not overcome hypoxia (DO< 2 mg/L) in the deepest region. The MeHg measured in the shallower depths are likely the result of MeHg produced in the bottom sediments, drawn up through the vertical mixers and mixed into the shallower water.

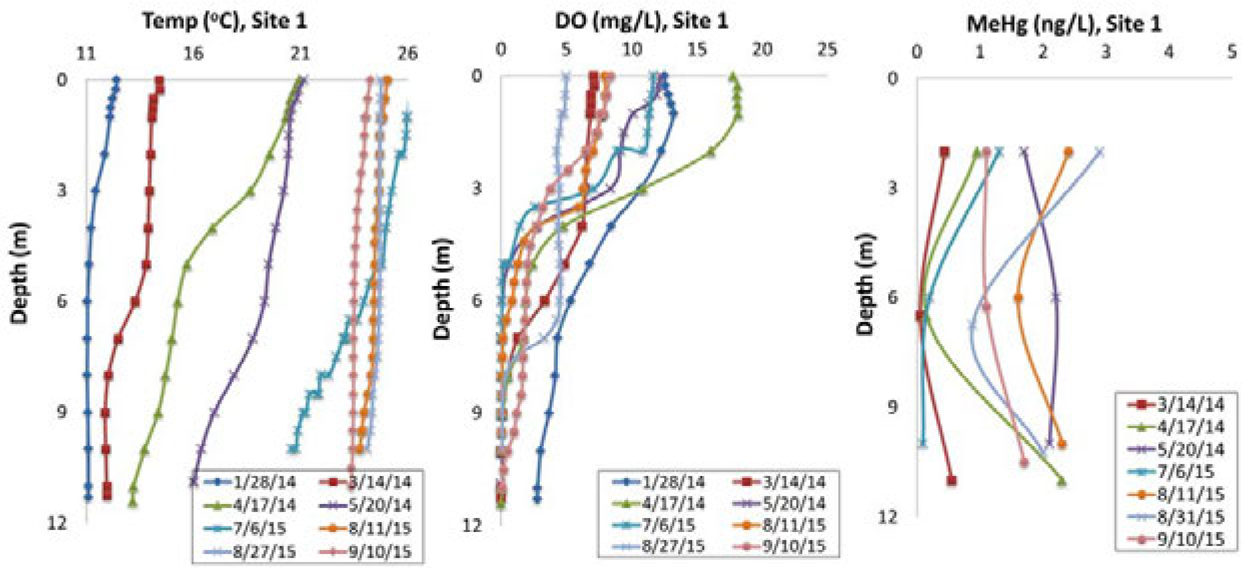


Figure 10. Almaden Lake vertical profiles at Site 1 for temperature, dissolved oxygen (DO), and MeHg, 2014-2015.

Regulatory Setting

Nearly 100 reservoirs throughout California are now listed as having concentrations of mercury in resident sport fish above the USEPA water quality criterion for MeHg of 0.3 mg/kg wet fish muscle tissue for protection of human health (USEPA 2001). The State Water Resources Control Board is developing a statewide regulatory program which will include water quality objectives for MeHg[3]. The primary goal of the proposed program is to reduce concentrations of mercury in fish in order to support the beneficial uses of fish consumption by humans and wildlife.

The spatial patterns observed in fish mercury concentrations statewide indicate that in-lake water quality factors, as well as external loadings, often control mercury concentrations in lake fish. A similar indication of multiple sources and factors influencing fish mercury concentrations has already been accepted and addressed in San Francisco Bay

[3] Program website is http://www.waterboards.ca.gov/water_issues/programs/mercury/.

regulatory programs. This section explains the regulations that have driven the District's MeHg regulatory compliance activities: monitoring, control studies, and this Almaden Lake Project.

First, the use of several similar yet unique regulatory terms used in this section warrant definition.

- **Standard** – The threshold level accepted in order to protect beneficial uses and control the level of contamination (Nath 2009).
- **Criterion** – Used in the Clean Water Act and by USEPA to designate a regulatory standard applied to waters of the US in order to meet water quality standards (USEPA 2010).
- **Objective** – Used in the California Water Code and by state regulators to refer to a regulatory standard applied to waters of the state in order to protect the beneficial uses of waterbodies (California Water Code Sections 13050-13051).
- **TMDL** – A program regulated under the federal Clean Water Act. Literally meaning Total Maximum Daily Load, but effectively referring to the maximum load (or concentration) that a waterbody can receive (or have) while still achieving water quality standards (USEPA 2010).
- **Allocation** – A portion of the TMDL loading capacity applied to specific sources, such as point or nonpoint sources. These are defined as Waste Load Allocations or Load Allocations, respectively (USEPA 1999).
- **Target** – A standard value of a specific pollutant used to set TMDLs and achieve water quality standards (USEPA 1999).
- **Goal** – A non-regulatory standard used to calculate targets or objectives. They do not imply how targets or objectives will be met (National Research Council. Policy Division 1996).

Federal Clean Water Act and California Water Code

The federal Clean Water Act requires California to adopt and enforce water quality standards to protect surface waters. Section 303(d) of the Act requires states to compile a list of "impaired" waterbodies that do not meet water quality standards and to establish Total Maximum Daily Loads (TMDLs) for each impaired waterbody and each pollutant that causes its impairment. A TMDL is the calculation of the maximum amount of a pollutant allowed to enter a waterbody so that the waterbody will meet water quality standards. Allocations of the allowable total pollutant load are classified differently for point sources (such as municipal wastewater outfalls and stormwater drains) and nonpoint sources (such as a lake bottom). TMDLs must account for seasonal variations in water quality, and include a margin of safety to account for uncertainty in predicting how well pollutant reductions will result in meeting water quality standards.

