NOTICE OF INTENT TO ADOPT A MITIGATED NEGATIVE DECLARATION FOR THE PROPOSED ILP NORTH CONVERSION PROJECT

This is to inform the general public that Irvine Ranch Water District (IRWD) proposes to adopt an Initial Study/Mitigated Negative Declaration (IS/MND) for the **Irvine Lake Pipeline North Conversion Project**.

Project Description: IRWD proposes the conversion of the northern section of the Irvine Lake Pipeline (ILP) from an untreated water system to a recycled water system. The Project would include construction of a 2.4 million gallon recycled water reservoir on 2.7 acres at 1802 East Santiago Canyon Road, Orange; conversion of an existing Zone A-C booster pump station at the Rattlesnake Complex located north of Portola Parkway between Jeffrey Road and Culver Drive in Irvine to a Zone A-C+ booster pump station; reconfiguration of the Orchard Hills Facility located at 10570 ½ Woody Knoll, Irvine, to serve as a back-up source of recycled water; and construction of a 20-inch Zone C+ pipeline along a portion of Jamboree Road from the Baker Raw Water Pump Station northerly to the intersection with Santiago Canyon Road and a 10-inch pipeline along a portion of Santiago Canyon Road between the proposed Santiago Hills Zone C+ Reservoir to the intersection of East Santiago Canyon Road and from the intersection with Jamboree Road to Holy Sepulcher Cemetery in the City of Orange.

Project Location: The Project involves improvements and modifications to several IRWD facilities in the cities of Orange and Irvine, Orange County, California.

Public Review Period: The IS/MND is being made available for public review for a period of 30 days beginning November 4, 2015 and ending December 3, 2015. All written comments must be received in the offices of IRWD by 5:00 P.M. on December 3, 2015.

Public Meeting: The Board will consider adoption of the IS/MND and any comments received at a regularly scheduled Board meeting to be held on January 11, 2016 at 5:00 p.m. at IRWD's Board Room, located at 15600 Sand Canyon Avenue, Irvine, CA 92618.

The IS/MND as well as all referenced documents will be available for public review at IRWD's website: www.irwd.com. All comments on the IS/MND should be directed to Jo Ann Corey at the above listed address. If you have any questions or would like any additional information, please contact IRWD at (949) 453-5300.

POSTED

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HUGH NGUYEN, CLERK-RECORDER

BY: _____ DEPUTY

Initial Study and Mitigated Negative Declaration

Irvine Lake Pipeline North Conversion Project

Prepared for

Irvine Ranch Water District
15600 Sand Canyon Avenue
Irvine, California 92618
Contact: Jo Ann Corey, MPA
(949) 453-5326

Prepared by

BonTerra Psomas
3 Hutton Centre Drive, Suite 200
Santa Ana, California 92707
Contact: Jennifer Marks
(714) 751-7373

October 30, 2015

Initial Study and Mitigated Negative Declaration

Irvine Lake Pipeline North Conversion Project

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October 30, 2015

TABLE OF CONTENTS

Section **Page**

TABLES

Table **Page**

EXHIBITS

Exhibit **Follows Page**

APPENDICES

Appendices

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SECTION 1.0 INTRODUCTION

1.1 PURPOSE OF THE INITIAL STUDY

The purpose of this Initial Study (IS) is to (1) describe the proposed Irvine Lake Pipeline (ILP) North Conversion Project (hereinafter referred to as the "Project"), which would occur in the cities of Orange and Irvine and (2) provide an evaluation of potential environmental effects associated with the Project's construction and operation. This IS has been prepared pursuant to the California Environmental Quality Act (CEQA), as amended (*Public Resources Code* §21000 et seq.) and in accordance with the State CEQA Guidelines (*California Code of Regulations* §15000 et seq.).

Pursuant to Section 15367 of the State CEQA Guidelines, Irvine Ranch Water District (IRWD) is the lead agency for the Project. The lead agency is the public agency that has the principal responsibility for carrying out or approving a project that may have a significant effect on the environment. IRWD, as the lead agency, has the authority for Project approval and certification of the accompanying environmental documentation.

The purpose of this document is to evaluate the conversion of a segment of the ILP from untreated water to recycled water and all associated improvements to IRWD water distribution system required to accommodate this conversion.

1.2 SUMMARY OF FINDINGS

Based on the environmental checklist form prepared for the Project (Section 4) and supporting environmental analysis (Section 5), the proposed Project would have no impact or less than significant impacts in the following environmental areas: agriculture and forest land resources, aesthetics, air quality, greenhouse gases, hazards and hazardous materials, hydrology and water quality, land use, mineral resources, public services, recreation, traffic, utilities and services systems. The proposed Project has the potential to have significant impacts on the following topics unless the recommended mitigation measures described herein are incorporated into the Project: biological resources, cultural resources, geology and soils, and noise.

According to the State CEQA Guidelines, it is appropriate to prepare a Mitigated Negative Declaration (MND) for the proposed Project because, after incorporation of the recommended mitigation measures, potentially significant environmental impacts would be eliminated or reduced to a level considered less than significant.

1.3 PROJECT APPROVAL

This IS/MND has been submitted to potentially affected agencies and individuals. Notices of the availability of the IS/MND for review and comment as well as the environmental documentation are available on IRWD's website (http://www.irwd.com) for review.

A 30-day public review period has been established for the IS/MND. The review period has been established in accordance with Section 15073 of the State CEQA Guidelines. During review of the IS/MND, affected public agencies and the interested public should focus on the document's adequacy in identifying and analyzing the potential environmental impacts and the ways in which the potentially significant effects of the Project area can be avoided or mitigated. Comments on

the IS/MND and the analysis contained herein must be received by 5:00 p.m., December 3, 2015 and should be addressed to:

Ms. Jo Ann Corey, MPA
Water Resources Department
Irvine Ranch Water District
15600 Sand Canyon Avenue
Irvine, CA 92618

Following receipt and evaluation of comments from agencies, organizations, and/or individuals, IRWD will determine whether any substantial new environmental issues have been raised. If so, further documentation—such as an Environmental Impact Report (EIR) or an expanded IS/MND—may be required. If not, the Project and the environmental documentation are tentatively scheduled to be submitted to the Board of Directors for consideration.

1.4 ORGANIZATION OF THE INITIAL STUDY

The IS/MND is organized into sections, as described below.

- **Section 1: Introduction.** This section provides an introduction and overview of the conclusions in the IS/MND.

- **Section 2: Project Location and Environmental Setting.** This section provides a brief description of the Project location, relevant background information, and a description of the existing conditions of the Project site and vicinity.

- **Section 3: Project Description.** This section provides a description of the proposed Project, a statement of purpose and need, and necessary discretionary approvals.

- **Section 4: Environmental Checklist.** The completed Environmental Checklist Form from the State CEQA Guidelines provides an overview of the potential impacts that may or may not result from Project implementation. The Environmental Checklist Form also includes "mandatory findings of significance", as required by CEQA.

- **Section 5: Discussion of Environmental Checklist Questions.** This section contains an analysis of environmental impacts identified in the environmental checklist and identifies standard conditions and regulations (SC) and mitigation measures (MM) that have been recommended to eliminate any potentially significant effects or to reduce them to a level considered less than significant.

- **Section 6: Report Preparers.** This section lists the authors, including staff from IRWD, who assisted in preparing and reviewing the IS/MND.

- **Section 7: References.** This section identifies the references used to prepare the IS/MND.

SECTION 2.0 PROJECT LOCATION AND ENVIRONMENTAL SETTING

2.1 PROJECT LOCATION

The proposed Project involves improvements and modifications to several IRWD facilities in the cities of Orange and Irvine, as depicted on Exhibit 2-1, Regional Location. The Project sites, as shown on Exhibit 2-2, Local Vicinity, and Exhibit 2-3 Aerial Photograph, include Santiago Hills Zone C+ Reservoir site, the Orchard Hills Facility, the Rattlesnake Complex, and pipeline construction in Santiago Canyon Road and Jamboree Road.

The proposed reservoir site is located on an approximate 2.7-acre portion of a 7.7-acre IRWD-owned parcel (Assessor Parcel Number [APN] 545-011-03), located at 1802 East Santiago Canyon Road in the City of Orange.

The Orchard Hills Facility is located at 10570½ Woody Knoll in the City of Irvine, north of the Furrow Road and Rembrandt Street intersection and within the City of Irvine's Planning Area 1 (Orchard Hills).

The Rattlesnake Complex is located north of Portola Parkway between Jeffrey Road and Culver Drive in the City of Irvine. The Rattlesnake Complex is situated to the north of Orange County Fire Authority (OCFA) Station No. 55 and west of the Rattlesnake Reservoir.

The proposed Project also includes conversion of the ILP North Alignment. Proposed improvements to this pipeline would extend along East Santiago Canyon Road between the proposed Santiago Hills Zone C+ Reservoir (referred to hereinafter as the "proposed reservoir") to the intersection of East Santiago Canyon Road and Jamboree Road, along Jamboree Road from the Baker Raw Water Pump Station (RWPS) northerly to the intersection with Santiago Canyon Road, and northwest along Santiago Canyon Road from the intersection with Jamboree Road to Holy Sepulcher Cemetery.

2.2 PROJECT BACKGROUND

IRWD's non-potable water system in the vicinity of the Project sites is made up of two main water supply systems: the recycled water system and the untreated water system. The recycled water supply facilities include the Orchard Hills Zone A–C booster pump station (BPS) and the Northwood Zone A–B BPS, and the untreated water supply facilities, which include Irvine Lake, the ILP, and the Santiago Aqueduct Commission (SAC) Pipeline (also known as the Baker Pipeline) to the Baker RWPS.

The recycled water system receives supply from the Michelson Water Recycling Plant (MWRP), which is distributed, via an extensive recycled water distribution system, throughout IRWD's service area to meet irrigation and industrial application demands. To meet peak demand periods, this system is supplemented by imported Metropolitan Water District (MWD) untreated water, native runoff, groundwater, and treated effluent from the Los Alisos Water Recycling Plant (LAWRP).

The untreated water system consists of two sub-systems: the ILP and the Baker Pipeline. The untreated water system receives MWD untreated water as the primary water source. The ILP is connected to Irvine Lake for its supply source and the imported MWD untreated water is supplemented with native storm runoff water.

When initially constructed, the ILP extended from Irvine Lake to the former Lambert Reservoir. In 2011, IRWD converted the southern section of the ILP extending from the Rattlesnake Complex

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Regional Location

Exhibit 2-1

ILP North Conversion Project

N W E S

10 5 0 10 Miles

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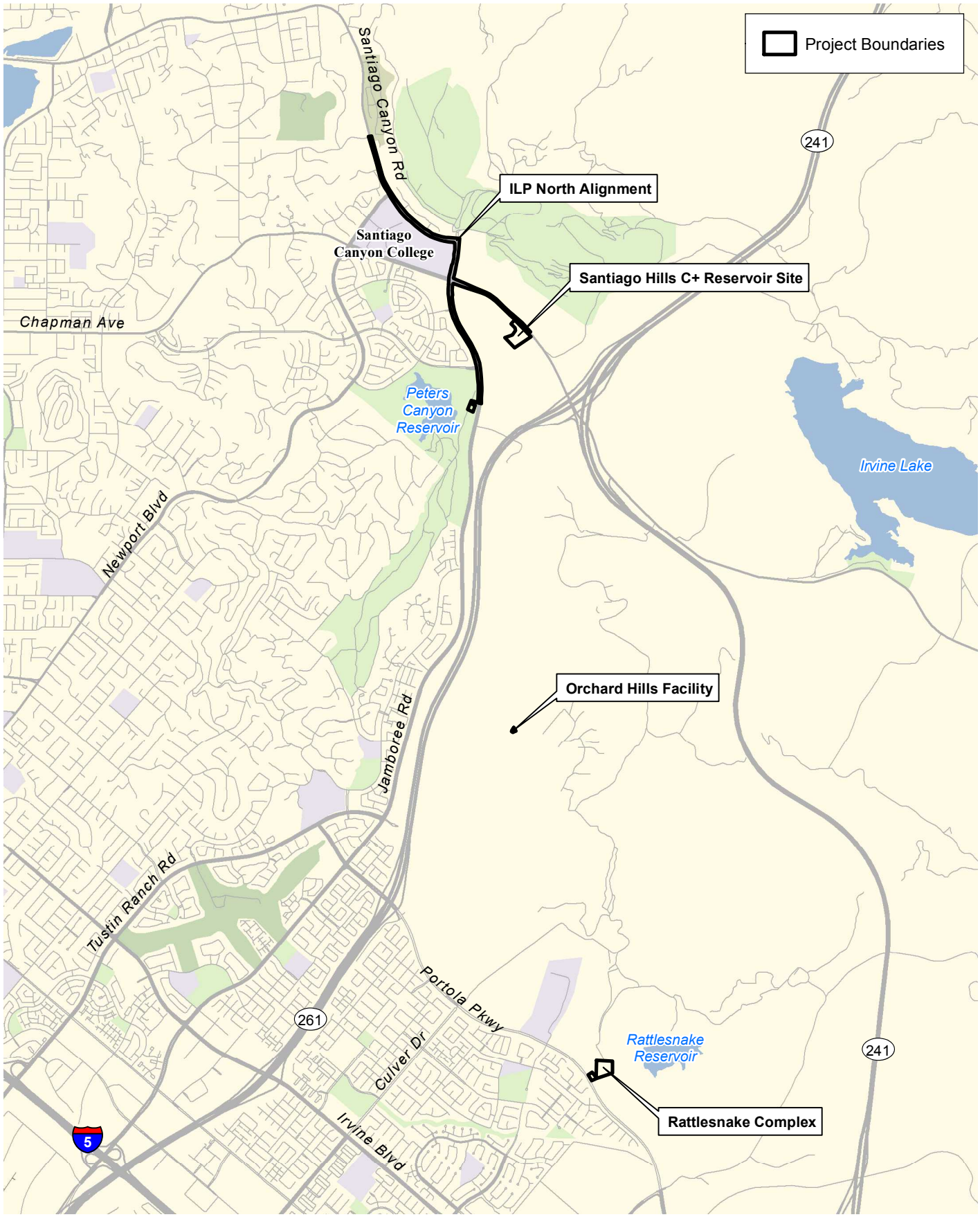

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Vicinity Map

Exhibit 2-2

ILP North Conversion Project

N W E S

4,000 2,000 0 4,000

Feet

BonTerra PSOMAS

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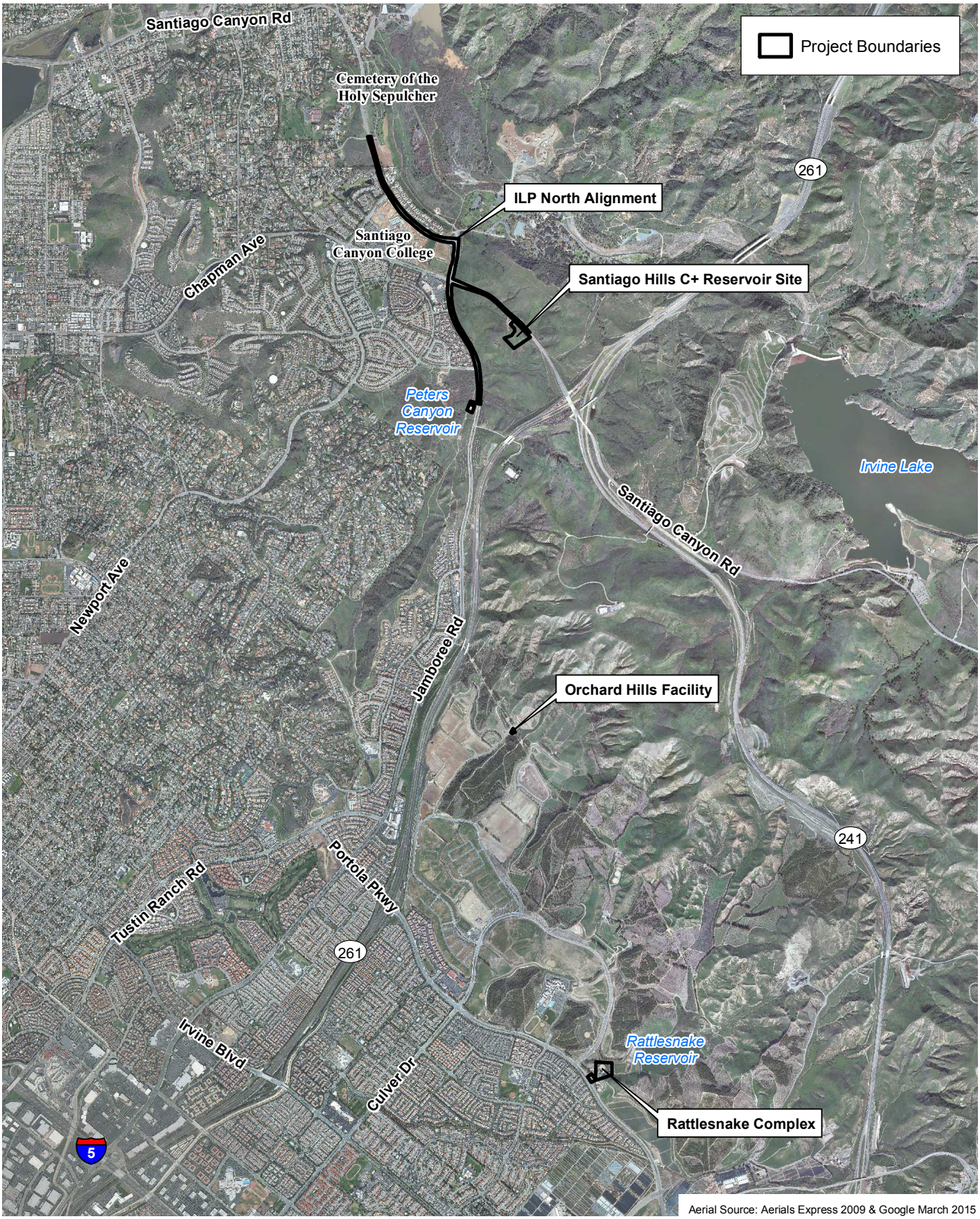

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Aerial Photograph

Exhibit 2-3

ILP North Conversion Project

N W E S

4,000 2,000 0 4,000 Feet

BonTerra PSOMAS

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to the endpoint of the UC Regents Cooperative AG Extension property, from the untreated water system to the recycled water system as a Zone C pipeline. This converted section of the ILP is primarily supplied by the Orchard Hills Zone A–C BPS. The proposed Project involves the conversion of the northern section of the ILP from the untreated water system to the recycled water system. The Project portion of the ILP North is made up of three pipeline segments including: 1) Segment A: one 42-inch pipeline provides for a direct connection from the existing ILP to the proposed Zone C+ recycled water reservoir and a second 42-inch pipeline provides the supply from the proposed Santiago Hills Zone C+ reservoir to the proposed Segment B recycled water pipeline in Jamboree Road; 2) Segment B: one 42-inch Zone C+ recycled water pipeline from the intersection of Jamboree and Chapman southerly to the Baker Raw Water Pump Station providing a direct connection to the converted ILP recycled water pipeline; and 3) Segment C: 20-inch and 10-inch Zone C+ recycled water pipelines extending northerly from the intersection of Jamboree and Chapman along Santiago to provide to the Irvine Regional Park, Santiago Canyon College, and the Holy Sepulcher Cemetery.

2.3 EXISTING CONDITIONS

Exhibit 2-3, Aerial Photograph, illustrates the location of each of the four proposed Project components.

2.3.1 SANTIAGO HILLS ZONE C+ RESERVOIR SITE

As discussed previously, the proposed reservoir site is located on an approximate 7.7-acre IRWD-owned parcel. The Project site is elevated from East Santiago Canyon Road and is located on a graded ridge. Approximately five acres of this parcel are currently occupied by the existing six-million-gallon (MG), buried Santiago Hills Zone 5 Domestic Water Reservoir (Zone 5 reservoir), the Santiago Hills Pumping Station Reservoir Management System, and a paved access road vehicle turn-around and parking area. One single-story building and two small concrete structures exist on the Project site; these structures house components of the pumping station and the Reservoir Management System and provide limited storage space. The remainder of the site exists as an undeveloped area with limited natural vegetation that slopes to the southeast.

Drainage flows from the Zone 5 reservoir and the access road are directed into a concrete-lined V-ditch on the southerly side of the access road, and then conveyed off site by the V-ditch through a drainage easement westerly of the access road. Drainage from the pump station parking area is directed along the lower portion of the access road to a curb and gutter that discharges just outside the access gate into a drainage course that flows westerly from the site. The proposed reservoir will be located in an undeveloped area of the City of Orange. The proposed reservoir would be constructed on a ridge that is approximately 700-feet in elevation and designated as Open Space (City of Orange 2010). The areas proximate to the proposed reservoir, which are also undeveloped, are designated as Low Density Residential. On-site vegetation is minimal and limited to small section of coastal sage plants.

2.3.2 IRVINE LAKE PIPELINE NORTH PIPELINE ALIGNMENT

The proposed Project transmission main alignments are located within the roadway rights-of-way of East Santiago Canyon Road and Jamboree Road. Along the proposed alignments, East Santiago Canyon Road transitions from a four-lane roadway to a six-lane, and Jamboree Road exists as a six-lane roadway. Surrounding land uses include Open Space Park, Low Density Residential, Medium Density Residential, and General Commercial and Public Facility zones; development includes residential and commercial development, park and open space, and Santiago Canyon College.

2.3.3 ORCHARD HILLS

The Orchard Hills Facility is located in an undeveloped area in the City of Irvine and is designated for residential development. The Project site exists as an asphalt-paved area with a variety of aboveground equipment, including two 14-inch strainers, flow meters, a flow control valve, and electrical equipment. As noted, this equipment is located above ground and, with the exception of four electrical boxes, are within two connected chain-link fenced areas. Two light standards and an antenna are also located on the Project site. Outside the fenced area, the Project site exists as an asphalt-paved area suitable for vehicle parking. An agricultural booster pump station that serves the local orchards and owned by The Irvine Company is located immediately adjacent to the IRWD facility. Land to the northeast of the facility is used as a dirt road and vehicle turn-around area associated with the adjacent agricultural uses. Avocado orchards are located to the south, east, and northeast, and undeveloped land is located to the west. Additionally, various concrete-lined drainage features exist surrounding the Orchard Hills Facility.

2.3.4 RATTLESNAKE COMPLEX

The Rattlesnake Complex is a fully developed site and includes a 5-MG, partially buried reservoir and its associated pump stations and pipelines; a chlorination building and dechlorination building; strainers; and pressure reducing valves. Two additional pump stations (Zone A–C Pump Station and Zone 3–5 Pump Station Building) are housed in a separate building and are contained behind an existing block wall. The areas immediately surrounding these facilities are asphalt-paved, and ornamental trees, which obscure the structures when viewed from Portola Parkway and surrounding areas, are located along the perimeter of the Complex. A single-family house and garage (designated as the caretaker's residence) is also located east of the reservoir. The Rattlesnake Complex site is designated in the General Plan as "Public Facilities" and surrounding areas are designated in the General Plan for residential development. The OCFA Fire Station No. 55, located at 4955 Portola Parkway, is also located approximately 250 feet south of the Rattlesnake Complex. The residential Northwood Pointe Community is located southwest of Portola Parkway, across from the Rattlesnake Complex.

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SECTION 3.0 PROJECT DESCRIPTION

3.1 PHYSICAL CHARACTERISTICS

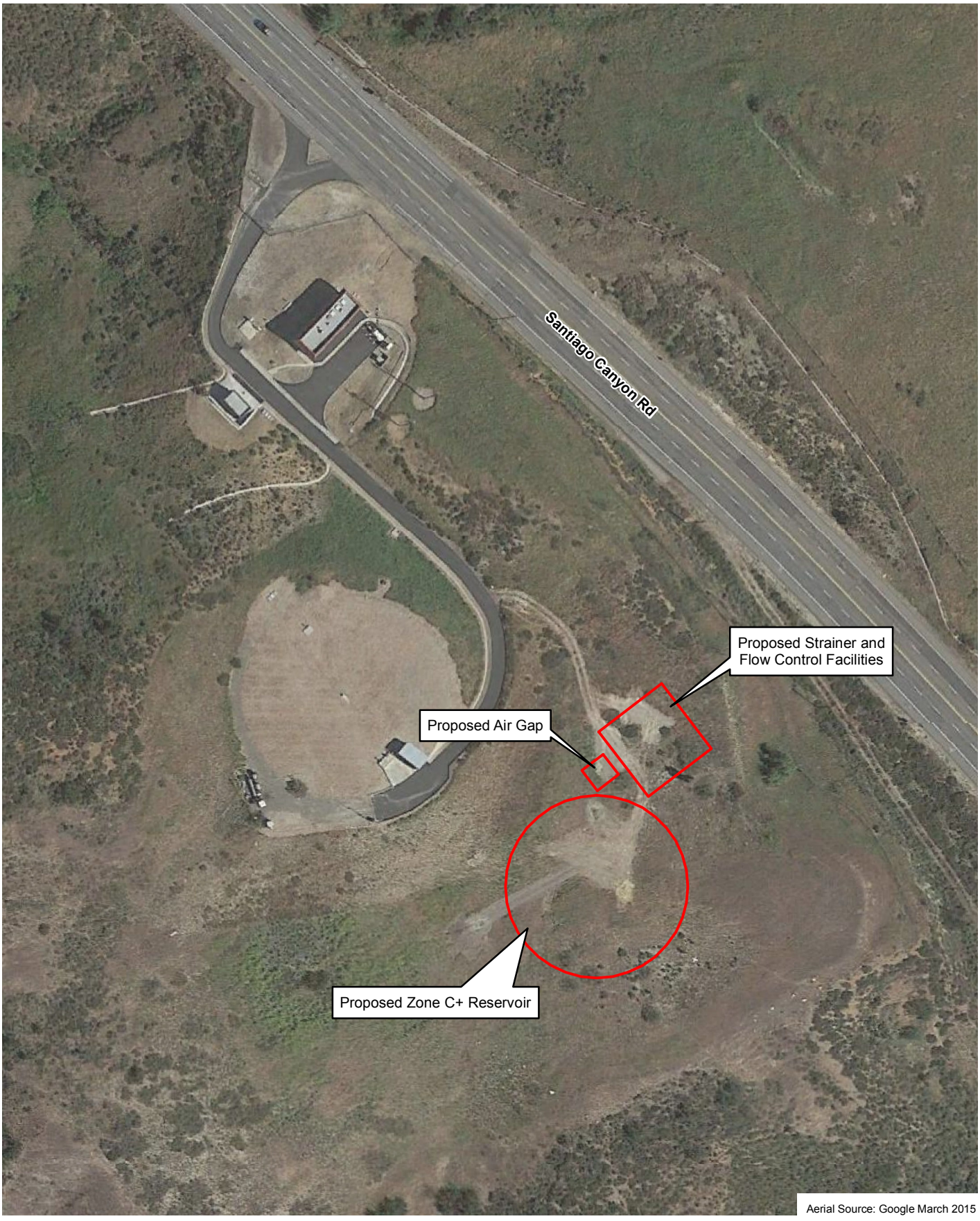
The proposed Project involves converting the northern section of the ILP from an untreated water system to a recycled water system to provide recycled water to existing customers in IRWD's North Tustin service area along Jamboree Road and in the Orchard Hills permanent agricultural uses, and extend the recycled water system to new customers including Santiago Canyon College the Irvine Park, the Cemetery of the Holy Sepulcher, Improvement District (ID) 252, and the future Santiago Hills II residential development. As part of this effort, a portion of the ILP from the Baker RWPS near the Peters Canyon Reservoir to the Rattlesnake Reservoir Complex would be converted to a recycled water line. The ILP North Conversion Project includes capacity for both existing and future planned untreated water demands. Individual components of the proposed Project are described in detail below.

3.1.1 PROPOSED FACILITIES

Santiago Hills Zone C+ Reservoir

The Project proposes to construct a 2.4-MG recycled water reservoir adjacent to IRWD's Zone 5 domestic water reservoir, as shown on Exhibit 3-1, Proposed Santiago Hills Zone C+ Reservoir. The proposed reservoir would be a partially buried circular tank and would have a high water level of 700 feet. Proposed reservoir construction and operation would also require the following improvements:

- **Tank Inlet Pipeline.** A 42-inch untreated water transmission main would be constructed by IRWD or another party along East Santiago Canyon Road from the existing 54-inch ILP, near the intersection of Jamboree Road and Chapman Avenue/Santiago Canyon Road, to the proposed reservoir, as shown on Exhibit 3-1.
- **Tank Outlet Pipeline.** A 42-inch recycled water transmission main would be constructed by IRWD or another party along East Santiago Canyon Road from the proposed reservoir to the existing 54-inch ILP south of the suction piping to the Baker RWPS.
- **Strainer Facility.** As part of the Project, two 30-inch automatic strainers would be installed to strain water flow from the ILP prior to discharging to the proposed reservoir. The project may include a proposed Strainer Backwash Recovery System that would consist of backwash pumps, a settling basin, a settled water wet well, backwash recovery pumps, piping, and a flow meter, and related appurtenances and equipment, or the Project may discharge into a future sewer line to be constructed in the Project area as part of a separate project (and subject to separate environmental analysis independent of this Project).
- **Outlet Valve and Vault.** Access to the outlet valve would be provided by a vault with equipment for access.
- **Ring Drain.** Drainage from the proposed reservoir ring drain would discharge into a below grade structure and either be recycled back into the recycled water reservoir or discharged to the storm drain. The ring drain includes piping, below ground structure, pumps, and associate appurtenances and equipment.



Aerial Source: Google March 2015

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Proposed Santiago Hills Zone C+ Reservoir

Exhibit 3-1

ILP North Conversion Project

N W E S

120 60 0 120

Feet

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Rattlesnake Complex Improvements

As part of the proposed Project, the existing Orchard Hills Zone A–C booster pump station, located in the Rattlesnake Complex (refer to Exhibit 3-2, Rattlesnake Complex), would be converted to a Zone A–C+ booster pump station, which would allow for pumping of recycled water to both Zone C and Zone C+. Due to the existing and proposed hydraulics, the conversion would only require minor modifications to the actual booster pump station.

Orchard Hills Facility Improvements

The Orchard Hills Facility (refer to Exhibit 3-3, Orchard Hills Facility) would be reconfigured to serve as a back-up source of recycled water for Zone C customers. The Project would include painting modified aboveground facilities and repairing the surrounding asphalt pavement that might be damaged during construction.

Zone C+ Distribution Pipelines/ILP North Alignment

As part of the Project, a 20-inch pipeline would be constructed by IRWD or another party along Jamboree Road from its intersection with Chapman Avenue/Santiago Canyon Road northward to Santiago Canyon Road and a 10-inch pipeline would be constructed along Santiago Canyon Road from Jamboree Road westward to the cemetery of the Holy Sepulcher.

Other Project-Related Improvements

As part of the Project, earthwork associated with the proposed reservoir has been designed to minimize impacts to the existing Zone 5 reservoir. If determined necessary, an earthen berm, with a maximum height of 24 feet, may be located between the permanent access road/paved area and Santiago Canyon Road; a strategically placed earthen berm may be incorporated as part of the preliminary grading plans presented in the preliminary design report in order to screen site improvements from public view.

At the proposed reservoir site, two retaining walls of varying height will be required due to elevation differences between the existing Zone 5 reservoir and the proposed reservoir.

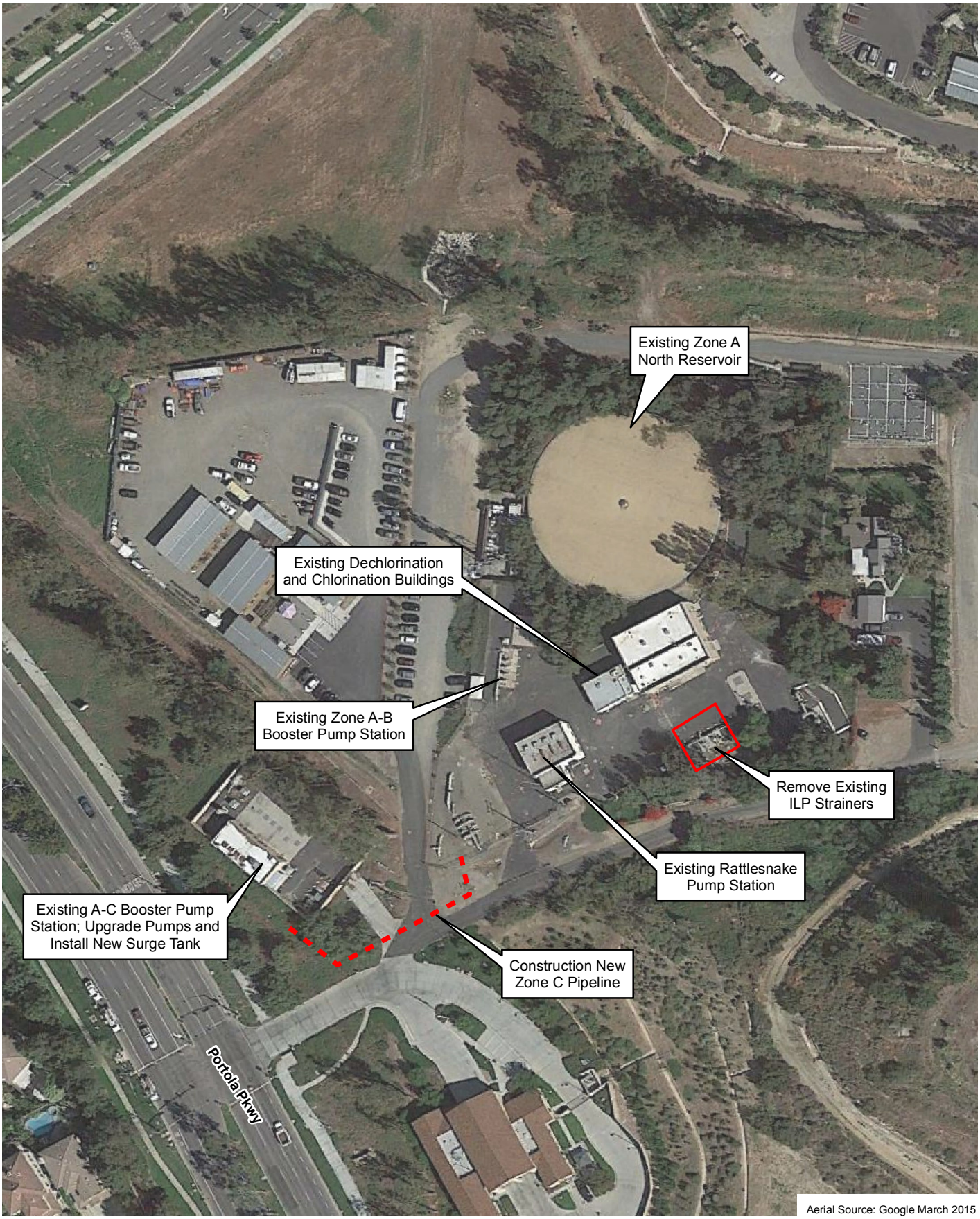
3.2 CONSTRUCTION ACTIVITIES AND PROJECT COMPONENTS

Construction at the Project sites is anticipated to begin in Mid-2016 and last approximately two years. It is anticipated that construction would begin at the Santiago Hills site and then follow at the Rattlesnake Complex and the Orchard Hills Facility.

There are multiple components planned for construction of the pipeline. These components include the pipeline from the proposed reservoir to Baker RWPS, the inlet pipeline from ILP to the proposed reservoir, the pipeline from the intersection of Jamboree Road and Chapman Avenue to Irvine Regional Park, and the pipeline from the intersection of Jamboree Road and East Santiago Canyon Road to Cemetery of the Holy Sepulcher. Pipeline construction is anticipated to begin in Spring 2016 and is expected to last approximately 15 months.

3.3 PURPOSE

The objective of the ILP North Conversion Project is: Construct recycled water conveyance pipelines and modify existing pipelines in East Santiago Canyon Road, Jamboree Road, and the distribution pipelines to supply recycled water to existing IRWD customers in the North Tustin service area along Jamboree Road, the Orchard Hills permanent agricultural uses, and extend



Aerial Source: Google March 2015

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Rattlesnake Complex

Exhibit 3-2

ILP North Conversion Project

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W E
S

120 60 0 120

Feet

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Aerial Source: Google March 2015

Orchard Hills Facility

Exhibit 3-3

ILP North Conversion Project

N
W E
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40 20 0 40

Feet

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the recycled water system to new customers including Santiago Canyon College, the Cemetery of the Holy Sepulcher, Improvement District 252, Irvine Park, and the future Santiago Hills II residential development.

In order to accomplish this, the Project would also construct the Santiago Hills Zone C+ Reservoir and its ancillary facilities and modify the existing facilities at the Rattlesnake Complex to facilitate delivery of recycled water to Santiago Hills Zone C+.

3.4 DISCRETIONARY APPROVALS

This IS/MND is intended to serve as the primary CEQA environmental document for all actions associated with the proposed ILP North Conversion Project, including all discretionary approvals requested or required to implement the Project. In addition, this is the primary reference document for the formulation and implementation of a mitigation monitoring program for the proposed Project.

The following construction easements are anticipated to be required during Project construction:

- **City of Orange.** Encroachment/Hauling Permits
- **Metropolitan Water District of Southern California.** Temporary Construction Easements
- **OC Parks.** Encroachment Permit and Permanent Easements
- **California Division of Drinking Water.** Notification and Approval
- **Regional Water Quality Control Board.** Construction Activities, Stormwater, and General Permit.

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SECTION 4.0 ENVIRONMENTAL CHECKLIST

ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED

The environmental factors checked below would be potentially affected by this Project, involving at least one impact that is a "Potentially Significant Impact" as indicated by the checklist on the following pages.

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

DETERMINATION: (To be completed by the Lead Agency.)

On the basis of this initial evaluation:

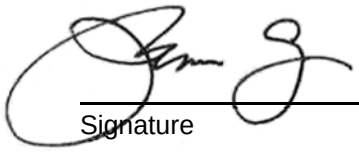
☐ I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

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

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

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

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



Signature

10/30/15

Date

Jo Ann Corey

Printed Name

Irvine Ranch Water District

For

EVALUATION OF ENVIRONMENTAL IMPACTS:

1) A brief explanation is required for all answers except "No Impact" answers that are adequately supported by the information sources a lead agency cites in the parentheses following each question. A "No Impact" answer is adequately supported if the referenced information sources show that the impact simply does not apply to projects like the one involved (e.g., the project falls outside a fault rupture zone). A "No Impact" answer should be explained where it is based on project-specific factors as well as general standards (e.g., the project will not expose sensitive receptors to pollutants, based on a project-specific screening analysis).

2) All answers must take account of the whole action involved, including off-site as well as on-site, cumulative as well as project-level, indirect as well as direct, and construction as well as operational impacts.

3) Once the lead agency has determined that a particular physical impact may occur, then the checklist answers must indicate whether the impact is potentially significant, less than significant with mitigation, or less than significant. "Potentially Significant Impact" is appropriate if there is substantial evidence that an effect may be significant. If there are one or more "Potentially Significant Impact" entries when the determination is made, an EIR is required.

4) "Negative Declaration: Less Than Significant With Mitigation Incorporated" applies where the incorporation of mitigation measures has reduced an effect from "Potentially Significant Impact" to a "Less than Significant Impact." The lead agency must describe the mitigation measures, and briefly explain how they reduce the effect to a less than significant level (mitigation measures from "Earlier Analysis," as described in (5) below, may be cross-referenced).

5) Earlier analyses may be used where, pursuant to the tiering, program EIR, or other CEQA process, an effect has been adequately analyzed in an earlier EIR or negative declaration. Section 15063 (c)(3)(D). In this case, a brief discussion should identify the following:

   a) Earlier Analysis Used. Identify and state where they are available for review.

   b) Impacts Adequately Addressed. Identify which effects from the above checklist were within the scope of and adequately analyzed in an earlier document pursuant to applicable legal standards, and state whether such effects were addressed by mitigation measures based on the earlier analysis.

   c) Mitigation Measures. For effects that are "Less than Significant with Mitigation Measures Incorporated," describe the mitigation measures which were incorporated or refined from the earlier document and the extent to which they address site-specific conditions for the project.

6) Lead agencies are encouraged to incorporate into the checklist references to information sources for potential impacts (e.g., general plans, zoning ordinances). Reference to a previously prepared or outside document should, where appropriate, include a reference to the page or pages where the statement is substantiated.

7) Supporting Information Sources: A source list should be attached, and other sources used or individuals contacted should be cited in the discussion.

8) This is only a suggested form, and lead agencies are free to use different formats; however, lead agencies should normally address the questions from this checklist that are relevant to a project's environmental effects in whatever format is selected.

9) The explanation of each issue should identify:

   a) the significance criteria or threshold, if any, used to evaluate each question; and

   b) the mitigation measure identified, if any, to reduce the impact to less than significance.

This section includes the completed Environmental Checklist Form. The checklist form is used to assist in evaluating the potential environmental impacts of the proposed Project. The Environmental Checklist Form identifies potential Project effects as follows: (1) Potentially Significant Impact; (2) Less Than Significant With Mitigation Incorporated; (3) Less Than Significant Impact; and, (4) No Impact. Substantiation and clarification for each checklist response is provided in Section 5.0, Environmental Evaluation. Included in each discussion are mitigation measures, as appropriate, that are recommended for implementation as part of the proposed Project.