In accordance with California Water Code section 13240, et seq., the California Regional Water Quality Control Board, San Francisco Bay Region (Regional Water Board) has developed and periodically amends its Water Quality Control Plan for the San Francisco Bay Region (Basin Plan). The Basin Plan delineates the applicable water quality standards, which include beneficial uses of waters in the Region, numeric and narrative water quality objectives to protect those uses, and provisions to enhance and protect existing water quality. A key distinction between federal and state law is that state law requires an Implementation Plan and a monitoring plan to track TMDL effectiveness.

Applicable Water Quality Standards

The designated beneficial uses of waters in the Guadalupe River Watershed, which contains Almaden Lake, include: Cold Freshwater Habitat; Freshwater Replenishment; Groundwater Recharge; Fish Migration; Municipal and Domestic Supply; Preservation of Rare and Endangered Species; Water Contact Recreation; Noncontact Water Recreation; Fish Spawning; Warm Freshwater Habitat; and Wildlife Habitat. Of these, only human consumption of fish (Water Contact Recreation) and wildlife consumption of fish (Preservation of Rare and Endangered Species and Wildlife Habitat) are impaired by mercury.

Superseding the USEPA criterion of 0.3 mg/kg, the Regional Water Board developed and applies the following objectives to Almaden Lake:

- Controllable water quality factors shall not cause a detrimental increase in concentrations of toxic substances found in bottom sediments or aquatic life. Effects on aquatic organisms, wildlife, and human health will be considered.
- 0.05 mg MeHg per kg fish as average wet weight concentration measured in whole trophic level 3 fish 5–15 cm in length
- 0.1 mg MeHg per kg fish as average wet weight concentration measured in whole trophic level 3 fish 15–35 cm in length[4]

Because mercury concentrations in Almaden Lake fish exceed both the narrative bioaccumulation objective and the numeric aquatic organism and wildlife mercury water quality objectives, the health of piscivorous birds is considered threatened (Reg. Wtr. Qual. Ctrl. Bd. – San Francisco Bay 2008b).

The Basin Plan's mercury water quality objectives also include the following numeric water quality objectives: for municipal supply 2,000 nanograms of mercury per liter of water (ng/L, or parts per trillion); and for toxic effects, 25 ng/L four-day average and 2,400 ng/L one-hour average. In addition, the California Toxics Rule (Code of Federal Regulations, Title 40, §131.38) limits total mercury concentrations in freshwater sources of drinking water to 50 ng/L as a 30-day average. Because these objectives are much greater than the mercury concentrations needed in water to result in protective fish tissue objectives, the fish tissue objective drives the current regulatory approach. Lower MeHg concentrations in water simply serve as a means to the end of lower fish tissue mercury concentrations.

Guadalupe River Watershed Mercury TMDL and Implementation Plan

The Guadalupe River Watershed Mercury TMDL and implementation plan are designed to resolve mercury impairment in waters downstream of mercury mines in the Guadalupe River Watershed, including Alamitos Creek and Almaden Lake (Reg. Wtr. Qual. Ctrl. Bd. –

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[4] This objective is one-third of the federal USEPA criterion referenced in the introduction to this Regulatory Setting section.

San Francisco Bay 2008b). The TMDL allocation that applies to Almaden Lake is expressed as 1.5 ng/L MeHg as a seasonal maximum in the hypolimnion. This allocation is 25 times greater than a comparable goal for the nearby Sacramento-San Joaquin Delta of 0.06 ng/L (Wood et al. 2010). The TMDL allocation that applies to Alamitos Creek is 0.2 mg mercury per kg suspended sediment (dry weight, annual median). This allocation is the same as the Baywide suspended sediment mercury concentration target of 0.2 mg mercury per kg dry sediment (Reg. Wtr. Qual. Ctrl. Bd. – San Francisco Bay 2006).

The Guadalupe River Watershed mercury TMDL's implementation is planned to proceed in two phases. The goals for the first phase, beginning January 1, 2009, include implementing effective source control measures for mining waste at mine sites; completing studies to reduce discharge of mining waste accumulated in Alamitos Creek; and completing studies of MeHg and bioaccumulation controls in reservoirs and lakes, by December 31, 2018. The goal for the second 10-year phase of implementation is the attainment of the watershed fish tissue targets and the San Francisco Bay mercury TMDL allocations to urban stormwater runoff and legacy mercury sources in the Guadalupe River Watershed, by December 31, 2028.

Other Applicable Regulations

Other regulations also apply to the Project, which may lead to additional mercury controls (**Table 1**). In all instances, the TMDL described above would guide implementation of those regulations or simply supersede them.

Table 1. Other Surface Water and Sediment Quality Regulations for Mercury That Apply to the Project

Regulation	Implementing Agency	Regulation Summary	Applicability to Almaden Lake Project
Federal Regulations			
Clean Water Act, Section 401	Delegated to the State Water Resources Control Board (SWRCB) and the Regional Water Board	A Federal agency cannot issue a license or permit to conduct any activity that may result in a discharge into waters of the United States until the state government of the state where the discharge would originate has granted or waived a Section 401 Certification that any such discharge will not violate state water quality standards.	Project activity includes filling waters of the United States with a levee and clay cap, so a water quality certification would be required.
Clean Water Act, Section 402	SWRCB responsible for permit administration; permit issued by Regional Water Board	Used to implement the NPDES program, which regulates all discharges of pollutants from point-source waters of the United States. Includes long-term and temporary (construction-related) discharge permits.	Construction of the project would require compliance with the State's general permit for construction-related stormwater runoff. As part of the project, the contractor would prepare, submit, and follow a SWPPP; this plan would describe BMPs and other measures that would be applied during project construction to avoid or minimize impacts on water quality, including mercury.
Clean Water Act, Section 404	The USACE authorizes the discharge of fill to waters of the United States. The U.S. Environmental Protection Agency has oversight authority.	Regulates discharges of dredged or fill material into waters of the United States.	Project activity could require the discharge of fill material to waters of the United States for construction of the levee and leveling and capping the lake sediment bed. Because of this, the project would require compliance with the existing Nationwide Permit program or a separate general permit.
State Regulations			
Porter-Cologne Water Quality Control Act	SWRCB; some regulatory authority delegated to the Regional Water Board	Authority to regulate discharges of waste into waters of the State, which are defined as "any surface or groundwater, including saline water, within the boundaries of the State" (California Water Code, Section 13050). This definition includes, but is broader than, waters of the United States. Primarily implemented through waste discharge requirements (WDRs).	The District would need to receive a WDR for the proposed Project and for future discharges to Almaden Lake, even if it is hydrologically separated from Alamitos Creek.
California Water Code		Dictates that the water resources of the State of California meet their beneficial uses to the fullest extent of which they are capable and that the conservation of water is exercised in the interest of the people and for public welfare. Section 8100 et. seq. of the Code contains guidelines for the construction of public works and improvements including the protection and restoration of watersheds, levees, or check dams to prevent overflow or flooding, conservation of the floodwaters, and the effects of construction projects on adjacent counties (especially upstream and downstream along a river).	Beneficial uses identified in the San Francisco Bay Basin Plan must be protected (such as through WDRs). Levee construction must comply with State requirements.
California Code of	Department of Toxic Substances	The California thresholds for hazardous waste classification is 20	The fill material (not including the clay cap layer) must hold to this

Regulation	Implementing Agency	Regulation Summary	Applicability to Almaden Lake Project
Regulations, Title 22, Chapter 11, Article 3	Control	mg/kg	standard
Regional Regulations			
Tier one environmental screening levels	San Francisco Bay Regional Water Quality Control Board	Mercury content cannot exceed 6.7 mg/kg	The 2.5-ft clay clap layer must comply with this standard

Findings from Implementing the Investigation Plan

A previous deliverable was an Investigation Plan, which summarized current information gaps and provided a plan for acquiring missing information. The information compiled was then used to describe the conditions at the Almaden Lake Project area related to mercury contamination. Much of the data presented above in section Physical Setting were obtained by implementing the Investigation Plan.

An additional component of the Plan was a site visit with District staff on February 9, 2016. We observed the vertical mixers in operation; noted the current lake orientation, use areas, bathymetry, and Alamitos Creek inlet and outlet; and visualized the proposed Project changes to Alamitos Creek, lake bathymetry, vertical mixers, and use areas. We also toured the downstream percolation pond and diversion structure.

Mercury-Related Impacts of the Project

A primary Project objective is to improve mercury conditions in Almaden Lake. Relevant to that objective, the current lake configuration and operation present the following conditions:

- Almaden Lake's sediments are highly contaminated with mercury from the historical mining legacy and a continuing supply of mercury-laden sediments from Alamitos Creek. Although upstream watershed improvement projects and sediment trapping in Almaden Reservoir likely have improved conditions, they appear inadequate to attain the regulatory requirements.
- MeHg appears to be produced in the hypolimnion of Almaden Lake during periods of hypoxia. Solar-powered vertical mixers installed and operated since 2006 appear to mix the MeHg-rich deep water into the epilimnion, but do not significantly reduce MeHg concentrations in the epilimnion. A very weakly stratified water column persisted in 2014-2015 almost throughout the year, which did not overcome hypoxia (DO< 2 mg/L) in the deepest region.
- Mercury concentrations in both large and small fish have not decreased since 2005, and both size classes continue to greatly exceed their respective TMDL objectives.

A California Environmental Quality Act (CEQA) analysis characterizes environmental impacts of a project and identifies appropriate mitigation, whereas in this case with existing mercury contamination there is an existing deleterious condition on site, which the Project is designed to address. Specifically:

- Separating Alamitos Creek from the lake would disconnect the ongoing supply of mercury-laden sediments from the watershed into the lake [see section Inflow and Outflow Mercury Concentrations].

- Capping the current lake sediment bed, which is highly contaminated with mercury [see section Mercury Contamination in Almaden Lake], with a clean, impermeable clay layer will minimize the flux of MeHg from the underlying sediments.
- Recontouring (filling and flattening) the lake sediment bed will eliminate deep, isolated pockets which currently appear to become hypoxic first and to produce the highest concentrations of MeHg [see section Lake Mercury Control Tests].
- Continuing to operate the vertical mixers, adding more mixers, and reducing the lake volume will slow the loss of dissolved oxygen, which triggers methylation [see section Effects of In-lake Mercury Controls].