	ENVIRONMENTAL ISSUES (See attachments for information sources)	**Potentially Significant Impact**	**Less Than Significant With Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
I.	**AESTHETICS.** Would the project:				
	a) Have a substantial adverse effect on a scenic vista?	☐	☐	☐	☒
	b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	☐	☐	☒	☐
	c) Substantially degrade the existing visual character or quality of the site and its surroundings?	☐	☐	☒	☐
	d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	☐	☐	☒	☐
II.	**AGRICULTURE AND FOREST RESOURCES.** In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Dept. of Conservation as an optional model to use in assessing impacts on agriculture and farmland. In determining whether impacts to forest resources, including timberland, are significant environmental effects, lead agencies may refer to information compiled by the California Department of forestry and Fire Protection regarding the State's inventory of forest land, including the Forest and Range Assessment Project and the Forest Legacy Assessment project; and forest carbon measurement methodology provided in Forest Protocols adopted by the California Air Resources Board. Would the project:				
	a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	☐	☐	☐	☒
	b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?	☐	☐	☐	☒
	c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220[g]), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104[g])?	☐	☐	☐	☒
	d) Result in the loss of forest land or conversion of forest land to non-forest use?	☐	☐	☐	☒
	e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to nonagricultural use or conversion of forest land to non-forest use?	☐	☐	☐	☒

ENVIRONMENTAL ISSUES (See attachments for information sources)	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
III. AIR QUALITY. Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations. Would the project**:**				
a) Conflict with or obstruct implementation of the applicable air quality plan?	☐	☐	☐	☒
b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?	☐	☐	☒	☐
c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?	☐	☐	☒	☐
d) Expose sensitive receptors to substantial pollutant concentrations?	☐	☐	☒	☐
e) Create objectionable odors affecting a substantial number of people?	☐	☐	☒	☐
IV. BIOLOGICAL RESOURCES. Would the project:				
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?	☐	☒	☐	☐
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?	☐	☒	☐	☐
c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	☐	☐	☐	☒
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	☐	☐	☒	☐
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinances?	☐	☒	☐	☐
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	☐	☐	☐	☒

ENVIRONMENTAL ISSUES (See attachments for information sources)	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
V. CULTURAL RESOURCES. Would the project:				
a) Cause a substantial adverse change in the significance of a historical resource as defined in §15064.5?	☐	☐	☐	☒
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?	☐	☒	☐	☐
c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☐	☒	☐	☐
d) Disturb any human remains, including those interred outside of formal cemeteries?	☐	☒	☐	☐
VI. GEOLOGY AND SOILS. Would the project:				
a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:				
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.	☐	☒	☐	☐
ii) Strong seismic ground shaking?	☐	☒	☐	☐
iii) Seismic-related ground failure, including liquefaction?	☐	☐	☒	☐
iv) Landslides?	☐	☒	☐	☐
b) Result in substantial soil erosion or the loss of topsoil?	☐	☒	☐	☐
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?	☐	☒	☐	☐
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?	☐	☒	☐	☐
e) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?	☐	☐	☐	☒
VII. GREENHOUSE GAS EMISSIONS. Would the project:				
a) Generate greenhouse gas emissions, either directly or indirectly, That may have a significant impact on the environment?	☐	☐	☐	☒
b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	☐	☐	☐	☒

ENVIRONMENTAL ISSUES (See attachments for information sources)	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
VIII. HAZARDS AND HAZARDOUS MATERIALS. Would the project:				
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	☐	☐	☒	☐
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	☐	☐	☒	☐
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☐	☐	☒	☐
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	☐	☐	☐	☒
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☒
f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☒
g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☐	☐	☒
h) Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?	☐	☐	☒	☐
IX. HYDROLOGY AND WATER QUALITY. Would the project:				
a) Violate any water quality standards or waste discharge requirements?	☐	☐	☒	☐
b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g. the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?	☐	☐	☐	☒
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off- site?	☐	☐	☒	☐

ENVIRONMENTAL ISSUES (See attachments for information sources)	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner in which would result in flooding on- or off-site?	☐	☐	☒	☐
e) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?	☐	☐	☒	☐
f) Otherwise substantially degrade water quality?	☐	☐	☒	☐
g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?	☐	☐	☐	☒
h) Place within a 100-year flood hazard area structures which would impede or redirect flood flows?	☐	☐	☐	☒
i) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?	☐	☐	☐	☒
j) Inundation by seiche, tsunami, or mudflow?	☐	☐	☐	☒
X. LAND USE AND PLANNING. Would the project:				
a) Physically divide an established community?	☐	☐	☐	☒
b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?	☐	☐	☐	☒
c) Conflict with any applicable habitat conservation plan or natural community conservation plan?	☐	☐	☐	☒
XI. MINERAL RESOURCES. Would the project:				
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	☐	☐	☐	☒
b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?	☐	☐	☐	☒
XII. NOISE. Would the project result in:				
a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☐	☒	☐	☐
b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?	☐	☐	☒	☐
c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☐	☒	☐

ENVIRONMENTAL ISSUES (See attachments for information sources)	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☐	☒	☐
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒
f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒
XIII. POPULATION AND HOUSING Would the project:				
a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	☐	☐	☐	☒
b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒
c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒
XIV. PUBLIC SERVICES.				
a) Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:				
Fire Protection?	☐	☐	☐	☒
Police Protection?	☐	☐	☐	☒
Schools?	☐	☐	☐	☒
Parks?	☐	☐	☐	☒
Other Public Facilities?	☐	☐	☐	☒
XV. RECREATION.				
a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	☐	☐	☐	☒
b) Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?	☐	☐	☐	☒

ENVIRONMENTAL ISSUES (See attachments for information sources)	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
XVI. TRANSPORTATION/CIRCULATION. Would the project:				
a) Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system. Including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?	☐	☐	☒	☐
b) Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?	☐	☐	☐	☒
c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?	☐	☐	☐	☒
d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g. farm equipment)?	☐	☐	☐	☒
e) Result in inadequate emergency access?	☐	☐	☐	☒
f) Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decreased the performance or safety of such facilities?	☐	☐	☐	☒
XVII. UTILITIES AND SERVICE SYSTEMS. Would the project:				
a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	☐	☐	☐	☒
b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☐	☒
c) Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects – and/or would the project include a new or retrofitted storm water treatment control Best Management Practice (BMP), (e.g. water quality treatment basin, constructed treatment wetlands), the operation of which could result in significant environmental effects (e.g. increased vectors and odors)?	☐	☐	☒	☐
d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?	☐	☐	☐	☒

ENVIRONMENTAL ISSUES (See attachments for information sources)	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
e) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	☐	☐	☐	☒
f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?	☐	☐	☒	☐
g) Comply with federal, state, and local statutes and regulations related to solid waste?	☐	☐	☐	☒
XVIII. MANDATORY FINDINGS OF SIGNIFICANCE.				
a. Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of rare or endangered plants or animals, or eliminate important examples of the major periods of California history or prehistory?	☐	☒	☐	☐
b. Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects.)	☐	☒	☐	☐
c. Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	☐	☒	☐	☐

Fish and Wildlife Determination

(Per Section 21089(b) of the Public Resources Code, all project applicants and public agencies subject to the California Environmental Quality Act shall pay a Fish and Game filing fee for each proposed project that would adversely affect wildlife resources.)*

Based on the responses contained in this Environmental Checklist, there is no evidence that the project has a potential for a change that would adversely affect wildlife resources or the habitat upon which the wildlife depends. Has the presumption of adverse effect set forth in 14 CCR 753.5 (d) been rebutted by substantial evidence?

__ Yes (Certificate of Fee Exemption and County Administrative fee required)

_X_ No (Pay fee)

***Note:** Fish and Game Code Section 711.4(c)(2)(A) states that projects that are Categorically Exempt from CEQA are also exempt from filing fee.

SECTION 5.0 DISCUSSION OF ENVIRONMENTAL CHECKLIST QUESTIONS

I. AESTHETICS

IMPACT ANALYSIS

Would the Project:

a) Have a substantial adverse effect on a scenic vista?

No Impact. According to the *City of Orange General Plan's* Natural Resources Element, an important concern is the preservation of open spaces in the eastern part of the City, many of which are located adjacent to creeks and reservoirs, in an effort to preserve scenic vistas. The proposed reservoir site is located in an area of the City known for its many scenic resources. Specifically the proposed reservoir site and immediately surrounding areas are largely undeveloped and are characterized by rugged hillsides, rock outcroppings, and winding canyons. As discussed in Section 3.0, Project Description, the proposed reservoir would be constructed as a partially buried tank on a currently vacant and undeveloped site that is located adjacent to the existing Zone 5 reservoir and Santiago Hills Pump Station. As discussed in more detail in Section X, Land Use and Planning, the proposed reservoir site is designated in the *City of Orange General Plan's* Land Use Element as Open Space and is surrounded by undeveloped land that is designated for Low Density Residential. The nearest existing residential development is approximately $^1/_3$ mile from the site. The proposed reservoir site and the adjacent, existing Zone 5 reservoir are located on the top of a ridge and surrounding land is lower in elevation than the reservoir site. Due to the difference in elevation and the proposed reservoir's partially subterranean design, views of the proposed reservoir would be limited and the proposed reservoir would not block views of other scenic vistas in the area; therefore, there would not be an adverse effect on a scenic vista at the Santiago Hills site. The ILP North Alignment component of the proposed Project would result in temporary visual impacts related to short-term construction activities; however, because impacts would be limited to the proposed alignment that is located entirely within existing roadway rights-of-way and because the impacts would be short-term and temporary in nature, this component of the Project would not have an adverse effect on a scenic vista.

Although the *City of Irvine General Plan's* Land Use Element does include policies directed at the preservation of aesthetic character and value of natural landforms in the City, there are no scenic vistas identified in the vicinity of the Orchard Hills Facility or the Rattlesnake Complex. Due to the nature of the proposed modifications at these two sites and because no scenic vistas are identified in the Project vicinity, no impacts would occur and no mitigation is required.

b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a State scenic highway?

Less Than Significant Impact. According to the California Department of Transportation's (Caltrans') California Scenic Highway Mapping System, the proposed Santiago Hills Reservoir would not be located within or near a State scenic highway (Caltrans 2013). However, as shown on Figure NR-4 of the *City of Orange General Plan,* Santiago Canyon Road, in the vicinity of the proposed reservoir site and along a portion of the ILP North Alignment, is designated as a Viewscape Corridor (City of Orange 2010). According to the *City of Orange General Plan's* Natural Resources Element, motorists traveling along this roadway have views of scenic resources. East Santiago Canyon Road is approximately 300 feet north of the proposed reservoir site. The ILP North Alignment component of the proposed Project and the construction phase of the proposed

reservoir would temporarily expose motorists to construction activities; however, the resulting degradation of the views from this designated Viewscape Corridor would be short-term and temporary in nature and would not represent a significant impact.

Following the completion of construction, there would be no visual changes associated with the ILP North Alignment component of the Project and the partially subterranean design of the proposed reservoir combined with the difference in elevation between the roadway and the proposed reservoir site would minimize views of the proposed reservoir from this roadway. Therefore, long-term impacts to motorists traveling along East Santiago Canyon Road would be less than significant.

The City of Orange also designates Newport Boulevard as a Viewscape Corridor (City of Orange 2010); however, the closest Project site is the ILP North Alignment, which is located approximately 0.65 mile to the east. Due to intervening topography, existing landforms and vegetation, and residential development, the ILP North Alignment is not visible from Newport Boulevard.

According to Caltrans' California Scenic Highway Mapping System, there are no officially designated or eligible state scenic highways within or in proximity to the City of Irvine (Caltrans 2013). However, according to the *City of Irvine General Plan,* Culver Drive and Jeffrey Road are both designated Scenic Highways of Urban Character and are each located approximately 0.75 mile from the Rattlesnake Complex (Irvine 2012). North of the intersection with Portola Parkway, Jeffrey Road is also designated as a Scenic Highway of Natural Character. As discussed in Section 3.0, Project Description, proposed Project actions at these two Project sites would be limited to modifications of on-site equipment and facilities; no new structures would be constructed. Further, views of these two Project sites from both Culver Drive and Jeffrey Road are obstructed by intervening topography and vegetation. Therefore, motorists traveling along both Culver Drive and Jeffrey Road would be unaffected by the Project. No impacts would occur and no mitigation is required.

c) Substantially degrade the existing visual character or quality of the site and its surroundings?

Less Than Significant Impact. The proposed Project is comprised of three separate elements: the ILP North Alignment, the proposed reservoir, the Orchard Hills Facility, and the Rattlesnake Reservoir.

Irvine Lake Pipeline North Alignment

As discussed previously, the ILP North Alignment would be limited to existing roadway rights-of-way and limited portions through existing OC Parks lands. The construction of the ILP North Alignment would have a temporary impact on the existing visual character along the alignment due to the anticipated construction activities associated with the Project. This impact would be short-term and would be less significant. Because the Project involves a recycled water pipeline to be located underground, no long-term visual impacts would occur.

Proposed Reservoir

As discussed in Section 2.0, Project Location, Environmental Setting and Existing Conditions, the proposed reservoir site is located in an area characterized by hilly, undeveloped terrain and is adjacent to the existing Zone 5 reservoir, the Santiago Hills Pumping Station, the Reservoir Management System, and a paved access road. Views of the proposed reservoir site are limited to passing motorists along East Santiago Canyon Road. Exhibit 5-1, Site Photographs: Santiago Hills Zone C+ Reservoir, presents photographs that depict the existing visual character of the site

and the perspective from East Santiago Canyon Road. Descriptions of these photographs are as follows:

- **View 1 – View of Proposed Reservoir Site, Looking East.** This view depicts the existing condition of the proposed reservoir site from the adjacent existing Zone 5 reservoir. As shown, the site, which is in the immediate foreground, exists as undeveloped, relatively flat land and is located atop a ridge overlooking an undeveloped canyon and East Santiago Canyon Road. Views of foothills can be seen in the distance.
- **View 2 – View from East Santiago Canyon Road, Looking Southwest.** This view depicts the view of the proposed reservoir site from East Santiago Canyon Road, which is located north of the site, and is representative of the view of a motorist, bicyclist, or pedestrian along East Santiago Canyon Road. As shown, a portion of the fenced off storage area is visible. The existing Zone 5 reservoir, which is completely buried, is not visible from this vantage point.

The proposed reservoir would be constructed as a partially buried tank. The northerly face of the reservoir would be exposed approximately 5 feet from the surface of the paved area, and the remaining portion of the reservoir would be partially exposed, ranging in height to less than 5 feet above ground surface. Along a portion of the western side of the paved area, a retaining wall would be constructed due to elevation differences between the existing Zone 5 reservoir and the proposed reservoir. As discussed previously, the proposed reservoir site and the adjacent existing Zone 5 reservoir are located on the top of a ridge and is at a higher elevation than nearby existing land uses. Therefore, the difference in elevation combined with the subterranean design of the reservoir would contribute toward screening the reservoir from surrounding areas. It should be noted that, although the surrounding land is currently undeveloped, the reservoir is adjacent to land that is zoned for low density residential development. However, this development is currently in the design stages, therefore, the analysis of potential future impacts would be speculative. Therefore, a less than significant impact would occur related to the visual character or quality of the site or surrounding areas.

Orchard Hills Facility

The Orchard Hills Facility is surrounded by avocado orchards to the east and west, and a new subdivision of the Orchard Hills community is currently under construction to the southwest. The Facility is located on a paved surface and is surrounded by a chain-link fence. Exhibit 5-2, Orchard Hills Facility, presents photographs that depict the existing visual character of the Orchard Hills site and the surrounding area.

- **View 1 – View of Orchard Hills Facility, Looking Southwest.** This view shows the existing equipment located on the Orchard Hills Facility site. As shown, the existing equipment includes low-profile pipes, valves, and electrical boxes. Vacant and undeveloped land and limited vegetation, including a eucalyptus tree windrow and some avocado trees are visible in the background.
- **View 2 – View of Orchard Hills Facility, Looking Northeast.** This view shows another perspective of the existing Orchard Hills Facility site. As shown in this photograph, a single pole that holds an antenna is visible as the tallest piece of equipment on the site. The existing Irvine Company agricultural booster pump station is also visible on the left edge of the photograph. An avocado orchard is visible in the middle-ground, and foothills are visible in the background. As shown, the existing Orchard Hills Facility does not obstruct views of the foothills to the northeast.

View 1: View of Santiago Hills site looking east.

View 2: View from E. Santiago Canyon Road looking southwest.

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Site Photographs: Santiago Hills Zone C+ Reservoir

Exhibit 5-1

ILP North Conversion Project

BonTerra PSOMAS

(07/15/2015 JAZ) R:\Projects\IRW_IRWD\3IRW000701\Graphics\MND\ex5-1_SP.pdf

As depicted in Exhibit 5-2, the Orchard Hills Facility is primarily surrounded by agricultural and vacant, undeveloped land. The Project does not propose for the construction of new structures at the site; rather, proposed Project actions would include the removal and modification of existing equipment. Therefore, the visual appearance of the Orchard Hills Facility would remain largely unchanged. No impact would occur related to the visual character or quality of the site or surrounding areas.

Rattlesnake Complex

As discussed in Section 2.1, Project Location, the Rattlesnake Complex is located on the north side of Portola Parkway in Irvine and is in the vicinity of residential development, which is located on the south side of Portola Parkway. Exhibit 5-3, Site Photographs: Rattlesnake Complex, presents photographs that depict the existing visual character of Rattlesnake Complex when viewed from Portola Parkway and the residential community located southwest of Portola Parkway.

- **View 1 – View from Portola Parkway, Looking North.** This view depicts the visual character of the site from motorists, bicyclists, and pedestrians traveling north along Portola Parkway. The foreground view is dominated by ornamental vegetation in the driveway associated with the adjacent Fire Station No. 55. As shown in the background of the photograph, the Rattlesnake Complex is surrounded by mature vegetation and trees. The only visible evidence of the Rattlesnake Complex is the brick wall that houses the booster pump stations and some low-profile pumping equipment located behind a chain-link fence.
- **View 2 – View from Portola Parkway, Looking East.** This view depicts the visual character of the site when traveling along the south side of Portola Parkway. This view is also representative of residents in the Northwood Pointe Community. As shown, the site is surrounded by mature vegetation and trees that shield the majority of the views of the Rattlesnake Complex.

The Project does not propose construction of new structures at the site; rather, proposed Project actions would include the removal and modification of existing equipment. Some landscaping would also need to be removed during construction activities; however, all landscaping will be restored to existing conditions once construction is complete. Therefore, the visual appearance of the Rattlesnake Complex would remain largely unchanged. No impact would occur related to the visual character or quality of the site or surrounding areas.

d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?

Less Than Significant Impact. Under existing conditions, each of the proposed Project sites have some form of night-lighting. The proposed reservoir site is subject to security lighting associated with the existing Zone 5 reservoir and Santiago Hills Pump Station facilities; the ILP North Alignment is located along existing roadways with light standards along the entire alignment; and the Orchard Hills Facility and Rattlesnake Complex have on-site security lighting. These existing lighting elements would remain at the Project sites and additional security lighting would be installed at the proposed reservoir. This new security lighting would be focused onto the Project site; therefore, there would be minimal overspill beyond the physical limits of the existing facilities. Project impacts pertaining to light or glare would be less than significant and no mitigation is required.

View 1: View of Orchard Hills Facility looking southwest.

View 2: View of Orchard Hills Facility looking northeast.

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Site Photographs: Orchard Hills Facility

Exhibit 5-2

ILP North Conversion Project

BonTerra PSOMAS

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View 1: View from Portola Parkway looking north.

View 2: View from Portola Parkway looking east.

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Site Photographs: Rattlesnake Complex

Exhibit 5-3

ILP North Conversion Project

BonTerra PSOMAS

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II. AGRICULTURE AND FOREST RESOURCES

IMPACT ANALYSIS

Would the Project:

a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?

b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?

No Impact. Data from the State of California Department of Conservation, Farmland Mapping and Monitoring Program indicate that the proposed reservoir site and associated ILP North Alignment contain no land designated as Prime Farmland, Farmland of Statewide Importance, Unique Farmland, or Farmland of Local Importance. As shown on Exhibit 5-4a, Farmland Resources, these areas are designated as Grazing Land, Urban and Built-Up Land, and Other Land; these Project sites are not used for agricultural purposes, nor are they under Williamson Act contracts.

As shown on Exhibit 5-4b, the area immediately south and east of the Orchard Hills Facility site is designated as Prime Farmland. Further to the south and east, this designation changes to Farmland of Statewide Importance. Land to the northwest of the Orchard Hills Facility is also designated as Farmland of Statewide Importance. These areas are also currently being used for agricultural production; however, proposed Project actions would not extend beyond the existing Orchard Hills Facility footprint and would not impact these off-site designated farmland areas. Therefore, no impacts would occur to the surrounding designated farmlands. The Orchard Hills Facility site is not under a Williamson Act contract.

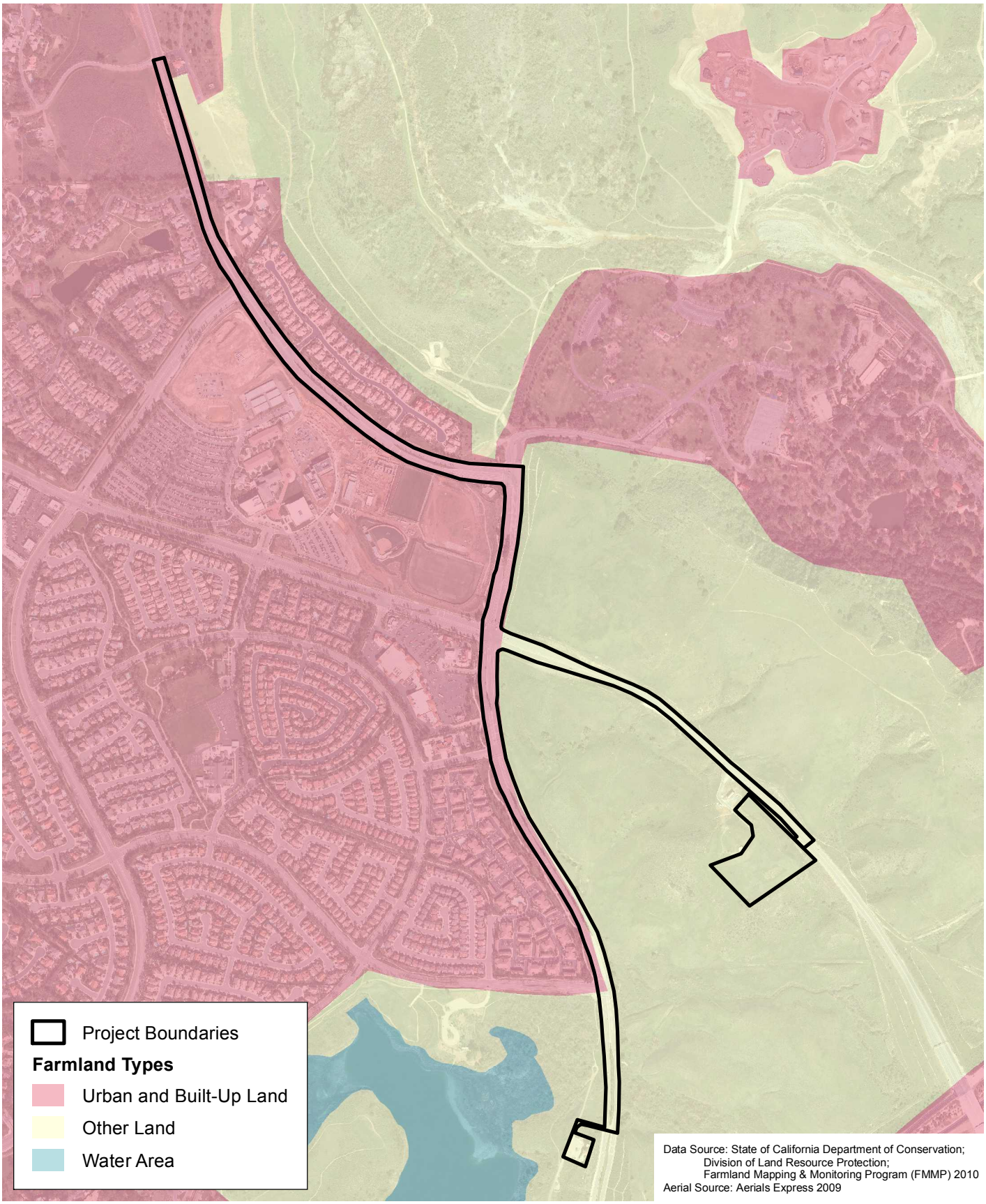
As shown on Exhibit 5-4c, the Rattlesnake Complex is designated as Other Land with Urban and Built-Up Land located immediately southwest of the site. There are areas located to the northwest, northeast, east, and southeast that are designated as Unique Farmland and a small area to the northwest that is designated Prime Farmland. These areas are also currently being used for agricultural production; however, proposed Project actions would not extend beyond the existing Rattlesnake Complex footprint and would not impact these off-site designated farmland areas. No impacts would occur to the surrounding designated farmlands, and the Rattlesnake Complex portion of the Project is not under a Williamson Act contract.

Although areas adjacent to some of the Project components are currently used for agriculture, the Project component sites are not in agricultural use or under Williamson Act contracts. No agricultural-related impacts would result from Project implementation. Therefore, no impacts would occur and no mitigation is required.

c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?

d) Result in the loss of forest land or conversion of forest land to non-forest use?

No Impact. According to Section 12220(g) of the *California Public Resources Code*, "forest land is land that can support 10 percent native tree cover of any species, including hardwoods, under natural conditions, and that allows for management of one or more forest resources, including



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Farmland Resources:
Santiago Hills Zone C+ Reservoir Site and ILP North Alignment

Exhibit 5-4a

ILP North Conversion Project

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1,000 500 0 1,000
Feet

BonTerra PSOMAS

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Data Source: State of California Department of Conservation;
Division of Land Resource Protection;
Farmland Mapping & Monitoring Program (FMMP) 2010
Aerial Source: Aerials Express 2009

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Farmland Resources: Orchard Hills Facility

Exhibit 5-4b

ILP North Conversion Project

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Feet

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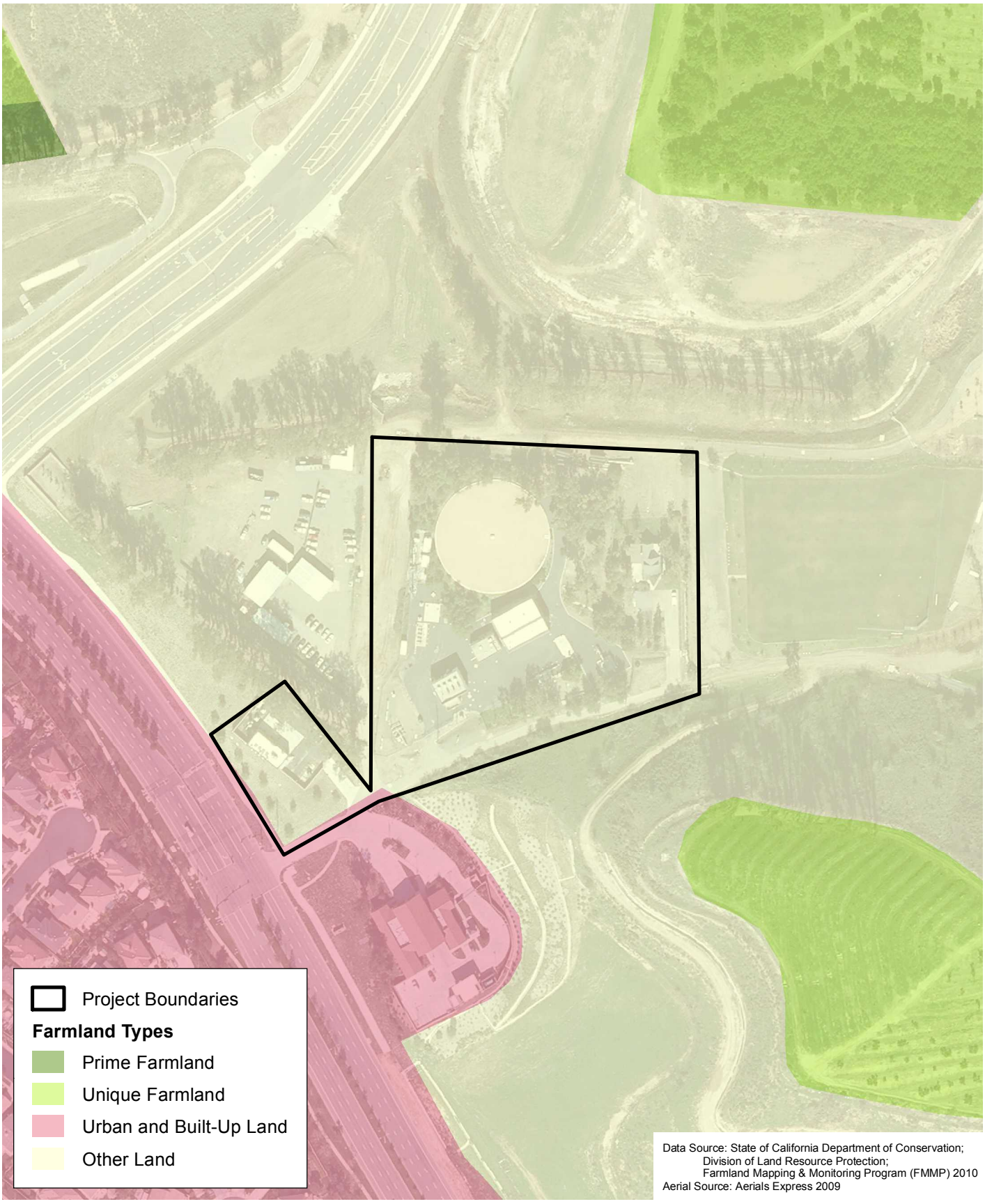

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Farmland Resources: Rattlesnake Complex

Exhibit 5-4c

ILP North Conversion Project

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timber, aesthetics, fish and wildlife, biodiversity, water quality, recreation, and other public benefits". None of the proposed Project sites meet the definition of forest land; therefore, no impacts would occur and no mitigation is required.

e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?

No Impact. As discussed previously, the proposed Project sites are not designated as farmland of significance and are not being used for agricultural production. There are areas in the vicinity of the Project sites that are currently used for agricultural purposes; however, proposed Project actions would not convert these areas to non-agricultural use. Further, there are no forest lands in the vicinity of the Project sites; therefore, the Project would not convert forest land to non-forest use. No impacts would occur and no mitigation is required.

III. AIR QUALITY

IMPACT ANALYSIS

Would the Project:

a) Conflict with or obstruct implementation of the applicable air quality plan?

No Impact. Air quality in Orange County is regulated by the South Coast Air Quality Management District (SCAQMD), which is the agency principally responsible for comprehensive air pollution control in the South Coast Air Basin (SoCAB). The SCAQMD develops rules and regulations; establishes permitting requirements for stationary sources; inspects emissions sources; and enforces such measures through educational programs or fines, when necessary. The SCAQMD is directly responsible for reducing emissions from stationary (area and point), mobile, and indirect sources. It has responded to this requirement by preparing a sequence of Air Quality Management Plans (AQMPs).

On December 7, 2012, the SCAQMD Governing Board adopted the 2012 AQMP, which is a regional and multi-agency effort (including participation by the SCAQMD, the California Air Resources Board [CARB], the Southern California Association of Governments [SCAG], and the U.S. Environmental Protection Agency [USEPA]). The purpose of the 2012 AQMP is to set forth a comprehensive program that will lead the region into compliance with federal air quality standards for 8-hour ozone (O_3) and fine particulate matter with a diameter of 2.5 microns or less (PM2.5). The 2012 AQMP incorporates the latest scientific and technical information and planning assumptions, including the 2012 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS); updated emission inventory methods for various source categories; and SCAG's latest growth forecasts.

The two principal criteria for conformance to an AQMP are:

1. Whether the project would result in an increase in the frequency or severity of existing air quality violations; cause or contribute to new violations; or delay timely attainment of air quality standards and
2. Whether the project would exceed the assumptions in the AQMP.

With respect to the first criterion, the analyses in Responses to Questions III.b and III.c below demonstrate that the Project would not (1) generate short-term or long-term emissions of volatile organic compounds (VOCs), oxides of nitrogen (NOx, which are O_3 precursors), or PM2.5 that

could potentially cause an increase in the frequency or severity of existing air quality violations; (2) cause or contribute to new violations; or (3) delay timely attainment of air quality standards.

With respect to the second criterion, the Project would not increase or modify SCAG's population, housing, or employment projections. The Project would accommodate the projected growth in population accounted for in the 2012 AQMP emissions forecast and would provide facilities that are capable of handling flows generated in the region. Therefore, the Project would be consistent with the region's AQMP. No impacts would occur and no mitigation is required.

b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?

Less Than Significant Impact. Standards are separated into the following topics: Regional Construction Emissions, Local/Ambient Air Quality Construction Emissions, and Long-Term Operational Emissions.

Existing Conditions

The Project sites are located in Orange County, in the cities of Orange and Irvine. The Project sites are located entirely within the SoCAB and are under the jurisdiction of the SCAQMD. Both the State of California and the USEPA have established health-based Ambient Air Quality Standards (AAQS) for air pollutants, which are known as "criteria pollutants". The AAQS are designed to protect the health and welfare of the populace within a reasonable margin of safety. The AAQS for O_3, carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), respirable particulate matter with a diameter of 10 microns or less (PM10), PM2.5, and lead are shown in Table 1.

TABLE 1
CALIFORNIA AND FEDERAL AMBIENT AIR QUALITY STANDARDS

Pollutant	Averaging Time	California Standards	Federal Standards	
			Primary[a]	Secondary[b]
O_3	1 Hour	0.09 ppm (180 µg/m^3)	–	–
	8 Hour	0.070 ppm (137 µg/m^3)	0.075 ppm (147 µg/m^3)	Same as Primary
PM10	24 Hour	50 µg/m^3	150 µg/m^3	Same as Primary
	AAM	20 µg/m^3	–	Same as Primary
PM2.5	24 Hour	–	35 µg/m^3	Same as Primary
	AAM	12 µg/m^3	12.0 µg/m^3	15.0 µg/m^3
CO	1 Hour	20 ppm (23 mg/m^3)	35 ppm (40 mg/m^3)	–
	8 Hour	9.0 ppm (10 mg/m^3)	9 ppm (10 mg/m^3)	–
	8 Hour (Lake Tahoe)	6 ppm (7 mg/m^3)	–	–
NO_2	AAM	0.030 ppm (57 µg/m^3)	0.053 ppm (100 µg/m^3)	Same as Primary
	1 Hour	0.18 ppm (339 µg/m^3)	0.100 ppm (188 µg/m^3)	–
SO_2	24 Hour	0.04 ppm (105 µg/m^3)	–	–
	3 Hour	–	–	0.5 ppm (1,300 µg/m^3)
	1 Hour	0.25 ppm (655 µg/m^3)	0.075 ppm (196 µg/m^3)	–
Lead	30-day Avg.	1.5 µg/m^3	–	–
	Calendar Quarter	–	1.5 µg/m^3	Same as Primary
	Rolling 3-month Avg.	–	0.15 µg/m^3	
Visibility Reducing Particles	8 hour	Extinction coefficient of 0.23 per km – visibility ≥ 10 miles (0.07 per km – ≥30 miles for Lake Tahoe)	**No Federal Standards**	
Sulfates	24 Hour	25 µg/m^3		
Hydrogen Sulfide	1 Hour	0.03 ppm (42 µg/m^3)		
Vinyl Chloride	24 Hour	0.01 ppm (26 µg/m^3)		

O_3: ozone; ppm: parts per million; µg/m^3: micrograms per cubic meter; PM10: respirable particulate matter; AAM: Annual Arithmetic Mean; –: No Standard; PM2.5: fine particulate matter; CO: carbon monoxide; mg/m^3: milligrams per cubic meter; NO_2: nitrogen dioxide; SO_2: sulfur dioxide; km: kilometer.

[a] *National Primary Standards:* The levels of air quality necessary, within an adequate margin of safety, to protect the public health.

[b] *National Secondary Standards:* The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

Note: More detailed information in the data presented in this table can be found at the CARB website (www.arb.ca.gov).

Source: CARB 2013

Regional air quality is defined by whether the area has attained or not attained State and federal air quality standards, as determined by air quality data from various monitoring stations. Areas that are considered in "nonattainment" are required to prepare plans and implement measures that will bring the region into "attainment". When an area has been reclassified from nonattainment to attainment for a federal standard, the status is identified as "maintenance", and there must be a plan and measures established that will keep the region in attainment for the following ten years.

For CARB, an "Unclassified" designation indicates that the air quality data for the area are incomplete and do not support a designation of attainment or nonattainment. Table 2 summarizes the attainment status of the SoCAB for the criteria pollutants.

TABLE 2
CRITERIA POLLUTANT DESIGNATIONS
IN THE SOUTH COAST AIR BASIN

Pollutant	State	Federal
O_3 (1-hour)	Nonattainment	No Standard
O_3 (8-hour)		Extreme Nonattainment
PM10	Nonattainment	Attainment/Maintenance
PM2.5	Nonattainment	Nonattainment
CO	Attainment	Attainment/Maintenance
NO_2	Attainment	Attainment/Maintenance
SO_2	Attainment	Attainment
Lead	Attainment	Nonattainment/Attainment[a]
Visibility-Reducing Particles	Unclassified[b]	No Standards
Sulfates	Attainment	
Hydrogen Sulfide	Unclassified	

O_3: ozone; PM10: respirable particulate matter with a diameter of 10 microns or less; PM2.5: fine particulate matter with a diameter of 2.5 microns or less; CO: carbon monoxide; NO_2: nitrogen dioxide; SO_2: sulfur dioxide; CARB: California Air Resources Board; SoCAB: South Coast Air Basin

[a] Los Angeles County is classified as nonattainment for lead; the remainder of the SoCAB is in attainment of State and federal standards.

[b] "Unclassified" designation indicates that the air quality data for the area are incomplete and do not support a designation of attainment or nonattainment.

Source: CARB 2015

O_3 is formed by photochemical reactions between NOx and VOCs rather than being directly emitted. O_3 is the principal component of smog. Elevated O_3 concentrations cause eye and respiratory infection; reduce resistance to lung infection; and may aggravate pulmonary conditions in persons with lung disease. O_3 is also damaging to vegetation and untreated rubber. The entire SoCAB is designated as a nonattainment area for the State one-hour O_3 standard.

CO is formed by the incomplete combustion of fossil fuels, almost entirely from automobiles. It is a colorless, odorless gas that can cause dizziness, headaches, and fatigue. The SoCAB is designated as an attainment area for federal CO standards.

NO_2 (a "whiskey brown"-colored gas) and nitric oxide (NO) (a colorless, odorless gas) are formed from combustion devices. These compounds are referred to as NOx. NOx is a primary component of the photochemical smog reaction. The severity of health effects of NOx depend primarily on the concentration inhaled. Acute symptoms can include coughing, difficulty breathing, vomiting, headache, and eye irritation. Respiratory symptoms may also increase in severity after prolonged exposure.

SO_2 is a corrosive gas that is primarily formed from the combustion of fuels containing sulfur (e.g., from power plants) and heavy industry that use coal or oil as fuel. SO_2 irritates the respiratory tract and can result in lung disease and breathing problems for asthmatics. Atmospheric SO_2 also contributes to acid rain.

Lead is found in old paints and coatings, plumbing, and a variety of other materials including gasoline anti-knock additives. Once in the blood stream, lead can cause damage to the brain, nervous system, and other body systems. Children are highly susceptible to the effects of lead. However, lead emissions have significantly decreased due to the near elimination of the use of leaded gasoline.

Particulate Matter is the term used for a mixture of solid particles and liquid droplets found in the air. Respirable particulate matter (i.e., PM10) derives from a variety of sources including road dust from paved and unpaved roads; diesel soot; combustion products; tire and brake abrasion; construction operations; and fires. Fuel combustion and certain industrial processes are primarily responsible for fine particle (i.e., PM2.5) levels. Coarse particles (PM10) can accumulate in the respiratory system and aggravate health problems such as asthma. PM2.5 can deposit itself deep in the lungs and may contain substances that are harmful to human health.

Toxic air contaminants (TACs) are a diverse group of air pollutants that may cause or contribute to an increase in deaths or in serious illness or that may pose a present or potential hazard to human health. TACs may be emitted from a variety of common sources, including motor vehicles, gasoline stations, dry cleaners, industrial operations, painting operations, and research and teaching facilities. TACs are different than the "criteria" pollutants previously discussed in that AAQS have not been established for them. TACs occurring at extremely low levels may still affect health, and it is typically difficult to identify levels of exposure that do not produce adverse health effects. TAC impacts on human health are described by having carcinogenic risk and being chronic (i.e., of long duration) or acute (i.e., severe but of short duration). Diesel particulate matter (diesel PM) is a TAC and is responsible for the majority of California's known cancer risk from outdoor air pollutants.

The effects from air pollution can be significant, both in the short term during smog alerts, but also from long-term exposure to pollutants. While the majority of the populace can overcome short-term air quality health concerns, selected segments of the population are more vulnerable to its effects. Specifically young children, the elderly, and persons with existing health problems are most susceptible to respirator complications.

There are no sensitive receptors near the reservoir site. The sensitive receptors near to the other Project sites are:

- Single-family residences and Santiago Canyon College adjacent to the proposed ILP North Alignment on East Santiago Canyon Road and Jamboree Road.
- The Northwood Point Community (single-family residential) within 165 feet of the Rattlesnake Complex.
- Additionally, there are residences under construction, within approximately 850 feet of the Orchard Hills Facility.

Significance Criteria

Appendix G of the State CEQA Guidelines states that the significance criteria established by the applicable air quality management district may be relied upon to make significance determinations. The SCAQMD has established significance thresholds to assess the regional and localized impacts of Project-related air pollutant emissions; Table 3 presents the current significance thresholds.

TABLE 3
SCAQMD AIR QUALITY SIGNIFICANCE THRESHOLDS

Mass Daily Thresholds[a]		
Pollutant	**Construction**	**Operation**
NOx	100 lbs/day	55 lbs/day
VOC	75 lbs/day	55 lbs/day
PM10	150 lbs/day	150 lbs/day
PM2.5	55 lbs/day	55 lbs/day
SOx	150 lbs/day	150 lbs/day
CO	550 lbs/day	550 lbs/day
Lead	3 lbs/day	3 lbs/day
TACs, Odor, and GHG Thresholds		
TACs (including carcinogens and non-carcinogens)	Maximum Incremental Cancer Risk ≥ 10 in 1 million Cancer Burden > 0.5 excess cancer cases (in areas ≥ 1 in 1 million) Chronic & Acute Hazard Index ≥ 1.0 (project increment)	
Odor	Project creates an odor nuisance pursuant to SCAQMD Rule 402	
GHG	10,000 MT/yr CO_2e for industrial facilities	
Ambient Air Quality Standards for Criteria Pollutants[b, c]		
NO_2 1-hour average annual arithmetic mean	The SCAQMD is in attainment; the Project is significant if it causes or contributes to an exceedance of the following attainment standards: 0.18 ppm (State) 0.03 ppm (State) and 0.0534 ppm (federal)	
PM10 24-hour average annual average	 10.4 µg/m^3 (construction)[c] & 2.5 µg/m^3 (operation) 1.0 µg/m^3	
PM2.5 24-hour average	 10.4 µg/m^3 (construction)[c] & 2.5 µg/m^3 (operation)	
SO_2 1-hour average 24-hour average	 0.25 ppm (State) & 0.075 ppm (federal – 99th percentile) 0.04 ppm (State)	
Sulfate 24-hour average	 25 µg/m^3 (State)	
CO 1-hour average 8-hour average	SCAQMD is in attainment; project is significant if it causes or contributes to an exceedance of the following attainment standards: 20.0 ppm (State) and 35 ppm (federal) 9.0 ppm (State/federal)	
Lead 30-day average Rolling 3-month average	 1.5 µg/m^3 (State) 0.15 µg/m^3 (federal)	

NOx: nitrogen oxides, lbs/day: pounds per day, VOC: volatile organic compound, PM10: respirable particulate matter with a diameter of 10 microns or less, PM2.5: fine particulate matter with a diameter of 2.5 microns or less, SOx: sulfur oxides, CO: carbon monoxide, TACs: toxic air contaminants, GHG: greenhouse gases, MT/yr CO_2e: metric tons per year of carbon dioxide equivalents, NO_2: nitrogen dioxide, ppm: parts per million, µg/m^3: micrograms per cubic meter; SCAQMD: South Coast Air Quality Management District

[a] Source: SCAQMD CEQA Handbook (SCAQMD 1993)
[b] Ambient air quality thresholds for criteria pollutants based on SCAQMD Rule 1303, Table A-2 unless otherwise stated
[c] Ambient air quality threshold is based on SCAQMD Rule 403

Source: SCAQMD 2015

Construction Emissions – Regional

Criteria pollutant emissions would occur during construction from operation of construction equipment; grading and earth-moving activities, which would generate fugitive dust; export of excavated soil; import of construction materials; and operation of vehicles driven to and from the site by construction workers. Emissions would vary from day to day, depending on the level of activity; the specific type of construction activity occurring; and, for fugitive dust, prevailing weather conditions.

A construction-period mass emissions inventory was compiled based on an estimate of construction equipment as well as scheduling and Project phasing assumptions. More specifically, the mass emissions analysis takes into account the following:

- Combustion emissions from operating on-site stationary and mobile construction equipment;
- Fugitive dust emissions from demolition, site preparation, and grading phases; and
- Mobile-source combustion emissions and fugitive dust from worker commute and truck travel.

Emissions were calculated using the California Emissions Estimator Model (CalEEMod) Version 2013.2.2 emissions inventory model (SCAQMD 2013). CalEEMod is a computer program accepted by the SCAQMD that can be used to estimate anticipated emissions associated with land development projects in California. CalEEMod has separate databases for specific counties and air districts, and the Orange County database was used for the proposed Project.

The mass emissions thresholds (see Table 3) are based on the rate of emissions (i.e., pounds of pollutants emitted per day). Therefore, the quantity, duration, and the intensity of construction activity are important in ensuring the analysis of worst case (i.e., maximum daily emissions) scenarios. The Project activities (e.g., grading, building) are identified by start date and duration. Each activity has associated off-road equipment (e.g., dozers, backhoes, cranes) and on-road vehicles (e.g., haul trucks, concrete trucks, worker commute vehicles).

For the purposes of estimating emissions associated with construction activities, a timeframe of February 2016 through June 2017 was applied to the analysis. Construction hauling truck trips were estimated based on the phase length and amount of debris or soil to export. The haul truck capacity specified for this Project is 15 tons or 12 cubic yards (cy).

It was assumed excavation and grading at the proposed reservoir site would last approximately 20 weeks following two weeks of site clearing and grubbing. Reservoir excavation would require the export of approximately 32,500 cy of soil. This translates to a total of 2,700 round trips (5,400 one-way trips) over the duration of the phase, or approximately 27 round trips (54 one-way trips) per day. Dust control by watering was assumed, consistent with the requirements of SCAQMD Rule 403 (AQ-1).Construction of the reservoir would then occur over a six-month period. Input details are provided in Appendix B.

This analysis assumes that construction activities associated with the Rattlesnake Complex and Orchard Hills Facility would be minimal and would not require a significant number of additional vehicles beyond those that are routinely traveling to and from the project site under existing conditions.

It was assumed that installation of the ILP North Alignment would last approximately 12 months and occur concurrently with reservoir site preparation, grading, and construction. Pipeline

installation would require both the export of excavated soil and demolished pavement and the import of bedding materials for the pipeline. Export and import is estimated to require a total of 2,000 round trips (4,000 one-way trips) over the duration of the pipeline installation, or approximately 10 round trips (20 one-way trips) per day.

Maximum daily emissions for the peak work day are shown in Table 4, Estimated Maximum Daily Construction Emissions. Actual emissions could be less than those forecasted due to the conservative nature of the assumptions incorporated into the CalEEMod program regarding phasing. If construction is delayed or occurs over a longer time period, emissions could be reduced because of (1) a more modern and cleaner-burning construction equipment fleet mix and/or (2) a less intensive buildout schedule (i.e., fewer daily emissions occurring over a longer time interval). As shown, all criteria pollutant emissions would be less than their respective thresholds. Thus, impacts would be less than significant.

TABLE 4
ESTIMATED MAXIMUM DAILY CONSTRUCTION EMISSIONS
(LBS/DAY)

	VOC	NOx	CO	SOx	PM10	PM2.5
Maximum daily emissions in 2016	6	59	47	<0.5	7	4
Maximum daily emissions in 2017	5	44	35	<0.5	4	3
SCAQMD Daily Thresholds *(Table 3)*	***75***	***100***	***550***	***150***	***150***	***55***
Exceeds SCAQMD Thresholds?	**No**	**No**	**No**	**No**	**No**	**No**

lbs/day: pounds per day; VOC: volatile organic compound(s); NOx: nitrogen oxides; CO: carbon monoxide; SOx: sulfur oxides; PM10: inhalable particulate matter with a diameter of 10 microns or less; PM2.5: fine particulate matter with a diameter of 2.5 microns or less; SCAQMD: South Coast Air Quality Management District.

Source: CalEEMod data in Appendix B.

Construction Emissions – Local/Ambient Air Quality

The localized effects from the on-site portion of daily emissions were evaluated at receptor locations potentially impacted by the Project according to the SCAQMD's localized significance threshold (LST) method, which utilizes on-site emissions rate look up tables and Project-specific modeling, where appropriate. LSTs are applicable to the following criteria pollutants: NO_2, CO, PM10, and PM2.5. LSTs represent the maximum emissions from a project that are not expected to cause or contribute to an exceedance of the most stringent applicable federal or State ambient air quality standard, and are developed based on the ambient concentrations of that pollutant for each source receptor area and distance to the nearest receptor. For the LST CO and NO_2 exposure analysis, receptors who could be exposed for one hour or more are considered. For PM10 and PM2.5 exposure analysis, receptors who could be exposed for 24 hours are considered. The mass rate look-up tables were developed for each source receptor area and can be used to determine whether or not a project may generate significant adverse localized air quality impacts. The SCAQMD provides LST mass rate look-up tables for projects that are less than or equal to five acres, which means this is the appropriate method for the Project. When quantifying mass emissions for localized analysis, only emissions that occur on site are considered. Consistent with the SCAQMD's LST method guidelines, emissions related to off-site delivery/haul truck activity and employee trips are not considered in the evaluation of localized impacts.

No LST analysis is required for the proposed reservoir site because there are no receptors with 500 meters of the work area. LST analyses for installation of the ILP North Alignment are shown

in Table 5; LST analyses for the Orchard Hills and Rattlesnake Complex work are shown in Table 6. The Orchard Hills and Rattlesnake Complex are considered together because both sites have the closest sensitive receptors at a distance of approximately 50 meters; the maximum daily emissions listed in Table 6 represent the worst-case on-site emissions from the Rattlesnake Complex Sites and Orchard Hills analyses. As shown in Tables 5 and 6, localized emissions for all criteria pollutants would be less than their respective SCAQMD LSTs for all pollutants. Thus, impacts would be less than significant and no mitigation is required.

TABLE 5
LOCALIZED CONSTRUCTION POLLUTANT EMISSIONS –
THE ILP NORTH PIPELINE (LBS/DAY)

	NOx	CO	PM10	PM2.5
Maximum Daily Emissions	17	13	1	1
SCAQMD LSTs*	81	485	4	3
Exceeds SCAQMD Thresholds?	**No**	**No**	**No**	**No**

lbs/day: pounds per day; NOx: nitrogen oxides; CO: carbon monoxide; PM10: respirable particulate matter with a diameter of 10 microns or less; PM2.5: fine particulate matter with a diameter of 2.5 microns or less; SCAQMD: South Coast Air Quality Management District; LST: Localized Significance Threshold.

* Thresholds for Source Receptor Area 17, Central Orange County, 1-acre site, 25 meter receptor distance

Source: SCAQMD 2009.

TABLE 6
MAXIMUM LOCALIZED CONSTRUCTION POLLUTANT EMISSIONS –
ORCHARD HILLS AND RATTLESNAKE COMPLEX SITES (LBS/DAY)

	NOx	CO	PM10	PM2.5
Maximum Daily Emissions	7	6	<0.5	<0.5
SCAQMD LSTs*	93	738	13	5
Exceeds SCAQMD Thresholds?	**No**	**No**	**No**	**No**

lbs/day: pounds per day; NOx: nitrogen oxides; CO: carbon monoxide; PM10: respirable particulate matter with a diameter of 10 microns or less; PM2.5: fine particulate matter with a diameter of 2.5 microns or less; SCAQMD: South Coast Air Quality Management District; LST: Localized Significance Threshold.

* Thresholds for Source Receptor Area 20, Central Orange County Coastal, 1-acre site, 50 meter receptor distance

Source: SCAQMD 2009.

Long-Term Operational Emissions

The Project would not require the addition of any new IRWD employees or generate regular vehicle trips. IRWD staff would periodically visit the proposed reservoir, the Orchard Hills Facility, and the Rattlesnake Complex for routine inspection and maintenance activities similar to current operations. Therefore, new pollutant emissions would be negligible; the impact would be less than significant and no mitigation is required.

c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable Federal or State ambient air quality standard (Including releasing emissions which exceed quantitative thresholds for ozone precursors)?

Less than Significant Impact. As noted previously in Table 2, the Orange County portion of the SoCAB is a nonattainment area for O_3, PM10, and PM2.5. The proposed Project would generate these pollutants during construction, and short-term cumulative impacts related to air quality could occur if Project construction and nearby construction activities were to occur simultaneously. In particular, with respect to local impacts, cumulative construction particulate (i.e., fugitive dust) impacts are considered when projects are located within a few hundred yards of each other. As described in the response to Question III.b, construction emissions would be below the SCAQMD regional and localized significance thresholds. Project construction at the Orchard Hills Facility may occur concurrently with nearby residential development; however, Project emissions at the site would be substantially less than significance thresholds, and the Project's contribution to cumulative emissions would not be considerable. Therefore, short-term construction emissions of nonattainment pollutants would not be cumulatively considerable, and Project impacts would be less than significant.

As previously discussed in the Response to Question III.b, long-term emissions would be negligible and therefore not cumulatively considerable; the long-term cumulative impact would be less than significant. No mitigation is required.

d) Expose sensitive receptors to substantial pollutant concentrations?

Less Than Significant Impact. Exposure of sensitive receptors is addressed for the following situations: CO hotspots; criteria pollutants from on-site construction; and TACs from on-site construction.

Carbon Monoxide Hotspot

A CO hotspot is an area of localized CO pollution caused by severe vehicle congestion on major roadways, typically near intersections. If a project increases average delay at signalized intersections operating at level of service (LOS) E or F or causes an intersection that would operate at LOS D or better without the project to operate at LOS E or F with the project, a quantitative screening is required. As discussed previously in the Response to Question III.b, operational traffic would be negligible. Thus, it may be inferred that the Project would neither cause new severe congestion nor significantly worsen existing congestion. There would be no potential for a CO hotspot or exposure of sensitive receptors to substantial, Project-generated local CO emissions. The impact would be less than significant and no mitigation is required.

Criteria Pollutants from On-Site Construction

Exposure of persons to NO_2, CO, PM10, and PM2.5 emissions is discussed in the LST analysis under Response III.b above. As discussed, there would be a less than significant impact and no mitigation is required.

Toxic Air Contaminant (Diesel PM) Emissions from On-Site Construction

Construction activities would result in short-term, Project-generated emissions of diesel PM from the exhaust of off-road, heavy-duty diesel equipment used for site preparation (e.g., demolition, excavation, and grading); paving; and building construction. CARB identified diesel PM as a TAC in 1998. The dose to which receptors are exposed is the primary factor used to determine health risk. Dose is a function of the concentration of a substance or substances in the environment and the duration of exposure to the substance. Thus, the risks estimated for a maximally exposed individual (MEI) are higher if a fixed exposure occurs over a longer time period. According to the Office of Environmental Health Hazard Assessment, health risk assessments—which determine the exposure of sensitive receptors to TAC emissions—should be based on a 30- to 70-year

exposure period; however, such assessments should be limited to the period/duration of activities associated with a project.

For the ILP North Conversion Project, there would be few pieces of off-road, heavy-duty diesel equipment in operation, and the construction period would be short when compared to a 30- to 70-year exposure period. When considering these facts combined with the highly dispersive properties of diesel PM and additional reductions in particulate emissions from newer construction equipment, as required by USEPA and CARB regulations, it can be concluded that TAC emissions during construction of the Project would not expose sensitive receptors to substantial emissions of TACs. There would be a less than significant impact, and no mitigation is required.

e) Create objectionable odors affecting a substantial number of people?

Less than Significant Impact. Objectionable odors are generally associated with agricultural activities; landfills and transfer stations; the generation or treatment of sewage; the use or generation of chemicals; food processing; or other activities that generate unpleasant odors (SCAQMD 1993). The proposed Project would involve construction and operation of a water storage tank and associated access road and pressure-reducing station. None of the proposed Project elements would generate objectionable odors. There would be no impact and no mitigation is required.

During construction, the proposed Project would operate equipment that may generate odors resulting from on-site construction equipment's diesel exhaust emissions or paving operations. However, these odors would be temporary and would dissipate rapidly from the source with an increase in distance. Therefore, construction odors would be considered less than significant and no mitigation would be required.

MITIGATION PROGRAM

Regulatory Requirement

AQ-1 During construction of the Project, Irvine Ranch Water District (IRWD) and its contractors shall be required to comply with regional rules, which would assist in reducing short-term air pollutant emissions. SCAQMD Rule 402 requires that air pollutant emissions not be a nuisance off site. SCAQMD Rule 403 requires that fugitive dust be controlled with the best available control measures so that the presence of such dust does not remain visible in the atmosphere beyond the property line of the emission source.

IV. BIOLOGICAL RESOURCES

IMPACT ANALYSIS

This section is based on the *Biological Resources Report, Irvine Ranch Water District, Irvine Lake Pipeline – North Conversion Project, City of Irvine, Orange County, California* prepared by BonTerra Psomas in 2015 (Appendix C).

Would the Project:

a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?

Less Than Significant With Mitigation. To facilitate this discussion, this section is separated into the following discussions: Special Status Plant Species; Coastal California Gnatcatcher/Scrub Habitats; Least Bell's Vireo/Southwestern Willow Flycatcher/Western Yellow-Billed Cuckoo/Riparian Habitats; Burrowing Owl Habitat; and Other Wildlife Species.

Special Status Plant Species

Suitable habitat for special status plant species is located on the proposed reservoir site, while limited suitable habitat for special status plants is located along the ILP North Alignment near the Baker RWPS. The proposed reservoir site would impact 3.00 acres of suitable scrub and grassland habitats and the portion of the ILP North Alignment south of the Baker RWPS would impact 0.19 acre of suitable scrub habitat (Exhibit 5-5a-e, Biological Resources]). One federally listed Threatened and State-listed Endangered species, thread-leaved brodiaea (*Brodiaea filifolia*), has potential to occur in the scrub and grassland habitats; any impact on this species would be considered significant if it were to occur within the impact boundary. Implementation of **BIO-1** would reduce this impact to a less than significant level.

Several California Rare Plant Rank (CRPR) List 1B, 2B, 3, and 4 species also have potential to occur in the habitats that would be impacted by the ILP North Alignment and the proposed reservoir; impacts on these species would be considered significant if they were present in the impact area and if the size of the population and the status of the species warrant a finding of significance. Impacts on intermediate mariposa lily (*Calochortus weedii* var. *intermedius*), Catalina mariposa lily (*Calochortus catalinae*), and Coulter's matilija poppy (*Romneya coulteri*) are covered or conditionally covered by IRWD's participation in the Central-Coastal Natural Communities Conservation Plan (NCCP)/Habitat Conservation Plan (HCP). Implementation of **BIO-1** would reduce this impact to a less than significant level.

No suitable habitat for special status plants is located at the Rattlesnake Complex, the Orchard Hills Facility, or within the remainder of the ILP North Alignment (north of the Baker RWPS). Therefore, these elements of the Project would not impact special status plant species.

Coastal California Gnatcatcher/Scrub Habitats

The ILP North Alignment near the Baker RWPS would impact 0.19 acre of California sagebrush–California buckwheat scrub that provides suitable habitat for the federally Threatened coastal California gnatcatcher (*Polioptila californica californica*). One pair of gnatcatchers were observed within 500 feet of this Project impact area during focused surveys; thus, the coastal sage scrub on this Project site would be considered occupied. This area is part of the NCCP/HCP Reserve located within Peters Canyon Regional Park (Exhibit 5-6a-b, NCCP/HCP Reserve Classifications). The ILP North Alignment near the Baker RWPS and its associated pipelines are existing permanent infrastructure within and adjacent to Peters Canyon Regional Park (i.e., NCCP/HCP Reserve). Construction of a recycled water pipeline is consistent with the provisions of Section 5.3 of the NCCP/HCP, which allows for operation, maintenance and repair, and reconstruction of existing infrastructure facilities in a Habitat Reserve. Section 5.3.3 of the NCCP/HCP Implementation Agreement states that activities related to the provision and operation of necessary public and quasi-public infrastructure facilities, construction of those new infrastructure, and ongoing operations and maintenance, repair, and reconstruction activities related to the new infrastructure facilities are "Permitted Activities" provided that they are consistent with adopted County and City general plans and provisions of the NCCP/HCP. Therefore, impacts on 0.19 acre of coastal sage scrub and one pair of gnatcatchers for construction of the ILP North Alignment near the Baker RWPS are considered fully mitigated with IRWD's participation in the NCCP/HCP. I Implementation of **BIO-2** will be required during clearing of coastal sage scrub.

Survey Area

Project Boundaries

Vegetation Types and Other Areas

- Southern Cactus Scrub (2.4)
- Coastal Goldenbush-Grassland (2.8.3)
- Urban (15.1)
- Transportation (15.4)
- Parks and Ornamental Plantings (15.5)
- Cleared or Graded (16.1)
- Other Disturbed Areas (16.2)

Aerial Source: Google, March 2015/Aerials Express 2009

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Biological Resources

Exhibit 5-5a

ILP North Conversion Project

N W E S

200 100 0 200 Feet

BonTerra PSOMAS

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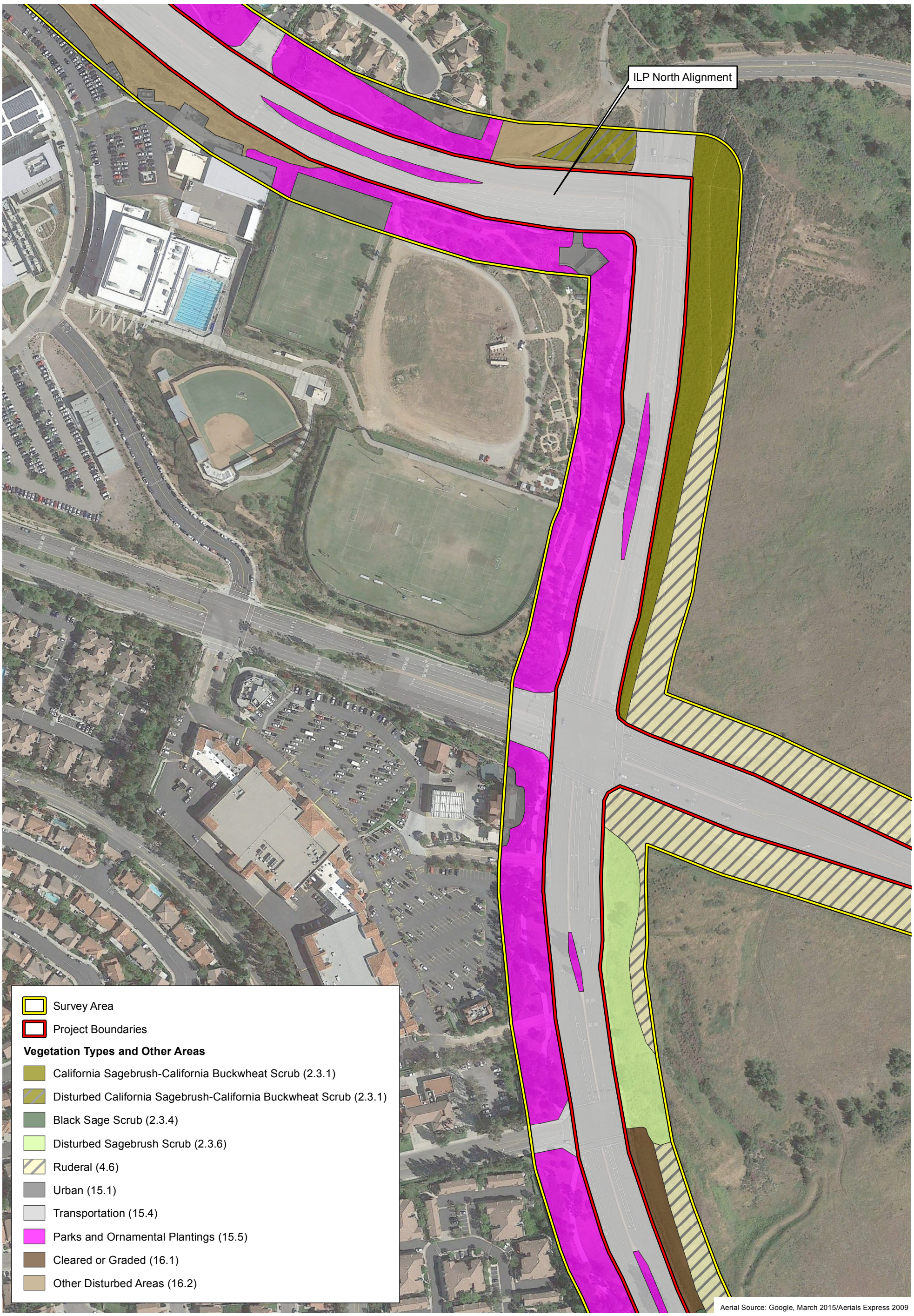

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Biological Resources

Exhibit 5-5b

ILP North Conversion Project

N W E S

200 100 0 200 Feet

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Santiago Hills C+ Reservoir

Survey Area

Project Boundaries

Coastal California Gnatcatcher Pair

Vegetation Types and Other Areas

California Sagebrush-California Buckwheat Scrub (2.3.1)

Disturbed California Sagebrush-California Buckwheat Scrub (2.3.1)

Buckwheat Scrub (2.3.7)

Southern Cactus Scrub (2.4)

Annual Grassland (4.1)

Ruderal (4.6)

Sumac Savannah (4.8)

Southern Willow Scrub (7.2)

Mulefat Scrub (7.3)

Non-urban Industrial (15.3)

Transportation (15.4)

Parks and Ornamental Plantings (15.5)

Cleared or Graded (16.1)

Aerial Source: Google, March 2015/Aerials Express 2009

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Biological Resources

Exhibit 5-5c

ILP North Conversion Project

N W E S

200 100 0 200 Feet

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Sant

Survey Area

Project Boundaries

Coastal California Gnatcatcher Pair

Vegetation Types and Other Areas

California Sagebrush-California Buckwheat Scrub (2.3.1)

Black Sage Scrub (2.3.4)

Southern Cactus Scrub (2.4)

Annual Grassland (4.1)

Ruderal (4.6)

Sumac Savannah (4.8)

Southern Willow Scrub (7.2)

Mulefat Scrub (7.3)

Disturbed Mulefat Scrub (7.3)

Southern Arroyo Willow Forest (7.6)

Urban (15.1)

Non-urban Industrial (15.3)

Transportation (15.4)

Parks and Ornamental Plantings (15.5)

Cleared or Graded (16.1)

Other Disturbed Areas (16.2)

Baker Raw Water Pumping Station

Aerial Source: Google, March 2015/Aerials Express 2009

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Biological Resources

Exhibit 5-5d

ILP North Conversion Project

N W E S

200 100 0 200 Feet

BonTerra PSOMAS

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Orchard Hills Facility

Survey Area

Project Boundaries

Vegetation Types and Other Areas

Ruderal (4.6)

Vineyards and Orchards (14.3)

Non-urban Industrial (15.3)

Other Disturbed Areas (16.2)

Aerial Source: Google, March 2015/Aerials Express 2009

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Biological Resources

Exhibit 5-5e

ILP North Conversion Project

N W E S

100 50 0 100 Feet

BonTerra PSOMAS

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Rattlesnake Complex

Survey Area

Project Boundaries

Vegetation Types and Other Areas

Disturbed California Sagebrush-California Buckwheat Scrub (2.3.1)

Ruderal (4.6)

Sumac Savannah (4.8)

Mulefat Scrub (7.3)

Urban (15.1)

Non-urban Industrial (15.3)

Transportation (15.4)

Parks and Ornamental Plantings (15.5)

Other Disturbed Areas (16.2)

Aerial Source: Google, March 2015/Aerials Express 2009

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Biological Resources

Exhibit 5-5f

ILP North Conversion Project

N W E S

100 50 0 100 Feet

BonTerra PSOMAS

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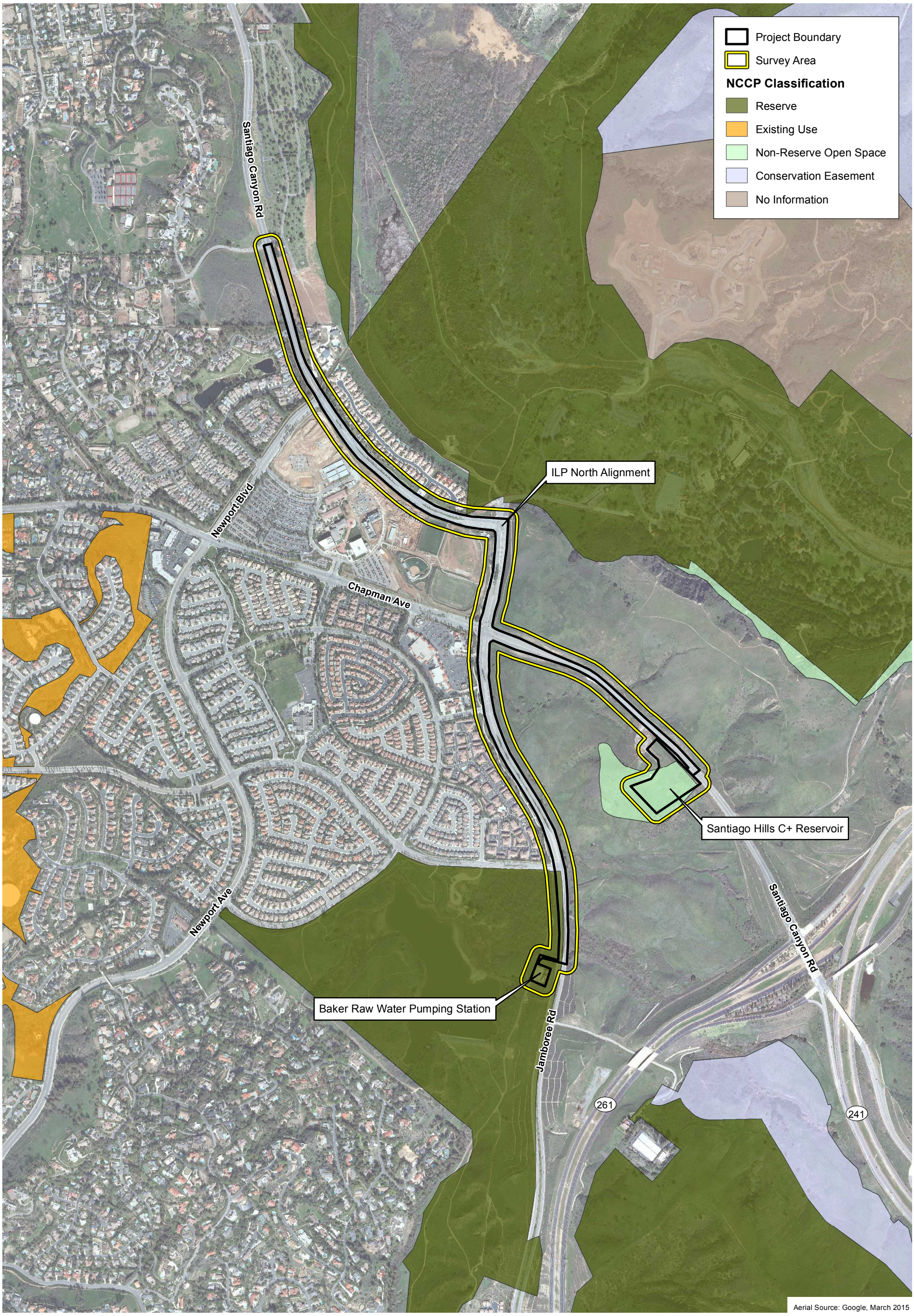

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NCCP/HCP Reserve Classifications

Exhibit 5-6a

ILP North Conversion Project

N W E S

1,000 500 0 1,000 Feet

BonTerra PSOMAS

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NCCP/HCP Reserve Classifications

Exhibit 5-6b

ILP North Conversion Project

N W E S

1,000 500 0 1,000 Feet

BonTerra PSOMAS

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The proposed reservoir would impact 0.77 acre (0.07 acre of California sagebrush–California buckwheat scrub and 0.70 acre of disturbed California sagebrush–California buckwheat scrub). No coastal California gnatcatcher were observed within 500 feet of this Project site during focused surveys; therefore, gnatcatchers are not expected to occur on this Project site. Coastal sage scrub on this Project site is limited in extent and small in stature and coastal California gnatcatchers are not expected to occur onsite in the future. Coastal sage scrub on the slopes and drainages offsite are much higher quality; any gnatcatchers would be expected to use those higher quality habitats rather than what is on the Project site. Therefore, the impacts on 0.77 acre of coastal sage scrub at this facility would be considered less than significant because this portion of the project would impact a limited amount of low quality scrub that is not occupied by coastal California gnatcatcher. Implementation of **BIO-2** would be required during clearing of coastal sage scrub vegetation.

No scrub habitats would be impacted at the Rattlesnake Complex, the Orchard Hills Facility, or within the remainder of the ILP North Alignment. Habitat occupied by coastal California gnatcatcher is adjacent to the ILP North Alignment (i.e., along Santiago Canyon Road).

Scrub habitats are also located adjacent to the ILP North Alignment near the Baker RWPS, proposed reservoir site, Rattlesnake Complex, and along the remainder of the ILP North Alignment. Construction noise and increased human activity for these portions of the Project could indirectly impact coastal California gnatcatcher adjacent to these facilities. However, indirect impacts are considered fully covered by the IRWD's participation in the NCCP/HCP as long as the measures listed in **BIO-2** are followed.

Least Bell's Vireo/Southwestern Willow Flycatcher/Western Yellow-Billed Cuckoo/Riparian Habitats

The Project would not impact riparian habitat with potential to support Threatened or Endangered riparian bird species (i.e., western yellow-billed cuckoo [*Coccyzus americanus occidentalis*], southwestern willow flycatcher [*Empidonax trailli extimus*], and least Bell's vireo [*Vireo bellii pusillus*]). Therefore, the Project would not be expected to directly impact Threatened or Endangered riparian bird species.

Riparian habitat adjacent to the ILP North Alignment near the Baker RWPS (within Peters Canyon Regional Park) is known to support least Bell's vireo and has potential to support southwestern willow flycatcher and migrants of western yellow-billed cuckoo. Additionally, a small drainage of mulefat scrub along East Santiago Canyon Road has potential to support least Bell's vireo. Construction noise and increased human activity for these portions of the Project could indirectly impact habitat for Threatened or Endangered riparian birds adjacent to these facilities if they occurred during the summer breeding season (March 15 to September 15). If possible, noise-intensive portions of construction should be planned to occur outside the breeding season for these species. If construction would occur within 500 feet of suitable riparian habitat during the breeding season, **BIO-3** would be required to reduce impacts to less than significant.

Burrowing Owl Habitat

Burrowing owl could occur at the ILP North Alignment near the Baker RWPS, at the proposed reservoir site, at the Rattlesnake Complex, at the Orchard Hills Facility, and along the remainder of the ILP North Alignment. The ILP North Alignment near the Baker RWPS would impact 0.49 acre of suitable scrub and disturbed habitats; the proposed reservoir would impact 3.00 acres of suitable scrub and grassland habitats; and the Orchard Hills Facility would impact 0.05 acre of suitable disturbed habitat. Additionally, suitable habitat for this species is located adjacent to these facilities and along the remainder of the ILP North Alignment. Construction noise and increased human activity associated with the Project could indirectly impact burrowing owl if it were nesting

adjacent to the Project sites. As discussed above, burrowing owl are not common in Orange County and therefore only have a limited potential to occur. **BIO-4** would be required to ensure that this species is not impacted by construction.

Other Wildlife Species

A total of 3.19 acres of scrub and grassland habitats that provide potentially suitable habitat for special status species would be impacted by the Project. This loss would be limited relative to the amount of habitat available for these species in the Project region, which includes large areas of native habitat set aside for the NCCP/HCP Reserve located immediately adjacent to the survey area. Therefore, the impact on special status wildlife species would be considered less than significant.

Any change to water quality could affect biological resources that occur adjacent to the Project sites. During construction, runoff carrying excessive silt or petroleum residues from construction equipment have the potential to impact water quality and, in turn, affect plant and wildlife species. Impacts on water quality or increases in dust would be considered potentially significant. Implementation of **BIO-5** would be required to reduce this impact to a less than significant level.

b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Wildlife or US Fish and Wildlife Services?

Less Than Significant With Mitigation Incorporated. Refer to the Response to Section IV, Biological Resources, Question a, above.

c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?

No Impact. Although the southern willow scrub, mulefat scrub, disturbed mulefat scrub, and southern arroyo willow forest mapped in the survey area that are adjacent to the ILP North Alignment along Jamboree Road just north of the Baker RWPS would be under the jurisdiction of the U.S. Army Corps of Engineers (USACE), the California Department of Fish and Wildlife (CDFW), and the Regional Water Quality Control Board (RWQCB), all work would be within the existing roadway; therefore, there would be no impact on jurisdictional areas.

d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?

Less Than Significant Impact. The proposed reservoir is located in an area with few constraints on wildlife movement; therefore, wildlife would be expected to move freely through the open space in this area and could easily move around the proposed reservoir after its construction.

The Rattlesnake Complex, the Orchard Hills Facility, and the ILP North Alignment are located in areas that are already developed IRWD facilities with adjacent open space. None of the Project areas are within or adjacent to a regional wildlife corridor.

Additionally, the Central-Coastal NCCP/HCP provides mitigation for impacts of Covered Activities on connectivity and wildlife movement. The NCCP/HCP and its Environmental Impact Report/Environmental Impact Statement (EIR/EIS) demonstrate that the NCCP Reserve design,

which is comprised of both Special Linkages and contiguous blocks of sensitive habitat, protects not only core habitat, but also biological connectivity, which provides for wildlife movement, species dispersal and interchange, genetic exchange, and refuge from catastrophic events, such as major fires.

e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?

Less Than Significant With Mitigation. Several raptor species (i.e., birds of prey) have potential to nest in the trees within and adjacent to the survey area. This includes riparian trees, such as willows, and those mapped as parks and ornamental plantings, such as pine (*Pinus* spp.) and gum (*Eucalyptus* spp.). If construction occurs during the raptor nesting season (i.e., February 1 to June 30), the loss of an active nest of any raptor species, including common raptor species, would be considered a violation of Sections 3503, 3503.5, and 3513 of the *California Fish and Game Code* and would be a significant impact. Implementation of **BIO-6** would be required to reduce this impact to a less than significant level.

The Migratory Bird Treaty Act (MBTA) protects the taking of migratory birds and their nests and eggs. Bird species protected under the provisions of the MBTA are identified by the List of Migratory Birds (*Code of Federal Regulations,* Title 50, §10.13). Any impact on an active bird nest would be considered a violation of the MBTA and would be considered significant. Implementation of **BIO-7** would be required to reduce this impact to a less than significant level.

f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or State habitat conservation plan?

No Impact. The Project is consistent with provisions in the NCCP/HCP. Although the proposed reservoir site is excluded from coverage, no take authorization is needed for this area because it was not occupied by coastal California gnatcatcher during focused surveys.

MITIGATION PROGRAM

Mitigation Measures

BIO-1 Prior to construction activities for the ILP North Alignment near the Baker RWPS and the Santiago Hills C+ Reservoir site, IRWD will retain a qualified Biologist to conduct focused surveys for special status plant species in Project impact areas that have potential to provide habitat for special status plant species. The survey will be done during the peak blooming period in accordance with the most current protocols approved by the CDFW and the California Native Plant Society (CNPS). Per requirements in the NCCP/HCP, if less than 20 individuals of Catalina mariposa lily or intermediate mariposa lily are observed in the impact area, no mitigation would be required; if more than 20 individuals are observed, mitigation will be required. If federally or State-listed species, or CRPR List 1B or 2 species are observed, mitigation will be required. To the greatest extent practicable, efforts shall be made to avoid any special status plant species observed. If avoidance is not feasible, corms/bulbs/seeds will be collected from the Project impact area and will be translocated to a mitigation site with the appropriate habitat for the species. The collection of corms/bulbs/seeds will be conducted at the appropriate time of year to maximize potential for success depending on the species of plant. IRWD will retain a qualified Biologist to prepare a detailed Special Status Plant Mitigation Plan to describe the translocation. IRWD will implement the Mitigation Plan as

approved and according to its specified materials, methods, and performance criteria. If thread-leaved brodiaea would be impacted, take authorization will be obtained from the USFWS and CDFW prior to impacting the species.

BIO-2 Direct impacts to scrub habitats and coastal California gnatcatchers for the ILP North Alignment near the Baker Raw Water Pump Station (RWPS) and indirect impacts for the ILP North Alignment near the Baker RWPS, Santiago Hills C+ Reservoir site, Rattlesnake Complex, and along the ILP North Alignment are fully mitigated through the IRWD's participation and contribution in the Central Coastal Natural Communities Conservation Plan (NCCP)/Habitat Conservation Plan (HCP). The participation not only provides mitigation for coastal sage scrub and coastal California gnatcatcher, but also other special status species designated as "Covered Species" by the NCCP/HCP. IRWD will follow the Construction Minimization Measures that are required by the NCCP/HCP listed below.

a. To the maximum extent practicable, no grading [removal] of coastal sage scrub habitat that is occupied by nesting gnatcatchers will occur during the breeding season (February 15 through July 15). It is expressly understood that this provision and the remaining provisions of these "construction-related minimization measures" are subject to public health and safety considerations. These considerations include unexpected slope stabilization, erosion-control measures, and emergency facility repairs. In the event of such public health and safety circumstances, landowners or public agencies/utilities will provide the U.S. Fish and Wildlife Service (USFWS) and the California Department of Fish and Wildlife (CDFW) with the maximum practicable notice (or such notice as is specified in the NCCP/HCP) to allow for capture of gnatcatchers, cactus wrens, and any other coastal sage scrub Identified Species that are not otherwise flushed and will carry out the following measures only to the extent as practicable in the context of the public health and safety considerations.

b. Prior to the commencement of grading operations or other activities involving significant soil disturbance, all areas of coastal sage scrub habitat to be avoided under the provisions of the NCCP/HCP shall be identified with temporary fencing or other markers clearly visible to construction personnel. Additionally, prior to the commencement of grading operations or other activities involving disturbance of coastal sage scrub [ILP North Alignment near the Baker RWPS and Santiago Hills C+ Reservoir site], a survey will be conducted to locate gnatcatchers and cactus wrens within 100 feet of the outer extent of projected soil disturbance activities, and the locations of any such species will be clearly marked and identified on the construction/grading plans.

c. A Monitoring Biologist that is familiar with the USFWS/CDFW requirements will be on site during any clearing of coastal sage scrub. The landowner or relevant public agency/utility will advise the USFWS/CDFW at least 7 calendar days (and preferably 14 calendar days) prior to the clearing of any habitat occupied by Identified Species to allow the USFWS/CDFW to work with the Monitoring Biologist in connection with bird-flushing capture activities. The Monitoring Biologist will flush Identified Species (avian or other mobile Identified Species) from occupied habitat areas immediately prior to brush-clearing and earth-moving activities. If birds cannot be flushed, they will be captured in mist nets, if feasible, and relocated to areas

of the site to be protected or to the NCCP/HCP Reserve System. It will be the Monitoring Biologist's responsibility to ensure that identified bird species will not be directly impacted by brush-clearing and earth-moving equipment in a manner that also allows for construction activities on a timely basis.

d. Following the completion of initial grading/earth-movement activities [ILP North Alignment near the Baker RWPS, Santiago Hills C+ Reservoir site, Rattlesnake Complex, and ILP North Alignment], all areas of coastal sage scrub habitat to be avoided by construction equipment and personnel will be marked with temporary fencing or other appropriate markers clearly visible to construction personnel. No construction access, parking, or equipment storage shall be permitted within such marked areas.

e. In areas bordering the NCCP Reserve System [ILP North Alignment and ILP North Alignment near the Baker RWPS] or Special Linkage/Special Management areas containing significant coastal sage scrub identified in the NCCP/HCP for protection, vehicle transportation routes between cut-and-fill locations will be restricted to a minimum number during construction consistent with Project construction requirements. Waste dirt or rubble will not be deposited on adjacent coastal sage scrub identified in the NCCP/HCP for protection. Pre-construction meetings involving the Monitoring Biologist, construction supervisors, and equipment operators will be conducted and documented to ensure maximum practicable adherence to these measures.

To the maximum extent practicable, IRWD will implement the following to minimize impacts:

1. Impacts on coastal sage scrub habitat should be minimized through the design process; and

2. Noise-intensive construction should occur outside the gnatcatcher breeding season (the breeding season is from February 15 to August 31).

BIO-3 If construction activities for the ILP North Alignment near the Baker RWPS or ILP North Alignment would occur during the breeding season for the least Bell's vireo and southwestern willow flycatcher (i.e., March 15 to September 15) within 500 feet of potential habitat for this species (e.g., southern willow scrub, southern arroyo willow forest, mulefat scrub, or disturbed mulefat scrub), IRWD will retain a qualified Biologist to conduct a pre-construction focused survey to determine whether habitat adjacent to the impact area is occupied at the time of construction. If active nests are found during the surveys, a qualified Biologist, in consultation with IRWD, will determine whether construction activities have the potential to disturb the nest(s) and will determine the appropriate construction limitations, which may include but would not be limited to erecting sound barriers, monitoring by a qualified Biologist, or establishing no construction buffers (usually 300 feet for special status song birds, and 500 feet for listed song birds or raptors). In addition, a qualified Biologist will serve as construction monitor, in consultation with IRWD, during those periods that occur near active nest areas to ensure no inadvertent impacts to the nest occur. If necessary, the limits of construction to avoid an active nest will be established in the field with flagging, fencing, or other appropriate

barriers, and construction personnel will be instructed on the sensitivity of nest areas.

BIO-4 IRWD will retain a qualified Biologist to conduct a pre-construction survey for burrowing owl within seven days prior to construction activities to determine if there are any active burrowing owls within or adjacent to the impact area. If no active burrows are observed, construction work can proceed. If occupied burrowing owl habitat is detected on or adjacent to the Project impact area, measures to avoid, minimize, or mitigate impacts will be incorporated into the Project and may include the following:

- Construction monitoring will occur throughout the duration of ground-disturbing construction activities to ensure that no impacts occur on burrowing owl. The frequency of monitoring will be determined by IRWD through consultation with a qualified Biologist.
- Construction exclusion areas will be established around the occupied burrows in which no disturbance will be allowed to occur while the burrows are occupied. Buffer areas will be determined by IRWD through consultation with a qualified Biologist based on the recommendations outlined in the *Staff Report on Burrowing Owl Mitigation* (CDFW 2012).

If burrow avoidance is infeasible, a qualified Biologist will implement a passive relocation program in accordance with the *Example Components for Burrowing Owl Artificial Burrow and Exclusion Plans* (CDFW 2012).

BIO-5 IRWD will require the construction contractor to include Best Management Practices (BMPs) in the Stormwater Pollution Prevention Plan for the Project to minimize soil erosion and sedimentation from the Project sites.

BIO-6 If construction initiation occurs during the raptor nesting season (i.e., February 1 to June 30), IRWD will retain a qualified Biologist to conduct a pre-construction survey within 500 feet of the limits of Project disturbance for the presence of any active raptor nests (common or special status). Any nest found during survey efforts will be mapped on construction plans. If no active nests are found, no further mitigation will be required.

If nesting activity is present at any raptor nest site, the following restrictions on construction will be required between February 1 and June 30 (or until nests are no longer active, as determined by IRWD, in consultation with a qualified Biologist): (1) clearing limits shall be established 500 feet in any direction from any occupied nest and (2) access and surveying shall be restricted to within 500 feet of any occupied nest. Any encroachment into the 500-foot buffer area around the known nest will only be allowed if IRWD, in consultation with a qualified Biologist, determines that the proposed activity will not disturb the nest occupants.

BIO-7 To the extent practicable, IRWD will plan vegetation removal efforts to occur between September 16 and February 14, which is outside the breeding season for nesting birds. If tree trimming or vegetation removal occurs during the breeding season for nesting birds (i.e., between February 15 and September 15), IRWD will retain a qualified Biologist to conduct a pre-construction nesting bird survey within three days prior to vegetation removal to ensure that no active bird nests would be impacted. If an active nest is observed within the proposed work area, IRWD, in

consultation with a qualified Biologist, will determine the appropriate size for a protective buffer around the nest based on the sensitivity of the species and the location of the nest. No construction activities will be allowed within the protective buffer until the nest is no longer active, as determined by a qualified Biologist.

V. CULTURAL RESOURCES

Information in this section is derived from the *Phase I Cultural Resources Assessment Irvine Lake Pipeline North Conversion Project, Irvine and Orange, California* (Phase I CRA) prepared by BonTerra Psomas and dated October 2015. (BonTerra Psomas 2015; Confidential Appendix D). Because the Project intends to use funds through the US Bureau of Reclamation (USBR), it is a federal action subject to Section 106 of the National Historic Preservation Act (NHPA). The USBR refers to these requirements as "CEQA-Plus".

As part of the Phase I CRA, a cultural resources records search was conducted for the Project by David M. Smith at the South Central Coastal Information Center (SCCIC) at California State University, Fullerton on June 11, 2015. The SCCIC is the designated branch of the California Historical Resources Information System (CHRIS) for the Project area and houses records concerning archaeological and historic resources in Los Angeles, Ventura, San Bernardino, and Orange Counties. The review consisted of an examination of the USGS El Toro, Tustin, and Blackstar 7.5-minute quadrangles to determine if any cultural resources studies had been conducted on or within a ½-mile radius of the parcels. The records search provided data on recorded archaeological and built environment resources as well as those on or within ½ mile of the Project sites. Sources consulted at the SCCIC included archaeological records, Archaeological Determinations of Eligibility, historic maps, and the Historic Property Data File (HPDF) maintained by the California Office of Historic Preservation. The HPDF contains listings for the California Register of Historic Resources (CRHR) and/or the National Register of Historic Places (NRHP), California Historical Landmarks, and California Points of Historical Interest.

A paleontological resources records search and literature review was conducted by Dr. Samuel A. McLeod at the Los Angeles County Natural History Museum (LACNHM) on July 17, 2015.

An inquiry was made on June 12, 2015, of the Native American Heritage Commission (NAHC) to request a review of the Sacred Lands File database regarding the possibility of Native American cultural resources and/or sacred places in the Project vicinity that are not documented on other databases. The NAHC responded on July 1, 2015, and provided a list of Native American groups and individuals who may have knowledge regarding Native American cultural resources not formally listed on any database. On July 10, 2015, tribes and individuals were mailed an informational letter, which describes the Project and requested any information regarding resources that may exist on or near the Project site.

An archaeological survey of the property was conducted on June 18, 2015 and July 14, 2015. The survey of the water tank location was accomplished using 10-meter (50-foot) transects. The remaining areas were surveyed intuitively on foot and by vehicle.