The preceding analysis substantiates that overall the Project will be beneficial to mercury exposure. Nonetheless, the following analysis identifies ways in which the Project could cause counterproductive, negative impacts to mercury exposure.

Regarding Almaden Lake, algae concentrations are likely to decrease as the organic, nutrient-rich lake sediment bed is covered with a clay cap. Nonetheless, over time (on the order of a decade), algae concentrations can be expected to increase as new sediments and decomposing algae accumulate in the lake sediment bed. Also, if nutrient-rich recycled water is used as the source water to manage water levels in Almaden Lake, the higher nutrient load would encourage eutrophication in the lake. Eutrophication increases the concentration of organic matter in the water column, which eventually settles to the lake sediment bed where bacterial decomposition consumes oxygen leading to hypoxia. As discussed above, hypoxia tends to trigger MeHg production.

Regarding Alamitos Creek, the preferred project alternative design consists of a low-flow channel and a shallow, vegetated, periodically inundated floodplain constrained by setback levees from the adjacent lake and lands. This design may have the following mercury-related impacts:

- Mercury concentrations in fish sampled from large watersheds tend to increase with the percent of wetland area (Brumbaugh et al. 2001). Although the design reduces the overall wetland area from the lake area to the floodplain area, the floodplain could serve as an efficient mercury methylation environment for in-stream biota.
- Aquatic plants will grow in the shallow floodplain, as they currently do downstream by the diversion structure. If that occurs, organic material would accumulate in the floodplain. Labile carbon in organic-rich substrates has been found to methylate mercury efficiently (Windham-Myers et al. 2014).

Mitigation and Avoidance Measures

Broadly, water managers have several types of mercury mitigation measures available (Davis et al. 2012). How those measures could be applied for the Project is summarized as follows.

- **Watershed source control**: The District and others are actively controlling legacy mercury sources in the watershed. The Project will separate Alamitos Creek—the lake's source of mercury-laden sediments—from the lake with either water source option. With a flow-control structure, (if the creek remains as the lake's primary water source) diversions could be restricted to periods when turbidity in the creek is relatively low. If recycled water is the primary source, the watershed mercury source would be eliminated.

- **In-lake control**: Within the lake itself, the Project also will reduce internal sources from the lake sediment bed by filling in deep pockets to a shallower depth, covering the entire lake sediment bed with a clay cap, and filling in some submerged areas completely. Clay caps provide effective barriers to sediment flux of soluble compounds (Himmelheber et al. 2008).
- **Destratification**: The Project will continue to operate and monitor four solar-powered vertical mixers, and install two additional mixers to counteract the effects of stratification. The mixers will be operated to increase dissolved oxygen concentrations at the sediment-water interface and in the overlying water column in order to minimize mercury methylation.
- **Food web—top down**: The TMDL for the Guadalupe River Watershed is approached from the perspective of improving the waterbody to support a more robust fishery. This approach would couple improved fish populations with less MeHg, in effect comparatively spreading less mercury amongst more fish so that each fish has less mercury than currently (Pickardt et al. 2002). The lake currently supports a population of predatory largemouth bass, which accumulate MeHg through their diet. Draining all/most of the lake for the Project will remove the fishery. How the lake will be re-stocked is undetermined. If predatory fish return, measures to eliminate them could be contemplated, although actual achievement of these results is problematic (SCVWD 2009). Alternatively, periodically harvesting large fish could potentially shift the balance of fish populations towards smaller fish.
- **Food web—bottom up**: The City or District may add algaecide or dye to the lake to control the formation of algae generated from the higher concentration of nutrients in the recycled water than in Alamitos Creek water. This practice would slow the accumulation of organic matter in the lake sediment bed, which leads to hypoxia and MeHg production. Conversely, this practice could work against the principle of biodilution (Slotton et al. 1995).
- **Outreach and education**: If, after all other mitigation measures are implemented, the lake remains impaired by mercury, public outreach messaging will be used to warn anglers and potential consumers of lake fish of the health risks associated with eating mercury-laden fish from the lake. Local health officials and the District already outreach about fish mercury conditions in the region, and the state's Office of Environmental Health Hazard Assessment has posted advisories for limiting consumption of fish from Alamitos Creek and upstream reservoirs.

The District will continue to test the hypothesis that vertical mixers in the lake can reduce mercury bioaccumulation. The District will continue to monitor water quality in Almaden Lake and adaptively managing the system. Adjustments to the current monitoring plan could include:

- Monitor dominant algae species present in the epilimnion every 1-2 months, particularly capturing algae blooms (chlorophyll *a* >> 5 µg/L).
- Analyze and report zooplankton mercury content as Total Mercury only and on the standard dry-weight basis.
- Identify zooplankton species and record total length of plankton net tows to estimate volumetric concentrations. Seasonal shifts in zooplankton species composition and density could be overlaid on time series of water column MeHg to evaluate which species (each with characteristic exposure and predation) drive MeHg biomagnification into trophic level 3 fish.
- Ensure that profiles of field measurements and samples are collected at least 56 feet (2x water depth) away from any vertical mixer.
- Ensure that fish sampling monitors the dominant fish community. Solely using shoreline sampling may bias fish in the littoral (near shore) habitats while missing pelagic (open water) fish more exposed to aeration effects.