IMPACT ANALYSIS

Would the Project:

a) Cause a substantial adverse change in the significance of a historical resource as defined in §15064.5?

No Impact. Based on the pedestrian survey, the Project sites consist of paved roadways; fenced water facilities; areas that overlay the ILP North Pipeline, which was constructed in 1977; and areas adjacent to an existing reservoir and do not contain any historical resources as defined in Section 15064.5 of the State CEQA Guidelines. No impact would occur and no mitigation is required.

b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?

Less Than Significant With Mitigation. Based on the pedestrian survey, the Project sites consist of paved roadways, fenced water facilities, and areas adjacent to an existing reservoir; no cultural resources were noted during the survey.

According to the records search results, 42 cultural resource studies have been conducted within a ½-mile radius of the Project site. Of those, eight included a portion of the Project site. None of these studies resulted in the identification of any cultural resources in the vicinity of any of the Project sites. Seven cultural resource sites have been recorded within a ½-mile radius of the Project sites, as described in Table 7. Of these, two have the potential for remnants of the site to be in the Project area.

TABLE 7
CULTURAL RESOURCES SITES WITHIN ONE-HALF MILE OF THE PROJECT SITES

Site Number	Most Recent Recorder	Description	Within Project Area
CA-ORA-361	Elliott 1972	Lithic scatter	No
CA-ORA-556	Cody 1984	Lithics, habitation debris	Potentially
CA-ORA-557	Cody 1984	Lithics, habitation debris	No
CA-ORA-625	Cody 1984	Bedrock milling feature	No
CA-ORA-1218	Keasling and Dice 2004	Lithic scatter	No
CA-ORA-1219	Keasling and Dice 2004	Lithic scatter	No
CA-ORA-1548	Keasling and Dice 2004	Historic ditch/refuse	Potentially

The sites with potential to be in the Project area consist of one prehistoric site (CA-ORA-556) and one historic site (CA-ORA-1548). The prehistoric site is described as an extensive lithic scatter consisting of metates, manos, cores, flakes, projectiles, and a bifacial knife. The original recorder reported that a "possible cemetary" [sic] was "likely" located approximately 100 meters east of the site. Subsequent investigators who re-recorded the site did not note a cemetery on their site records. The site was originally recorded along a ½-mile swath north of Santiago Canyon roughly between Jamboree Road and North Newport Boulevard. Most of the site appears to have been lost due to construction, but remnants could remain beneath Santiago Canyon Road.

The historic site, CA-ORA-1548, is described as a historic ditch and associated artifacts recorded in the vicinity of Jamboree Road, approximately ¼ mile south of Chapman Avenue. The site was

associated with an Irvine Ranch water conveyance system dating to the early part of the 20th Century. The site was tested and found that, although it is an important aspect of the historic Irvine Ranch, it was not eligible for listing on the NRHP or CRHR. It is likely most or all of the site has been lost or is buried. There is a potential that historic artifacts associated with the site are buried beneath Jamboree Road.

The NAHC Search of the Sacred Lands File on July 1, 2015, failed to identify the presence of Native American cultural resources on the Project sites. The NAHC provided a list of Native American groups and individuals that may have knowledge of the religious and/or cultural significance of resources that may be on or near the Project sites. All individuals were notified in writing of the Project on July 10, 2015, and asked to provide any information they may have regarding historic or prehistoric sites near the Project area. To date, one response has been received from one of the tribal representatives notified of the Project. That response was from Mr. Andrew Salas, the Chairman of the Gabrieleno Band of Mission Indians – Kish Nation. Mr. Salas indicated that the Project area was within the Gabrieleno's homelands and he requested one of the tribe's monitors be on site during any and all ground disturbances. Follow up phone calls were made on July 17, 2015, to the remaining tribal representatives notified of the Project. Two additional responses were received. The first response was from Joyce Perry, Representing Tribal Chairperson, of the Juaneño Band of Mission Indians Acjachemen Nation, stating that the Project is located in an area of cultural sensitivity and therefore she requests that archaeological and Native American monitoring be conducted during ground-disturbing activities. A second response was received from Anthony Morales, Chairperson, Gabrieleno-Tongva San Gabriel Band of Mission Indians, stating that the Project is located in an area of sensitivity (heavily in cultural resources) and therefore warrants due diligence. He requests that Native American monitoring also be conducted.

Based on this analysis, there is a potential for subsurface cultural deposits to be discovered during grading activities, which would be considered a potentially significant impact. Implementation of **CULT-1**, which requires retention of a qualified Archaeologist and monitoring during grading activities, would reduce potential impacts to less than significant levels.

c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?

Less Than Significant With Mitigation. Based on the results of the NHMLAC records search, there are no vertebrate fossil localities that lie directly within the proposed Project boundaries; however, there are fossil vertebrate localities nearby from the same sedimentary deposits that occur in the proposed Project area. Therefore, excavations exceeding eight feet in depth may encounter sensitive fossils, thereby resulting in a potentially significant impact.

Based on this analysis, there is a potential for subsurface cultural deposits to be discovered during grading activities, which would be considered a potentially significant impact. Implementation of **CULT-2**, which requires retention of a qualified Paleontologist to be available "on-call" throughout the duration of grading activities, would reduce potential impacts to less than significant levels.

d) Disturb any human remains, including those interred outside of formal cemeteries?

Less Than Significant With Mitigation. There are no known formal cemeteries on the Project site. However, this does not preclude the possibility that individual burial sites may be discovered during grading activities. Implementation of **CULT-3**, which requires compliance with Section 7050.5 of the *California Health and Safety Code* and Section 5097.98 of the *California Public Resources Code* would reduce potential impacts to less than significant levels.

MITIGATION PROGRAM

Mitigation Measures

CULT-1 **Archaeological Observation and Salvage.** Prior to the initiation of construction, IRWD shall retain a qualified Archaeologist to be available "on-call" throughout the duration of the ground-disturbing activities. The Archaeologist shall be present at the pre-grade conference; shall, in consultation with IRWD, establish procedures for archaeological resource surveillance; and shall establish, in consultation with IRWD, procedures for temporarily halting or redirecting work to permit the sampling, identification, and evaluation of the artifacts as appropriate. If the archaeological resources are found to be significant, the Archaeological Observer shall determine appropriate actions, in consultation with IRWD, for exploration and/or salvage. Following the completion of all earth-disturbance activities, the Archaeologist's Report will be provided to IRWD.

CULT-2 **Paleontological Observation and Salvage.** Prior to the initiation of construction, IRWD shall retain a qualified Paleontologist to be available "on-call" throughout the duration of grading activities. In the event that prehistoric or historic subsurface cultural resources are discovered during ground-disturbing activities, all work within 50 feet of the resources will be halted and IRWD will consult with the qualified archaeologist to assess the significance of the find according to *CEQA Guidelines* Section 15064.5. If any find is determined to be significant, IRWD and the archaeologist will meet to determine the appropriate avoidance measures or other appropriate mitigation. IRWD will make the final determination. All significant cultural materials recovered will be, as necessary and at the discretion of the consulting archaeologist, subject to scientific analysis, professional museum curation, and documentation according to current professional standards. The qualified paleontologist shall be retained to review project design plans and consult with IRWD to when and where monitoring is required during construction. Based on observations, monitoring may be reduced or discontinued if the qualified paleontologist determines that the possibility of encountering fossiliferious deposits is low. When onsite, the qualified paleontologist will prepare a final monitoring report to be submitted to IRWD.

CULT-3 In the unlikely event that human remains are encountered, CA Health and Safety Code Section 7050.5 states that no further disturbance shall occur until the county coroner has made a determination of origin and disposition pursuant to CA Public Resources Code Section 5097.98. The county coroner shall be notified immediately if any human remains are found. If the remains are determined to be prehistoric, the coroner will notify the Native American Heritage Commission, which will determine and notify the most likely descendant. With the permission of IRWD or an authorized representative, the most likely descendant may inspect the site of the discovery. IRWD will meet and confer with the most likely descendant regarding their recommendations prior to disturbing the site by further construction activity.

VI. GEOLOGY AND SOILS

Information in this section is derived from the *Report of Geotechnical Investigation ILP North Conversion Proposed Santiago Hills Zone C+ Reservoir Irvine Ranch Water District Project no. 30996 (5407), City of Orange, Orange County, California, Kleinfelder Project No. 20153742.001A* (Geotechnical Investigation) prepared by Kleinfelder and dated May 14, 2015. (Kleinfelder 2015; Appendix E).

IMPACT ANALYSIS

Would the Project:

a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:

i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.

ii) Strong seismic ground shaking?

Less than Significant With Mitigation. The Project sites, as with the entire Southern California region, are subject to secondary effects from earthquakes, including ground shaking due to future earthquakes on regionally active faults. According to the Geotechnical Investigation, the proposed reservoir site is not located within a State-designated Alquist-Priolo Earthquake Fault Zone. The nearest Alquist-Priolo zones to the proposed reservoir site are associated with the Whittier Fault/Elsinore Fault zone (approximately 6.9 miles northeast of the site) and the Newport-Inglewood Fault/Newport-Inglewood-Rose Canyon Fault zone (approximately 14.4 miles southwest of the site). The Whittier Fault is a northern continuation of the Elsinore Fault Zone and is capable of generating a 7.2 magnitude earthquake and the Newport-Inglewood Fault is capable of generating a 7.4 magnitude earthquake. The faults mapped at the site are not designated as active based on the Alquist-Priolo maps.

The two faults nearest the Project sites are El Modeno and Peralta Hills, which are located 0.5 miles west and 3 miles northwest of the proposed reservoir site, respectively. These two faults are not designated as active based on the Alquist-Priolo maps, but have had Quaternary ruptures (within the last 2 to 3 million years) and are suspected of having ruptured more recently; however, there is insufficient evidence to zone them as “active”. Table 8, Significant Faults in the Project Vicinity, identifies the name, approximate distance from fault rupture, fault length, maximum earthquake magnitude, slip rate, and recurrence interval of the major faults that contribute to the seismicity of the proposed reservoir site. Since the ILP North Alignment, the Rattlesnake Complex, and the Orchard Hills Facility are all existing sites that would include improvements to existing facilities, the fault-related discussion focuses on the proposed reservoir site only.

TABLE 8
SIGNIFICANT FAULTS IN THE VICINITY OF THE PROPOSED RESERVOIR SITE

Fault Name	Approximate Distance[a] (miles)	Fault Length (miles)	Maximum Earthquake Magnitude[b]	Slip Rate (mm/yr)	Recurrence Interval (years)
Peralta Hills Fault	2.8	6.2	N/A	N/A	N/A
Elsinor-Whittier Section (Whittier Fault)	6.8	24.8	7.2	2.50–3.00	unknown
Elsinore Fault	7.4	111.8	7.5	4.00	250
Chino Fault	9.6	13.0	7.0[c]	1.00	unknown
Newport-Inglewood Fault Zone	12.8	46.6	7.4	0.60	unknown
Sierra Madre Fault	23.4	34.1	7.0	0.36–4.00	unknown
Puente Hills Fault (Blind Thrust)	11.1	27.3	7.1	0.44-1.70	unknown
San Jose Fault	19.2	11.1	6.5	0.20–2.00	Unknown
Palos Verdes Fault	29.8	49.7	7.0	0.10–3.00	Unknown
Raymond Fault	29.9	16.1	7.0	0.10–0.22	~4,500
San Jacinto-San Bernardino Mountains Section	30.3	130.4	7.5	7.00–17.00	100 and 300
Crafton Hills Fault	33.8	12.4	N/A	N/A	N/A
San Andreas-San Bernardino Section South Branch	37.2	341.7	8.0	20.00–35.00	140–300
Cucamonga Fault	42.8	18.6	7.0	5.00–14.00	600–700

mm/yr: millimeters per year; N/A – Not Available
[a] Closest distance to potential rupture
[b] Moment magnitude: an estimate of an earthquake's magnitude based on the seismic moment
[c] Maximum Earthquake Magnitude is not well constrained

Source: Kleinfelder 2015

As shown in Table 8, potential surface rupture associated with the nearest significant faults would not occur at the proposed reservoir site or any of the other Project sites. However, strong seismic shaking would occur on the Project sites. The Geotechnical Investigation concludes that the proposed reservoir site is suitable for development of the water storage tank from a geotechnical standpoint, including the estimated seismic shaking hazard, provided that the recommendations provided in the Geotechnical Investigation (refer to **GEO-1**) are incorporated into the Project.

Because the proposed improvements and Project actions at the other Project sites (ILP North Alignment, Orchard Hills Facility, and Rattlesnake Complex) primarily involve modifications to existing equipment to accommodate the ILP North Conversion, the potential for seismic ground shaking would not represent a significant impact.

iii) Seismic-related ground failure, including liquefaction?

Less Than Significant Impact. Soil liquefaction occurs when saturated, cohesionless soils lose their strength due to the buildup of excess pore water pressure during cycling loading, such as that induced by earthquakes, causing it to behave as a liquid. The types of soils that are most susceptible to liquefaction are clean, loose, and uniformly graded fine-grained sands and saturated non-plastic silts. Based on the California Hazard Zones Map for the Orange Quadrangle, the types of on-site soils, the depth to groundwater, and soil density, liquefaction is not considered a hazard at the proposed reservoir site.

Lateral spreading is the horizontal displacement of the surficial soil layer that results from the liquefaction of a subsurface granular deposit, and ground lurching occurs when soft, water-saturated surface soils are agitated. As discussed previously, the subsurface units at the Reservoir site are not considered liquefiable and are not in a saturated condition; therefore, the potential for lateral spreading and ground lurching are also considered minimal.

Impacts related to seismic-related ground failure, including liquefaction, would be less than significant and no mitigation would be required.

Because the proposed improvements and Project actions at the other Project sites (ILP North Alignment, Orchard Hills Facility, and Rattlesnake Complex) primarily involve modifications to existing equipment to accommodate the ILP North Conversion, the potential for liquefaction would not represent a significant impact.

iv) Landslides?

Less Than Significant With Mitigation. According to the Geotechnical Investigation, the majority of the proposed reservoir site is located in an area defined as most susceptible to landsliding and, based on evidence from published maps, aerial photography and field data reviewed and compiled as part of the Geotechnical Investigation, the potential for earthquake-induced landslides at the Reservoir site is considered to be high to very high. The Geotechnical Investigation includes recommendations that the estimated landslide area not be disturbed during construction and that the proposed reservoir be located away from the limits of the landslide area. Additionally, temporary support of excavation is recommended to protect the existing Zone 5 reservoir during construction of the proposed reservoir. According to the Geotechnical Investigation, placement of soil on or near the landslide area is not recommended as the load could potentially activate movement of the landslide(s).

The Geotechnical Investigation concludes that the proposed reservoir site is suitable for development from a geotechnical standpoint provided that the recommendations provided in the Geotechnical Investigation are incorporated into the Project. There would be less than significant impacts related to secondary seismic hazards with implementation of **GEO-1**, which would ensure the specific recommendations of the Draft Geotechnical Investigation prepared for the Project are fully incorporated in the design and construction of the Project.

Because the proposed improvements and Project actions at the other Project sites (ILP North Alignment, Orchard Hills Facility, and Rattlesnake Complex) primarily involve modifications to existing equipment to accommodate the ILP North Conversion, impacts related to seismically induced landslides would not represent a significant impact.

b) Result in substantial soil erosion or the loss of topsoil?

Less Than Significant with Mitigation. The largest source of erosion and topsoil loss is uncontrolled drainage during construction. As discussed in more detail in Section XI, Hydrology and Water Quality, the National Pollutant Discharge Elimination System (NPDES) permit program controls water pollution by regulating point sources that discharge pollutants into “waters of the U.S.”. Construction activities shall be conducted in compliance with the statewide NPDES General Permit for Storm Water Discharges Associated with the Construction and Land Disturbance Activities (Order No 2012-0006-DWQ, NPDES No. CAS000002), adopted by the State Water Resources Control Board (SWRCB) on July 17, 2012. In compliance with the NPDES permit, erosion potential during construction of the proposed Project would be managed with Best Management Practices (BMPs) implemented on the Project site as part of a Storm Water Pollution Prevention Plan (SWPPP) during construction activities in accordance with NPDES requirements.

Implementation of the BMPs would reduce construction-related erosion impacts to less than significant levels.

The Geotechnical Investigation recommends reducing deterioration of slope surfaces through installing vegetative cover and implementing proper watering techniques and drainage control on slope faces as soon as possible after completion of grading.

Therefore, compliance with NPDES Permit requirements and implementation of **GEO-1** would reduce impacts on soil erosion to less than significant levels.

c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?

Less Than Significant With Mitigation. According to the Geotechnical Investigation, there is evidence of landslide activity near the southern property line of the proposed reservoir site and, as discussed previously, the potential for earthquake-induced landslides at the proposed reservoir site is considered to be high to very high. However, the proposed reservoir site is not located in an area where subsidence has been recorded. Additionally, potential impacts related to liquefaction and subsequent lateral spreading would be less than significant at the proposed reservoir site as discussed previously in the Response to Question VI.a(iii).

The Geotechnical Investigation concludes that the proposed reservoir site is suitable for development from a geotechnical standpoint provided that the recommendations provided in the Geotechnical Investigation are incorporated into the Project. There would be less than significant impacts related to development on an unstable geologic unit or soil with implementation of **GEO-1**, which would ensure the specific recommendations of the Draft Geotechnical Investigation prepared for the Project are fully incorporated in the design and construction of the Project.

Because the proposed improvements and Project actions at the other Project sites (ILP North Alignment, Orchard Hills Facility, and Rattlesnake Complex) primarily involve modifications to existing equipment to accommodate the ILP North Conversion, impacts related to unstable geologic units or soils would not represent a significant impact.

d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?

Less Than Significant With Mitigation. According to the Geotechnical Investigation, the Reservoir site is underlain by the Puente, Topanga, and Vaqueros/Sespe Formations, all of which are known to contain expansive soils. Based on on-site testing, expansive materials were encountered, thus making it likely that expansive bedrock exists on the site and resulting in a potentially significant impact. However, implementation of **GEO-1** would ensure the specific recommendations of the Draft Geotechnical Investigation prepared for the Project and any future geotechnical reporting are fully incorporated in the design and construction of the Project.

Because the proposed improvements and Project actions at the other Project sites (ILP North Alignment, Orchard Hills Facility, and Rattlesnake Complex) primarily involve modifications to existing equipment to accommodate the ILP North Conversion, impacts related to expansive soils would not represent a significant impact.

e) Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?

No Impact. The proposed Project would not involve the use of septic tanks or alternative wastewater disposal systems. No impacts would occur and no mitigation is required.

MITIGATION PROGRAM

Mitigation Measure

GEO-1 Prior to approval of final plans and specifications for the proposed Project, the Engineer, or his/her designee, shall review the Project plans to confirm that all recommendations in the *Report of Geotechnical Investigation ILP North Conversion Proposed Santiago Hills Zone C+ Reservoir Irvine Ranch Water District Project No. 30496 (5407), City of Orange, Orange County, California* (dated May 14, 2015 and prepared by **Kleinfelder) and any future geotechnical reports** have been fully and appropriately incorporated.

VII. GREENHOUSE GASES

IMPACT ANALYSIS

Would the Project:

a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?

No Impact. Climate change refers to any significant change in climate, such as the average temperature, precipitation, or wind patterns over a period of time. Climate change may result from natural factors, natural processes, and human activities that change the composition of the atmosphere and alter the surface and features of the land. Significant changes in global climate patterns have been associated with global warming, which is an average increase in the temperature of the atmosphere near the Earth's surface; this is attributed to an accumulation of greenhouse gas (GHG) emissions in the atmosphere. GHGs trap heat in the atmosphere, which in turn increases the Earth's surface temperature. Some GHGs occur naturally and are emitted into the atmosphere through natural processes, while others are created and emitted solely through human activities. The emission of GHGs through fossil fuel combustion, in conjunction with other human activities, appears to be closely associated with global warming (OPR 2008). Table 9 shows the magnitude of GHG emissions on the global, national, State, and regional scales.[1]

[1] GHG emissions for project-level analyses are commonly expressed in metric tons of carbon dioxide equivalent ($MTCO_2e$). Larger quantities of emissions, such as on the State or world scale, as shown in Table 10, are expressed in million metric tons of carbon dioxide equivalent ($MMTCO_2e$). (Metric tons may also be stated as "tonnes".) The CO_2e for a gas is derived by multiplying the tons of the gas by the associated Global Warming Potential (GWP) such that $MMTCO_2e$ = (million metric tons of a GHG) x (GWP of the GHG). For example, the GWP for CH_4 is 21. This means that emissions of 1 million metric tons of CH_4 are equivalent to the emissions of 21 million metric tons of CO_2e.

TABLE 9
COMPARISON OF WORLDWIDE
GREENHOUSE GAS EMISSIONS

Area and Data Year	Annual GHG Emissions ($MMTCO_2e$)
World (2012)	46,049
United States (2013)	6,673
California (2012)	459
Orange County (2011)	21
GHG: greenhouse gas; $MMTCO_2e$: million metric tons of carbon dioxide equivalent Source: WRI 2014; USEPA 2015; CARB 2014; SCAG 2011	

GHGs, as defined under California's Assembly Bill (AB) 32, include carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6). General discussions on climate change often include water vapor, O_3, and aerosols in the GHG category. Water vapor and atmospheric O_3 are not gases that are formed directly in the construction or operation of development projects, nor can they be controlled in these projects. Aerosols are not gases. While these elements have a role in climate change, they are not considered by regulatory bodies, such as CARB, or climate change groups, such as The Climate Registry, as gases to be reported or analyzed for control. Therefore, no further discussion of water vapor, O_3, or aerosols is provided herein.

GHGs vary widely in the power of their climatic effects; therefore, climate scientists have established a unit called global warming potential (GWP). The GWP of a gas is a measure of both its potency and lifespan in the atmosphere as compared to CO_2. For example, since CH_4 and N_2O are approximately 21 and 310 times more powerful than CO_2, respectively, in their ability to trap heat in the atmosphere, they have GWPs of 21 and 310, respectively (CO_2 has a GWP of 1). Carbon dioxide equivalent (CO_2e) is a quantity that enables all GHG emissions to be considered as a group despite their varying GWP. The GWP of each GHG is multiplied by the emission rate of that gas to produce the CO_2e emissions.

On June 1, 2005, Governor Arnold Schwarzenegger signed Executive Order S-3-05, which proclaims that California is vulnerable to the impacts of climate change. It declares that increased temperatures could reduce snowpack in the Sierra Nevada Mountains; could further exacerbate California's air quality problems; and could potentially cause a rise in sea levels. In an effort to avoid or reduce the impacts of climate change, Executive Order S-3-05 calls for a reduction in GHG emissions to the year 2000 level by 2010, to year 1990 levels by 2020, and to 80 percent below 1990 levels by 2050.

AB 32, the California Global Warming Solutions Act of 2006 (*California Health and Safety Code* §38501), recognizes that California is the source of substantial amounts of GHG emissions. The statute states that:

> Global warming poses a serious threat to the economic well-being, public health, natural resources, and the environment of California. The potential adverse impacts of global warming include the exacerbation of air quality problems, a reduction in the quality and supply of water to the state from the Sierra snowpack, a rise in sea levels resulting in the displacement of thousands of coastal businesses and residences, damage to marine ecosystems and the natural

environment, and an increase in the incidences of infectious diseases, asthma, and other human health-related problems.

In order to avert these consequences, AB 32 establishes a State goal of reducing GHG emissions to 1990 levels by the year 2020, which is a reduction of approximately 16 percent from forecasted emission levels, with further reductions to follow (CARB 2011). In an effort to help achieve this reduction, on November 17, 2008, Governor Arnold Schwarzenegger signed Executive Order S-14-08, raising California's renewable energy goals to 33 percent by 2020.

California Executive Order B-30-15 (April 29, 2015) set an "interim" statewide emission target to reduce GHG emissions to 40 percent below 1990 levels by 2030, and directed State agencies with jurisdiction over GHG emissions to implement measures pursuant to statutory authority to achieve this 2030 target and the 2050 target of 80 percent below 1990 levels.

Orange County has not formally adopted a quantitative GHG emissions significance criterion to date. Beginning in April 2008, the SCAQMD convened a Working Group to provide guidance to local lead agencies on determining significance for GHG emissions in their CEQA documents. On December 5, 2008, the SCAQMD Governing Board adopted its staff proposal for an interim CEQA GHG significance threshold of 10,000 metric tons of CO_2 equivalent per year ($MTCO_2e$/yr) for projects where the SCAQMD is the lead agency (SCAQMD 2008). In September 2010, the Working Group proposed that the 10,000 $MTCO_2e$/yr threshold be expanded to apply to industrial projects where SCAQMD is not the lead agency (SCAQMD 2010). The Working Group has not convened since the fall of 2010. As of July 2015, the proposal has not been considered or approved for use by the SCAQMD Board. However, this threshold is selected by IRWD as appropriate for the proposed Project.

Proposed Project Greenhouse Gas Emissions

Construction

Construction GHG emissions are generated by vehicle engine exhaust from construction equipment, on-road hauling trucks, vendor trips, and worker commuting trips. Construction GHG emissions were calculated concurrently with air quality criteria pollutant emissions by using CalEEMod Version 2013.2.2 and the Project information as described in Section 4.3, Air Quality.

Input details are provided in Appendix B. The results are output in $MTCO_2e$ for each year of construction. The estimated construction GHG emissions for the Project are shown in Table 10.

TABLE 10
ESTIMATED ANNUAL GREENHOUSE GAS EMISSIONS FROM CONSTRUCTION

Year	Emissions ($MTCO_2e$)
2016	752
2017	153
Total	**905**
Annual Emissions*	**30**

$MTCO_2e$: metric tons of carbon dioxide equivalent

* Combined total amortized over 30 years

Source: CalEEMod data in Appendix B.

GHG emissions generated from construction activities are finite and occur for a relatively short-term period of time. Unlike the numerous opportunities available to reduce a project's long-term GHG emissions through design features, operational restrictions, use of green-building materials, and other methods, GHG emissions-reduction measures for construction equipment are relatively limited. Therefore, SCAQMD staff recommended that construction emissions be amortized over a 30-year project lifetime, so that GHG reduction measures will address construction GHG emissions as part of the operational GHG reduction strategies (SCAQMD 2008). As shown in Table 10, Estimated Annual Greenhouse Gas Emissions from Construction, the 30-year amortized construction emissions would be 30 $MTCO_2e$/yr.

Operations

Operational GHG emissions for the Project are estimated by including purchased electricity; natural gas use for space and water heating; the electricity embodied in water consumption; the energy associated with solid waste disposal; and mobile source emissions. The Project would not require additional IRWD employees or generate regular vehicle trips, nor would it use natural gas. Water consumption and solid waste generation would be negligible with respect to the generation of GHGs. However, because the Project would provide recycled water to replace imported water, the Project would reduce the amount of electricity used to import water and the associated GHG emissions. The Project would require additional electricity to store and distribute the recycled water. It is estimated that imported water reduction would be 3,450 acre-feet per year (afy), which is equal to 1,124 million gallons per year. IRWD has estimated that the additional energy required for the project would be approximately 3,000 kilowatt hours (kWh) per million gallons of water. The GHG intensity factors for Southern California Edison, as used in CalEEMod, are as follows:

- **CO_2:** 630.89 pounds per megawatt hour (lb/MWh)
- **CH_4:** 0.029 lb/MWh
- **N_2O:** 0.00617 lb/MWh

Combining these data results in an increase of operational project-level GHG emissions of approximately 970 $MTCO_2e$/yr. Adding the amortized construction emissions of 30 $MTCO_2e$/yr (Table 10) results in project-level GHG emissions of 1,000 $MTCO_2e$/yr. However, GHG emissions are not a local, or even regional issue. Considered in the statewide or larger context, the proposed project would reduce the amount of imported water by approximately 3,450 afy per year. IRWD estimates that the energy required to import water is approximately 6,000 kWh per million gallons of water. Thus, using the GHG intensity factors above, the reduction of imported water would result in a reduction of GHG emissions of approximately 1,940 MTCO2e/yr at the statewide or larger level. The net result would be an overall reduction of 940 MTCO2e/yr (1,940 minus 1,000). Because the Project would reduce overall GHG emissions and thus be beneficial, there would be no impact and the proposed project would not generate GHGs that would have a significant impact on the environment.

b) Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases?

No Impact. As discussed above, the principal State plan and policy adopted for the purpose of reducing GHG emissions is AB 32. The quantitative goal of AB 32 is to reduce GHG emissions to 1990 levels by 2020. The Project contributes to this goal by reducing the quantity of GHG emissions resulting from electricity generation. Similarly, the Project supports the goals of Executive Orders S-3-05 and B-30-15. Therefore, the Project does not conflict with these plans and regulations.

Senate Bill (SB) 375, signed in September 2008 (Chapter 728, Statutes of 2008), aligns regional transportation planning efforts, regional GHG reduction targets, and land use and housing allocations. SB 375 requires Metropolitan Planning Organizations (MPOs) to adopt a Sustainable Communities Strategy (SCS) or alternative planning strategy (APS) that will address land use allocation in that Metropolitan Planning Organization's Regional Transportation Plan (RTP). The principles of SB 375 are incorporated in SCAG's adopted 2012 RTP/SCS. The proposed ILP – North Conversion Project is neither a housing development project nor a transportation project. Therefore, the Project would not conflict with the goals of SB 375 or the SCAG RTP/SCS.

Implementation of the Project would not conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing GHG emissions. There would be no impact.

VIII. HAZARDS AND HAZARDOUS MATERIALS

IMPACT ANALYSIS

Would the Project:

a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?

b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?

Less than Significant Impact. Project construction activities would require the transport and use of standard construction equipment and materials, some of which may include a hazardous component such as transport and storage of fuels. These activities would be conducted in compliance with existing federal, State, and local regulations.

Daily Project operations would not involve the use or transport of hazardous materials. The Project sites are located near several major transportation facilities and arterials, including Jamboree Road, Santiago Canyon Road/Chapman Avenue, State Route (SR) 241, and SR-261. These roadways may be used to transport hazardous materials; however, the proposed Project would neither increase the frequency of transport, nor would it introduce hazards that would increase the likelihood for accidental release of hazardous materials into the environment.

Due to the storage of chemicals on site associated with the Zone 5 reservoir, the existing reservoir has been operating under an approved Fire Master Plan from the City of Orange Fire Department. No additional chemicals would be stored on the proposed reservoir site and no changes are proposed to the existing site access road; therefore, it is not anticipated that an update to the existing Fire Master Plan would be necessary (Kleinfelder PDR 2015). However, should storage of additional chemicals be deemed necessary in the future, the Fire Master Plan would need to be updated and storage of the additional chemicals would occur in accordance with applicable regulations. Additionally, the proposed Project improvements associated with the ILP North Alignment, the Orchard Hills Facility, and the Rattlesnake Complex would not require any new or additional chemical storage or transport. As such, a less than significant impact related to the transport, use, or disposal of hazardous materials or the release of hazardous materials into the environment would occur.

c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?

Less Than Significant Impact. The nearest schools to the proposed Project sites are Santiago Canyon College, located less than 0.25 mile from the proposed ILP North Alignment along Jamboree and Santiago Canyon Roads, and Northwood High School, located approximately 0.3 mile west of the Rattlesnake Complex. Additionally, there is a proposed Kindergarten through eighth grade school that would be located approximately 0.75 mile west of the Rattlesnake Complex. Although the new pipeline would be located less than 0.25 mile from Santiago Canyon College, the pipeline would be constructed within the existing roadway right-of-way and would not emit hazardous emissions or handle hazardous or acutely hazardous materials that would significantly impact students at Santiago Canyon College. Temporary construction activities may require the use of materials listed as hazardous; however, these materials would be routine construction materials and would not be required in large quantities. Therefore, the potential impacts associated with the transport and use of hazardous materials during construction would be less than significant, and no mitigation is required.

d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?

No Impact. Two EDR Radius Map™ with Geocheck® Reports were prepared for the Project by Environmental Data Resources, Inc. (EDR 2015a, 2015b). Search parameters were based on a one-mile radius of the Project sites and consisted of a search of federal, State, local, tribal, and other databases. The complete list of databases and additional information regarding the identified sites can be found in Appendix F. According to the EDR Radius Maps, no hazardous materials sites were identified within boundaries of any of the Project sites. The following two listings were reported in the vicinity of the ILP North Alignment.

> **Santiago Hills Cleaners (8500 East Chapman Avenue, Orange).** This site is identified in the Dry Cleaners Database. According to the EDR Report, no violations have been reported.
>
> **Irvine Regional Park (21501 Chapman Avenue, Irvine).** This site is identified on the following databases: "Cortese" List (HIST CORTESE), Leaking Underground Storage Tank (LUST), Orange County Leaking Underground Storage Tank (ORANGE CO. LUST), and Region 8 Leaking Underground Storage Tank. The EDR Report identifies a gasoline leak affecting the soil that was reported in 1989. The site was subject clean up and the case was closed in 1990.

The EDR Report also identifies Chevron (1409 Chapman Avenue) as being within 0.5 mile of the proposed reservoir site. This address is incorrectly mapped and is actually located over four miles east of any of the proposed Project sites. No hazardous materials sites were reported in the vicinity of the other Project sites. Of the two hazardous materials sites identified, none of the sites pose a hazard to the proposed Project. Based on a search of hazardous materials sites compiled pursuant to Section 65962.5 of the *California Government Code,* no sites are identified within 0.5 mile of the Project. No impacts related to known hazardous materials sites would occur and no mitigation is required.

e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the Project area?

f) For a project within the vicinity of a private airstrip, would the Project result in a safety hazard for people residing or working in the Project area?

No Impact. The Project sites are not located within an adopted Airport Land Use Plan or in the vicinity of a private airstrip, heliport, or helistop. The nearest airport is John Wayne Airport, located approximately seven miles southwest of the Rattlesnake Complex, which is the southernmost Project site. The Project would be located outside the John Wayne Airport influence area and would not expose additional people to safety hazards related to airport operations. Implementation of the proposed Project would not impact the airport facilities or their operation; no mitigation would be required.

g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?

No Impact. Both the City of Orange and the City of Irvine have prepared and adopted a City Emergency Management Plan for the protection of residents and properties (see City of Orange Municipal Code, Chapter 2.68 and City of Irvine Municipal Code, Title 4, Division 9). Implementation of the proposed Project would provide additional recycled water services to IRWD's existing and future customers and would not alter traffic conditions or modify the local or regional circulation system. Therefore, development of the Project would not interfere with the implementation of either the City of Orange or City of Irvine Emergency Management Plans. Additionally, should an emergency occur at any of the proposed Project sites, the internal street systems would provide access to the outlying arterial roadway system. Therefore, no impacts related to the adopted emergency response or evacuation plans would occur and no mitigation is required.

h) Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?

Less Than Significant Impact. According to the *City of Orange General Plan's* Public Safety Element, the proposed reservoir site is located in close proximity to Very High Fire Hazard Areas. However, the risk of injury or death at the site from a wildland fire is minimal because the Project does not propose construction of any habitable structures. Additionally, the partially subterranean design of the reservoir would minimize potential structural impacts from a wildland fire.

The ILP North Alignment would traverse areas that have been designated by the City of Orange as Very High Fire Hazard Areas. However, due to the nature of the pipeline which is proposed to be constructed below ground and would not be exposed to a wildland fire, potential impacts would be less than significant.

The *City of Irvine General Plan's* Safety Element designates high-risk fire areas as High Fire Severity Rating and Open Space with Fire Potential. Neither of the two Project sites in the City of Irvine (the Orchard Hills Facility and the Rattlesnake Complex) are located in or near designated high-risk fire areas. However, due to limited development in the area, there is a potential for the sites to be exposed to wildland fires. As proposed, the Project would not include construction of habitable structures intended for human occupancy. Therefore, impacts would be less than significant and no mitigation is required.

IX. HYDROLOGY AND WATER QUALITY

IMPACT ANALYSIS

Would the Project:

a) Violate any water quality standards or waste discharge requirements?

e) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?

f) Otherwise substantially degrade water quality?

Short-Term Construction-Related Water Quality Impacts

Less Than Significant Impact. Potential impacts of construction activities on water quality focus on sediments, turbidity, and pollutants associated with sediments. Construction-related activities that are primarily responsible for sediment releases are related to exposing soils to potential mobilization by rainfall, runoff, and wind. These activities include grading and other earth-disturbance activities. Non-sediment-related pollutants that are also of concern during construction include waste construction materials and chemicals, liquid products, and petroleum products used in building construction or the maintenance of heavy equipment. Based on **HYDRO-1**, stated below, construction impacts from implementation of the proposed Project would be minimized through compliance with the Construction General Permit. This permit requires the development and implementation of a SWPPP for each of the proposed Project sites, which must include erosion- and sediment-control BMPs that meet or exceed measures required by the NPDES Construction General Permit, as well as BMPs that control the other potential construction-related pollutants. A SWPPP would be developed, as required by and in compliance with, the NPDES Construction General Permit. Erosion-control BMPs are designed to prevent erosion, whereas sediment controls are designed to trap sediment once it has been mobilized. The NPDES Construction General Permit requires the SWPPP to include BMPs to be selected and implemented based on the phase of construction and weather conditions.

The SWPPP would be designed and implemented to address site-specific conditions related to Project construction. The SWPPP would identify and describe the sources of sediment and other pollutants that may affect the quality of storm water discharges; it would also ensure the implementation and maintenance of BMPs to reduce or eliminate sediment, pollutants adhering to sediment, and other non-sediment pollutants in storm water and non-storm water discharges.

Compliance with the NPDES Construction General Permit and the preparation of a SWPPP would ensure that any impacts to downstream waters resulting from construction activities on the Project site would be less than significant. Erosion-control and treatment-control BMPs would be implemented per NPDES requirements.

In addition to the requirements of the NPDES General Construction Permit, all areas of exposed soils would be re-vegetated and/or watered to stabilize slopes and to reduce erosion as recommended in the Geotechnical Investigation and discussed in the Response to Question VI.b. Full compliance with applicable local, State, and federal regulations, including **HYDRO-1** and **HYDRO-2**, would ensure that water quality impacts associated with construction would be less than significant.

Long-Term Operational Water Quality Impacts

Less Than Significant Impact. Currently, the proposed reservoir site is partially undeveloped; a portion of the site is developed with reservoir uses and the area designated for the proposed reservoir is undeveloped and exists in a natural state with pervious surface area. Because the majority of the Project site is currently developed with the Zone 5 reservoir and Santiago Hills Pumping Station and because Project implementation would expand existing water infrastructure uses rather than introducing new uses to the proposed reservoir site, development of the Project would not introduce substantial amounts of urban pollutants to the storm water runoff beyond existing conditions.

Because the proposed improvements and Project actions at the other Project sites (ILP North Alignment, Orchard Hills Facility, and Rattlesnake Complex) primarily involve modifications to existing equipment to accommodate the ILP North Conversion and would not substantially change the nature of the existing facilities, impacts related to long-term operational water quality impacts would not represent a significant impact.

b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?

No Impact. The proposed Project would not deplete groundwater supplies or substantially interfere with groundwater recharge. Project implementation would increase the amount impervious surface area at the proposed reservoir site, which would limit the amount of runoff infiltrating the ground surface and reaching the groundwater basin. However, according to the *City of Orange General Plan,* the proposed reservoir site is not located in a groundwater recharge area (Orange 2010). Because the proposed improvements and Project actions at the other Project sites (ILP North Alignment, Orchard Hills Facility, and Rattlesnake Complex) primarily involve modifications to existing equipment to accommodate the ILP North Conversion and would not substantially change the nature of the existing facilities, impacts related to groundwater supplies and groundwater recharge would not represent a significant impact. Additionally, implementation of the Project would make recycled water supplies available to a greater number of existing and future IRWD customers which would reduce demands for domestic water supplies, and thereby reduce the dependence on groundwater sources. Therefore, no impacts would occur and no mitigation is required.

c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?

d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?

Less Than Significant Impact. Development of the proposed Project would involve modifications to existing equipment to accommodate the ILP North Conversion as well as the construction of a new partially buried recycled water reservoir. The proposed modifications to existing equipment and infrastructure would occur within existing facility footprints; however, the proposed reservoir would increase the impervious surface area on the proposed reservoir site. Because the proposed Project would introduce impervious surfaces to a previously natural area, the post-development

runoff that would be generated on site would be slightly higher than the pre-development runoff. Under existing conditions, drainage flows from the existing Zone 5 reservoir and access road southeasterly of the Santiago Hills Pump Station (Kleinfelder PDR 2015) are directed into a concrete-lined V-ditch on the southerly side of the access road and then conveyed off site through a drainage easement located west of the access road. Drainage flows from the existing parking area at the Zone 5 reservoir are currently directed along the lower portion of the site access to a curb and gutter that discharges just outside the access gate into a drainage course flowing westerly from the proposed reservoir site. As detailed in Section 3, Project Description, storm water runoff from the proposed Reservoir site would be collected and conveyed to storm drain pipes and ultimately discharged into the existing drainage channel located adjacent to Santiago Canyon Road. Additionally, the proposed reservoir would have an overflow pipe, which would be used in the event of an emergency and would outlet into the existing drainage channel. A less than significant impact would occur related to changes in the drainage pattern.

g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?

h) Place within a 100-year flood hazard area structures which would impede or redirect flood flows?

No Impact. According to the *City of Orange General Plan* (Figure PS-1, Environmental and Natural Hazard Policy Map) and the *City of Irvine General Plan* (Figure J-3, Flood Hazard Areas), the proposed Project sites are not located within the a 100-year flood hazard area, and the Project would not expose people or structures to flood hazard conditions. No impact would occur and no mitigation is required.

i) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?

No Impact. There are several dams present in the cities of Irvine and Orange. Specifically, the Rattlesnake Reservoir and its associated earthfill dam is located approximately 0.13 mile east of the Rattlesnake Complex; the Peter's Canyon Dam is located approximately 0.15 mile southwest of the southernmost point of the ILP North Alignment (where it connects to the Baker RWPS); and the Santiago Dam at Irvine Lake is located approximately 1.5 miles east of the proposed reservoir site. The proposed Project would not introduce any new uses that would expose people or structures to hazards associated with the failure of this dam; therefore, no impacts would occur.

j) Inundation by seiche or mudflow?

No Impact. There are several large bodies of water near the Project sites. Consistent with the previous discussion, Irvine Lake is located approximately 1.5 miles east of the proposed reservoir, Peters Canyon Reservoir is located approximately 0.15 mile southwest of the southernmost point of the ILP North Alignment, and Rattlesnake Reservoir is located approximately 0.13 mile east of the Rattlesnake Complex. While a seiche, or standing wave, is possible within any of these water bodies, the likelihood of the seiche effects reaching one of the Project sites is low due to intervening topography and physical distance.

Two of the Project sites (Rattlesnake Complex and the ILP North Alignment) are located within developed areas and would not be subject to mudflow. The proposed reservoir site and the Orchard Hills Facility are both located adjacent to undeveloped areas; however, the vegetation cover of the surrounding areas would reduce the risk of mudflows on the Project sites.

Additionally, the proposed Project would not introduce any uses that would expose people or structures to hazards associated with a seiche or mudflows. Consequently, no impacts are anticipated and no mitigation is required.

MITIGATION PROGRAM

Regulatory Requirements

HYDRO-1 Prior to initiation of construction, IRWD shall ensure that a Notice of Intent with the State Water Resources Control Board (SWRCB) has been filed in order to obtain coverage under the Construction General Permit. Pursuant to the permit requirements, the construction contractor shall develop a Storm Water Pollution Prevention Plan (SWPPP) that incorporates Best Management Practices for reducing or eliminating construction-related pollutants in the site runoff.

HYDRO-2 Prior to initiation of construction, IRWD shall verify that the General Waste Discharge Requirements issued by the Santa Ana Regional Water Quality Control Board (R8-2015-0004, NPDES No. CAG998001, General Waste Discharge Requirements for Discharges to Surface Waters that Pose an Insignificant [De Minimis] Threat to Water Quality) are in effect and shall govern discharges from construction dewatering and water line/sprinkler line testing should they occur during construction. The property owner/developer shall comply with these regulations, including provisions requiring notification, testing, and reporting of dewatering and testing-related discharges, which shall mitigate any impacts of such discharges.

X. LAND USE AND PLANNING

IMPACT ANALYSIS

Would the Project:

a) Physically divide an established community?