Regarding the creek, the future creek cross-section will minimize the seasonally shallow floodplain area, which is typically an important area of MeHg production (McCord and Heim 2015). The ideal elevation of the floodplain would be level with the low-flow water surface. With this design, winter season flows will be contained in the low-flow channel while the floodplain would be inundated only when the flashboards at the downstream diversion structure are installed. If high flows with the flashboard dam removed do not scour accumulated organic material from the low-flow channel or its floodplain, accumulated sediments will be removed in the channel as part of the Stream Maintenance Program.

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Appendix A – Acronyms and Abbreviations

Algaecide – A chemical added to lake water to kill algae

Anadromous – A fish that spends the majority of its life at sea, but returns to freshwater to spawn

Anoxia – The absence of oxygen

Basin Plan – Common-use term for the Water Quality Control Plan for the San Francisco Bay Basin

DDT – dichlorodiphenyltrichloroethane, a colorless, crystalline, tasteless and almost odorless organochloride known for its insecticidal properties

Epilimnion – The surface mixed layer in a vertically stratified lake

Eutrophication – Excessive productivity in an aquatic ecosystem

Hypolimnion – The deep, isolated layer in a vertically stratified lake

Hypoxia – A condition of defficient oxygen, stressing aerobic organisms and initiating alternative redox reactions for as energy sources

Labile carbon – Reactive, bioavailable carbon

Littoral – The shoreline zone of a lake

MeHg – Methylmercury, a highly bioaccumulative, toxic form

OEHHA – Office of Environmental Health Hazard Assessment

Pelagic – The open water zone of a lake

Photodemethylation – A chemical reaction driven by solar radiation which oxidizes methylated mercury back to its ionic form

Piscivorous – Fish eating

Regional Water Board – Regional Water Quality Control Board, of which the San Francisco Bay Regional Board regulates water quality in California

THg – unfiltered, total mercury

TMDL – Total Maximum Daily Load, a federal program regulated by section 303(d) of the Clean Water Act which includes a calculation of the maximum amount of a pollutant that can occur in a waterbody and allocates the necessary reductions to one or more pollutant sources

Appendix F
Noise

F.1 Noise Monitoring Data

METROSONICS db-308 SN 2456 V2.3 3/87

CURRENT DATE: 9/09/16
CURRENT TIME: 15:55:36

____

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____

CALIBRATED: 9/08/16 @   9:56:13

DISPLAY RANGE: 42.0dB TO 138.0dB

DOUBLING RATE: 3 dB

FILTER: A WGHT

RESPONSE: SLOW

SCHEDULED RUN: OFF

START DATE: 7/25/16
START TIME:12:11:00
LENGTH: 0:15:00

** OVERALL REPORT **

TEST STARTING DATE: 9/09/16
TEST STARTING TIME: 10:34:48
TEST LENGTH: 0DAYS 1:01:34

Lav   = 66.3dB
Lav 80= 42.0dB
Lav 90= 42.0dB
SEL   =101.9dB

Lmax = 79.7dB ON 9/09/16 @ 11:57:00
Lpk < 117dB

TIME OVER 115dB 0D 0:00:00.00

DOSE CRITERION: 90dB

```
 8 HR DOSE ( 80dB CUTOFF)=  0.00%
 8 HR PROJ. DOSE ( 80dB CUTOFF)=  0.00%
 8 HR DOSE ( 90dB CUTOFF)=  0.00%
 8 HR PROJ. DOSE ( 90dB CUTOFF)=  0.00%


** TIME HISTORY REPORT **

MODE: CONTINUOUS
PERIOD LENGTH:  0:15:00
TIME HISTORY CUTOFF: NONE
Ln(1): 33.0%  Ln(2): 90.0%

 INT#   START    Lav    Lmax   Lpk
 TAG#   TIME      ET     L1    L2
______________________________________

    1  9/09/16   48.3    49.9 <117       * +
    0 10:34:48  PARTIAL  48     47

    2  9/09/16   52.0    67.8 <117            *                 +
    0 10:37:12  0:15:00  50     48

    3  9/09/16   59.0    69.5 <117                    *           +
    0 10:52:12  PARTIAL  50     47

    4  9/09/16   55.4    78.7 <117               *                          +
    0 11:08:57  0:15:00  53     49

    5  9/09/16   51.0    52.1 <117          * +
    0 11:23:57  PARTIAL  51     49

    6  9/09/16   71.8    79.7 <117                                  *        +
    0 11:42:48  0:15:00  72     60

    7  9/09/16   75.7    77.9 <117                                       * +
    0 11:57:48  PARTIAL  76     72

    8  9/09/16   59.2    76.4 <117                    *                  +
    0 12:10:02  0:15:00  56     48

    9  9/09/16   49.7    54.7 <117         *     +
    0 12:25:02  PARTIAL  48     47


** AMPLITUDE DISTRIBUTION REPORT **
```

F.1

TOTAL SAMPLES = 29552

dB	SAMPLES		% OF TOTAL
45	51	+	.17
46	264	*	.89
47	957	***	3.23
48	2105	*******	7.12
49	3546	************	11.99
50	2853	**********	9.65
51	2504	********	8.47
52	2647	*********	8.95
53	1984	*******	6.71
54	1278	****	4.32
55	832	***	2.81
56	691	**	2.33
57	460	**	1.55
58	437	*	1.47
59	468	**	1.58
60	475	**	1.60
61	520	**	1.75
62	452	**	1.52
63	490	**	1.65
64	516	**	1.74
65	578	**	1.95
66	557	**	1.88
67	518	**	1.75
68	428	*	1.44
69	413	*	1.39
70	365	*	1.23
71	402	*	1.36
72	380	*	1.28
73	405	*	1.37
74	454	**	1.53
75	634	**	2.14
76	573	**	1.93
77	257	*	.86
78	45	+	.15
79	13	.	.04

Ln(0.0) = 79dB
Ln(10.0) = 71dB
Ln(50.0) = 52dB
Ln(99.9) = 45dB

NO CUTOFF	80.0dB CUTOFF	90.0dB CUTOFF

Ldod	63.9dB	42.0dB	42.0dB
Losha	62.4dB	42.0dB	42.0dB
Leq(6)	61.4dB	42.0dB	42.0dB

SOUND LEVEL MEASUREMENTS

DATE: 9-9-2016

Investigator(s): Todd Haurin	Project Name: Almaden Lake	Project Number: D130679.00

LOCATION OF MEASUREMENT

Almaden Lake Village

INSTRUMENTATION	TYPE	SERIAL NO.
SLM	db-308	2456
MICROPHONE		
FILTER		
CALIBRATOR		
RECORDER		

AUDIBLE SOURCES

Birds, distant aircraft, vehicles on nearby roads, voices of adjacent residents

CONDITIONS

TIME	TEMP	R. HUMID	W. SPEED	W. DIR
10:38am	72°F	57%	~~SE~~ 3 MPH	SE

WEIGHTING	☑ A	☐ B	☐ C	☐ FLAT
OPER. MODE	☑ SLOW	☐ FAST	☐ PEAK	☐ IMPULSE
RECORDER CHART ATTACHED			☑ YES	☐ NO

TIME PERIOD 10:38am - 10:53am

DESCRIPTION OF CONDITIONS

Sunny, clear skies, light breeze, warm

STATISTICAL RESULTS

Lav = 52.0

Lmax = 67.8

SOUND LEVEL MEASUREMENTS

DATE: 9-9-2016

Investigator(s):	Project Name: Almaden Lake	Project Number: D130619.00

LOCATION OF MEASUREMENT

Le Mirador Senior Apartments

INSTRUMENTATION	TYPE	SERIAL NO.
SLM	db-308	2456
MICROPHONE		
FILTER		
CALIBRATOR		
RECORDER		

AUDIBLE SOURCES

Birds, vehicles on Almaden Expressway, voices of adjacent residents

CONDITIONS

TIME	TEMP	R. HUMID	W. SPEED	W. DIR
11:09am	72°F	57%	4mph	W

WEIGHTING	☐ A	☐ B	☐ C	☐ FLAT
OPER. MODE	☐ SLOW	☐ FAST	☐ PEAK	☐ IMPULSE
RECORDER CHART ATTACHED			☐ YES	☐ NO

TIME PERIOD 11:09am - 11:24am

DESCRIPTION OF CONDITIONS

Sunny, clear skies, light breeze, warm

STATISTICAL RESULTS

$L_{av} = 55.4$

$L_{max} = 78.7$

SOUND LEVEL MEASUREMENTS

DATE: 9-9-2016

Investigator(s):	Project Name:	Project Number:

LOCATION OF MEASUREMENT

Lot adjacent to Porto Alegre Ct. + Almaden

INSTRUMENTATION	TYPE	SERIAL NO.
SLM	db-308	2456
MICROPHONE		
FILTER		
CALIBRATOR		
RECORDER		

AUDIBLE SOURCES

Vehicles on Almaden Expressway, Nearby garbage truck, nearby resident's pump motor, aircraft overhead

CONDITIONS

TIME	TEMP	R. HUMID	W. SPEED	W. DIR
11:43am	77°F	48%	5mph	ENE

WEIGHTING	☐ A	☐ B	☐ C	☐ FLAT
OPER. MODE	☐ SLOW	☐ FAST	☐ PEAK	☐ IMPULSE
RECORDER CHART ATTACHED			☐ YES	☐ NO

TIME PERIOD 11:43am-11:58am

DESCRIPTION OF CONDITIONS

Sunny, clear skies, light breeze, warm

STATISTICAL RESULTS

Lav = 71.8

Lmax = 79.7

SOUND LEVEL MEASUREMENTS

DATE: 9-9-2016

Investigator(s): Todd Haurin	Project Name: Almaden Lake	Project Number: D130679.00

LOCATION OF MEASUREMENT

Terrace View Dr.