No Impact. The proposed reservoir would be located on a vacant and undeveloped site adjacent to the existing Zone 5 reservoir, with the nearest established community located approximately 0.25 mile to the west. Construction of the ILP North recycled water pipeline would occur entirely within existing roadway rights-of-way. There are no existing communities at any of the Project sites; therefore, implementation of the proposed Project components would not divide an established community. Both the Orchard Hills Facility and the Rattlesnake Complex are existing utilities, and the proposed modifications to existing equipment would be limited to the existing development footprints associated with these utilities; no new structures would be constructed. The proposed modifications at the Orchard Hills Facility and Rattlesnake Complex would not physically divide an established community.

No impact would occur and no mitigation is required.

b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the Project (including, but not limited to the general plan, specific plan or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?

No Impact. The proposed reservoir site and the ILP North Alignment are located in City of Orange. The reservoir site is currently zoned Planned Community and the General Plan land use designation is Open Space. The proposed reservoir would be a conditionally permitted use according to the City's zoning code. The ILP North Alignment extends through multiple City of Orange land use designations (Open Space; Open Space Park; Low Density Residential 2-6 dwelling unit per acre; and Public Facilities Max. 0.5 Floor Area Ratio [FAR] and Institutions Max. 2.0 FAR) and multiple land use zones (P-C/Planned Community, R-O/Recreation Open Space, P-I/Public Institution, and R-1-15/Single Family Residential 15,000 square feet). The Orchard Hills Facility and the Rattlesnake Complex are located in the City of Irvine. The Orchard Hills Facility site is currently zoned 2.2D/Low Density Residential and the General Plan land use designation is Low Density Residential; the Rattlesnake Complex is zoned 6.1/Institutional with the land use designation Public Facilities. The Project does not propose to change the existing land use designations of these sites, and, pursuant to Government Code Section 53091(e), the proposed Project would be exempt from city zoning ordinances because it involves the construction of facilities for the production, generation, storage, treatment, or transmission of water. Implementation of the proposed Project would not conflict with applicable plans, policies, and regulations. Therefore, no impacts would occur and no mitigation is required.

c) Conflict with any applicable habitat conservation plan or natural community conservation plan?

No Impact. As discussed previously in Section IV, Biological Resources, the Project is consistent with provisions in the NCCP/HCP. Although the proposed reservoir site is excluded from coverage, no take authorization is needed for this area because it was not occupied by coastal California gnatcatcher during focused surveys.

XI. MINERAL RESOURCES

IMPACT ANALYSIS

Would the Project:

a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?

b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?

No Impact. According to the *City of Orange General Plan's* Natural Resources Element, mineral resource deposits in the City are primarily limited to the sand and gravel resources contained in and along the Santa Ana River and Santiago Creek (City of Orange 2010). Neither the proposed reservoir site nor the ILP North Alignment are located in the vicinity of these known resources; thus, no impact would occur related to the loss of availability of mineral resources at these sites.

The Orchard Hills Facility is designated as MRZ-1 by the State Mining and Geology Board and is defined as an area where adequate information indicates that no significant mineral deposits are present or where it is judged that little likelihood exists for their presence (Irvine 2012). The Rattlesnake Complex is designated as MRZ-3, defined as areas containing mineral deposits the significance of which cannot be evaluated from available date (Irvine 2012). Neither site is designated as MRZ-2, which indicates the presence of significant mineral resources. Additionally, proposed Project actions at the existing Orchard Hills Facility and the existing Rattlesnake Complex would be limited to modifications to existing utility equipment and would not involve

construction outside the existing facility footprints. No impacts would occur and no mitigation is required.

XII. NOISE

IMPACT ANALYSIS

Would the Project:

a) Expose persons to or generate noise levels in excess of standards established in a local general plan or noise ordinance or applicable standards of other agencies?

Less than Significant With Mitigation. Construction and operational noise associated with the Project would result in impacts that are less than significant, as described below.

Noise-Sensitive Receptors and Existing Conditions at the Project Sites

Noise-sensitive land uses typically include residences, hospitals, convalescent and day care facilities, schools and libraries, which could all be adversely affected by an increase in noise levels.

The reservoir site is located in an undeveloped area; there are no sensitive receptors near the reservoir site. Noise at the reservoir site is limited to background sounds of distant traffic.

The sensitive receptors near other Project sites are:

- Single-family residences and Santiago Canyon College adjacent to the ILP North Alignment on East Santiago Canyon Road and Jamboree Road. The dominant noise along the alignment is vehicle traffic on the roads.
- The Northwood Point Community (single-family residential) within 165 feet of the Rattlesnake Complex portion of the Project. The dominant noise source at the site is traffic on Portola Parkway.
- Additionally, there are residences under construction, within approximately 850 feet of the Orchard Hills Facility boundary. The site is relatively quiet with the exception of noise from ongoing construction.

Regulatory Background

For the evaluation of potential noise impacts, IRWD complies with the Cities of Orange and Irvine Noise Ordinances

City of Orange Noise Standards

The City of Orange Municipal Code (Chapter 8.24, Noise Control) contains the City of Orange Noise Ordinance. It is designed to protect residential land uses from unnecessary, excessive and annoying sounds. Table 11, Exterior Noise Standards in the City of Orange, establishes the following standards on fixed noise sources, which is defined as a stationary noise source which creates sounds while fixed or motionless, including but not limited to construction equipment, industrial and commercial machinery and equipment, pumps, fans, compressors, generators, air conditioners and refrigeration equipment.

TABLE 11
EXTERIOR NOISE STANDARDS IN THE CITY OF ORANGE

Table 8.24.040 Exterior Noise Standards		
	Noise Level	**Time Period**
Hourly Average (L_{eq})	55 dB(A)	7:00 AM- 10:00 PM
	50 dB(A)	10:00 PM- 7:00 AM
Maximum Level	70 dB(A)	7:00 AM-10:00 PM
	65 dB(A)	10:00 PM- 7:00 AM

Section 8.24.050, Exemptions from Chapter Provisions includes the following:

> E. Noise sources associated with construction, repair, remodeling, or grading of any real property, provided said activities take place between the hours of 7:00 a.m. and 8:00 p.m. on any day except for Sunday or a Federal holiday, or between the hours of 9:00 a.m. and 8:00 p.m. on Sunday or a Federal holiday. Noise generated outside of the hours specified are subject to the noise standards identified in Table 8.24.040.
>
> K. Any maintenance or construction activity undertaken by a public agency or utility within street right of way.

City of Irvine Municipal Code

The City of Irvine Municipal Code (Title 6, Division 8, Chapter 2) contains the City of Irvine Noise Ordinance. The Noise Ordinance is designed to control unnecessary, excessive, and annoying sounds from sources on private property by setting limits that cannot be exceeded at adjacent properties. Noise Ordinance requirements cannot be applied to mobile noise sources (e.g., heavy trucks traveling on public roadways, trains, or aircraft). Control of noise generated by these transportation sources is preempted by federal and State laws, and is therefore not subject to the provisions of the Noise Ordinance. However, the Noise Ordinance does apply to vehicles while they are on private property. All activities within the City are subject to the Noise Ordinance unless specifically exempted. All new development must implement measures to ensure that activities at the new development do not violate the Noise Ordinance.

The Noise Ordinance specifies that noise generated on a site cannot exceed defined noise levels at adjacent properties for a specified period of time as shown in Table 12, City of Irvine Noise Ordinance Standards for Zones 1 Through 4. Both interior and exterior noise level limits are specified by noise zones. The applicable noise zone is based on the land use being exposed to the noise. The residential units east and west of East Santiago Canyon Road, east of Jamboree Road, and are in Zone 1. Noise levels at residences near the Rattlesnake Complex would be partially masked by traffic noise from Portola Parkway.

TABLE 12
CITY OF IRVINE NOISE ORDINANCE STANDARDS FOR ZONES 1 THROUGH 4

Noise Levels for a Period Not Exceeding (minutes/hour)							
			Minutes				
			30	15	5	1	0 (anytime)
Noise Zone[a]		Time Period	Noise Level – dBA				
1	Exterior	7:00 AM–10:00 PM	55	60	65[b]	70	75
		10:00 PM–7:00 AM	50	55	60	65[b]	70
	Interior	7:00 AM–10:00 PM	–	–	55	60	65
		10:00 PM–7:00 AM	–	–	45	50	55
2	Exterior	Any time	55	60	65	70	75
	Interior	Any time	–	–	55	60	65
3	Exterior	Any time	60	65	70	75	80
	Interior	Any time	--	--	55	60	65
4	Exterior	Any time	70	75	80	85	90
	Interior	Any time	--	--	55	60	65

dBA: A-weighted decibel(s)

[a] Noise zone 1: All hospitals, libraries, churches, schools and residential properties.
Noise zone 2: All professional office and public institutional properties.
Noise zone 3: All commercial properties excluding professional office properties.
Noise zone 4: All industrial properties.

[b] This standard does not apply to multi-family residence private balconies. Multi-family developments with balconies that do not meet the 65 CNEL are required to provide occupancy disclosure notices to all future tenants regarding potential noise impacts.

Source: City of Irvine 2015.

Section 6-8-205, Special provisions, of the City of Irvine municipal code limits construction activities to between the hours of 7:00 AM and 7:00 PM Mondays through Fridays, and 9:00 AM and 6:00 PM on Saturdays, with no construction activities permitted outside of the hours listed above or on Sundays or federal holidays unless a temporary waiver is granted by the Chief Building Official or his or her authorized representative. Any waiver granted shall take impact upon the community into consideration.

Construction Noise

Project construction would generally not occur between 7:00 PM and 7:00 AM on weekdays or before 9:00 AM or after 6:00 PM Saturdays, or at any time on Sundays or federal holidays, consistent with the Cities or Irvine and Orange standards. However, to avoid or minimize undesirable traffic impacts, night work may be required for pipeline installation or similar activities that would occur in roadways. Should night work be required for this Project in the City of Irvine, IRWD would obtain a temporary waiver, per Section 6-8-205 of the Irvine municipal code; compliance with the code is required by **NOISE-1**. If night work should be required in the portions of the Project in the City of Orange, no waiver is required because construction activity undertaken by a public agency in a street right of way is exempt from the City of Orange noise ordinance.

Noise would be generated by construction equipment at each of the Project sites. Construction activities may require use of a variety of equipment including, but not limited to bulldozers, excavators, dump trucks, front-end loaders, backhoes, welders, forklifts, cranes, and similar

equipment. No pile driving, blasting, or high-impact demolition is anticipated. Based on this list of equipment, maximum noise levels (L_{max}) measured at a distance of 50 feet from a piece of equipment can reach as high as 85 dBA. Because the equipment power levels vary during operation, maximum noise levels would occur intermittently. Construction equipment of the types mentioned are typically at full power approximately 40 percent of their operating time; thus, average noise levels are less than maximum noise levels. During construction of the Project, it is likely that two or three pieces of equipment would be operating at one time. With multiple pieces of equipment, noise levels are analyzed from the center of the construction area. Average noise levels at a distance of 100 feet would be approximately 80 dBA. Noise would be reduced between 6.0 and 7.5 dBA per doubling of distance, depending on the nature of the ground surface. Thus, 80.0 dBA at 100 feet would be 72.5 to 74.0 dBA at 200 feet and would be 65.0 to 68.0 dBA at 400 feet from the center of the working area.

Construction noise could be heard intermittently at residences and at Santiago Canyon College adjacent to East Santiago Canyon Road and Jamboree Road. While traffic noise may be have similar noise levels as the construction noise, the character of the two noises is different, allowing the receptor to hear the two noises separately. Because the ILP North Alignment is a linear Project, construction noise impacts at any individual receptor would be anticipated to occur for less than a full day on any given day and for relatively few of the days during the five-month pipeline installation effort. Noise levels at residences near the Rattlesnake Complex would be partially masked by traffic noise from Portola Parkway.

If construction is required at night on the pipeline alignment, construction noise may be substantially greater than the ambient noise level at receptors near the work areas. Therefore **NOISE-1** would be incorporated into the project.

Additionally, there is a possibility that lighted warning signs could be required at night or on weekends to alert motorists to detours or road hazards during pipeline installation, and that the signs could be powered by internal combustion engines. To avoid exceeding the noise level limits of the Orange and Irvine noise ordinances, as described above, **NOISE-2** would be incorporated into the Project.

With implementation of **NOISE-1**, and **NOISE-2**, the Project would not expose persons to or generate noise levels in excess of the applicable standards. The impact would be less than significant.

Blasting

While not currently anticipated, there is a possibility that blasting may be required for either some sections of one of the roads or the water storage tank pad and foundation. However, compliance with **NOISE-3**, which prescribes a program (which includes but is not limited to pre-blast survey, blast design, and blast monitoring) would be implemented, would ensure a less than significant impact.

Operational Noise

The proposed reservoir, pipelines, and other Project elements are not noise-generating facilities. The Project would not require additional IRWD employees, nor would it generate regular vehicle trips. IRWD staff would periodically visit the proposed reservoir, the Orchard Hills Facility, and the Rattlesnake Complex for routine inspection and maintenance activities similar to current operations. Operational noise would be negligible; the impact would be less than significant and no mitigation is required.

b) Expose persons to or generation of excessive ground borne vibration or ground borne noise levels?

Less than Significant Impact. Vibration affects structures and persons located relatively close to the source of the vibration. There would be no pile driving, which is one of the more severe sources of construction vibration. Blasting can also be a source of vibration to more distant receptors. Blasting is discussed under Question XII.a above. Vibration impacts from blasting would be less than significant with compliance with **NOISE-3**.

Jackhammers may be used to remove roadway pavement for pipeline installation; however, jackhammer vibration is barely perceptible at a distance of 25 feet. It is also noted that jackhammer vibration is approximately $^1/_3$ of the magnitude of the vibration of heavy trucks. There are no sensitive structures or residences near the proposed reservoir site. Vibration impacts would be less than significant; no mitigation is required.

c) Result in a substantial permanent increase in ambient noise levels in the Project vicinity above levels existing without the Project?

Less than Significant. As discussed in response to impact Question XII.a above, permanent, operational noise levels would be negligible and therefore would not be substantial. The impact would be less than significant; no mitigation is required.

d) Result in a substantial temporary or periodic increase in ambient noise levels in the Project vicinity above levels existing without the Project?

Less than Significant Impact. As discussed in response to impact Question XII.a above, construction activities would cause temporary noise increases. Although daytime construction noise levels at residences adjacent to the pipeline alignment and near the Rattlesnake Complex would be heard above ambient traffic noise, neither the magnitude nor the duration of the noise would be substantial. Potential substantial noise increases from nighttime construction would be reduced to less than significant by implementation of **NOISE-1** and **NOISE-2**. Potential substantial noise increases from blasting would be reduced to less than significant by implementation of **NOISE-3**. The impact would be less than significant; no mitigation is required.

e) For a Project located within an airport land use plan or, where such plan has not been adopted, within two miles of a private or public airport or public use airport, would the Project expose people residing or working in the Project area to excessive noise levels?

f) For a Project within the vicinity of a private airstrip, would the Project expose people residing or working in the Project area to excessive noise levels?

No Impact. The Project is not located in an airport land use plan or in the vicinity of a private airstrip or heliport, and it would not expose people to excessive noise levels associated with airport operations or aircraft travel. The closest airport to the Project site is John Wayne Airport, located more than seven miles southwest of the existing Rattlesnake Complex. No impacts would result, and no mitigation is required.

MITIGATION PROGRAM

Mitigation Measures

NOISE-1 Project construction activities shall comply with the noise ordinances of the City of Irvine and the City of Orange, including any daily restrictions on construction hours.

NOISE-2 If warning signs and similar devices are required to operate between the hours of 8:00 PM and 7:00 AM on weekdays or Saturdays or at any time on Sunday or a federal holiday, IRWD and its contractors shall limit the noise from these devices such that it complies with the City noise ordinances.

NOISE-3 In the event that blasting activities are required and IRWD shall ensure that a blasting plan is prepared and submitted to the City of Orange for review and approval. The blasting plan shall be prepared in accordance with the United States Department of Interior, Office of Surface Mining (USOSM) standards.

XIII. POPULATION AND HOUSING

IMPACT ANALYSIS

Would the Project:

a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?

b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?

c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?

No Impact. The proposed Project involves the conversion of the northern section of the ILP's non-potable water system from an untreated water system to a recycled water system to provide recycled water to a larger number of existing and future IRWD customers. Implementation of the Project would not increase employment and population in the area and, because the Project is intended to serve existing IRWD customers or new customers within established or planned areas of the cities of Orange and Irvine. The Project would not extend recycled water service into an area that is not currently developed or approved for future development; therefore, the Project would not result in either direct or indirect population growth. Additionally, as described in Section X, Land Use and Planning, the Project would not displace existing housing or population, resulting in construction of replacement housing elsewhere. Therefore, no impacts would occur and no mitigation is required.

XIV. PUBLIC SERVICES

IMPACT ANALYSIS

a) Would the Project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services: fire protection, police protection, schools, parks, and other public facilities?

No Impact. Due to the nature of the proposed Project, no new demand for public services such as fire protection, police protection, schools, parks, libraries, or other public facilities would occur. Any increase in maintenance of the proposed facilities would be the responsibility of the IRWD. No impact would occur, and no mitigation is required.

XV. RECREATION

IMPACT ANALYSIS

Would the Project:

a) Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?

b) Include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?

No Impact. The proposed Project involves the conversion of the northern section of the ILP's non-potable water system from an untreated water system to a recycled water system. As mentioned previously, the Project is not anticipated to induce population growth; therefore it would not directly or indirectly impact any local recreational facilities through increase of use. Additionally, the ILP North Alignment would be located adjacent to the existing Peters Canyon Regional Park and a minor easement would be required to connect the pipeline within the roadway right-of-way to the Baker RWPS; the Project would not impact the existing park. No impacts related to demand or use of recreational facilities would occur and no mitigation is required.

XVI. TRANSPORTATION/TRAFFIC

IMPACT ANALYSIS

Would the Project:

a) Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?

Less Than Significant Impact. Implementation of the proposed Project is expected to generate short-term traffic impacts generated during the construction period. Vehicle trips would be generated by trucks hauling materials and supplies to the sites and workers commuting to and from the Project sites. As discussed previously in Section III, Air Quality, it is anticipated that an average of 27 heavy truck round trips (54 one-way trips) would occur per day related to excavation for the reservoir. An additional approximately 10 heavy truck round trips (20 one-way trips) per day would occur related to ILP North Alignment pipeline installation. It is anticipated that these trips would occur throughout the day and would not be concentrated during traffic peak hours. Therefore, short-term construction-related impacts would be less than significant.

Under existing conditions, a small number of vehicle trips are associated with routine inspection and maintenance at the existing Zone 5 reservoir and Santiago Hills Pumping Station site, the Orchard Hills Facility, and the Rattlesnake Complex. Because the Project components are located either on or near existing IRWD utility sites, it is anticipated that routine inspection and maintenance trips would continue and no new operational trips would occur with implementation of the proposed Project. Therefore, because there would be no increase in daily trips associated with daily operation of the Project components, no Project-related traffic impacts are anticipated.

b) Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?

No Impact. The nearest intersection to the proposed Project that has been designated by the Orange County Transportation Authority as a Congestion Management Program intersection is Irvine Boulevard and Culver Drive. This intersection is approximately 1.5 miles southwest of the Rattlesnake Complex. Due to the nominal amount of traffic generated by the proposed Project and its distance from the designated intersection, no impact would occur at the intersection and no mitigation is required.

c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?

No Impact. The proposed Project involves the conversion of a non-potable water system from an untreated water system to a recycled water system and would have no effect on air travel volumes, nor would it impact air traffic patterns. No impact would occur and no mitigation is required.

d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses?

No Impact. The Project does not propose any modifications to the existing circulation system in the Project's vicinity. Further, traffic patterns and the types of vehicles traveling along the roads near the proposed reservoir, the Orchard Hills Facility, and the Rattlesnake Complex would not be affected. Therefore, no impact would occur related to hazards due to a design feature or incompatible uses. No impact would occur and no mitigation is required.

e) Result in inadequate emergency access?

Less Than Significant Impact. The proposed Project would involve modifications to existing facilities; installation of a pipeline along existing roadway rights-of-way; and construction of a new reservoir adjacent to an existing IRWD facility. During construction, existing access routes would be maintained at the three existing Project sites (the proposed reservoir site, the Orchard Hills

Facility, and the Rattlesnake Complex). Construction of the ILP North Alignment would require temporary lane closures along the alignment, including Santiago Canyon Road/Chapman Avenue and Jamboree Road. It is anticipated that at least one lane of through traffic in each direction would be maintained, thus allowing for adequate emergency access.

As noted previously, the Project would involve modifications to existing facilities and construction of a reservoir adjacent to an existing facility. Emergency access routes are already in place at each of these Project sites, and proposed Project actions would not alter access. Therefore, no impact to local or regional emergency access routes would occur and no mitigation is required.

f) Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?

No Impact. Access to the reservoir site would be provided by East Santiago Canyon Road, which includes a Class II bicycle route. The City of Orange defines Class II bicycle routes as those that are located along arterial roadways and are delineated by painted stripes and other features. The segment of Portola Parkway adjacent to Rattlesnake Complex includes both a Class I trail (off-street) and a Class II trail (on-street). Due to the nature of the Project, no impacts related to adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or the performance or safety of such facilities would occur and no mitigation is required.

XVII. UTILITIES AND SERVICE SYSTEMS

IMPACT ANALYSIS

Would the Project:

a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?

e) Result in a determination by the wastewater treatment provider which serves or may serve the Project that it has adequate capacity to serve the Project's projected demand in addition to the provider's existing commitments?

No Impact. The Project would involve construction of a recycled water reservoir, the conversion of the ILP North Alignment to recycled water, and related facility improvements. Minor amounts of water would be generated on an irregular basis during backwash and strainer cleanouts at the proposed reservoir site; however, this water would be recycled back into the untreated system. The Project would require connection to IRWD's sewer system; however, no impacts would occur related to capacity of wastewater infrastructure or wastewater treatment facilities. Further, the Project would not exceed wastewater treatment requirements.

b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?

Water

No Impact. Development of the proposed Project would serve to enhance the water supply and distribution system by improving the reliability of IRWD's water supply by decreasing the reliance on domestic water sources. No additional impacts related to water-related facilities are anticipated and no mitigation is required.

Wastewater

No Impact. As noted previously in the responses to Questions XVII.a and XVII.e, the Project would involve construction of a recycled water reservoir and related facilities and would generate minor amounts of backwash water on an irregular basis. No impacts would occur related to capacity of wastewater infrastructure or wastewater treatment facilities.

c) Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?

Less Than Significant Impact. Development of the proposed Project would involve modifications to existing equipment to accommodate the ILP – North Conversion and the construction of a new partially buried recycled water reservoir. The proposed modifications to existing equipment and infrastructure would occur within existing facility footprints and would not impact storm water drainage facilities.

As discussed previously in Subsection IX, Hydrology and Water Quality, storm water runoff from the proposed reservoir site would be collected and conveyed to storm drain pipes that ultimately discharge into the existing drainage channel located adjacent to Santiago Canyon Road. Additionally, the proposed reservoir would have an overflow pipe, which would be used in the event of an emergency and which would also outlet into the existing drainage channel. The anticipated volume of flows entering the drainage channel would be insignificant and, under normal operating conditions, would not substantially alter drainage patterns or exceed the capacity of the channel. Therefore, the Project would not require the expansion of existing storm drain facilities, and impacts would be less than significant.

d) Have sufficient water supplies available to serve the Project from existing entitlements and resources, or are new or expanded entitlements needed?

No Impact. As discussed previously under response to Question XVII.b, development of the proposed Project would serve to enhance the water supply and distribution system by improving the reliability of IRWD's water supply by decreasing the reliance on domestic water sources. No additional impacts related to utilities and service systems are anticipated and no mitigation is required.

f) Be served by a landfill with sufficient permitted capacity to accommodate the Project's solid waste disposal needs?

Less Than Significant Impact. Solid waste generated from the Project site would most likely be disposed of at the Frank R. Bowerman Landfill, which is part of the Orange County landfill system operated by OC Waste & Recycling. The landfill is permitted to receive a maximum of 11,500 tons per day (tpd). The Frank R. Bowerman Landfill is approximately 725 acres with 530 acres permitted for refuse disposal. The landfill opened in 1990 and is scheduled to close in approximately 2053 (OCWaste 2015). The increase in solid waste disposal resulting from implementation of the Project could be accommodated within the permitted capacity of the County's overall landfill system, which includes the Frank R. Bowerman Landfill (Arnau 2015). A less than significant impact related to landfill capacity would occur from implementation of the proposed Project and no mitigation is required.

g) Comply with Federal, State, and local statutes and regulations related to solid waste?

No Impact. Solid waste practices in California are governed by multiple federal, State, and local agencies that enforce legislation and regulations to ensure landfill operations minimize impacts to public health and safety and the environment. OC Waste & Recycling is obligated to obtain a Solid Waste Facilities Permit, a Storm Water Discharge Permit, and a permit to construct and operate gas management systems and to meet Waste Discharge Requirements. The Local Enforcement Agency (the SCAQMD) and the SWRCB enforce landfill regulations related to health, air quality, and water quality, respectively. The proposed Project would not inhibit OC Waste & Recycling's compliance with the requirements of each of these governing bodies. No impact would occur and no mitigation is required.

XVIII. MANDATORY FINDINGS OF SIGNIFICANCE

IMPACT ANALYSIS

Does the Project:

a) Have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?

Less Than Significant With Mitigation. As described throughout the analysis in Section 5.0, with the incorporation of the identified mitigation measures, implementation of the proposed Project would not degrade the quality of the environment; would not substantially reduce the habitats of fish or wildlife species; would not cause a fish or wildlife population to drop below self-sustaining levels; would not threaten to eliminate a plant or animal; and would not eliminate important examples of major periods of California history or prehistory. With respect to the quality of the environment, the Project would not preclude the ability to achieve long-term environmental goals.

b) Have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental efforts of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probably future projects)?

Less Than Significant With Mitigation. While the Project may have the potential to impact the environment, specific regulatory requirements and mitigation measures would be implemented to reduce these impacts to a less than significant level.

c) Have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?

Less Than Significant With Mitigation. Based on the analysis of the above-listed topics, the proposed project could have the potential to impact human beings, either directly or indirectly; however, the implementation of the mitigation measures described throughout this document would reduce all potential impacts to less than significant levels.

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Appendix A

Mitigation Monitoring and Reporting Program

MITIGATION MONITORING AND REPORTING PROGRAM

INTRODUCTION

In accordance with the requirements of Public Resources Code Section 21081.6, and as part of its certification of the adequacy of the Mitigated Negative Declaration (MND) for the ILP North Conversion Project, the following "Mitigation Monitoring and Reporting Plan" ("MMRP" or "Plan") is hereby adopted for this Project. The principal purpose of the MMRP is to ensure that the mitigation measures for the adopted Project are reported and monitored so as to ensure compliance with the measures' requirements.

MITIGATION MONITORING AND REPORTING PLAN

The MMRP is provided in tabular format to facilitate effective tracking and documentation of the status of mitigation measures. The attached MMRP Table provides the following monitoring information:

- **Mitigation Program.** The text of all adopted mitigation program for the Project from the MND.
- **Implementation Action.** This summarizes the action that must be taken to implement the required measure.
- **Timing of Verification.** This identifies when in the process the measure needs to be implemented.
- **Responsible Party.** The party responsible for overseeing the implementation and completion of each measure.

Mitigation Program	Implementing Action(s)	Time of Verification	Responsible Party
AIR QUALITY			
AQ-1. During construction of the Project, Irvine Ranch Water District (IRWD) and its contractors shall be required to comply with regional rules, which would assist in reducing short-term air pollutant emissions. SCAQMD Rule 402 requires that air pollutant emissions not be a nuisance off site. SCAQMD Rule 403 requires that fugitive dust be controlled with the best available control measures so that the presence of such dust does not remain visible in the atmosphere beyond the property line of the emission source.	Verification of compliance with Rule 402 and Rule 403	Inclusion of requirements in contract specifications/ verify during construction	IRWD Construction Contractor
BIOLOGICAL RESOURCES			
BIO-1. Prior to construction activities for the ILP North Alignment near the Baker RWPS and the Santiago Hills C+ Reservoir site, IRWD will retain a qualified Biologist to conduct focused surveys for special status plant species in Project impact areas that have potential to provide habitat for special status plant species. The survey will be done during the peak blooming period in accordance with the most current protocols approved by the CDFW and the California Native Plant Society (CNPS). Per requirements in the NCCP/HCP, if less than 20 individuals of Catalina mariposa lily or intermediate mariposa lily are observed in the impact area, no mitigation would be required; if more than 20 individuals are observed, mitigation will be required. If federally or State-listed species, or CRPR List 1B or 2 species are observed, mitigation will be required. To the greatest extent practicable, efforts shall be made to avoid any special status plant species observed. If avoidance is not feasible, corms/bulbs/seeds will be collected from the Project impact area and will be translocated to a mitigation site with the appropriate habitat for the species. The collection of corms/bulbs/seeds will be conducted at the appropriate time of year to maximize potential for success depending on the species of plant. IRWD will retain a qualified Biologist to prepare a detailed Special Status Plant Mitigation Plan to describe the translocation. IRWD will implement the Mitigation Plan as approved and according to its specified materials, methods, and performance criteria. If thread-leaved brodiaea would be impacted, take authorization will be obtained from the USFWS and CDFW prior to impacting the species.	Conduct focused surveys for special status plant species	Prior to initiation of construction/ verify implementation during construction	IRWD Construction Contractor
BIO-2. Direct impacts to scrub habitats and coastal California gnatcatchers for the ILP North Alignment near the Baker Raw Water Pump Station (RWPS) and indirect impacts for the ILP North Alignment near the Baker RWPS, Santiago Hills C+ Reservoir site, Rattlesnake Complex, and along the ILP North Alignment are fully mitigated through IRWD's participation and contribution in the Central Coastal Natural Communities Conservation Plan (NCCP)/Habitat Conservation Plan (HCP). The participation not only provides mitigation for coastal sage scrub and coastal California gnatcatcher, but also other special status species designated as "Covered Species" by the NCCP/HCP. IRWD will follow the Construction Minimization Measures that are required by the NCCP/HCP listed below. a. To the maximum extent practicable, no grading [removal] of coastal sage scrub habitat that is occupied by nesting gnatcatchers will occur during the breeding season (February 15 through July 15). It is expressly understood that this	Restriction on removal of occupied coastal sage scrub during the bird/raptor and California gnatcatcher breeding seasons (February 15 to September 15).	Prior to initiation of construction/ verify implementation during construction	IRWD Construction Contractor

Mitigation Program	Implementing Action(s)	Time of Verification	Responsible Party
provision and the remaining provisions of these "construction-related minimization measures" are subject to public health and safety considerations. These considerations include unexpected slope stabilization, erosion-control measures, and emergency facility repairs. In the event of such public health and safety circumstances, landowners or public agencies/utilities will provide the U.S. Fish and Wildlife Service (USFWS) and the California Department of Fish and Wildlife (CDFW) with the maximum practicable notice (or such notice as is specified in the NCCP/HCP) to allow for capture of gnatcatchers, cactus wrens, and any other coastal sage scrub Identified Species that are not otherwise flushed and will carry out the following measures only to the extent as practicable in the context of the public health and safety considerations. b. Prior to the commencement of grading operations or other activities involving significant soil disturbance, all areas of coastal sage scrub habitat to be avoided under the provisions of the NCCP/HCP shall be identified with temporary fencing or other markers clearly visible to construction personnel. Additionally, prior to the commencement of grading operations or other activities involving disturbance of coastal sage scrub [ILP North Alignment near the Baker RWPS and Santiago Hills C+ Reservoir site], a survey will be conducted to locate gnatcatchers and cactus wrens within 100 feet of the outer extent of projected soil disturbance activities, and the locations of any such species will be clearly marked and identified on the construction/grading plans. c. A Monitoring Biologist that is familiar with the USFWS/CDFW requirements will be on site during any clearing of coastal sage scrub. The landowner or relevant public agency/utility will advise the USFWS/CDFW at least 7 calendar days (and preferably 14 calendar days) prior to the clearing of any habitat occupied by Identified Species to allow the USFWS/CDFW to work with the Monitoring Biologist in connection with bird-flushing capture activities. The Monitoring Biologist will flush Identified Species (avian or other mobile Identified Species) from occupied habitat areas immediately prior to brush-clearing and earth-moving activities. If birds cannot be flushed, they will be captured in mist nets, if feasible, and relocated to areas of the site to be protected or to the NCCP/HCP Reserve System. It will be the Monitoring Biologist's responsibility to ensure that identified bird species will not be directly impacted by brush-clearing and earth-moving equipment in a manner that also allows for construction activities on a timely basis. d. Following the completion of initial grading/earth-movement activities [ILP North Alignment near the Baker RWPS, Santiago Hills C+ Reservoir site, Rattlesnake Complex, and ILP North Alignment], all areas of coastal sage scrub habitat to be avoided by construction equipment and personnel will be marked with temporary fencing or other appropriate markers clearly visible to construction personnel. No construction access, parking, or equipment storage shall be permitted within such marked areas.			

Mitigation Program	Implementing Action(s)	Time of Verification	Responsible Party
e. In areas bordering the NCCP Reserve System [ILP North Alignment and ILP North Alignment near the Baker RWPS] or Special Linkage/Special Management areas containing significant coastal sage scrub identified in the NCCP/HCP for protection, vehicle transportation routes between cut-and-fill locations will be restricted to a minimum number during construction consistent with Project construction requirements. Waste dirt or rubble will not be deposited on adjacent coastal sage scrub identified in the NCCP/HCP for protection. Pre-construction meetings involving the Monitoring Biologist, construction supervisors, and equipment operators will be conducted and documented to ensure maximum practicable adherence to these measures. To the maximum extent practicable, IRWD will implement the following to minimize impacts: 3. Impacts on coastal sage scrub habitat should be minimized through the design process; 4. Noise-intensive construction should occur outside the gnatcatcher breeding season (the breeding season is from February 15 to August 31).			
BIO-3. If construction activities for the ILP North Alignment near the Baker RWPS or ILP North Alignment would occur during the breeding season for the least Bell's vireo and southwestern willow flycatcher (i.e., March 15 to September 15) within 500 feet of potential habitat for this species (e.g., southern willow scrub, southern arroyo willow forest, mulefat scrub, or disturbed mulefat scrub), IRWD will retain a qualified Biologist to conduct a pre-construction focused survey to determine whether habitat adjacent to the impact area is occupied at the time of construction. If active nests are found during the surveys, a qualified Biologist, in consultation with IRWD, will determine whether construction activities have the potential to disturb the nest(s) and will determine the appropriate construction limitations, which may include but would not be limited to erecting sound barriers, monitoring by a qualified Biologist, or establishing no construction buffers (usually 300 feet for special status song birds, and 500 feet for listed song birds or raptors). In addition, a qualified Biologist will serve as construction monitor, in consultation with IRWD, during those periods that occur near active nest areas to ensure no inadvertent impacts to the nest occur. If necessary, the limits of construction to avoid an active nest will be established in the field with flagging, fencing, or other appropriate barriers, and construction personnel will be instructed on the sensitivity of nest areas.	Conduct a pre-construction focused survey/Monitor during construction activities	Prior to initiation of construction/ verify implementation during construction	IRWD Construction Contractor

Mitigation Program	Implementing Action(s)	Time of Verification	Responsible Party
BIO-4. IRWD will retain a qualified Biologist to conduct a pre-construction survey for burrowing owl within seven days prior to construction activities to determine if there are any active burrowing owls within or adjacent to the impact area. If no active burrows are observed, construction work can proceed. If occupied burrowing owl habitat is detected on or adjacent to the Project impact area, measures to avoid, minimize, or mitigate impacts will be incorporated into the Project and may include the following: • Construction monitoring will occur throughout the duration of ground-disturbing construction activities to ensure that no impacts occur on burrowing owl. The frequency of monitoring will be determined by IRWD through consultation with a qualified Biologist. • Construction exclusion areas will be established around the occupied burrows in which no disturbance will be allowed to occur while the burrows are occupied. Buffer areas will be determined by IRWD through consultation with a qualified Biologist based on the recommendations outlined in the *Staff Report on Burrowing Owl Mitigation* (CDFW 2012). If burrow avoidance is infeasible, a qualified Biologist will implement a passive relocation program in accordance with the *Example Components for Burrowing Owl Artificial Burrow and Exclusion Plans* (CDFW 2012).	Conduct a pre-construction focused survey/Monitor during construction activities	Prior to initiation of construction/ verify implementation during construction	IRWD Construction Contractor
BIO-5. IRWD will require the construction contractor to include Best Management Practices (BMPs) in the Stormwater Pollution Prevention Plan for the Project to minimize soil erosion and sedimentation from the Project sites.	Prepare Stormwater Pollution Prevention Plan to include Best Management Practices	Prior to initiation of construction/ verify implementation during construction	IRWD Construction Contractor
BIO-6. If construction initiation occurs during the raptor nesting season (i.e., February 1 to June 30), IRWD will retain a qualified Biologist to conduct a pre-construction survey within 500 feet of the limits of Project disturbance for the presence of any active raptor nests (common or special status). Any nest found during survey efforts will be mapped on construction plans. If no active nests are found, no further mitigation will be required. If nesting activity is present at any raptor nest site, the following restrictions on construction will be required between February 1 and June 30 (or until nests are no longer active, as determined by IRWD, in consultation with a qualified Biologist): (1) clearing limits shall be established 500 feet in any direction from any occupied nest and (2) access and surveying shall be restricted to within 500 feet of any occupied nest. Any encroachment into the 500-foot buffer area around the known nest will only be allowed if IRWD, in consultation with a qualified Biologist, determines that the proposed activity will not disturb the nest occupants.	Conduct a pre-construction focused survey/Restrict construction activities	Prior to initiation of construction/ verify implementation during construction	IRWD Construction Contractor

Mitigation Program	Implementing Action(s)	Time of Verification	Responsible Party
BIO-7. To the extent practicable, IRWD will plan vegetation removal efforts to occur between September 16 and February 14, which is outside the breeding season for nesting birds. If tree trimming or vegetation removal occurs during the breeding season for nesting birds (i.e., between February 15 and September 15), IRWD will retain a qualified Biologist to conduct a pre-construction nesting bird survey within three days prior to vegetation removal to ensure that no active bird nests would be impacted. If an active nest is observed within the proposed work area IRWD, in consultation with a qualified Biologist, will determine the appropriate size for a protective buffer around the nest based on the sensitivity of the species and the location of the nest. No construction activities will be allowed within the protective buffer until the nest is no longer active, as determined by a qualified Biologist.	Limit vegetation removal between September 16 and February 14/Conduct a pre-construction nesting bird survey	Prior to initiation of construction/ verify implementation during construction	IRWD Construction Contractor
CULTURAL RESOURCES			
CULT-1. Archaeological Observation and Salvage. Prior to the initiation of construction, IRWD shall retain a qualified Archaeologist to be available "on-call" throughout the duration of the ground-disturbing activities. The Archaeologist shall be present at the pre-grade conference; shall, in consultation with IRWD, establish procedures for archaeological resource surveillance; and shall establish, in consultation with IRWD, procedures for temporarily halting or redirecting work to permit the sampling, identification, and evaluation of the artifacts as appropriate. If the archaeological resources are found to be significant, the Archaeological Observer shall determine appropriate actions, in consultation with IRWD, for exploration and/or salvage. Following the completion of all earth-disturbance activities, the Archaeologist's Report will be provided to IRWD.	Conduct archaeological observation and salvage during construction activities	Prior to initiation of construction/ verify implementation during construction	IRWD Construction Contractor
CULT-2. Paleontological Observation and Salvage. Prior to the initiation of construction, IRWD shall retain a qualified Paleontologist to be available "on-call" throughout the duration of grading activities. In the event that prehistoric or historic subsurface cultural resources are discovered during ground-disturbing activities, all work within 50 feet of the resources will be halted and IRWD will consult with the qualified archaeologist to assess the significance of the find according to *CEQA Guidelines* Section 15064.5. If any find is determined to be significant, IRWD and the archaeologist will meet to determine the appropriate avoidance measures or other appropriate mitigation. IRWD will make the final determination. All significant cultural materials recovered will be, as necessary and at the discretion of the consulting archaeologist, subject to scientific analysis, professional museum curation, and documentation according to current professional standards. The qualified paleontologist shall be retained to review project design plans and consult with IRWD to when and where monitoring is required during construction. Based on observations, monitoring may be reduced or discontinued if the qualified paleontologist determines that the possibility of encountering fossiliferious deposits is low. When onsite, the qualified paleontologist will prepare a final monitoring report to be submitted to IRWD.	Conduct paleontological observation and salvage during construction activities	Prior to initiation of construction/ verify implementation during construction	IRWD Construction Contractor

Mitigation Program	Implementing Action(s)	Time of Verification	Responsible Party
CULT-3. In the unlikely event that human remains are encountered, CA Health and Safety Code Section 7050.5 states that no further disturbance shall occur until the county coroner has made a determination of origin and disposition pursuant to CA Public Resources Code Section 5097.98. The county coroner shall be notified immediately if any human remains are found. If the remains are determined to be prehistoric, the coroner will notify the Native American Heritage Commission, which will determine and notify the most likely descendant. With the permission of IRWD or an authorized representative, the most likely descendant may inspect the site of the discovery. IRWD will meet and confer with the most likely descendant regarding their recommendations prior to disturbing the site by further construction activity.	Notify County coroner if human remains are encountered	Implementation during construction	IRWD Construction Contractor
GEOLOGY AND SOILS			
GEO-1. Prior to approval of final plans and specifications for the proposed Project, the Engineer, or his/her designee, shall review the Project plans to confirm that all recommendations in the *Report of Geotechnical Investigation ILP North Conversion Proposed Santiago Hills Zone C+ Reservoir Irvine Ranch Water District Project No. 30496 (5407), City of Orange, Orange County, California* (dated May 14, 2015 and prepared by Kleinfelder) and any future geotechnical reports have been fully and appropriately incorporated.	Incorporate all geotechnical recommendations	Prior approval of final plans and specifications/ verify implementation during construction	IRWD Construction Contractor
HYDROLOGY AND WATER QUALITY			
HYDRO-1. Prior to initiation of construction, IRWD shall ensure that a Notice of Intent with the State Water Resources Control Board (SWRCB) has been filed in order to obtain coverage under the Construction General Permit. Pursuant to the permit requirements, the construction contractor shall develop a Storm Water Pollution Prevention Plan (SWPPP) that incorporates Best Management Practices for reducing or eliminating construction-related pollutants in the site runoff.	File Notice of Intent with State Water Resources Control Board/ Develop a SWPPP	Prior to initiation of construction/ verify implementation during construction	IRWD Construction Contractor
HYDRO-2. Prior to initiation of construction, IRWD shall verify that the General Waste Discharge Requirements issued by the Santa Ana Regional Water Quality Control Board (R8-2015-0004, NPDES No. CAG998001, General Waste Discharge Requirements for Discharges to Surface Waters that Pose an Insignificant [De Minimis] Threat to Water Quality) are in effect and shall govern discharges from construction dewatering and water line/sprinkler line testing should they occur during construction. The property owner/developer shall comply with these regulations, including provisions requiring notification, testing, and reporting of dewatering and testing-related discharges, which shall mitigate any impacts of such discharges.	Verify that the General Waste Discharge Requirements are in effect	Prior to initiation of construction/ verify implementation during construction	IRWD Construction Contractor

Mitigation Program	Implementing Action(s)	Time of Verification	Responsible Party
NOISE			
NOISE-1. Project construction activities shall comply with the noise ordinances of the City of Irvine and the City of Orange, including any daily restrictions on construction hours.	Comply with the noise ordinances	Verify implementation during construction	IRWD Construction Contractor
NOISE-2. If warning signs and similar devices are required to operate between the hours of 8:00 PM and 7:00 AM on weekdays or Saturdays or at any time on Sunday or a federal holiday, IRWD and its contractors shall limit the noise from these devices such that it complies with the City noise ordinances.	Limit noise to comply with noise ordinances	Prior to initiation of construction/ verify implementation during construction	IRWD Construction Contractor
NOISE-3. In the event that blasting activities are required, IRWD shall ensure that a blasting plan is prepared and submitted to the City of Orange Fire Department for review and approval. The blasting plan shall be prepared in accordance with the United States Department of Interior, Office of Surface Mining (USOSM) standards.	Prepare and implement a blasting plan and conduct a pre-blast survey	Prior to commencement of any blasting/ verify implementation during blasting	IRWD Construction Contractor

Appendix B

CalEEMod Calculations

ILP North Conversion - 082515

Orange County, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
User Defined Industrial	1.00	User Defined Unit	3.00	10.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	30
Climate Zone	8			**Operational Year**	2017
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	630.89	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - 3 acres for grading;

Construction Phase - Construction Phase - Clear/Grub (2/8/16-2/19/16), shoring (2/20-3/11/16), exc. (3/12-7/29/16), res. cons (7/30/16-1/27/17), und pip (1/28-3/10/17), orc hill st (1/21-2/17/17), above ground equip (3/11-5/5/17), ratl cmlx (3/11-6/16/17), pving (6/10-6/30/17), pipeline install (3/1/16-2/28/17)

Trips and VMT - Per updated Data needs

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	220.00	261.00
tblConstructionPhase	NumDays	220.00	130.00
tblConstructionPhase	NumDays	220.00	70.00
tblConstructionPhase	NumDays	6.00	100.00
tblConstructionPhase	NumDays	10.00	15.00

tblConstructionPhase	NumDays	3.00	10.00
tblConstructionPhase	PhaseEndDate	3/13/2017	2/28/2017
tblConstructionPhase	PhaseEndDate	8/11/2017	6/16/2017
tblConstructionPhase	PhaseEndDate	7/18/2017	7/29/2016
tblConstructionPhase	PhaseEndDate	7/7/2017	6/30/2017
tblConstructionPhase	PhaseEndDate	2/24/2017	2/17/2017
tblConstructionPhase	PhaseEndDate	3/31/2017	3/10/2017
tblConstructionPhase	PhaseStartDate	3/12/2016	3/1/2016
tblConstructionPhase	PhaseStartDate	5/6/2017	3/11/2017
tblConstructionPhase	PhaseStartDate	3/1/2017	3/12/2016
tblConstructionPhase	PhaseStartDate	6/17/2017	6/10/2017
tblConstructionPhase	PhaseStartDate	1/28/2017	1/21/2017
tblConstructionPhase	PhaseStartDate	2/18/2017	1/28/2017
tblGrading	AcresOfGrading	0.00	50.00
tblGrading	MaterialExported	0.00	32,500.00
tblLandUse	LandUseSquareFeet	0.00	10.00
tblLandUse	LotAcreage	0.00	3.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
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tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
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tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
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tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
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tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
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tblOffRoadEquipment	UsageHours	7.00	4.00
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tblOffRoadEquipment	UsageHours	7.00	8.00
tblProjectCharacteristics	OperationalYear	2014	2017
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tblTripsAndVMT	HaulingTripNumber	4,063.00	5,400.00
tblTripsAndVMT	VendorTripNumber	0.00	4.00
tblTripsAndVMT	VendorTripNumber	0.00	10.00
tblTripsAndVMT	VendorTripNumber	0.00	2.00
tblTripsAndVMT	VendorTripNumber	0.00	2.00
tblTripsAndVMT	WorkerTripNumber	5.00	2.00
tblTripsAndVMT	WorkerTripNumber	10.00	16.00
tblTripsAndVMT	WorkerTripNumber	8.00	2.00
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tblTripsAndVMT	WorkerTripNumber	0.00	40.00
tblTripsAndVMT	WorkerTripNumber	3.00	4.00
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tblTripsAndVMT	WorkerTripNumber	3.00	4.00
tblTripsAndVMT	WorkerTripNumber	0.00	10.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2016	5.7777	58.9311	47.4427	0.0912	8.1512	2.7116	10.8628	3.7975	2.5330	6.3305			9,128.4505	1.1478	0.0000	9,152.5552
2017	4.6882	43.8436	35.1424	0.0654	2.0147	2.4580	4.4727	0.5175	2.2956	2.8131			6,390.4093	1.2326	0.0000	6,416.2939
Total	**10.4659**	**102.7747**	**82.5851**	**0.1566**	**10.1659**	**5.1696**	**15.3355**	**4.3149**	**4.8287**	**9.1436**			**15,518.8599**	**2.3804**	**0.0000**	**15,568.8491**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2016	5.7777	58.9311	47.4427	0.0912	4.5272	2.7116	7.2388	1.9423	2.5330	4.4753			9,128.4505	1.1478	0.0000	9,152.5552
2017	4.6882	43.8436	35.1424	0.0654	2.0147	2.4580	4.4727	0.5175	2.2956	2.8131			6,390.4093	1.2326	0.0000	6,416.2939
Total	**10.4659**	**102.7747**	**82.5851**	**0.1566**	**6.5419**	**5.1696**	**11.7115**	**2.4597**	**4.8287**	**7.2884**			**15,518.8599**	**2.3804**	**0.0000**	**15,568.8491**

	ROG	NOx	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**	**35.65**	**0.00**	**23.63**	**42.99**	**0.00**	**20.29**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	2.7000e-004	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000			2.2000e-004	0.0000		2.3000e-004
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
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Total	**2.7000e-004**	**0.0000**	**1.0000e-004**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**			**2.2000e-004**	**0.0000**	**0.0000**	**2.3000e-004**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	2.7000e-004	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000			2.2000e-004	0.0000		2.3000e-004
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
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Total	**2.7000e-004**	**0.0000**	**1.0000e-004**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**			**2.2000e-004**	**0.0000**	**0.0000**	**2.3000e-004**

	ROG	NOx	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	Clear and Grub	Site Preparation	2/8/2016	2/19/2016	5	10	
2	Install Shoring	Trenching	2/20/2016	3/11/2016	5	15	
3	Pipeline Installation	Building Construction	3/1/2016	2/28/2017	5	261	
4	Excavation	Grading	3/12/2016	7/29/2016	5	100	
5	Reservoir Construction	Building Construction	7/30/2016	1/27/2017	5	130	
6	Orchard Hill Strainers	Trenching	1/21/2017	2/17/2017	5	20	
7	Underground Piping	Trenching	1/28/2017	3/10/2017	5	30	
8	Above Ground equipment	Trenching	3/11/2017	5/5/2017	5	40	
9	Rattle Snake Complex	Building Construction	3/11/2017	6/16/2017	5	70	
10	Site Paving	Paving	6/10/2017	6/30/2017	5	15	

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 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Clear and Grub	Rubber Tired Dozers	1	8.00	255	0.40
Clear and Grub	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Install Shoring	Bore/Drill Rigs	1	8.00	205	0.50
Install Shoring	Cranes	1	4.00	226	0.29
Install Shoring	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Pipeline Installation	Cranes	0	7.00	226	0.29

Pipeline Installation	Forklifts	1	8.00	89	0.20
Pipeline Installation	Generator Sets	1	8.00	84	0.74
Pipeline Installation	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Pipeline Installation	Welders	1	8.00	46	0.45
Excavation	Excavators	1	8.00	162	0.38
Excavation	Graders	0	8.00	174	0.41
Excavation	Rubber Tired Dozers	1	8.00	255	0.40
Excavation	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Reservoir Construction	Aerial Lifts	2	8.00	62	0.31
Reservoir Construction	Bore/Drill Rigs	1	6.00	205	0.50
Reservoir Construction	Cranes	1	4.00	226	0.29
Reservoir Construction	Forklifts	1	4.00	89	0.20
Reservoir Construction	Generator Sets	0	8.00	84	0.74
Reservoir Construction	Other Construction Equipment	1	8.00	171	0.42
Reservoir Construction	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Reservoir Construction	Welders	0	8.00	46	0.45
Orchard Hill Strainers	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Underground Piping	Cranes	1	4.00	226	0.29
Underground Piping	Excavators	1	8.00	162	0.38
Above Ground equipment	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Rattle Snake Complex	Cranes	0	4.00	226	0.29
Rattle Snake Complex	Excavators	1	8.00	162	0.38
Rattle Snake Complex	Forklifts	0	8.00	89	0.20
Rattle Snake Complex	Generator Sets	0	8.00	84	0.74
Rattle Snake Complex	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Rattle Snake Complex	Welders	0	8.00	46	0.45
Site Paving	Cement and Mortar Mixers	0	6.00	9	0.56
Site Paving	Graders	1	8.00	174	0.41

Site Paving	Pavers	1	8.00	125	0.42
Site Paving	Paving Equipment	0	6.00	130	0.36
Site Paving	Rollers	2	6.00	80	0.38
Site Paving	Tractors/Loaders/Backhoes	0	8.00	97	0.37

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Clear and Grub	2	2.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Install Shoring	3	2.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Pipeline Installation	6	10.00	4.00	4,000.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Excavation	3	16.00	0.00	5,400.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Reservoir Construction	7	40.00	10.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Orchard Hill Strainers	1	4.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Underground Piping	2	6.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Above Ground equipment	1	4.00	2.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Rattle Snake Complex	2	10.00	2.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Site Paving	4	16.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Clear and Grub - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.0221	0.0000	6.0221	3.3102	0.0000	3.3102			0.0000			0.0000
Off-Road	1.5788	17.1258	12.8976	0.0120		0.8960	0.8960		0.8243	0.8243			1,247.1093	0.3762		1,255.0089
Total	**1.5788**	**17.1258**	**12.8976**	**0.0120**	**6.0221**	**0.8960**	**6.9181**	**3.3102**	**0.8243**	**4.1346**			**1,247.1093**	**0.3762**		**1,255.0089**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
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
Worker	7.3000e-003	9.8600e-003	0.1034	2.6000e-004	0.0224	1.6000e-004	0.0225	5.9300e-003	1.4000e-004	6.0700e-003			21.4914	1.0700e-003		21.5138
Total	**7.3000e-003**	**9.8600e-003**	**0.1034**	**2.6000e-004**	**0.0224**	**1.6000e-004**	**0.0225**	**5.9300e-003**	**1.4000e-004**	**6.0700e-003**			**21.4914**	**1.0700e-003**		**21.5138**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.7099	0.0000	2.7099	1.4896	0.0000	1.4896			0.0000			0.0000
Off-Road	1.5788	17.1258	12.8976	0.0120		0.8960	0.8960		0.8243	0.8243			1,247.1093	0.3762		1,255.0089
Total	**1.5788**	**17.1258**	**12.8976**	**0.0120**	**2.7099**	**0.8960**	**3.6060**	**1.4896**	**0.8243**	**2.3139**			**1,247.1093**	**0.3762**		**1,255.0089**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
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
Worker	7.3000e-003	9.8600e-003	0.1034	2.6000e-004	0.0224	1.6000e-004	0.0225	5.9300e-003	1.4000e-004	6.0700e-003			21.4914	1.0700e-003		21.5138
Total	**7.3000e-003**	**9.8600e-003**	**0.1034**	**2.6000e-004**	**0.0224**	**1.6000e-004**	**0.0225**	**5.9300e-003**	**1.4000e-004**	**6.0700e-003**			**21.4914**	**1.0700e-003**		**21.5138**

3.3 Install Shoring - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.0487	12.7672	5.9532	0.0147		0.5982	0.5982		0.5503	0.5503			1,524.5368	0.4599		1,534.1938
Total	**1.0487**	**12.7672**	**5.9532**	**0.0147**		**0.5982**	**0.5982**		**0.5503**	**0.5503**			**1,524.5368**	**0.4599**		**1,534.1938**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
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
Worker	7.3000e-003	9.8600e-003	0.1034	2.6000e-004	0.0224	1.6000e-004	0.0225	5.9300e-003	1.4000e-004	6.0700e-003			21.4914	1.0700e-003		21.5138
Total	**7.3000e-003**	**9.8600e-003**	**0.1034**	**2.6000e-004**	**0.0224**	**1.6000e-004**	**0.0225**	**5.9300e-003**	**1.4000e-004**	**6.0700e-003**			**21.4914**	**1.0700e-003**		**21.5138**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.0487	12.7672	5.9532	0.0147		0.5982	0.5982		0.5503	0.5503			1,524.5368	0.4599		1,534.1938
Total	**1.0487**	**12.7672**	**5.9532**	**0.0147**		**0.5982**	**0.5982**		**0.5503**	**0.5503**			**1,524.5368**	**0.4599**		**1,534.1938**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
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
Worker	7.3000e-003	9.8600e-003	0.1034	2.6000e-004	0.0224	1.6000e-004	0.0225	5.9300e-003	1.4000e-004	6.0700e-003			21.4914	1.0700e-003		21.5138
Total	**7.3000e-003**	**9.8600e-003**	**0.1034**	**2.6000e-004**	**0.0224**	**1.6000e-004**	**0.0225**	**5.9300e-003**	**1.4000e-004**	**6.0700e-003**			**21.4914**	**1.0700e-003**		**21.5138**

3.4 Pipeline Installation - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.3223	17.1347	13.3689	0.0188		1.3020	1.3020		1.2363	1.2363			1,838.8871	0.4116		1,847.5297
Total	**2.3223**	**17.1347**	**13.3689**	**0.0188**		**1.3020**	**1.3020**		**1.2363**	**1.2363**			**1,838.8871**	**0.4116**		**1,847.5297**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.2995	4.3678	3.5176	0.0113	0.3058	0.0637	0.3695	0.0826	0.0586	0.1412			1,133.4445	8.1800e-003		1,133.6163
Vendor	0.0388	0.3542	0.4914	8.6000e-004	0.0250	5.5400e-003	0.0305	7.1200e-003	5.0900e-003	0.0122			86.0122	6.3000e-004		86.0255
Worker	0.0365	0.0493	0.5171	1.2800e-003	0.1118	7.8000e-004	0.1126	0.0296	7.2000e-004	0.0304			107.4568	5.3400e-003		107.5688
Total	**0.3748**	**4.7712**	**4.5261**	**0.0134**	**0.4426**	**0.0700**	**0.5126**	**0.1194**	**0.0644**	**0.1838**			**1,326.9134**	**0.0142**		**1,327.2106**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.3223	17.1347	13.3689	0.0188		1.3020	1.3020		1.2363	1.2363			1,838.8871	0.4116		1,847.5297
Total	**2.3223**	**17.1347**	**13.3689**	**0.0188**		**1.3020**	**1.3020**		**1.2363**	**1.2363**			**1,838.8871**	**0.4116**		**1,847.5297**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.2995	4.3678	3.5176	0.0113	0.3058	0.0637	0.3695	0.0826	0.0586	0.1412			1,133.4445	8.1800e-003		1,133.6163
Vendor	0.0388	0.3542	0.4914	8.6000e-004	0.0250	5.5400e-003	0.0305	7.1200e-003	5.0900e-003	0.0122			86.0122	6.3000e-004		86.0255
Worker	0.0365	0.0493	0.5171	1.2800e-003	0.1118	7.8000e-004	0.1126	0.0296	7.2000e-004	0.0304			107.4568	5.3400e-003		107.5688
Total	**0.3748**	**4.7712**	**4.5261**	**0.0134**	**0.4426**	**0.0700**	**0.5126**	**0.1194**	**0.0644**	**0.1838**			**1,326.9134**	**0.0142**		**1,327.2106**

3.4 Pipeline Installation - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.1135	16.0215	13.2191	0.0188		1.1798	1.1798		1.1196	1.1196			1,822.2125	0.3992		1,830.5956
Total	**2.1135**	**16.0215**	**13.2191**	**0.0188**		**1.1798**	**1.1798**		**1.1196**	**1.1196**			**1,822.2125**	**0.3992**		**1,830.5956**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.2813	4.0056	3.3801	0.0112	1.3236	0.0583	1.3818	0.3325	0.0536	0.3860			1,114.7405	8.0300e-003		1,114.9091
Vendor	0.0357	0.3220	0.4662	8.6000e-004	0.0250	4.9400e-003	0.0300	7.1200e-003	4.5500e-003	0.0117			84.6104	6.2000e-004		84.6233
Worker	0.0332	0.0448	0.4703	1.2800e-003	0.1118	7.6000e-004	0.1125	0.0296	7.1000e-004	0.0304			103.2970	4.9500e-003		103.4010
Total	**0.3501**	**4.3724**	**4.3165**	**0.0134**	**1.4603**	**0.0640**	**1.5243**	**0.3692**	**0.0588**	**0.4281**			**1,302.6479**	**0.0136**		**1,302.9334**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.1135	16.0215	13.2191	0.0188		1.1798	1.1798		1.1196	1.1196			1,822.2125	0.3992		1,830.5956
Total	**2.1135**	**16.0215**	**13.2191**	**0.0188**		**1.1798**	**1.1798**		**1.1196**	**1.1196**			**1,822.2125**	**0.3992**		**1,830.5956**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.2813	4.0056	3.3801	0.0112	1.3236	0.0583	1.3818	0.3325	0.0536	0.3860			1,114.7405	8.0300e-003		1,114.9091
Vendor	0.0357	0.3220	0.4662	8.6000e-004	0.0250	4.9400e-003	0.0300	7.1200e-003	4.5500e-003	0.0117			84.6104	6.2000e-004		84.6233
Worker	0.0332	0.0448	0.4703	1.2800e-003	0.1118	7.6000e-004	0.1125	0.0296	7.1000e-004	0.0304			103.2970	4.9500e-003		103.4010
Total	**0.3501**	**4.3724**	**4.3165**	**0.0134**	**1.4603**	**0.0640**	**1.5243**	**0.3692**	**0.0588**	**0.4281**			**1,302.6479**	**0.0136**		**1,302.9334**

3.5 Excavation - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.5891	0.0000	6.5891	3.3731	0.0000	3.3731			0.0000			0.0000
Off-Road	1.9670	21.5566	16.3260	0.0173		1.1140	1.1140		1.0249	1.0249			1,797.0274	0.5421		1,808.4104
Total	**1.9670**	**21.5566**	**16.3260**	**0.0173**	**6.5891**	**1.1140**	**7.7031**	**3.3731**	**1.0249**	**4.3980**			**1,797.0274**	**0.5421**		**1,808.4104**

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	lb/day										lb/day					
Hauling	1.0552	15.3898	12.3944	0.0397	0.9407	0.2243	1.1650	0.2576	0.2063	0.4639			3,993.6917	0.0288		3,994.2971
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
Worker	0.0584	0.0789	0.8274	2.0600e-003	0.1788	1.2500e-003	0.1801	0.0474	1.1500e-003	0.0486			171.9309	8.5400e-003		172.1101
Total	**1.1136**	**15.4687**	**13.2218**	**0.0417**	**1.1195**	**0.2256**	**1.3451**	**0.3050**	**0.2075**	**0.5125**			**4,165.6226**	**0.0374**		**4,166.4073**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.9651	0.0000	2.9651	1.5179	0.0000	1.5179			0.0000			0.0000
Off-Road	1.9670	21.5566	16.3260	0.0173		1.1140	1.1140		1.0249	1.0249			1,797.0274	0.5421		1,808.4104
Total	**1.9670**	**21.5566**	**16.3260**	**0.0173**	**2.9651**	**1.1140**	**4.0791**	**1.5179**	**1.0249**	**2.5428**			**1,797.0274**	**0.5421**		**1,808.4104**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	1.0552	15.3898	12.3944	0.0397	0.9407	0.2243	1.1650	0.2576	0.2063	0.4639			3,993.6917	0.0288		3,994.2971
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
Worker	0.0584	0.0789	0.8274	2.0600e-003	0.1788	1.2500e-003	0.1801	0.0474	1.1500e-003	0.0486			171.9309	8.5400e-003		172.1101
Total	**1.1136**	**15.4687**	**13.2218**	**0.0417**	**1.1195**	**0.2256**	**1.3451**	**0.3050**	**0.2075**	**0.5125**			**4,165.6226**	**0.0374**		**4,166.4073**

3.6 Reservoir Construction - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.8091	21.2401	12.1932	0.0223		1.0734	1.0734		0.9876	0.9876			2,318.0617	0.6992		2,332.7451
Total	**1.8091**	**21.2401**	**12.1932**	**0.0223**		**1.0734**	**1.0734**		**0.9876**	**0.9876**			**2,318.0617**	**0.6992**		**2,332.7451**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	0.0969	0.8854	1.2284	2.1500e-003	0.0625	0.0139	0.0764	0.0178	0.0127	0.0305			215.0304	1.5900e-003		215.0637
Worker	0.1461	0.1972	2.0684	5.1400e-003	0.4471	3.1200e-003	0.4502	0.1186	2.8800e-003	0.1215			429.8271	0.0213		430.2753
Total	**0.2430**	**1.0826**	**3.2968**	**7.2900e-003**	**0.5096**	**0.0170**	**0.5266**	**0.1364**	**0.0156**	**0.1520**			**644.8575**	**0.0229**		**645.3390**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.8091	21.2401	12.1932	0.0223		1.0734	1.0734		0.9876	0.9876			2,318.0617	0.6992		2,332.7451
Total	**1.8091**	**21.2401**	**12.1932**	**0.0223**		**1.0734**	**1.0734**		**0.9876**	**0.9876**			**2,318.0617**	**0.6992**		**2,332.7451**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	0.0969	0.8854	1.2284	2.1500e-003	0.0625	0.0139	0.0764	0.0178	0.0127	0.0305			215.0304	1.5900e-003		215.0637
Worker	0.1461	0.1972	2.0684	5.1400e-003	0.4471	3.1200e-003	0.4502	0.1186	2.8800e-003	0.1215			429.8271	0.0213		430.2753
Total	**0.2430**	**1.0826**	**3.2968**	**7.2900e-003**	**0.5096**	**0.0170**	**0.5266**	**0.1364**	**0.0156**	**0.1520**			**644.8575**	**0.0229**		**645.3390**

3.6 Reservoir Construction - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.6725	19.4038	11.9782	0.0223		0.9697	0.9697		0.8921	0.8921			2,281.2511	0.6990		2,295.9295
Total	**1.6725**	**19.4038**	**11.9782**	**0.0223**		**0.9697**	**0.9697**		**0.8921**	**0.8921**			**2,281.2511**	**0.6990**		**2,295.9295**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	0.0892	0.8051	1.1654	2.1500e-003	0.0625	0.0124	0.0749	0.0178	0.0114	0.0292			211.5259	1.5400e-003		211.5582
Worker	0.1328	0.1790	1.8812	5.1400e-003	0.4471	3.0500e-003	0.4502	0.1186	2.8200e-003	0.1214			413.1882	0.0198		413.6041
Total	**0.2220**	**0.9841**	**3.0466**	**7.2900e-003**	**0.5096**	**0.0154**	**0.5250**	**0.1364**	**0.0142**	**0.1506**			**624.7141**	**0.0214**		**625.1623**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.6725	19.4038	11.9782	0.0223		0.9697	0.9697		0.8921	0.8921			2,281.2511	0.6990		2,295.9295
Total	**1.6725**	**19.4038**	**11.9782**	**0.0223**		**0.9697**	**0.9697**		**0.8921**	**0.8921**			**2,281.2511**	**0.6990**		**2,295.9295**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	0.0892	0.8051	1.1654	2.1500e-003	0.0625	0.0124	0.0749	0.0178	0.0114	0.0292			211.5259	1.5400e-003		211.5582
Worker	0.1328	0.1790	1.8812	5.1400e-003	0.4471	3.0500e-003	0.4502	0.1186	2.8200e-003	0.1214			413.1882	0.0198		413.6041
Total	**0.2220**	**0.9841**	**3.0466**	**7.2900e-003**	**0.5096**	**0.0154**	**0.5250**	**0.1364**	**0.0142**	**0.1506**			**624.7141**	**0.0214**		**625.1623**

3.7 Orchard Hill Strainers - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.3168	3.0439	2.3938	3.1100e-003		0.2289	0.2289		0.2106	0.2106			318.2649	0.0975		320.3128
Total	**0.3168**	**3.0439**	**2.3938**	**3.1100e-003**		**0.2289**	**0.2289**		**0.2106**	**0.2106**			**318.2649**	**0.0975**		**320.3128**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
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
Worker	0.0133	0.0179	0.1881	5.1000e-004	0.0447	3.1000e-004	0.0450	0.0119	2.8000e-004	0.0121			41.3188	1.9800e-003		41.3604
Total	**0.0133**	**0.0179**	**0.1881**	**5.1000e-004**	**0.0447**	**3.1000e-004**	**0.0450**	**0.0119**	**2.8000e-004**	**0.0121**			**41.3188**	**1.9800e-003**		**41.3604**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.3168	3.0439	2.3938	3.1100e-003		0.2289	0.2289		0.2106	0.2106			318.2649	0.0975		320.3128
Total	**0.3168**	**3.0439**	**2.3938**	**3.1100e-003**		**0.2289**	**0.2289**		**0.2106**	**0.2106**			**318.2649**	**0.0975**		**320.3128**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
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
Worker	0.0133	0.0179	0.1881	5.1000e-004	0.0447	3.1000e-004	0.0450	0.0119	2.8000e-004	0.0121			41.3188	1.9800e-003		41.3604
Total	**0.0133**	**0.0179**	**0.1881**	**5.1000e-004**	**0.0447**	**3.1000e-004**	**0.0450**	**0.0119**	**2.8000e-004**	**0.0121**			**41.3188**	**1.9800e-003**		**41.3604**

3.8 Underground Piping - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.6862	7.8634	4.7992	8.1100e-003		0.3691	0.3691		0.3396	0.3396			829.8808	0.2543		835.2205
Total	**0.6862**	**7.8634**	**4.7992**	**8.1100e-003**		**0.3691**	**0.3691**		**0.3396**	**0.3396**			**829.8808**	**0.2543**		**835.2205**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
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
Worker	0.0199	0.0269	0.2822	7.7000e-004	0.0671	4.6000e-004	0.0675	0.0178	4.2000e-004	0.0182			61.9782	2.9700e-003		62.0406
Total	**0.0199**	**0.0269**	**0.2822**	**7.7000e-004**	**0.0671**	**4.6000e-004**	**0.0675**	**0.0178**	**4.2000e-004**	**0.0182**			**61.9782**	**2.9700e-003**		**62.0406**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.6862	7.8634	4.7992	8.1100e-003		0.3691	0.3691		0.3396	0.3396			829.8808	0.2543		835.2205
Total	**0.6862**	**7.8634**	**4.7992**	**8.1100e-003**		**0.3691**	**0.3691**		**0.3396**	**0.3396**			**829.8808**	**0.2543**		**835.2205**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
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
Worker	0.0199	0.0269	0.2822	7.7000e-004	0.0671	4.6000e-004	0.0675	0.0178	4.2000e-004	0.0182			61.9782	2.9700e-003		62.0406
Total	**0.0199**	**0.0269**	**0.2822**	**7.7000e-004**	**0.0671**	**4.6000e-004**	**0.0675**	**0.0178**	**4.2000e-004**	**0.0182**			**61.9782**	**2.9700e-003**		**62.0406**

3.9 Above Ground equipment - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.3168	3.0439	2.3938	3.1100e-003		0.2289	0.2289		0.2106	0.2106			318.2649	0.0975		320.3128
Total	**0.3168**	**3.0439**	**2.3938**	**3.1100e-003**		**0.2289**	**0.2289**		**0.2106**	**0.2106**			**318.2649**	**0.0975**		**320.3128**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	0.0178	0.1610	0.2331	4.3000e-004	0.0125	2.4700e-003	0.0150	3.5600e-003	2.2700e-003	5.8300e-003			42.3052	3.1000e-004		42.3116
Worker	0.0133	0.0179	0.1881	5.1000e-004	0.0447	3.1000e-004	0.0450	0.0119	2.8000e-004	0.0121			41.3188	1.9800e-003		41.3604
Total	**0.0311**	**0.1789**	**0.4212**	**9.4000e-004**	**0.0572**	**2.7800e-003**	**0.0600**	**0.0154**	**2.5500e-003**	**0.0180**			**83.6240**	**2.2900e-003**		**83.6721**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.3168	3.0439	2.3938	3.1100e-003		0.2289	0.2289		0.2106	0.2106			318.2649	0.0975		320.3128
Total	**0.3168**	**3.0439**	**2.3938**	**3.1100e-003**		**0.2289**	**0.2289**		**0.2106**	**0.2106**			**318.2649**	**0.0975**		**320.3128**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	0.0178	0.1610	0.2331	4.3000e-004	0.0125	2.4700e-003	0.0150	3.5600e-003	2.2700e-003	5.8300e-003			42.3052	3.1000e-004		42.3116
Worker	0.0133	0.0179	0.1881	5.1000e-004	0.0447	3.1000e-004	0.0450	0.0119	2.8000e-004	0.0121			41.3188	1.9800e-003		41.3604
Total	**0.0311**	**0.1789**	**0.4212**	**9.4000e-004**	**0.0572**	**2.7800e-003**	**0.0600**	**0.0154**	**2.5500e-003**	**0.0180**			**83.6240**	**2.2900e-003**		**83.6721**

3.10 Rattle Snake Complex - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.6790	7.0607	5.8149	8.4000e-003		0.4266	0.4266		0.3924	0.3924			859.5267	0.2634		865.0572
Total	**0.6790**	**7.0607**	**5.8149**	**8.4000e-003**		**0.4266**	**0.4266**		**0.3924**	**0.3924**			**859.5267**	**0.2634**		**865.0572**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	0.0178	0.1610	0.2331	4.3000e-004	0.0125	2.4700e-003	0.0150	3.5600e-003	2.2700e-003	5.8300e-003			42.3052	3.1000e-004		42.3116
Worker	0.0332	0.0448	0.4703	1.2800e-003	0.1118	7.6000e-004	0.1125	0.0296	7.1000e-004	0.0304			103.2970	4.9500e-003		103.4010
Total	**0.0510**	**0.2058**	**0.7034**	**1.7100e-003**	**0.1243**	**3.2300e-003**	**0.1275**	**0.0332**	**2.9800e-003**	**0.0362**			**145.6022**	**5.2600e-003**		**145.7127**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.6790	7.0607	5.8149	8.4000e-003		0.4266	0.4266		0.3924	0.3924			859.5267	0.2634		865.0572
Total	**0.6790**	**7.0607**	**5.8149**	**8.4000e-003**		**0.4266**	**0.4266**		**0.3924**	**0.3924**			**859.5267**	**0.2634**		**865.0572**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	0.0178	0.1610	0.2331	4.3000e-004	0.0125	2.4700e-003	0.0150	3.5600e-003	2.2700e-003	5.8300e-003			42.3052	3.1000e-004		42.3116
Worker	0.0332	0.0448	0.4703	1.2800e-003	0.1118	7.6000e-004	0.1125	0.0296	7.1000e-004	0.0304			103.2970	4.9500e-003		103.4010
Total	**0.0510**	**0.2058**	**0.7034**	**1.7100e-003**	**0.1243**	**3.2300e-003**	**0.1275**	**0.0332**	**2.9800e-003**	**0.0362**			**145.6022**	**5.2600e-003**		**145.7127**

3.11 Site Paving - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.7791	18.0242	10.6604	0.0147		1.0552	1.0552		0.9708	0.9708			1,501.8614	0.4602		1,511.5249
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.7791**	**18.0242**	**10.6604**	**0.0147**		**1.0552**	**1.0552**		**0.9708**	**0.9708**			**1,501.8614**	**0.4602**		**1,511.5249**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
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
Worker	0.0531	0.0716	0.7525	2.0500e-003	0.1788	1.2200e-003	0.1801	0.0474	1.1300e-003	0.0486			165.2753	7.9200e-003		165.4416
Total	**0.0531**	**0.0716**	**0.7525**	**2.0500e-003**	**0.1788**	**1.2200e-003**	**0.1801**	**0.0474**	**1.1300e-003**	**0.0486**			**165.2753**	**7.9200e-003**		**165.4416**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.7791	18.0242	10.6604	0.0147		1.0552	1.0552		0.9708	0.9708			1,501.8614	0.4602		1,511.5249
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.7791**	**18.0242**	**10.6604**	**0.0147**		**1.0552**	**1.0552**		**0.9708**	**0.9708**			**1,501.8614**	**0.4602**		**1,511.5249**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
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
Worker	0.0531	0.0716	0.7525	2.0500e-003	0.1788	1.2200e-003	0.1801	0.0474	1.1300e-003	0.0486			165.2753	7.9200e-003		165.4416
Total	**0.0531**	**0.0716**	**0.7525**	**2.0500e-003**	**0.1788**	**1.2200e-003**	**0.1801**	**0.0474**	**1.1300e-003**	**0.0486**			**165.2753**	**7.9200e-003**		**165.4416**

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	lb/day										lb/day					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
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

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
User Defined Industrial	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

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-...	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
User Defined Industrial	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
0.510449	0.057012	0.191854	0.151889	0.041459	0.005887	0.015572	0.014818	0.001440	0.002145	0.004716	0.000509	0.002251

5.0 Energy Detail

4.4 Fleet Mix

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000			0.0000	0.0000	0.0000	0.0000
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

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
User Defined Industrial	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
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**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
User Defined Industrial	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
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**

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	lb/day										lb/day					
Mitigated	2.7000e-004	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000			2.2000e-004	0.0000		2.3000e-004
Unmitigated	2.7000e-004	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000			2.2000e-004	0.0000		2.3000e-004

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	6.0000e-005					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	2.0000e-004					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	1.0000e-005	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000			2.2000e-004	0.0000		2.3000e-004
Total	**2.7000e-004**	**0.0000**	**1.0000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**			**2.2000e-004**	**0.0000**		**2.3000e-004**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	6.0000e-005					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	2.0000e-004					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	1.0000e-005	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000			2.2000e-004	0.0000		2.3000e-004
Total	**2.7000e-004**	**0.0000**	**1.0000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**			**2.2000e-004**	**0.0000**		**2.3000e-004**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

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

10.0 Vegetation

ILP North Conversion - 082515

Orange County, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
User Defined Industrial	1.00	User Defined Unit	3.00	10.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	30
Climate Zone	8			**Operational Year**	2017
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	630.89	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - 3 acres for grading;

Construction Phase - Construction Phase - Clear/Grub (2/8/16-2/19/16), shoring (2/20-3/11/16), exc. (3/12-7/29/16), res. cons (7/30/16-1/27/17), und pip (1/28-3/10/17), orc hill st (1/21-2/17/17), above ground equip (3/11-5/5/17), ratl cmlx (3/11-6/16/17), pving (6/10-6/30/17), pipeline install (3/1/16-2/28/17)

Trips and VMT - Per updated Data needs

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	220.00	261.00
tblConstructionPhase	NumDays	220.00	130.00
tblConstructionPhase	NumDays	220.00	70.00
tblConstructionPhase	NumDays	6.00	100.00
tblConstructionPhase	NumDays	10.00	15.00

tblConstructionPhase	NumDays	3.00	10.00
tblConstructionPhase	PhaseEndDate	3/13/2017	2/28/2017
tblConstructionPhase	PhaseEndDate	8/11/2017	6/16/2017
tblConstructionPhase	PhaseEndDate	7/18/2017	7/29/2016
tblConstructionPhase	PhaseEndDate	7/7/2017	6/30/2017
tblConstructionPhase	PhaseEndDate	2/24/2017	2/17/2017
tblConstructionPhase	PhaseEndDate	3/31/2017	3/10/2017
tblConstructionPhase	PhaseStartDate	3/12/2016	3/1/2016
tblConstructionPhase	PhaseStartDate	5/6/2017	3/11/2017
tblConstructionPhase	PhaseStartDate	3/1/2017	3/12/2016
tblConstructionPhase	PhaseStartDate	6/17/2017	6/10/2017
tblConstructionPhase	PhaseStartDate	1/28/2017	1/21/2017
tblConstructionPhase	PhaseStartDate	2/18/2017	1/28/2017
tblGrading	AcresOfGrading	0.00	50.00
tblGrading	MaterialExported	0.00	32,500.00
tblLandUse	LandUseSquareFeet	0.00	10.00
tblLandUse	LotAcreage	0.00	3.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00

tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	UsageHours	7.00	4.00
tblOffRoadEquipment	UsageHours	7.00	4.00
tblOffRoadEquipment	UsageHours	8.00	4.00
tblOffRoadEquipment	UsageHours	7.00	8.00
tblProjectCharacteristics	OperationalYear	2014	2017
tblTripsAndVMT	HaulingTripNumber	0.00	4,000.00
tblTripsAndVMT	HaulingTripNumber	4,063.00	5,400.00
tblTripsAndVMT	VendorTripNumber	0.00	4.00
tblTripsAndVMT	VendorTripNumber	0.00	10.00
tblTripsAndVMT	VendorTripNumber	0.00	2.00
tblTripsAndVMT	VendorTripNumber	0.00	2.00
tblTripsAndVMT	WorkerTripNumber	5.00	2.00
tblTripsAndVMT	WorkerTripNumber	10.00	16.00
tblTripsAndVMT	WorkerTripNumber	8.00	2.00
tblTripsAndVMT	WorkerTripNumber	0.00	10.00
tblTripsAndVMT	WorkerTripNumber	8.00	16.00
tblTripsAndVMT	WorkerTripNumber	0.00	40.00
tblTripsAndVMT	WorkerTripNumber	3.00	4.00
tblTripsAndVMT	WorkerTripNumber	5.00	6.00
tblTripsAndVMT	WorkerTripNumber	3.00	4.00
tblTripsAndVMT	WorkerTripNumber	0.00	10.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2016	5.7777	58.9311	47.4427	0.0912	8.1512	2.7116	10.8628	3.7975	2.5330	6.3305			9,128.4505	1.1478	0.0000	9,152.5552
2017	4.6882	43.8436	35.1424	0.0654	2.0147	2.4580	4.4727	0.5175	2.2956	2.8131			6,390.4093	1.2326	0.0000	6,416.2939
Total	**10.4659**	**102.7747**	**82.5851**	**0.1566**	**10.1659**	**5.1696**	**15.3355**	**4.3149**	**4.8287**	**9.1436**			**15,518.8599**	**2.3804**	**0.0000**	**15,568.8491**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2016	5.7777	58.9311	47.4427	0.0912	4.5272	2.7116	7.2388	1.9423	2.5330	4.4753			9,128.4505	1.1478	0.0000	9,152.5552
2017	4.6882	43.8436	35.1424	0.0654	2.0147	2.4580	4.4727	0.5175	2.2956	2.8131			6,390.4093	1.2326	0.0000	6,416.2939
Total	**10.4659**	**102.7747**	**82.5851**	**0.1566**	**6.5419**	**5.1696**	**11.7115**	**2.4597**	**4.8287**	**7.2884**			**15,518.8599**	**2.3804**	**0.0000**	**15,568.8491**

	ROG	NOx	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**	**35.65**	**0.00**	**23.63**	**42.99**	**0.00**	**20.29**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	2.7000e-004	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000			2.2000e-004	0.0000		2.3000e-004
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
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Total	**2.7000e-004**	**0.0000**	**1.0000e-004**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**			**2.2000e-004**	**0.0000**	**0.0000**	**2.3000e-004**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	2.7000e-004	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000			2.2000e-004	0.0000		2.3000e-004
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
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Total	**2.7000e-004**	**0.0000**	**1.0000e-004**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**			**2.2000e-004**	**0.0000**	**0.0000**	**2.3000e-004**

	ROG	NOx	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	Clear and Grub	Site Preparation	2/8/2016	2/19/2016	5	10	
2	Install Shoring	Trenching	2/20/2016	3/11/2016	5	15	
3	Pipeline Installation	Building Construction	3/1/2016	2/28/2017	5	261	
4	Excavation	Grading	3/12/2016	7/29/2016	5	100	
5	Reservoir Construction	Building Construction	7/30/2016	1/27/2017	5	130	
6	Orchard Hill Strainers	Trenching	1/21/2017	2/17/2017	5	20	
7	Underground Piping	Trenching	1/28/2017	3/10/2017	5	30	
8	Above Ground equipment	Trenching	3/11/2017	5/5/2017	5	40	
9	Rattle Snake Complex	Building Construction	3/11/2017	6/16/2017	5	70	
10	Site Paving	Paving	6/10/2017	6/30/2017	5	15	

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 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Clear and Grub	Rubber Tired Dozers	1	8.00	255	0.40
Clear and Grub	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Install Shoring	Bore/Drill Rigs	1	8.00	205	0.50
Install Shoring	Cranes	1	4.00	226	0.29
Install Shoring	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Pipeline Installation	Cranes	0	7.00	226	0.29
Pipeline Installation	Forklifts	1	8.00	89	0.20
Pipeline Installation	Generator Sets	1	8.00	84	0.74
Pipeline Installation	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Pipeline Installation	Welders	1	8.00	46	0.45
Excavation	Excavators	1	8.00	162	0.38
Excavation	Graders	0	8.00	174	0.41
Excavation	Rubber Tired Dozers	1	8.00	255	0.40
Excavation	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Reservoir Construction	Aerial Lifts	2	8.00	62	0.31
Reservoir Construction	Bore/Drill Rigs	1	6.00	205	0.50
Reservoir Construction	Cranes	1	4.00	226	0.29
Reservoir Construction	Forklifts	1	4.00	89	0.20
Reservoir Construction	Generator Sets	0	8.00	84	0.74
Reservoir Construction	Other Construction Equipment	1	8.00	171	0.42
Reservoir Construction	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Reservoir Construction	Welders	0	8.00	46	0.45
Orchard Hill Strainers	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Underground Piping	Cranes	1	4.00	226	0.29
Underground Piping	Excavators	1	8.00	162	0.38
Above Ground equipment	Tractors/Loaders/Backhoes	1	8.00	97	0.37

Rattle Snake Complex	Cranes	0	4.00	226	0.29
Rattle Snake Complex	Excavators	1	8.00	162	0.38
Rattle Snake Complex	Forklifts	0	8.00	89	0.20
Rattle Snake Complex	Generator Sets	0	8.00	84	0.74
Rattle Snake Complex	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Rattle Snake Complex	Welders	0	8.00	46	0.45
Site Paving	Cement and Mortar Mixers	0	6.00	9	0.56
Site Paving	Graders	1	8.00	174	0.41
Site Paving	Pavers	1	8.00	125	0.42
Site Paving	Paving Equipment	0	6.00	130	0.36
Site Paving	Rollers	2	6.00	80	0.38
Site Paving	Tractors/Loaders/Backhoes	0	8.00	97	0.37

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Clear and Grub	2	2.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Install Shoring	3	2.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Pipeline Installation	6	10.00	4.00	4,000.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Excavation	3	16.00	0.00	5,400.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Reservoir Construction	7	40.00	10.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Orchard Hill Strainers	1	4.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Underground Piping	2	6.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Above Ground equipment	1	4.00	2.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Rattle Snake Complex	2	10.00	2.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Site Paving	4	16.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Clear and Grub - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.0221	0.0000	6.0221	3.3102	0.0000	3.3102			0.0000			0.0000
Off-Road	1.5788	17.1258	12.8976	0.0120		0.8960	0.8960		0.8243	0.8243			1,247.1093	0.3762		1,255.0089
Total	**1.5788**	**17.1258**	**12.8976**	**0.0120**	**6.0221**	**0.8960**	**6.9181**	**3.3102**	**0.8243**	**4.1346**			**1,247.1093**	**0.3762**		**1,255.0089**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
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
Worker	7.3000e-003	9.8600e-003	0.1034	2.6000e-004	0.0224	1.6000e-004	0.0225	5.9300e-003	1.4000e-004	6.0700e-003			21.4914	1.0700e-003		21.5138
Total	**7.3000e-003**	**9.8600e-003**	**0.1034**	**2.6000e-004**	**0.0224**	**1.6000e-004**	**0.0225**	**5.9300e-003**	**1.4000e-004**	**6.0700e-003**			**21.4914**	**1.0700e-003**		**21.5138**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.7099	0.0000	2.7099	1.4896	0.0000	1.4896			0.0000			0.0000
Off-Road	1.5788	17.1258	12.8976	0.0120		0.8960	0.8960		0.8243	0.8243			1,247.1093	0.3762		1,255.0089
Total	**1.5788**	**17.1258**	**12.8976**	**0.0120**	**2.7099**	**0.8960**	**3.6060**	**1.4896**	**0.8243**	**2.3139**			**1,247.1093**	**0.3762**		**1,255.0089**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
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
Worker	7.3000e-003	9.8600e-003	0.1034	2.6000e-004	0.0224	1.6000e-004	0.0225	5.9300e-003	1.4000e-004	6.0700e-003			21.4914	1.0700e-003		21.5138
Total	**7.3000e-003**	**9.8600e-003**	**0.1034**	**2.6000e-004**	**0.0224**	**1.6000e-004**	**0.0225**	**5.9300e-003**	**1.4000e-004**	**6.0700e-003**			**21.4914**	**1.0700e-003**		**21.5138**