INSTRUMENTATION	TYPE	SERIAL NO.
SLM	db-308	2456
MICROPHONE		
FILTER		
CALIBRATOR		
RECORDER		

AUDIBLE SOURCES

Vehicles on Winfield Blvd, birds, pedestrians talking,

CONDITIONS

TIME	TEMP	R. HUMID	W. SPEED	W. DIR
12:10pm	77°F	49 %	6 mph	NE

IGHTING	☐ A	☐ B	☐ C	☐ FLAT
OPER. MODE	☐ SLOW	☐ FAST	☐ PEAK	☐ IMPULSE
RECORDER CHART ATTACHED			☐ YES	☐ NO

TIME PERIOD 12:10pm – 12:25 pm

DESCRIPTION OF CONDITIONS

Sunny, clear skies, light breeze, warm

STATISTICAL RESULTS

Lav = 59.2

Lmax = 76.4

F.2 Construction Equipment Noise Level Estimates

F.2 - Construction Equipment Noise Level Estimates

Equipment	Reference Noise Level*	Distance to Receptor	Number of equipment	Hourly Usage	Lmax	Combined Lmax	Leq(h)	Combined Leq(h)
Creek Diversion								
Crane	80.6	400	1	16	58.0	**78.4**	50.1	**71.6**
Vibratory Pile Driver	100.8	400	1	20	78.2		71.2	
Pumps	80.9	400	3	50	63.1		60.1	
Levee Footprint								
Cement and Mortar Mixers	78.8	200	1	40	63.7	**77.5**	59.8	**73.3**
Graders	85	200	2	40	73.0		69.0	
Off-Highway Trucks	76.5	200	2	40	64.5		60.5	
Other Material Handling Equipme	85	200	1	50	69.9		66.9	
Plate Compactors	83.2	200	2	20	71.2		64.2	
Pumps	80.9	200	1	50	65.8		62.8	
Rubber Tired Dozers	81.7	200	1	40	66.6		62.7	
Dewatering								
Pumps	80.9	300	1	50	61.4	**61.4**	58.4	**58.4**
Working Surface/V & DR								
Excavators	80.7	250	3	40	68.0	**70.6**	64.0	**66.7**
Rubber Tired Dozers	81.7	250	2	40	67.2		63.3	
Lake & Levee FA								
Graders	85	250	1	40	67.5	**71.4**	63.5	**66.1**
Off-Highway Trucks	76.5	250	1	40	59.0		55.0	
Plate Compactors	83.2	250	2	20	68.7		61.7	
Islands (expanded and new)								
Graders	85	450	2	40	64.2	**68.1**	60.2	**62.7**
Off-Highway Trucks	76.5	450	2	40	55.7		51.7	
Plate Compactors	83.2	450	4	20	65.4		58.4	
Transfer PL (from AVPL)								
Concrete Saw**	89.6	30	1	20	95.1	**95.1**	88.2	**88.2**
Cranes	80.6	40	1	16	83.0	**92.6**	75.1	**88.7**
Excavators	80.7	50	1	40	80.7		76.7	
Other Construction Equipment	85	30	1	50	90.5		87.5	
Plate Compactors	83.2	50	1	20	83.2		76.2	
Rubber Tired Loaders	79.1	40	1	40	81.5		77.5	
Lake Area 2.5 CC								
Graders	85	250	1	40	67.5	**71.4**	63.5	**66.1**
Off-Highway Trucks	76.5	250	1	40	59.0		55.0	
Plate Compactors	83.2	250	2	20	68.7		61.7	
Alamitos RCA 2.5 CC								
Graders	85	325	1	40	64.7	**67.2**	60.7	**62.4**
Off-Highway Trucks	76.5	325	1	40	56.2		52.2	
Plate Compactors	83.2	325	1	20	62.9		55.9	
Transfer PL (to LAPP)								
Concrete Saw**	89.6	100	1	20	82.1	**82.1**	75.1	**75.1**
Cranes	80.6	110	1	16	72.0	**80.8**	64.1	**76.5**
Excavators	80.7	120	1	40	71.2		67.2	
Other Construction Equipment	85	100	1	50	77.5		74.5	
Plate Compactors	83.2	120	1	20	73.7		66.7	
Rubber Tired Loaders	79.1	110	1	40	70.5		66.6	
New Park								
Graders	85	300	1	40	65.5	**69.5**	61.6	**64.1**
Off-Highway Trucks	76.5	300	1	40	57.0		53.1	
Plate Compactors	83.2	300	2	20	66.8		59.8	
Alamitos Creek WBSG								
Graders	85	400	1	40	62.4	**65.0**	58.4	**60.1**
Off-Highway Trucks	76.5	400	1	40	53.9		49.9	
Plate Compactors	83.2	400	1	20	60.6		53.6	
Reveg & Landscaping								
Excavators	80.7	30	1	40	86.2	**89.2**	82.3	**85.7**
Generator Sets	80.6	30	1	50	86.1		83.1	
Repaving								
Paver	77	30	1	50	82.5	**87.3**	79.5	**82.1**
Roller	80	30	1	20	85.5		78.6	

*See Appendix F.3, Roadway Construction Noise Model Output, for reference noise levels.
**It is assumed that concrete saws would not operate at the same time and vicinity as the other pipeline installation equipment.