3.3 Install Shoring - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.0487	12.7672	5.9532	0.0147		0.5982	0.5982		0.5503	0.5503			1,524.5368	0.4599		1,534.1938
Total	**1.0487**	**12.7672**	**5.9532**	**0.0147**		**0.5982**	**0.5982**		**0.5503**	**0.5503**			**1,524.5368**	**0.4599**		**1,534.1938**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
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
Worker	7.3000e-003	9.8600e-003	0.1034	2.6000e-004	0.0224	1.6000e-004	0.0225	5.9300e-003	1.4000e-004	6.0700e-003			21.4914	1.0700e-003		21.5138
Total	**7.3000e-003**	**9.8600e-003**	**0.1034**	**2.6000e-004**	**0.0224**	**1.6000e-004**	**0.0225**	**5.9300e-003**	**1.4000e-004**	**6.0700e-003**			**21.4914**	**1.0700e-003**		**21.5138**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.0487	12.7672	5.9532	0.0147		0.5982	0.5982		0.5503	0.5503			1,524.5368	0.4599		1,534.1938
Total	**1.0487**	**12.7672**	**5.9532**	**0.0147**		**0.5982**	**0.5982**		**0.5503**	**0.5503**			**1,524.5368**	**0.4599**		**1,534.1938**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
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
Worker	7.3000e-003	9.8600e-003	0.1034	2.6000e-004	0.0224	1.6000e-004	0.0225	5.9300e-003	1.4000e-004	6.0700e-003			21.4914	1.0700e-003		21.5138
Total	**7.3000e-003**	**9.8600e-003**	**0.1034**	**2.6000e-004**	**0.0224**	**1.6000e-004**	**0.0225**	**5.9300e-003**	**1.4000e-004**	**6.0700e-003**			**21.4914**	**1.0700e-003**		**21.5138**

3.4 Pipeline Installation - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.3223	17.1347	13.3689	0.0188		1.3020	1.3020		1.2363	1.2363			1,838.8871	0.4116		1,847.5297
Total	**2.3223**	**17.1347**	**13.3689**	**0.0188**		**1.3020**	**1.3020**		**1.2363**	**1.2363**			**1,838.8871**	**0.4116**		**1,847.5297**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.2995	4.3678	3.5176	0.0113	0.3058	0.0637	0.3695	0.0826	0.0586	0.1412			1,133.4445	8.1800e-003		1,133.6163
Vendor	0.0388	0.3542	0.4914	8.6000e-004	0.0250	5.5400e-003	0.0305	7.1200e-003	5.0900e-003	0.0122			86.0122	6.3000e-004		86.0255
Worker	0.0365	0.0493	0.5171	1.2800e-003	0.1118	7.8000e-004	0.1126	0.0296	7.2000e-004	0.0304			107.4568	5.3400e-003		107.5688
Total	**0.3748**	**4.7712**	**4.5261**	**0.0134**	**0.4426**	**0.0700**	**0.5126**	**0.1194**	**0.0644**	**0.1838**			**1,326.9134**	**0.0142**		**1,327.2106**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.3223	17.1347	13.3689	0.0188		1.3020	1.3020		1.2363	1.2363			1,838.8871	0.4116		1,847.5297
Total	**2.3223**	**17.1347**	**13.3689**	**0.0188**		**1.3020**	**1.3020**		**1.2363**	**1.2363**			**1,838.8871**	**0.4116**		**1,847.5297**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.2995	4.3678	3.5176	0.0113	0.3058	0.0637	0.3695	0.0826	0.0586	0.1412			1,133.4445	8.1800e-003		1,133.6163
Vendor	0.0388	0.3542	0.4914	8.6000e-004	0.0250	5.5400e-003	0.0305	7.1200e-003	5.0900e-003	0.0122			86.0122	6.3000e-004		86.0255
Worker	0.0365	0.0493	0.5171	1.2800e-003	0.1118	7.8000e-004	0.1126	0.0296	7.2000e-004	0.0304			107.4568	5.3400e-003		107.5688
Total	**0.3748**	**4.7712**	**4.5261**	**0.0134**	**0.4426**	**0.0700**	**0.5126**	**0.1194**	**0.0644**	**0.1838**			**1,326.9134**	**0.0142**		**1,327.2106**

3.4 Pipeline Installation - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.1135	16.0215	13.2191	0.0188		1.1798	1.1798		1.1196	1.1196			1,822.2125	0.3992		1,830.5956
Total	**2.1135**	**16.0215**	**13.2191**	**0.0188**		**1.1798**	**1.1798**		**1.1196**	**1.1196**			**1,822.2125**	**0.3992**		**1,830.5956**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.2813	4.0056	3.3801	0.0112	1.3236	0.0583	1.3818	0.3325	0.0536	0.3860			1,114.7405	8.0300e-003		1,114.9091
Vendor	0.0357	0.3220	0.4662	8.6000e-004	0.0250	4.9400e-003	0.0300	7.1200e-003	4.5500e-003	0.0117			84.6104	6.2000e-004		84.6233
Worker	0.0332	0.0448	0.4703	1.2800e-003	0.1118	7.6000e-004	0.1125	0.0296	7.1000e-004	0.0304			103.2970	4.9500e-003		103.4010
Total	**0.3501**	**4.3724**	**4.3165**	**0.0134**	**1.4603**	**0.0640**	**1.5243**	**0.3692**	**0.0588**	**0.4281**			**1,302.6479**	**0.0136**		**1,302.9334**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.1135	16.0215	13.2191	0.0188		1.1798	1.1798		1.1196	1.1196			1,822.2125	0.3992		1,830.5956
Total	**2.1135**	**16.0215**	**13.2191**	**0.0188**		**1.1798**	**1.1798**		**1.1196**	**1.1196**			**1,822.2125**	**0.3992**		**1,830.5956**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.2813	4.0056	3.3801	0.0112	1.3236	0.0583	1.3818	0.3325	0.0536	0.3860			1,114.7405	8.0300e-003		1,114.9091
Vendor	0.0357	0.3220	0.4662	8.6000e-004	0.0250	4.9400e-003	0.0300	7.1200e-003	4.5500e-003	0.0117			84.6104	6.2000e-004		84.6233
Worker	0.0332	0.0448	0.4703	1.2800e-003	0.1118	7.6000e-004	0.1125	0.0296	7.1000e-004	0.0304			103.2970	4.9500e-003		103.4010
Total	**0.3501**	**4.3724**	**4.3165**	**0.0134**	**1.4603**	**0.0640**	**1.5243**	**0.3692**	**0.0588**	**0.4281**			**1,302.6479**	**0.0136**		**1,302.9334**

3.5 Excavation - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.5891	0.0000	6.5891	3.3731	0.0000	3.3731			0.0000			0.0000
Off-Road	1.9670	21.5566	16.3260	0.0173		1.1140	1.1140		1.0249	1.0249			1,797.0274	0.5421		1,808.4104
Total	**1.9670**	**21.5566**	**16.3260**	**0.0173**	**6.5891**	**1.1140**	**7.7031**	**3.3731**	**1.0249**	**4.3980**			**1,797.0274**	**0.5421**		**1,808.4104**

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	lb/day										lb/day					
Hauling	1.0552	15.3898	12.3944	0.0397	0.9407	0.2243	1.1650	0.2576	0.2063	0.4639			3,993.6917	0.0288		3,994.2971
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
Worker	0.0584	0.0789	0.8274	2.0600e-003	0.1788	1.2500e-003	0.1801	0.0474	1.1500e-003	0.0486			171.9309	8.5400e-003		172.1101
Total	**1.1136**	**15.4687**	**13.2218**	**0.0417**	**1.1195**	**0.2256**	**1.3451**	**0.3050**	**0.2075**	**0.5125**			**4,165.6226**	**0.0374**		**4,166.4073**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.9651	0.0000	2.9651	1.5179	0.0000	1.5179			0.0000			0.0000
Off-Road	1.9670	21.5566	16.3260	0.0173		1.1140	1.1140		1.0249	1.0249			1,797.0274	0.5421		1,808.4104
Total	**1.9670**	**21.5566**	**16.3260**	**0.0173**	**2.9651**	**1.1140**	**4.0791**	**1.5179**	**1.0249**	**2.5428**			**1,797.0274**	**0.5421**		**1,808.4104**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	1.0552	15.3898	12.3944	0.0397	0.9407	0.2243	1.1650	0.2576	0.2063	0.4639			3,993.6917	0.0288		3,994.2971
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
Worker	0.0584	0.0789	0.8274	2.0600e-003	0.1788	1.2500e-003	0.1801	0.0474	1.1500e-003	0.0486			171.9309	8.5400e-003		172.1101
Total	**1.1136**	**15.4687**	**13.2218**	**0.0417**	**1.1195**	**0.2256**	**1.3451**	**0.3050**	**0.2075**	**0.5125**			**4,165.6226**	**0.0374**		**4,166.4073**

3.6 Reservoir Construction - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.8091	21.2401	12.1932	0.0223		1.0734	1.0734		0.9876	0.9876			2,318.0617	0.6992		2,332.7451
Total	**1.8091**	**21.2401**	**12.1932**	**0.0223**		**1.0734**	**1.0734**		**0.9876**	**0.9876**			**2,318.0617**	**0.6992**		**2,332.7451**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	0.0969	0.8854	1.2284	2.1500e-003	0.0625	0.0139	0.0764	0.0178	0.0127	0.0305			215.0304	1.5900e-003		215.0637
Worker	0.1461	0.1972	2.0684	5.1400e-003	0.4471	3.1200e-003	0.4502	0.1186	2.8800e-003	0.1215			429.8271	0.0213		430.2753
Total	**0.2430**	**1.0826**	**3.2968**	**7.2900e-003**	**0.5096**	**0.0170**	**0.5266**	**0.1364**	**0.0156**	**0.1520**			**644.8575**	**0.0229**		**645.3390**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.8091	21.2401	12.1932	0.0223		1.0734	1.0734		0.9876	0.9876			2,318.0617	0.6992		2,332.7451
Total	**1.8091**	**21.2401**	**12.1932**	**0.0223**		**1.0734**	**1.0734**		**0.9876**	**0.9876**			**2,318.0617**	**0.6992**		**2,332.7451**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	0.0969	0.8854	1.2284	2.1500e-003	0.0625	0.0139	0.0764	0.0178	0.0127	0.0305			215.0304	1.5900e-003		215.0637
Worker	0.1461	0.1972	2.0684	5.1400e-003	0.4471	3.1200e-003	0.4502	0.1186	2.8800e-003	0.1215			429.8271	0.0213		430.2753
Total	**0.2430**	**1.0826**	**3.2968**	**7.2900e-003**	**0.5096**	**0.0170**	**0.5266**	**0.1364**	**0.0156**	**0.1520**			**644.8575**	**0.0229**		**645.3390**

3.6 Reservoir Construction - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.6725	19.4038	11.9782	0.0223		0.9697	0.9697		0.8921	0.8921			2,281.2511	0.6990		2,295.9295
Total	**1.6725**	**19.4038**	**11.9782**	**0.0223**		**0.9697**	**0.9697**		**0.8921**	**0.8921**			**2,281.2511**	**0.6990**		**2,295.9295**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	0.0892	0.8051	1.1654	2.1500e-003	0.0625	0.0124	0.0749	0.0178	0.0114	0.0292			211.5259	1.5400e-003		211.5582
Worker	0.1328	0.1790	1.8812	5.1400e-003	0.4471	3.0500e-003	0.4502	0.1186	2.8200e-003	0.1214			413.1882	0.0198		413.6041
Total	**0.2220**	**0.9841**	**3.0466**	**7.2900e-003**	**0.5096**	**0.0154**	**0.5250**	**0.1364**	**0.0142**	**0.1506**			**624.7141**	**0.0214**		**625.1623**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.6725	19.4038	11.9782	0.0223		0.9697	0.9697		0.8921	0.8921			2,281.2511	0.6990		2,295.9295
Total	**1.6725**	**19.4038**	**11.9782**	**0.0223**		**0.9697**	**0.9697**		**0.8921**	**0.8921**			**2,281.2511**	**0.6990**		**2,295.9295**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	0.0892	0.8051	1.1654	2.1500e-003	0.0625	0.0124	0.0749	0.0178	0.0114	0.0292			211.5259	1.5400e-003		211.5582
Worker	0.1328	0.1790	1.8812	5.1400e-003	0.4471	3.0500e-003	0.4502	0.1186	2.8200e-003	0.1214			413.1882	0.0198		413.6041
Total	**0.2220**	**0.9841**	**3.0466**	**7.2900e-003**	**0.5096**	**0.0154**	**0.5250**	**0.1364**	**0.0142**	**0.1506**			**624.7141**	**0.0214**		**625.1623**

3.7 Orchard Hill Strainers - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.3168	3.0439	2.3938	3.1100e-003		0.2289	0.2289		0.2106	0.2106			318.2649	0.0975		320.3128
Total	**0.3168**	**3.0439**	**2.3938**	**3.1100e-003**		**0.2289**	**0.2289**		**0.2106**	**0.2106**			**318.2649**	**0.0975**		**320.3128**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
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
Worker	0.0133	0.0179	0.1881	5.1000e-004	0.0447	3.1000e-004	0.0450	0.0119	2.8000e-004	0.0121			41.3188	1.9800e-003		41.3604
Total	**0.0133**	**0.0179**	**0.1881**	**5.1000e-004**	**0.0447**	**3.1000e-004**	**0.0450**	**0.0119**	**2.8000e-004**	**0.0121**			**41.3188**	**1.9800e-003**		**41.3604**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.3168	3.0439	2.3938	3.1100e-003		0.2289	0.2289		0.2106	0.2106			318.2649	0.0975		320.3128
Total	**0.3168**	**3.0439**	**2.3938**	**3.1100e-003**		**0.2289**	**0.2289**		**0.2106**	**0.2106**			**318.2649**	**0.0975**		**320.3128**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
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
Worker	0.0133	0.0179	0.1881	5.1000e-004	0.0447	3.1000e-004	0.0450	0.0119	2.8000e-004	0.0121			41.3188	1.9800e-003		41.3604
Total	**0.0133**	**0.0179**	**0.1881**	**5.1000e-004**	**0.0447**	**3.1000e-004**	**0.0450**	**0.0119**	**2.8000e-004**	**0.0121**			**41.3188**	**1.9800e-003**		**41.3604**

3.8 Underground Piping - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.6862	7.8634	4.7992	8.1100e-003		0.3691	0.3691		0.3396	0.3396			829.8808	0.2543		835.2205
Total	**0.6862**	**7.8634**	**4.7992**	**8.1100e-003**		**0.3691**	**0.3691**		**0.3396**	**0.3396**			**829.8808**	**0.2543**		**835.2205**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
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
Worker	0.0199	0.0269	0.2822	7.7000e-004	0.0671	4.6000e-004	0.0675	0.0178	4.2000e-004	0.0182			61.9782	2.9700e-003		62.0406
Total	**0.0199**	**0.0269**	**0.2822**	**7.7000e-004**	**0.0671**	**4.6000e-004**	**0.0675**	**0.0178**	**4.2000e-004**	**0.0182**			**61.9782**	**2.9700e-003**		**62.0406**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.6862	7.8634	4.7992	8.1100e-003		0.3691	0.3691		0.3396	0.3396			829.8808	0.2543		835.2205
Total	**0.6862**	**7.8634**	**4.7992**	**8.1100e-003**		**0.3691**	**0.3691**		**0.3396**	**0.3396**			**829.8808**	**0.2543**		**835.2205**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
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
Worker	0.0199	0.0269	0.2822	7.7000e-004	0.0671	4.6000e-004	0.0675	0.0178	4.2000e-004	0.0182			61.9782	2.9700e-003		62.0406
Total	**0.0199**	**0.0269**	**0.2822**	**7.7000e-004**	**0.0671**	**4.6000e-004**	**0.0675**	**0.0178**	**4.2000e-004**	**0.0182**			**61.9782**	**2.9700e-003**		**62.0406**

3.9 Above Ground equipment - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.3168	3.0439	2.3938	3.1100e-003		0.2289	0.2289		0.2106	0.2106			318.2649	0.0975		320.3128
Total	**0.3168**	**3.0439**	**2.3938**	**3.1100e-003**		**0.2289**	**0.2289**		**0.2106**	**0.2106**			**318.2649**	**0.0975**		**320.3128**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	0.0178	0.1610	0.2331	4.3000e-004	0.0125	2.4700e-003	0.0150	3.5600e-003	2.2700e-003	5.8300e-003			42.3052	3.1000e-004		42.3116
Worker	0.0133	0.0179	0.1881	5.1000e-004	0.0447	3.1000e-004	0.0450	0.0119	2.8000e-004	0.0121			41.3188	1.9800e-003		41.3604
Total	**0.0311**	**0.1789**	**0.4212**	**9.4000e-004**	**0.0572**	**2.7800e-003**	**0.0600**	**0.0154**	**2.5500e-003**	**0.0180**			**83.6240**	**2.2900e-003**		**83.6721**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.3168	3.0439	2.3938	3.1100e-003		0.2289	0.2289		0.2106	0.2106			318.2649	0.0975		320.3128
Total	**0.3168**	**3.0439**	**2.3938**	**3.1100e-003**		**0.2289**	**0.2289**		**0.2106**	**0.2106**			**318.2649**	**0.0975**		**320.3128**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	0.0178	0.1610	0.2331	4.3000e-004	0.0125	2.4700e-003	0.0150	3.5600e-003	2.2700e-003	5.8300e-003			42.3052	3.1000e-004		42.3116
Worker	0.0133	0.0179	0.1881	5.1000e-004	0.0447	3.1000e-004	0.0450	0.0119	2.8000e-004	0.0121			41.3188	1.9800e-003		41.3604
Total	**0.0311**	**0.1789**	**0.4212**	**9.4000e-004**	**0.0572**	**2.7800e-003**	**0.0600**	**0.0154**	**2.5500e-003**	**0.0180**			**83.6240**	**2.2900e-003**		**83.6721**

3.10 Rattle Snake Complex - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.6790	7.0607	5.8149	8.4000e-003		0.4266	0.4266		0.3924	0.3924			859.5267	0.2634		865.0572
Total	**0.6790**	**7.0607**	**5.8149**	**8.4000e-003**		**0.4266**	**0.4266**		**0.3924**	**0.3924**			**859.5267**	**0.2634**		**865.0572**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	0.0178	0.1610	0.2331	4.3000e-004	0.0125	2.4700e-003	0.0150	3.5600e-003	2.2700e-003	5.8300e-003			42.3052	3.1000e-004		42.3116
Worker	0.0332	0.0448	0.4703	1.2800e-003	0.1118	7.6000e-004	0.1125	0.0296	7.1000e-004	0.0304			103.2970	4.9500e-003		103.4010
Total	**0.0510**	**0.2058**	**0.7034**	**1.7100e-003**	**0.1243**	**3.2300e-003**	**0.1275**	**0.0332**	**2.9800e-003**	**0.0362**			**145.6022**	**5.2600e-003**		**145.7127**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.6790	7.0607	5.8149	8.4000e-003		0.4266	0.4266		0.3924	0.3924			859.5267	0.2634		865.0572
Total	**0.6790**	**7.0607**	**5.8149**	**8.4000e-003**		**0.4266**	**0.4266**		**0.3924**	**0.3924**			**859.5267**	**0.2634**		**865.0572**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	0.0178	0.1610	0.2331	4.3000e-004	0.0125	2.4700e-003	0.0150	3.5600e-003	2.2700e-003	5.8300e-003			42.3052	3.1000e-004		42.3116
Worker	0.0332	0.0448	0.4703	1.2800e-003	0.1118	7.6000e-004	0.1125	0.0296	7.1000e-004	0.0304			103.2970	4.9500e-003		103.4010
Total	**0.0510**	**0.2058**	**0.7034**	**1.7100e-003**	**0.1243**	**3.2300e-003**	**0.1275**	**0.0332**	**2.9800e-003**	**0.0362**			**145.6022**	**5.2600e-003**		**145.7127**

3.11 Site Paving - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.7791	18.0242	10.6604	0.0147		1.0552	1.0552		0.9708	0.9708			1,501.8614	0.4602		1,511.5249
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.7791**	**18.0242**	**10.6604**	**0.0147**		**1.0552**	**1.0552**		**0.9708**	**0.9708**			**1,501.8614**	**0.4602**		**1,511.5249**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
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
Worker	0.0531	0.0716	0.7525	2.0500e-003	0.1788	1.2200e-003	0.1801	0.0474	1.1300e-003	0.0486			165.2753	7.9200e-003		165.4416
Total	**0.0531**	**0.0716**	**0.7525**	**2.0500e-003**	**0.1788**	**1.2200e-003**	**0.1801**	**0.0474**	**1.1300e-003**	**0.0486**			**165.2753**	**7.9200e-003**		**165.4416**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.7791	18.0242	10.6604	0.0147		1.0552	1.0552		0.9708	0.9708			1,501.8614	0.4602		1,511.5249
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.7791**	**18.0242**	**10.6604**	**0.0147**		**1.0552**	**1.0552**		**0.9708**	**0.9708**			**1,501.8614**	**0.4602**		**1,511.5249**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
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
Worker	0.0531	0.0716	0.7525	2.0500e-003	0.1788	1.2200e-003	0.1801	0.0474	1.1300e-003	0.0486			165.2753	7.9200e-003		165.4416
Total	**0.0531**	**0.0716**	**0.7525**	**2.0500e-003**	**0.1788**	**1.2200e-003**	**0.1801**	**0.0474**	**1.1300e-003**	**0.0486**			**165.2753**	**7.9200e-003**		**165.4416**

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	lb/day										lb/day					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
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

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
User Defined Industrial	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

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-...	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
User Defined Industrial	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
0.510449	0.057012	0.191854	0.151889	0.041459	0.005887	0.015572	0.014818	0.001440	0.002145	0.004716	0.000509	0.002251

5.0 Energy Detail

4.4 Fleet Mix

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000			0.0000	0.0000	0.0000	0.0000
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

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
User Defined Industrial	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
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**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
User Defined Industrial	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
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**

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	lb/day										lb/day					
Mitigated	2.7000e-004	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000			2.2000e-004	0.0000		2.3000e-004
Unmitigated	2.7000e-004	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000			2.2000e-004	0.0000		2.3000e-004

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	6.0000e-005					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	2.0000e-004					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	1.0000e-005	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000			2.2000e-004	0.0000		2.3000e-004
Total	**2.7000e-004**	**0.0000**	**1.0000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**			**2.2000e-004**	**0.0000**		**2.3000e-004**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	6.0000e-005					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	2.0000e-004					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	1.0000e-005	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000			2.2000e-004	0.0000		2.3000e-004
Total	**2.7000e-004**	**0.0000**	**1.0000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**			**2.2000e-004**	**0.0000**		**2.3000e-004**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

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

10.0 Vegetation

Appendix C

Biotechnical Report

BonTerra PSOMAS

Biological Resources Report

Irvine Ranch Water District
Irvine Lake Pipeline North Conversion Project
Cities of Irvine and Orange, Orange County, California

Prepared for

Ms. Jo Ann Corey
Irvine Ranch Water District
15600 Sand Canyon Avenue
Irvine, California 92618

Prepared by

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BonTerra Psomas
3 Hutton Centre Drive, Suite 200
Santa Ana, California 92707

October 2015

TABLE OF CONTENTS

Section **Page**

TABLES

Table **Page**

EXHIBITS

Exhibit **Follows Page**

ATTACHMENTS

Attachment

This Biological Resources Report presents the findings of biological surveys for the Irvine Ranch Water District's (IRWD) Irvine Lake Pipeline (ILP) North Conversion Project (hereinafter referred to as the "proposed Project") located in the cities of Irvine and Orange, Orange County, California (Exhibit 1). The purpose of the surveys was to evaluate biological resources within and adjacent to the Project sites to evaluate potential impacts and to determine appropriate mitigation for the Project.

1.0 PROJECT DESCRIPTION

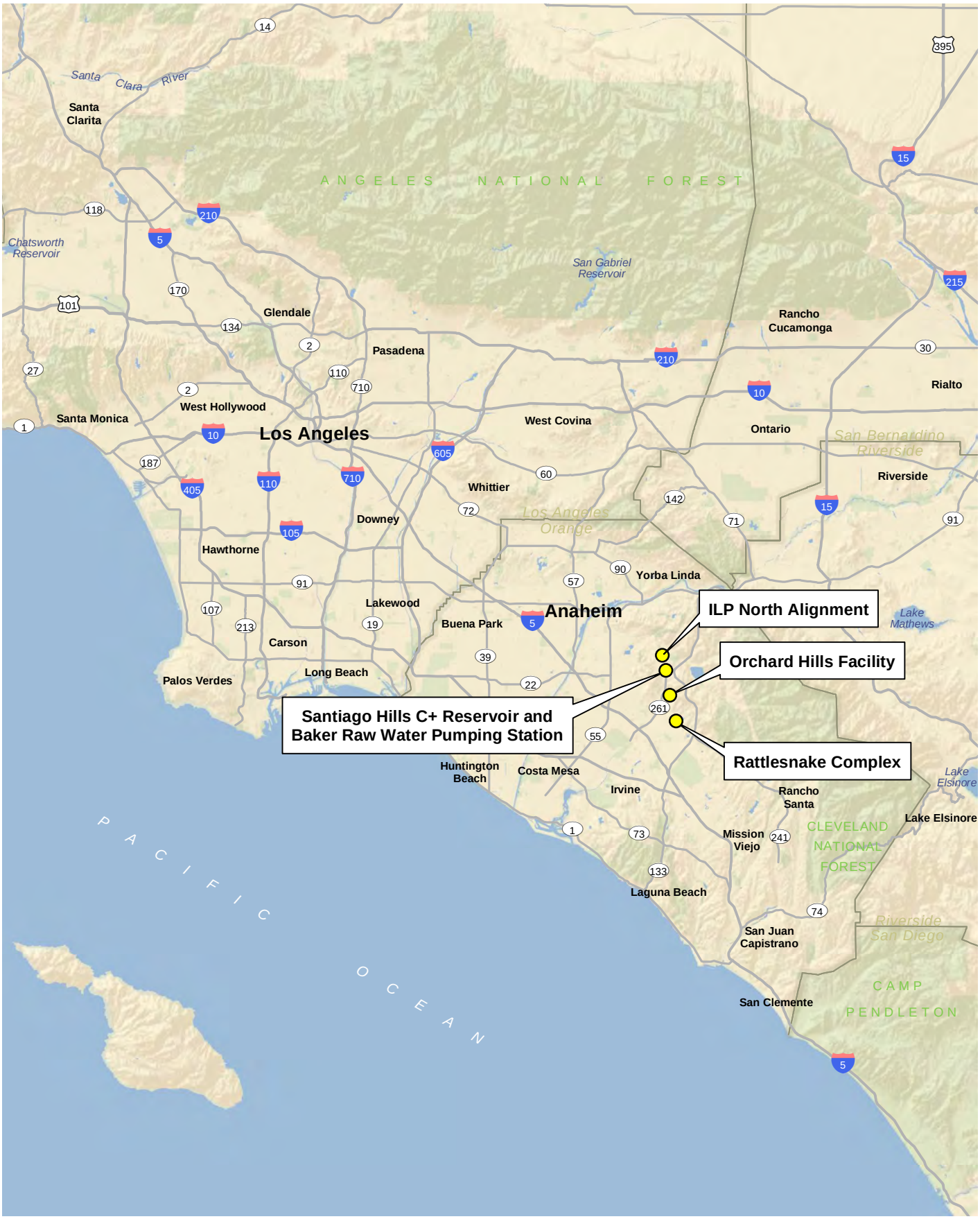
Irvine Ranch Water District (IRWD) is proposing to convert the northern section of the ILP to a pipeline that can supply recycled water to existing customers and to extend the recycled water system. As part of this effort, a section of the ILP from the section of the proposed Baker Raw Water Pump Station (RWPS) near the Peters Canyon Reservoir to the Rattlesnake Reservoir Complex would be converted to a recycled water line. The proposed Project would include the following:

- Construction of a buried, circular 2.4 million gallon Zone C+ recycled water tank in the vicinity of the existing Zone 5 Santiago Hills reservoir.
- Construction of a 42-inch reservoir inlet transmission main along East Santiago Canyon Road from the ILP to the proposed Zone C+ tank.
- Construction of a 42-inch reservoir outlet transmission main along East Santiago Canyon Road from the proposed Zone C+ tank to the ILP, south of the suction piping to the Baker RWPS.
- Minor modifications to the existing booster pump station in the Rattlesnake Complex.
- Construction of a 20-inch recycled water pipeline northerly along Jamboree Road from its intersection with Chapman Avenue/Santiago Canyon Road to Santiago Canyon Road and a 10-inch pipeline along Santiago Canyon Road from Jamboree Road to the irrigation meter at the cemetery of the Holy Sepulcher.
- Reconfiguration of the Orchard Hills Facility to serve as a back-up source of recycled water for Zone C customers.

2.0 PROJECT LOCATION

The proposed Project is located in the cities of Irvine and Orange (Exhibit 1). The proposed Project is located on the U.S. Geologic Survey's (USGS) Orange and El Toro 7.5-minute quadrangles (Exhibit 2).

The survey area for the proposed Project includes the Project site plus a 100-foot buffer around it (Exhibits 3a–3c). The survey area extends along East Santiago Canyon Road from its intersection with Amopola Road southeast to its intersection with Jamboree Road, then along Jamboree Road south to the Baker RWPS located in Peters Canyon Regional Park. It also extends along East Santiago Canyon Road from its intersection with Jamboree Road east to the Santiago Hills C+ Reservoir site. The improvements at the Orchard Hills Facility and Rattlesnake Complex would both occur within the existing facilities. The Orchard Hills Facility is located north of the Orchard Hills community approximately 900 feet west of the terminus of Rembrandt Road and 2,300 feet southeast of State Route (SR) 261. The Rattlesnake Complex is located southeast of the intersection of Portola Parkway and Orchard Hills. In this report, we generally refer to the following areas: (1) Santiago Hills C+ Reservoir site; (2) ILP North Alignment near the Baker RWPS; (3) ILP North Alignment (i.e., pipelines along East Santiago Canyon Road and Jamboree



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Regional Location

Exhibit 1

IRWD ILP North Conversion Project

N W E S

10 5 0 10 Miles

BonTerra PSOMAS

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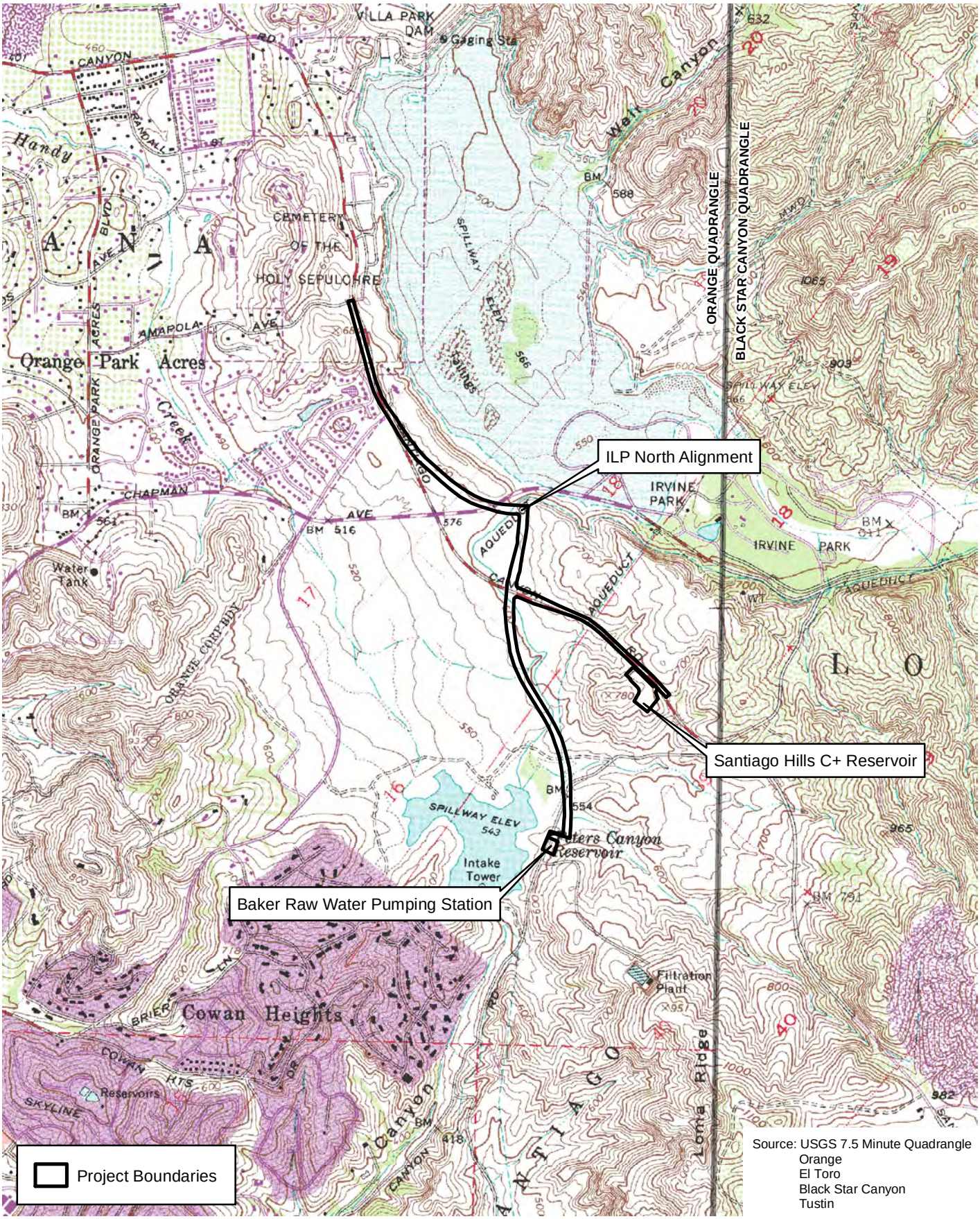

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Local Vicinity

Exhibit 2a

IRWD ILP North Conversion Project

N W E S

2,000 1,000 0 2,000

Feet

BonTerra PSOMAS

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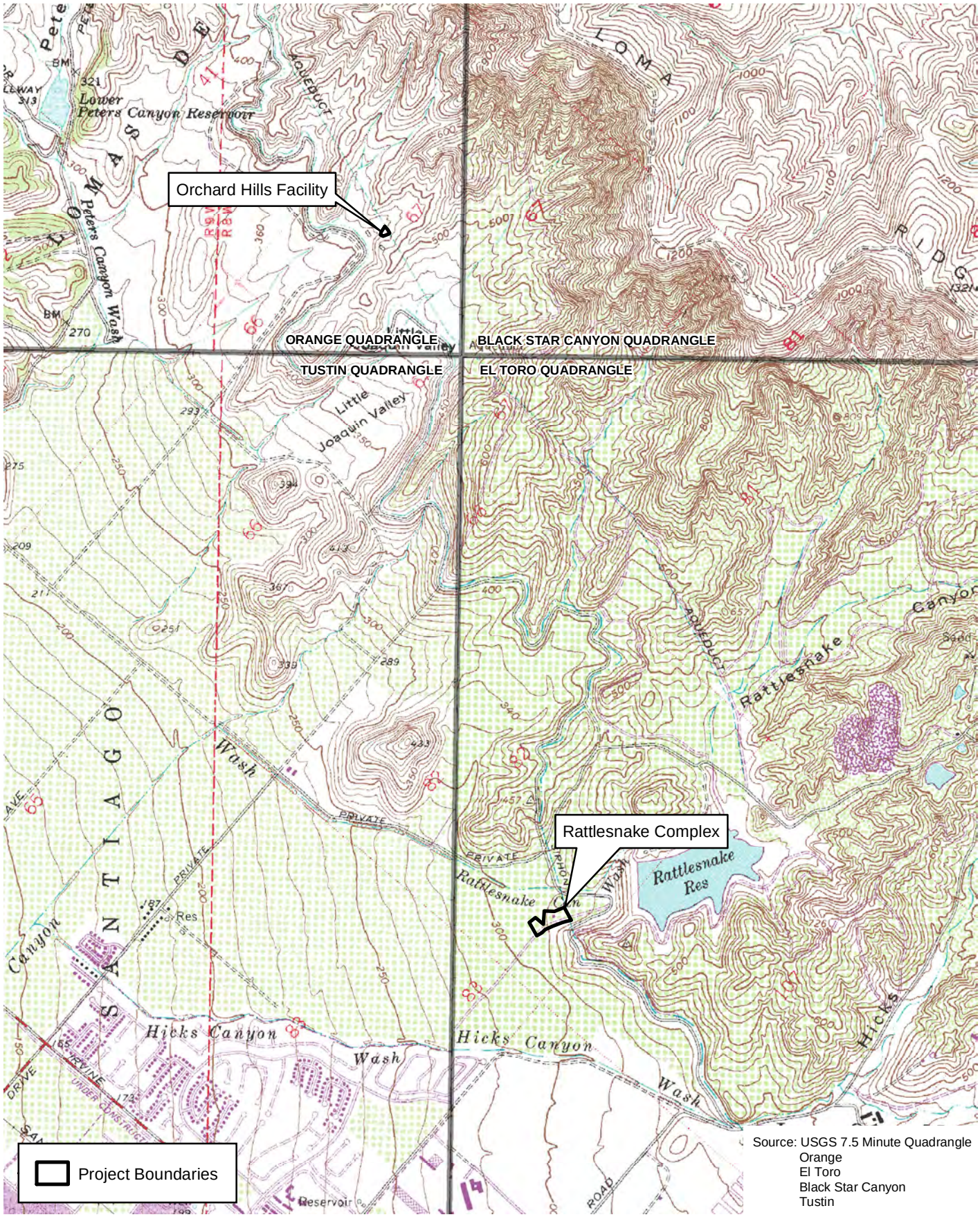

Source: USGS 7.5 Minute Quadrangle
Orange
El Toro
Black Star Canyon
Tustin

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Local Vicinity

Exhibit 2b

IRWD ILP North Conversion Project

N W E S

2,000 1,000 0 2,000

Feet

BonTerra PSOMAS

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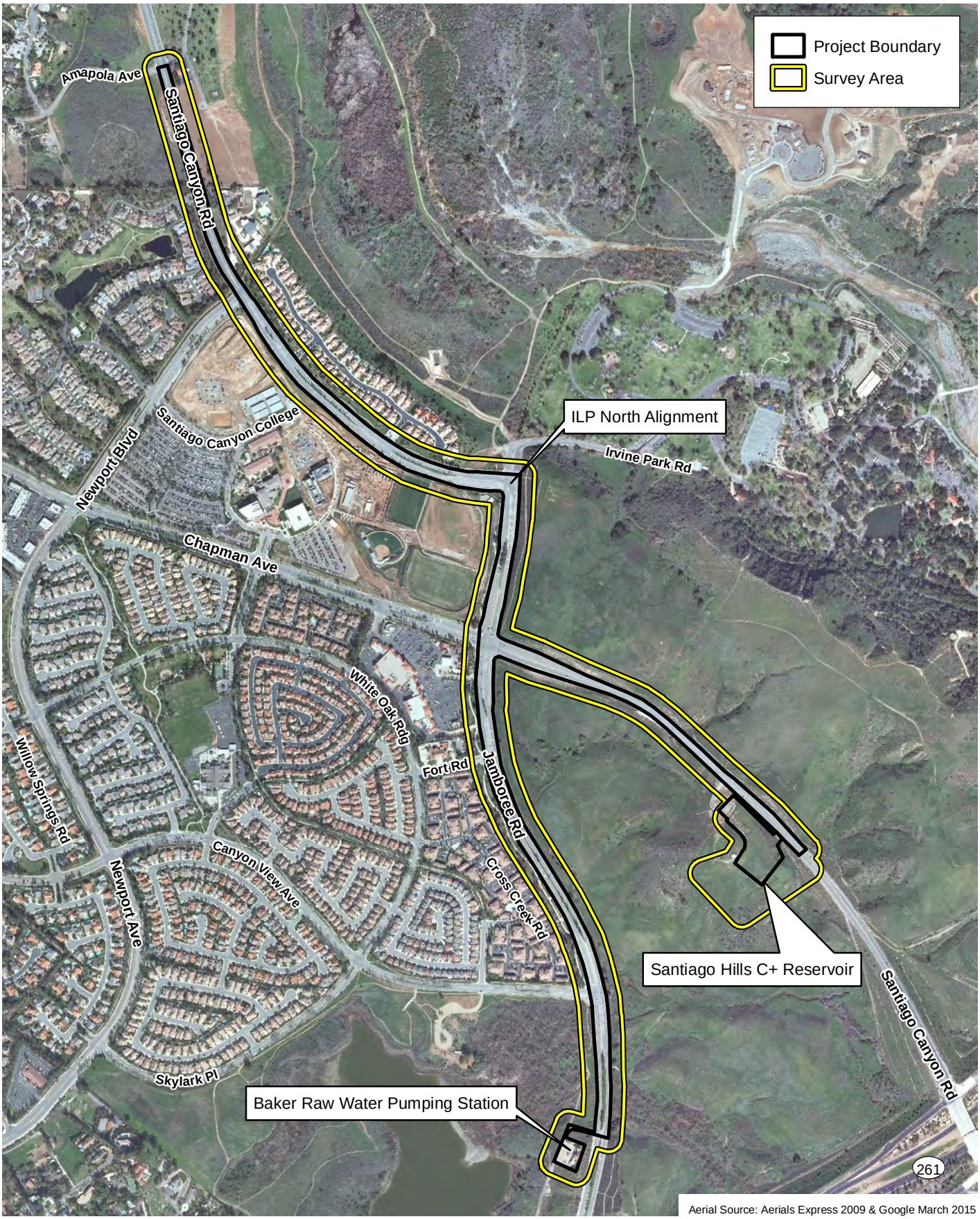

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Survey Area

Exhibit 3a

IRWD ILP North Conversion Project

N W E S

1,000 500 0 1,000

Feet

BonTerra PSOMAS

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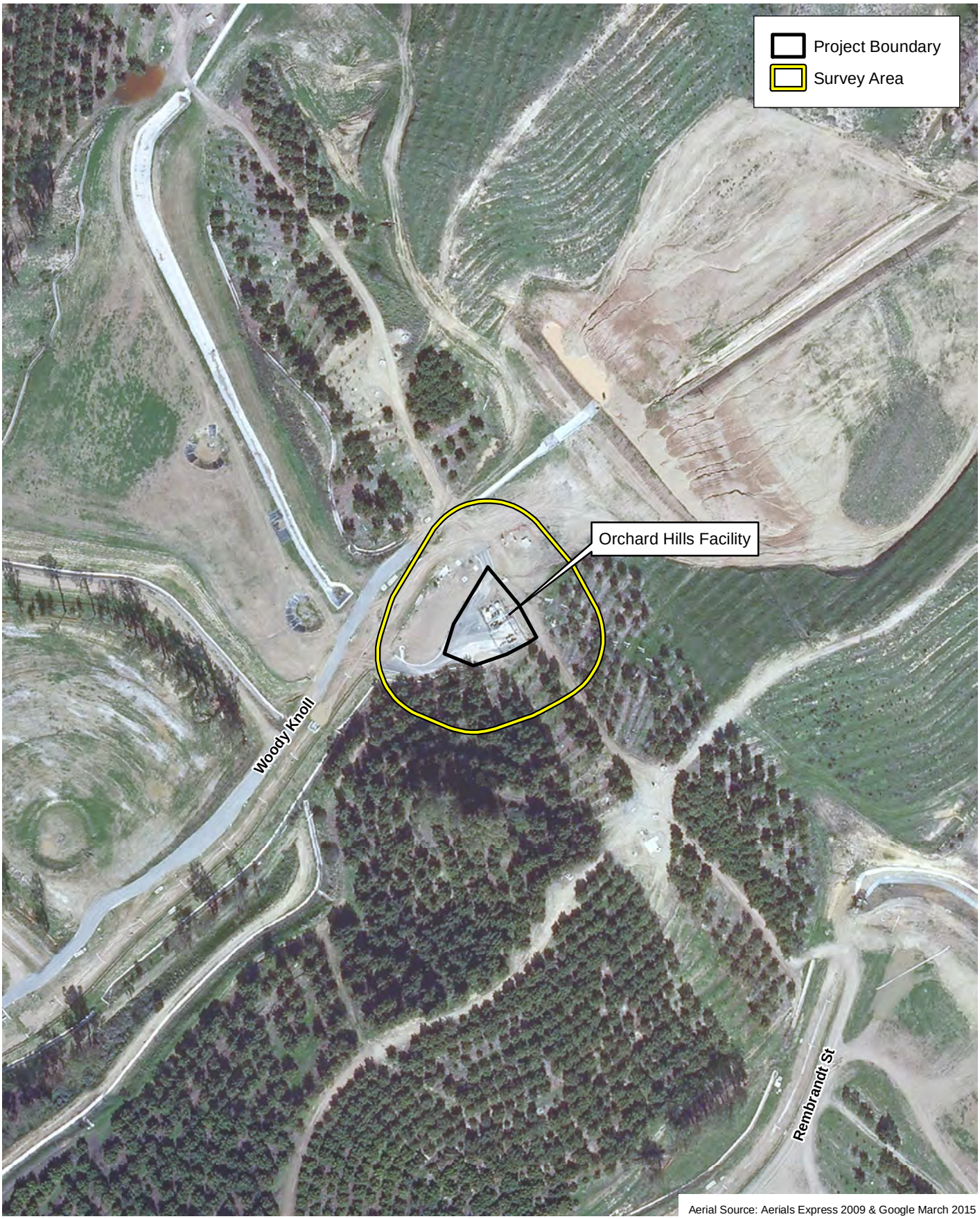

Aerial Source: Aerials Express 2009 & Google March 2015

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Survey Area

Exhibit 3b

IRWD ILP North Conversion Project

N
W E
S

200 100 0 200

Feet

BonTerra PSOMAS

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Survey Area

Exhibit 3c

IRWD ILP North Conversion Project

N W E S

200 100 0 200

Feet

BonTerra PSOMAS

(Rev: 9-10-2015 JAZ) R:\Projects\IRW_IRWD\3IRW000701\Graphics\BioConstraints\ex3_SurveyArea.pdf

Road); (4) Rattlesnake Complex; and (5) Orchard Hills Facility. Representative photographs of the survey area are provided in Attachment A.