F.3 Roadway Construction Noise Model Output

Construction Noise Output
Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 03/05/2019
Case Description: Almaden Lake Improvements Project

**** Receptor #1 ****

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Reference Noise levels	Residential	50.0	40.0	30.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Crane	No	16		80.6	50.0	0.0
Vibratory Pile Driver	No	20		100.8	50.0	0.0
Pumps	No	50		80.9	50.0	0.0
Concrete Mixer Truck	No	40		78.8	50.0	0.0
Grader	No	40	85.0		50.0	0.0
Dump Truck	No	40		76.5	50.0	0.0
All Other Equipment > 5 HP	No	50	85.0		50.0	0.0
Compactor (ground)	No	20		83.2	50.0	0.0
Dozer	No	40		81.7	50.0	0.0
Excavator	No	40		80.7	50.0	0.0
Front End Loader	No	40		79.1	50.0	0.0
Generator	No	50		80.6	50.0	0.0
Soil Mix Drill Rig	No	50	80.0		50.0	0.0

Construction Noise Output

Results

Equipment	Calculated (dBA) Lmax	Calculated (dBA) Leq	Noise Limits (dBA) Day Lmax	Day Leq	Evening Lmax	Evening Leq	Night Lmax	Night Leq	Noise Limit Exceedance (dBA) Day Lmax	Day Leq	Evening Lmax	Evening Leq	Night Lmax	Night Leq
Crane	80.6	72.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vibratory Pile Driver	100.8	93.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pumps	80.9	77.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Concrete Mixer Truck	78.8	74.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Grader	85.0	81.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dump Truck	76.5	72.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	85.0	82.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Compactor (ground)	83.2	76.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	81.7	77.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	80.7	76.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	79.1	75.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Generator	80.6	77.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Soil Mix Drill Rig	80.0	77.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	100.8	94.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Combine with othe RCMN file

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 07/16/2019
Case Description: Almaden Lake

**** Receptor #1 ****

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Residence	Residential	50.0	45.0	40.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Paver	No	50		77.2	50.0	0.0
Roller	No	20		80.0	50.0	0.0
Concrete Saw	No	20		89.6	50.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA) Day		Evening		Night		Noise Limit Exceedance (dBA) Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Paver	77.2	74.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Roller	80.0	73.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Concrete Saw	89.6	82.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	89.6	83.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

F.4 Traffic and Pump Station Noise Estimates

Traffic Noise Baseline Ldn

Winfield Blvd Thursday, 6/2/16

TIME	dBA	micro pascals	Penalization 10 dBA (Ldn) micro pascals	Penalization 5 dBA (CNEL) micro pascals
0 / 24	46.2	41234	412343	130394
100	44.8	30383	303832	96080
200	42.9	19532	195321	61766
300	42.9	19532	195321	61766
400	47.8	60766	607664	192160
500	50.7	117192	1171923	370595
600	55.8	379790	3797900	1201001
700	57.1	512174	5121739	1619636
800	58.1	642388	6423876	2031408
900	58.0	629366	6293662	1990231
1000	57.9	622856	6228555	1969642
1100	58.1	646728	6467280	2045134
1200	57.8	605494	6054937	1914739
1300	58.2	659749	6597494	2086311
1400	57.7	588132	5881319	1859836
1500	58.0	638047	6380471	2017682
1600	58.8	761750	7617501	2408865
1700	58.7	735707	7357074	2326511
1800	58.7	735707	7357074	2326511
1900	57.5	559919	5599189	1770619
2000	57.2	525195	5251953	1660813
2100	57.0	505663	5056632	1599047
2200	54.9	310343	3103426	981390
2300	51.1	130214	1302137	411772

Low 57.094174
High 58.818125

Leq Daytime 8:00 am-5:00 p.m.
58.1 dBA

Leq Daytime 7:00 am-7:00 p.m.
58.1 dBA

Leq 24-Hour
56.4 dBA

Ldn: 10 dBA penalty for noise between 10:00 p.m. and 7:00 a.m.
59.3 dBA

CNEL: 5 dBA penalty for noise between 7:00p.m. and 10:00 p.m., and 10 dBA penalty for noise between 10:00 p.m. and 7:00 a.m.
60.0 dBA

CNEL - Ldn = 0.674907

Coleman Rd Thursday, 6/2/16

TIME	dBA	micro pascals	Penalization 10 dBA (Ldn) micro pascals	Penalization 5 dBA (CNEL) micro pascals
0 / 24	50.5	111229	1112290	351737
100	47.6	57091	570910	180538
200	45.2	33467	334671	105832
300	43.4	21655	216552	68480
400	46.8	48232	482320	152523
500	52.6	180132	1801319	569627
600	58.0	625048	6250478	1976575
700	62.8	1889908	18899084	5976415
800	63.2	2085789	20857895	6595846
900	61.6	1455820	14558200	4603707
1000	61.4	1390854	13908544	4398268
1100	61.7	1480428	14804282	4681525
1200	62.3	1694027	16940272	5356984
1300	62.3	1717651	17176511	5431690
1400	62.8	1914517	19145165	6054233
1500	63.0	1980466	19804665	6262785
1600	62.9	1967670	19676702	6222320
1700	63.6	2265921	22659214	7165473
1800	62.7	1843645	18436450	5830117
1900	61.6	1430228	14302275	4522777
2000	60.6	1142804	11428040	3613863
2100	59.8	947907	9479072	2997546
2200	57.4	553192	5531919	1749346
2300	53.8	241160	2411602	762615

Low 61.432817
High 63.552448

Leq Daytime 8:00 am-5:00 p.m.
62.4 dBA

Leq Daytime 7:00 am-7:00 p.m.
62.6 dBA

Leq 24-Hour
60.5 dBA

Ldn: 10 dBA penalty for noise between 10:00 p.m. and 7:00 a.m.
62.6 dBA

CNEL: 5 dBA penalty for noise between 7:00p.m. and 10:00 p.m., and 10 dBA penalty for noise between 10:00 p.m. and 7:00 a.m.
63.3 dBA

CNEL - Ldn = 0.6942562