Topography in the survey area generally consists of rolling foothills; elevation ranges from approximately 313 feet above mean sea level (msl) at the Rattlesnake Complex to 733 feet above msl along East Santiago Canyon Road.

Soils in the survey area are mapped as Alo clay, Balcom clay loam, Balcom–rock outcrop complex, Calleguas clay loam, Capistrano sandy loam, Mocho loam, Myford sandy loam, Soper gravelly loam, Yorba cobbly sandy loam, and Yorba gravelly sandy loam.

The survey area is located in the Central/Coastal Subregion of the Natural Communities Conservation Plan/Habitat Conservation Plan (NCCP/HCP). The purpose of this plan is intended to ensure the long-term survival of the coastal California gnatcatcher (*Polioptila californica californica*) and other special status coastal sage scrub-dependent plant and wildlife species in accordance with State-sanctioned NCCP program guidelines. IRWD is a participating jurisdiction and, as such, is subject to the terms of the NCCP/HCP Implementation Agreement (IA).

3.0 SURVEY METHODS

The California Native Plant Society's (CNPS's) Inventory of Rare and Endangered Vascular Plants of California (CNPS 2015), the California Department of Fish and Wildlife's (CDFW's) California Natural Diversity Database (CDFW 2015), and the U.S. Fish and Wildlife Service's (USFWS') Information for Planning and Conservation Database (IPaC) were reviewed prior to the survey to identify special status plants, wildlife, and habitats known to occur in the vicinity of the Project sites. Database searches included the USGS' Black Star Canyon, Tustin, El Toro, and Orange 7.5-minute quadrangles and are included in Attachment B. Other pertinent information was obtained from documentation prepared by biologists who have previously conducted research in the immediate vicinity. This includes various reports prepared by Harmsworth Associates (1998–1999) for the NCCP Central/Coastal Subregion.

BonTerra Psomas Biologists Ian Cain and Courtney Rose conducted a general plant and wildlife survey and mapped vegetation on June 23 and July 1, 2015. Vegetation was mapped in the field on a 1 inch equals 200 feet (1″ = 200′) scale color aerial. In the event the tree canopy covered another vegetation type (e.g., oak canopy over a road) the vegetation was mapped as the corresponding vegetation type for the canopy. Nomenclature for vegetation types follows that of *The Habitat Classification System Natural Resources Geographic Information System (GIS) Project* (Gray and Bramlet 1992).

BonTerra Psomas Biologist Jonathan Aguayo (USFWS Permit No. TE96514A-0) conducted focused surveys for coastal California gnatcatcher following the USFWS survey protocol for projects within NCCP areas. This protocol requires three visits, conducted at least one week apart, to all potentially occupied habitat areas under suitable weather conditions; surveys were conducted on August 10, 18, and 26, 2015. Results of the survey are included in Attachment C.

4.0 SURVEY RESULTS

4.1 VEGETATION TYPES

Vegetation types and other areas in the survey area consist of California sagebrush–California buckwheat scrub, disturbed California sagebrush–California buckwheat scrub, black sage scrub, disturbed California sagebrush scrub, buckwheat scrub, southern cactus scrub, coastal goldenbush–grassland, annual grassland, ruderal, sumac savannah, southern willow scrub,

southern arroyo willow forest, mulefat scrub, disturbed mulefat scrub, vineyards and orchards, urban, non-urban industrial, transportation, parks and ornamental plantings, cleared or graded, and other disturbed areas (Exhibits 4a–4f). These vegetation types are described below; the number codes for the Habitat Classification system are listed with each vegetation type.

4.1.1 Scrub Habitats

California Sagebrush–California Buckwheat Scrub (2.3.1)

California sagebrush–California buckwheat scrub is dominated by California sagebrush (*Artemisia californica*) and leafy California buckwheat (*Eriogonum fasciculatum* var. *foliolosum*) in the shrub layer, with some occurrence of other species such as laurel sumac (*Malosma laurina*) and black sage (*Salvia mellifera*). The herb layer contains red brome (*Bromus madritensis* ssp. *rubens*) and rattail fescue (*Festuca myuros*). Bare ground composes between 10 and 20 percent of this vegetation type. This vegetation type occurs throughout the survey area.

Disturbed California Sagebrush–California Buckwheat Scrub (2.3.1)

Disturbed California sagebrush – California buckwheat scrub is dominated by sparse cover of California sagebrush and leafy California buckwheat with non-native species, such as fennel (*Foeniculum vulgare*), tocalote (*Centaurea melitensis*), and red brome, forming the understory. Within the survey area this vegetation type occurs at the Santiago Hills C+ Reservoir site.

Black Sage Scrub (2.3.4)

Black sage scrub is dominated by black sage with California brittlebush (*Encelia californica*) and leafy California buckwheat co-occurring. The herb layer is somewhat poorly developed, but rattail fescue, red brome, shortpod mustard (*Hirschfeldia incana*), and San Diego wire-lettuce (*Stephanomeria diegensis*) occur along the margins and in openings. Within the survey area, this vegetation type occurs along Jamboree Road.

Disturbed California Sagebrush Scrub (2.3.6)

Disturbed California sagebrush scrub is dominated by California sagebrush; it is considered degraded quality due to the high cover (50 percent) of non-native species such as red brome, shortpod mustard, and tocalote. Within the survey area, this vegetation type occurs along Jamboree Road.

Buckwheat Scrub (2.3.7)

Buckwheat scrub is dominated by leafy California buckwheat with coastal goldenbush (*Isocoma menziesii*) and California brittlebush also occurring but at much lower density. The herb layer consists of red brome, branching phacelia (*Phacelia ramosissima*), and rattail fescue. Within the survey area, this vegetation type occurs along East Santiago Canyon Road.

Southern Cactus Scrub (2.4)

Southern cactus scrub consists of a relatively high cover of coast prickly pear (*Opuntia littoralis*), with leafy California buckwheat and California sagebrush also occurring. The herb layer is dominated by red brome and rattail fescue. Within the survey area, this vegetation type occurs along East Santiago Canyon Road and Jamboree Road.

Survey Area

Project Boundaries

Vegetation Types and Other Areas

- Southern Cactus Scrub (2.4)
- Coastal Goldenbush-Grassland (2.8.3)
- Urban (15.1)
- Transportation (15.4)
- Parks and Ornamental Plantings (15.5)
- Cleared or Graded (16.1)
- Other Disturbed Areas (16.2)

Aerial Source: Google, March 2015/Aerials Express 2009

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Biological Resources

Exhibit 4a

IRWD ILP North Conversion Project

N W E S

200 100 0 200 Feet

BonTerra PSOMAS

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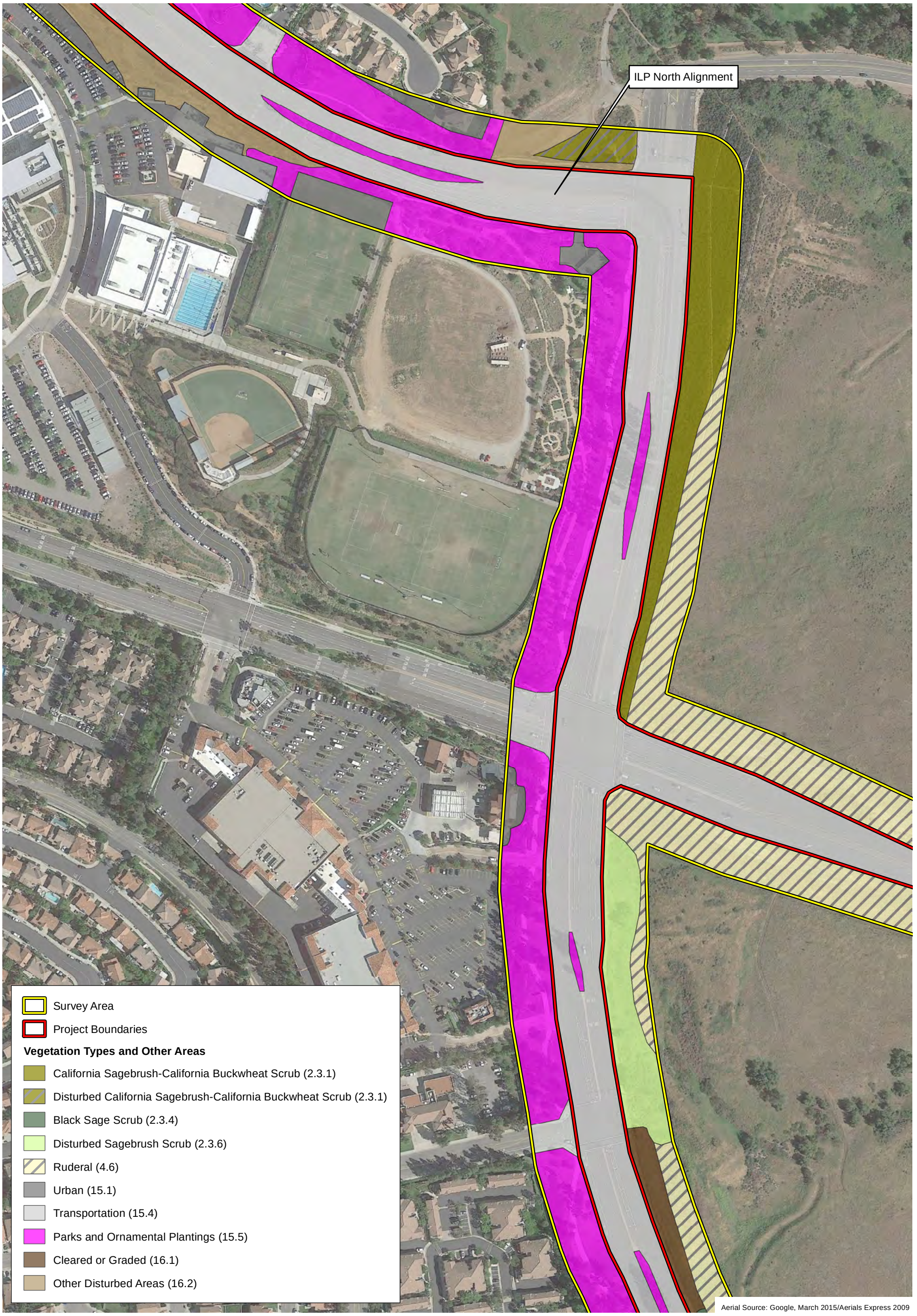

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Biological Resources

Exhibit 4b

IRWD ILP North Conversion Project

N W E S

200 100 0 200

Feet

BonTerra PSOMAS

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Santiago Hills C+ Reservoir

Survey Area

Project Boundaries

Coastal California Gnatcatcher Pair

Vegetation Types and Other Areas

California Sagebrush-California Buckwheat Scrub (2.3.1)

Disturbed California Sagebrush-California Buckwheat Scrub (2.3.1)

Buckwheat Scrub (2.3.7)

Southern Cactus Scrub (2.4)

Annual Grassland (4.1)

Ruderal (4.6)

Sumac Savannah (4.8)

Southern Willow Scrub (7.2)

Mulefat Scrub (7.3)

Non-urban Industrial (15.3)

Transportation (15.4)

Parks and Ornamental Plantings (15.5)

Cleared or Graded (16.1)

Aerial Source: Google, March 2015/Aerials Express 2009

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Biological Resources

Exhibit 4c

IRWD ILP North Conversion Project

N W E S

200 100 0 200

Feet

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Survey Area

Project Boundaries

Coastal California Gnatcatcher Pair

Vegetation Types and Other Areas

California Sagebrush-California Buckwheat Scrub (2.3.1)

Black Sage Scrub (2.3.4)

Southern Cactus Scrub (2.4)

Annual Grassland (4.1)

Ruderal (4.6)

Sumac Savannah (4.8)

Southern Willow Scrub (7.2)

Mulefat Scrub (7.3)

Disturbed Mulefat Scrub (7.3)

Southern Arroyo Willow Forest (7.6)

Urban (15.1)

Non-urban Industrial (15.3)

Transportation (15.4)

Parks and Ornamental Plantings (15.5)

Cleared or Graded (16.1)

Other Disturbed Areas (16.2)

Sant

Baker Raw Water Pumping Station

Aerial Source: Google, March 2015/Aerials Express 2009

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Biological Resources

Exhibit 4d

IRWD ILP North Conversion Project

N W E S

200 100 0 200

Feet

BonTerra PSOMAS

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Orchard Hills Facility

Survey Area

Project Boundaries

Vegetation Types and Other Areas

Ruderal (4.6)

Vineyards and Orchards (14.3)

Non-urban Industrial (15.3)

Other Disturbed Areas (16.2)

Aerial Source: Google, March 2015/Aerials Express 2009

Biological Resources

Exhibit 4e

IRWD ILP North Conversion Project

N W E S

100 50 0 100 Feet

BonTerra PSOMAS

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Rattlesnake Complex

Survey Area

Project Boundaries

Vegetation Types and Other Areas

Disturbed California Sagebrush-California Buckwheat Scrub (2.3.1)

Ruderal (4.6)

Sumac Savannah (4.8)

Mulefat Scrub (7.3)

Urban (15.1)

Non-urban Industrial (15.3)

Transportation (15.4)

Parks and Ornamental Plantings (15.5)

Other Disturbed Areas (16.2)

Aerial Source: Google, March 2015/Aerials Express 2009

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Biological Resources

Exhibit 4f

IRWD ILP North Conversion Project

N W E S

100 50 0 100 Feet

BonTerra PSOMAS

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Coastal Goldenbush–Grassland (2.8.3)

Coastal goldenbush–grassland is dominated by coastal goldenbush in the shrub layer, with various species in the herb layer including rattail fescue, prickly Russian thistle (*Salsola tragus*), tocalote, and shortpod mustard. Within the survey area, this vegetation type occurs along East Santiago Canyon Road.

4.1.2 Grassland Habitats

Annual Grassland (4.1)

Annual grassland consists of areas dominated by non-native grass species such as red brome, ripgut brome (*Bromus diandrus*), and rattail fescue. Occasional herbaceous species, such as prickly lettuce (*Lactuca serriola*), shortpod mustard, and tocalote, occur at less than five percent cover. Within the survey area, this vegetation type occurs along Jamboree Road.

Ruderal (4.6)

Ruderal areas are heavily dominated by non-native weedy species such as shortpod mustard, prickly Russian thistle, tocalote, red brome, and prickly lettuce. This vegetation type occurs throughout the survey area.

Sumac Savannah (4.8)

Sumac savannah is dominated by laurel sumac in the shrub layer as a monoculture. The herb layer consists of red brome and shortpod mustard around the margins and in openings. Within the survey area, this vegetation type occurs along Jamboree Road, at the Santiago Hills C+ Reservoir site, and at the Rattlesnake Complex.

4.1.3 Riparian Habitats

Southern Willow Scrub (7.2)

Southern willow scrub is dominated by Hind's willow (*Salix exigua* var. *hindsiana*), Goodding's black willow (*Salix gooddingii*), and arroyo willow (*Salix lasiolepis*) in varying quantities. The understory also contains some cover of mule fat (*Baccharis salicifolia* ssp. *salicifolia*) as well as Douglas' sagebrush (*Artemisia douglasiana*), branching phacelia, poison hemlock (*Conium maculatum*), and western poison oak (*Toxicodendron diversilobum*). Within the survey area, this vegetation type occurs along Jamboree Road in Peters Canyon Regional Park.

Southern Arroyo Willow Forest (7.6)

Southern arroyo willow forest is dominated by arroyo willow in the tree layer with a well-developed understory of mule fat in the shrub layer. This vegetation type lacks an herb layer; however, some individuals of shortpod mustard and prickly Russian thistle occur along the margins and in openings. Within the survey area, this vegetation type occurs along Jamboree Road near the Baker RWPS.

Mulefat Scrub (7.3)

Mulefat scrub is dominated by mule fat with some blue elderberry (*Sambucus nigra* ssp. *caerulea*), California sagebrush, and leafy California buckwheat occurring along the margins. The herb layer is poorly developed, but branching phacelia, red brome, and spotted hindseed (*Eucrypta chrysanthemifolia*) can occur along the margin. Within the survey area, this vegetation

type occurs along East Santiago Canyon Road, Jamboree Road, and at the Rattlesnake Complex.

Disturbed Mulefat Scrub (7.3)

Disturbed mulefat scrub is dominated by mule fat, but at a lower cover than mulefat scrub with openings vegetated with red brome, ripgut brome, and shortpod mustard. Within the survey area, this vegetation type occurs along Jamboree Road.

4.1.4 Agriculture

Vineyards and Orchards (14.3)

Vineyards and orchards consist of avocado (*Persea americana*) plantings in rows with irrigation. Within the survey area, this vegetation type occurs at the Orchard Hills Facility.

4.1.5 Developed Areas

Urban (15.1)

Urban areas consist of developed areas with buildings and/or parking areas. This mapping unit occurs throughout the survey area.

Non-Urban Industrial (15.3)

Non-urban industrial areas consist of existing IRWD facilities. Within the survey area, this mapping unit occurs at the Santiago Hills C+ Reservoir site, the ILP North Alignment near the Baker RWPS, the Rattlesnake Complex, and the Orchard Hills Facility.

Transportation (15.4)

Transportation areas consist of roadways. This mapping unit occurs throughout the survey area.

Parks and Ornamental Plantings (15.5)

Parks and ornamental plantings are dominated by various non-native species planted for ornamental purposes. These can include, but are not limited to, cape honeysuckle (*Tecomaria capensis*), Aleppo pine (*Pinus halepense*), ngaio tree (*Myoporum laetum*), Yeddow hawthorn (*Rahiolepis umbellata*), and Japanese honeysuckle (*Lonicera japonica*). This vegetation type occurs throughout the survey area.

4.1.6 Disturbed Areas

Cleared or Graded (16.1)

Cleared or graded areas consist of areas that are mowed and/or partially graded leaving plant debris and litter at nearly 100 percent cover. Within the survey area, this mapping unit occurs along East Santiago Canyon Road and Jamboree Road.

Other Disturbed Areas (16.2)

Other disturbed areas consist of dirt paths and eroded areas. This mapping unit occurs throughout the survey area.

4.2 WILDLIFE HABITAT

There was no standing or running water in the survey area; therefore, no native fish are expected to occur. Amphibian species expected to occur in the native habitat in the survey area include California toad (*Anaxyrus boreas halophilus*), California treefrog (*Pseudacris cadaverina*), Baja California treefrog (*Pseudacris hypochondriaca*), and garden slender salamander (*Batrachoseps major major*).

The western fence lizard (*Sceloporus occidentalis*) and side-blotched lizard (*Uta stansburiana*) were observed in native habitat in the survey area. Other reptile species expected to occur in the survey area include alligator lizard (*Elgaria multicarinata*), red racer (*Coluber flagellum piceus*), California striped racer (*Coluber lateralis lateralis*), gopher snake (*Pituophis catenifer*), and western diamondback rattlesnake (*Crotalus atrox*).

Bird species observed in the survey area include turkey vulture (*Cathartes aura*), Cooper's hawk (*Accipiter cooperii*), red-tailed hawk (*Buteo jamaicensis*), American kestrel (*Falco sparverius*), mourning dove (*Zenaida macroura*), Allen's hummingbird (*Selasphorus sasin*), Anna's hummingbird (*Calypte anna*), acorn woodpecker (*Melanerpes formicivorus*), Nuttall's woodpecker (*Picoides nuttallii*), black phoebe (*Sayornis nigricans*), Cassin's kingbird (*Tyrannus vociferans*), western scrub-jay (*Aphelocoma californica*), American crow (*Corvus brachyrhynchos*), common raven (*Corvus corax*), violet-green swallow (*Tachycineta thalassina*), northern rough-winged swallow (*Stelgidopteryx serripennis*), bushtit (*Psaltriparus minimus*), Bewick's wren (*Thryomanes bewickii*), blue-gray gnatcatcher (*Polioptila caerulea*), wrentit (*Chamaea fasciata*), northern mockingbird (*Mimus polyglottos*), European starling (*Sturnus vulgaris*), yellow warbler (*Dendroica petechial*), yellow-rumped warbler (*Setophaga coronata*), California towhee (*Melozone crissalis*), spotted towhee (*Pipilo maculatus*), song sparrow (*Melospiza melodia*), hooded oriole (*Icterus cucullatus*), house finch (*Carpodacus mexicanus*), and lesser goldfinch (*Spinus psaltria*).

The only mammal species observed was the California ground squirrel (*Spermophilus beecheyi*). Small mammal species expected to occur in the survey area include dusky-footed woodrat (*Neotoma fuscipes*) and deer mouse (*Peromyscus* sp.). Medium- to large-sized mammals expected to occur in the survey area include coyote (*Canis latrans*), northern raccoon (*Procyon lotor*), striped skunk (*Mephitis mephitis*), and bobcat (*Lynx rufus*). Bat species expected to occur in the survey area include big brown bat (*Eptesicus fuscus*), California myotis (*Myotis californicus*), canyon bat (*Parastrellus hesperus*), and Brazilian free-tailed bat (*Tadarida brasiliensis*).

4.3 WILDLIFE MOVEMENT

Wildlife corridors link together areas of suitable wildlife habitat that are otherwise separated by rugged terrain, changes in vegetation, or human disturbance. The fragmentation of open space areas by urbanization creates isolated "islands" of wildlife habitat. In the absence of habitat linkages that allow movement to adjoining open space areas, various studies have concluded that some wildlife species, especially the larger and more mobile mammals, will not likely persist over time in fragmented or isolated habitat areas because they prohibit the infusion of new individuals and genetic information (MacArthur and Wilson 1967; Soule 1987; Harris and Gallagher 1989; Bennett 1990). Corridors mitigate the effects of this fragmentation by (1) allowing animals to move between remaining habitats, thereby permitting depleted populations to be replenished and promoting genetic exchange; (2) providing escape routes from fire, predators, and human disturbances, thus reducing the risk that catastrophic events, such as fire or disease, will result in population or local species extinction; and (3) serving as travel routes for individual animals as they move in their home ranges in search of food, water, mates, and other necessary resources (Noss 1983; Farhig and Merriam 1985; Simberloff and Cox 1987; Harris and Gallagher 1989).

Within large open space areas where there are few or no man-made or naturally occurring physical constraints to wildlife movement, wildlife corridors may not yet exist. However, once open space areas become constrained and/or fragmented as a result of urban development or the construction of physical obstacles (such as roads and highways), the remaining landscape features or travel routes that connect the larger open space areas become corridors as long as they provide adequate space, cover, food, and water and do not contain obstacles or distractions (e.g., man-made noise, lighting) that would generally hinder wildlife movement.

A wildlife movement corridor is traditionally defined as a linear habitat whose primary wildlife function is to connect two or more significant habitat areas. Wildlife typically move within open space and along ridges and drainages adjacent to roads.

The Santiago Hills C+ Reservoir site is located in an area with few constraints on wildlife movement; therefore, wildlife would be expected to move freely through the open space in this area. The Rattlesnake Complex, Orchard Hills Facility, ILP North Alignment near the Baker RWPS, and ILP North Alignment along East Santiago Road and Jamboree Road are located in areas that are already developed IRWD facilities with open space adjacent. None of the Project areas are within or adjacent to a wildlife corridor.

Additionally, the Central-Coastal NCCP/HCP provides mitigation for impacts of Covered Activities on connectivity and wildlife movement. The NCCP/HCP and its Environmental Impact Report/Environmental Impact Statement (EIR/EIS) demonstrate that the NCCP Reserve design, which is comprised of both Special Linkages and contiguous blocks of sensitive habitat, protects not only core habitat, but also biological connectivity, which provides for wildlife movement, species dispersal and interchange, genetic exchange, and refuge from catastrophic events, such as major fires (County of Orange 1996a, 1996c).

4.4 SPECIAL STATUS VEGETATION TYPES

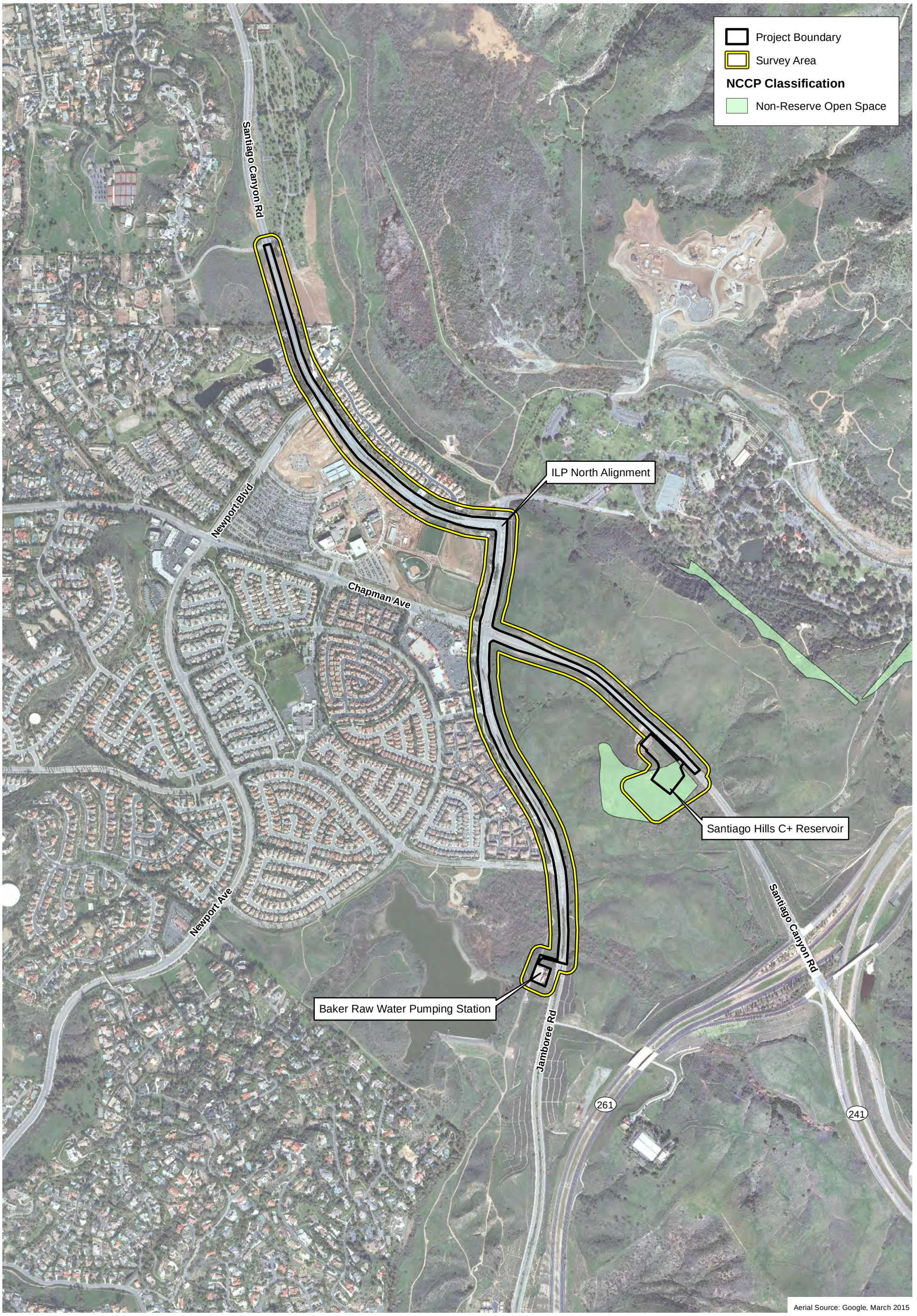
Special status vegetation types are considered to be “depleted” habitats by either the CDFW or local jurisdictions. These vegetation types may be protected by ordinances, codes, regulations, or planning policies.

4.4.1 Coastal Sage Scrub

Coastal sage scrub vegetation types are declining throughout Southern California. They support many special status plant and wildlife species, and the ecological function in Southern California’s remaining coastal sage scrub is threatened by habitat fragmentation, invasive non-native species, livestock grazing, off-highway vehicles, altered fire regime, and perhaps air pollution. Within Orange County, coastal sage scrub is considered to be a special status vegetation type. Coastal sage scrub vegetation types in the survey area include California sagebrush–California buckwheat scrub, disturbed California sagebrush–California buckwheat scrub, black sage scrub, disturbed California sagebrush scrub, buckwheat scrub, southern cactus scrub, and coastal goldenbush–grassland.

Coastal sage scrub vegetation occurs throughout the survey area. Removal and/or disturbance of coastal sage scrub resources would be authorized in accordance with the provisions of the NCCP/HCP IA except for areas designated as Existing Use, Non-Reserve Open Space, or NCCP Reserve. Coastal sage scrub areas covered by the NCCP/HCP IA would be deducted from IRWD’s authorized take of this vegetation type. It should be noted that the Santiago Hills C+ Reservoir site is located in an area designated as Non-Reserve Open Space (Exhibits 5a–5b).

Additionally, the ILP North Alignment near the Baker RWPS is located within an area designated as NCCP Reserve (Exhibits 5a–5b). The ILP and its appurtenant facilities, specifically the



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NCCP/HCP Reserve Classifications

Exhibit 5a

IRWD ILP North Conversion Project

N W E S

1,000 500 0 1,000 Feet

BonTerra PSOMAS

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NCCP/HCP Reserve Classifications

Exhibit 5b

IRWD ILP North Conversion Project

N
W E
S

1,000 500 0 1,000 Feet

Bonterra PSOMAS

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Jamboree Road portion of the ILP North Alignment and the ILP North Alignment near the Baker RWPS, exist as permanent infrastructure within and adjacent to Peters Canyon Regional Park. Construction of a recycled water pipeline is consistent with the provisions of the NCCP/HCP, operation, maintenance and repair and reconstruction of existing facilities (County of Orange 1996a). Section 5.3 of the NCCP/HCP and Section 5.3.3 of the IA state that activities related to the provision and operation of necessary public and quasi-public infrastructure facilities, construction of new infrastructure, and ongoing operations and maintenance, repair and reconstruction activities related to the new infrastructure facilities are "Permitted Activities" provided that they are consistent with adopted County and City general plans and provisions of the NCCP/HCP.

4.4.2 Riparian

Riparian vegetation occurs along perennial or intermittent drainages that are typically subject to seasonal flooding. Most natural riparian vegetation in Southern California has been lost or degraded by land use conversions to agricultural, urban, and recreational uses; channelization for flood control; sand and gravel mining; groundwater pumping; water impoundments; and various other changes. It is estimated that as much as 95 to 97 percent of historic riparian habitats in Southern California have been lost (Faber et al. 1989). In general, riparian vegetation can provide important biological functions for an ecosystem, such as cover and water sources for wildlife, filtration of runoff water and groundwater recharge, and flood control and sediment stabilization. Riparian vegetation in the survey area occurs along East Santiago Canyon Road and Jamboree Road and is comprised of southern willow scrub, southern arroyo willow forest, mulefat scrub, and disturbed mulefat scrub. Mulefat scrub also occurs at the Rattlesnake Complex, but it occurs in an upland area that is not associated with a drainage.

Jurisdictional Areas

Drainages, which may include wetlands and "waters of the U.S.", are protected under Section 404 of the Clean Water Act (CWA) and are under the jurisdiction of the U.S. Army Corps of Engineers (USACE). "Waters of the U.S." include navigable coastal and inland waters, lakes, rivers, streams and their tributaries; interstate waters and their tributaries; wetlands adjacent to such waters; intermittent streams; and other waters that could affect interstate commerce. A CWA Section 401 Water Quality Certification from the Regional Water Quality Control Board (RWQCB) is required before the USACE will issue a Section 404 permit. In addition, if drainages in the survey area meet the criteria established by Section 1600 of the *California Fish and Game Code,* the CDFW may require a Streambed Alteration Agreement prior to any modification of the bed, bank, or channel of streambeds in the survey area.

Several un-named blueline stream features cross the survey area. However, none of them are within the Project sites. A jurisdictional delineation would be needed to evaluate these features if Project design plans show that they would be impacted by the Project.

4.5 SPECIAL STATUS PLANT AND WILDLIFE SPECIES

Plants or wildlife may be considered "special status" due to declining populations, vulnerability to habitat change, or restricted distributions. Certain special status species have been listed as Threatened or Endangered under the State and/or Federal Endangered Species Acts.

4.5.1 Special Status Plants

Several special status plant species have been reported in the vicinity of the survey area (Table 1; CDFW 2015; CNPS 2015). Seven of these species are federally and/or State-listed Threatened or Endangered species: Braunton's milk-vetch (*Astragalus brauntonii*), thread-leaved brodiaea

(*Brodiaea filifolia*), San Fernando Valley spineflower (*Chorizanthe parryi* var. *fernandina*), slender-horned spineflower (*Dodecahema leptoceras*), Santa Monica Mountains dudleya (*Dudleya cymosa* ssp. *ovatifolia*), Laguna Beach liveforever (*Dudleya stolonifera*), and Santa Ana River woollystar (*Eriastrum densifolium* ssp. *sanctorum*). Braunton's milk-vetch, San Fernando spineflower, slender-horned spineflower, Santa Monica Mountains dudleya, Laguna Beach dudleya, and Santa Ana River wollystar are not expected to occur in the survey area due to lack of suitable habitat/soils, or because the species are not currently known to occur in the Project vicinity. Thread-leaved brodiaea has the potential to occur and will be discussed further below.

TABLE 1
SPECIAL STATUS PLANT SPECIES REPORTED FROM THE PROJECT REGION

Species	Status			Covered by NCCP?	Potential to Occur within the Survey Area
	Federal	State	CRPR		
Abronia villosa var. *aurita* chaparral sand-verbena	—	—	1B.1	No	Suitable habitat and potential to occur at the ILP North Alignment near the Baker RWPS and the Santiago Hills C+ Reservoir site. Not expected at Orchard Hills Facility, Rattlesnake Complex, or within roadways due to lack of suitable habitat.
Astragalus brauntonii Braunton's milk-vetch	FE	—	1B.1	No	Not expected to occur at any sites due to lack of suitable soils.
Atriplex coulteri Coulter's saltbush	—	—	1B.2	No	Suitable habitat and potential to occur at the ILP North Alignment near the Baker RWPS, and the Santiago Hills C+ Reservoir site. Not expected at the Orchard Hills Facility, the Rattlesnake Complex, or within roadways due to lack of suitable habitat.
Atriplex pacifica South Coast saltscale	—	—	1B.2	No	Not expected to occur due to lack of suitable habitat.
Atriplex serenana var. *davidsonii* Davidson's saltscale	—	—	1B.2	No	Not expected to occur due to lack of suitable habitat.
Baccharis malibuensis Malibu baccharis	—	—	1B.1	No	Not expected to occur; not observed (species is detectable year round)
Brodiaea filifolia thread-leaved brodiaea	FT	SE	1B.1	No	Suitable habitat and potential to occur at the ILP North Alignment near the Baker RWPS, and the Santiago Hills C+ Reservoir site. Not expected at the Orchard Hills Facility, the Rattlesnake Complex, or within roadways due to lack of suitable habitat.
Calandrinia breweri Brewer's calandrinia	—	—	4.2	No	Suitable habitat and potential to occur at the ILP North Alignment near the Baker RWPS, and the Santiago Hills C+ Reservoir site. Not expected at the Orchard Hills Facility, the Rattlesnake Complex, or within roadways due to lack of suitable habitat.
Calochortus catalinae Catalina mariposa lily	—	—	4.2	Covered	Suitable habitat and potential to occur at the ILP North Alignment near the Baker RWPS and the Santiago Hills C+ Reservoir site. Not expected at the Orchard Hills Facility, the Rattlesnake Complex, or within roadways due to lack of suitable habitat.
Calochortus plummerae Plummer's mariposa lily	—	—	4.2	No	Not expected to occur at any of the sites due to lack of suitable soils.

TABLE 1
SPECIAL STATUS PLANT SPECIES REPORTED FROM THE PROJECT REGION

Species	Status			Covered by NCCP?	Potential to Occur within the Survey Area
	Federal	State	CRPR		
Calochortus weedii var. *intermedius* intermediate mariposa lily	—	—	1B.2	Conditionally Covered	Suitable habitat and potential to occur at the ILP North Alignment near the Baker RWPS and the Santiago Hills C+ Reservoir site. Not expected at the Orchard Hills Facility, the Rattlesnake Complex, or within roadways due to lack of suitable habitat.
Camissoniopsis lewisii Lewis' evening-primrose	—	—	3	No	Suitable habitat and potential to occur at the ILP North Alignment near the Baker RWPS and the Santiago Hills C+ Reservoir site. Not expected at the Orchard Hills Facility, the Rattlesnake Complex, or within roadways due to lack of suitable habitat.
Centromadia parryi ssp. *australis* southern tarplant	—	—	1B.1	No	Not expected to occur; not observed (species blooms and is detectable in July)
Cercocarpus minutiflorus San Diego mountain mahogany	—	—	—	Covered	Not expected to occur; not observed (species is detectable year round)
Chorizanthe parryi var. *fernandina* San Fernando Valley spineflower	FC	SE	1B.1	No	Not expected to occur; extirpated from the Project region
Chorizanthe polygonoides var. *longispina* long-spined spineflower	—	—	1B.2	No	Suitable habitat and potential to occur at the ILP North Alignment near the Baker RWPS, and the Santiago Hills C+ Reservoir site. Not expected at the Orchard Hills Facility, the Rattlesnake Complex, or within roadways due to lack of suitable habitat.
Convolvulus simulans small-flowered morning-glory	—	—	4.2	No	Suitable habitat and potential to occur at the ILP North Alignment near the Baker RWPS and the Santiago Hills C+ Reservoir site. Not expected at the Orchard Hills Facility, the Rattlesnake Complex, or within roadways due to lack of suitable habitat.
Deinandra paniculata paniculate tarplant	—	—	4.2	No	Suitable habitat and potential to occur at the ILP North Alignment near the Baker RWPS and the Santiago Hills C+ Reservoir site. Not expected at the Orchard Hills Facility, the Rattlesnake Complex, or within roadways due to lack of suitable habitat.
Dodecahema letpoceras slender-horned spineflower	FE	SE	1B.1	No	Not expected to occur due to lack of suitable habitat.
Dudleya cymosa ssp. *ovatifolia* Santa Monica Mountains dudleya	FT	—	1B.1	No	Not expected to occur at any sites due to lack of suitable soils.
Dudleya multicaulis many-stemmed dudleya	—	—	1B.2	No	Suitable habitat and potential to occur at the ILP North Alignment near the Baker RWPS, and the Santiago Hills C+ Reservoir site. Not expected at the Orchard Hills Facility, the Rattlesnake Complex, or within roadways due to lack of suitable habitat.
Dudleya stolonifera Laguna Beach liveforever	FT	—	1B.1	No	Not expected to occur at any sites due to lack of suitable soils.

TABLE 1
SPECIAL STATUS PLANT SPECIES REPORTED FROM THE PROJECT REGION

Species	Status			Covered by NCCP?	Potential to Occur within the Survey Area
	Federal	State	CRPR		
Eriastrum densifolium ssp. *sanctorum* Santa Ana River woollystar	FE	SE	1B.1	No	Not expected to occur due to lack of suitable habitat; all known occurrences are along the Santa Ana River.
Harpagonella palmeri Palmer's grapplinghook	—	—	4.2	No	Suitable habitat and potential to occur at the ILP North Alignment near the Baker RWPS and the Santiago Hills C+ Reservoir site. Not expected at the Orchard Hills Facility, the Rattlesnake Complex, or within roadways due to lack of suitable habitat.
Helianthus nuttallii ssp. *parishii* Los Angeles sunflower	—	—	1A	No	Not expected to occur; believed to be extinct.
Hesperocyparis forbesii Tecate cypress	—	—	1B.1	Covered	Not expected to occur; not observed (species is detectable year round)
Hordeum intercedens vernal barley	—	—	3.2	No	Suitable habitat and potential to occur at the ILP North Alignment near the Baker RWPS and the Santiago Hills C+ Reservoir site. Limited potential to occur at the Orchard Hills Facility due to marginally suitable habitat. Not expected to occur at the Rattlesnake Complex or within roadways due to lack of suitable habitat.
Lasthenia gracilis ssp. *coulteri* Coulter's goldfields	—	—	1B.1	No	Not expected to occur due to lack of suitable habitat.
Lepechinia cardiophylla heart-leaved pitcher sage	—	—	1B.2	Covered	Not expected to occur due to lack of suitable habitat; sites are below known elevation range.
Lepidium virginicum var. *robinsonii* Robinson's pepper-grass	—	—	4.3	No	Suitable habitat and potential to occur at the ILP North Alignment near the Baker RWPS and the Santiago Hills C+ Reservoir site. Not expected at the Orchard Hills Facility, the Rattlesnake Complex, or within roadways due to lack of suitable habitat.
Lilium humboldtii ssp. *ocellatum* ocellated Humboldt lily	—	—	4.2	No	Suitable habitat and potential to occur at the ILP North Alignment near the Baker RWPS and the Santiago Hills C+ Reservoir site. Not expected at the Orchard Hills Facility, the Rattlesnake Complex, or within roadways due to lack of suitable habitat.
Monardella hypoleuca ssp. *intermedia* intermediate monardella	—	—	1B.3	No	Not expected to occur due to lack of suitable habitat; sites are below known elevation range.
Nama stenocarpum mud nama	—	—	2B.2	No	Not expected to occur due to lack of suitable habitat.
Nolina cismontana chaparral nolina	—	—	1B.2	No	Not expected to occur; not observed (species is detectable year round)
Penstemon californicus California beardtongue	—	—	1B.2	No	Not expected to occur due to lack of suitable habitat; sites are below known elevation range.

TABLE 1
SPECIAL STATUS PLANT SPECIES REPORTED FROM THE PROJECT REGION

Species	Status			Covered by NCCP?	Potential to Occur within the Survey Area
	Federal	State	CRPR		
Pentachaeta aurea ssp.*allenii* Allen's pentachaeta	—	—	1B.1	No	Suitable habitat and potential to occur at the ILP North Alignment near the Baker RWPS and the Santiago Hills C+ Reservoir site. Not expected at the Orchard Hills Facility, the Rattlesnake Complex, or within roadways due to lack of suitable habitat.
Pickeringia montana var. *tomentosa* woolly chaparral pea	—	—	4.3	No	Not expected to occur; not observed (species is detectable year round)
Polygala cornuta var. *fishiae* Fish's milkwort	—	—	4.3	No	Not expected to occur; not observed (species is detectable year round)
Pseudognaphalium leucocephalum white rabbit-tobacco	—	—	2B.2	No	Suitable habitat and potential to occur at the ILP North Alignment near the Baker RWPS and the Santiago Hills C+ Reservoir site. Not expected at the Orchard Hills Facility, the Rattlesnake Complex, or within roadways due to lack of suitable habitat.
Romneya coulteri Coulter's matilija poppy	—	—	4.2	Covered	Suitable habitat and potential to occur at the ILP North Alignment near the Baker RWPS and the Santiago Hills C+ Reservoir site. Not expected at the Orchard Hills Facility, the Rattlesnake Complex, or within roadways due to lack of suitable habitat.
Senecio aphanactis chaparral ragwort	—	—	2B.2	No	Suitable habitat and potential to occur at the ILP North Alignment near the Baker RWPS and the Santiago Hills C+ Reservoir site. Not expected at the Orchard Hills Facility, the Rattlesnake Complex, or within roadways due to lack of suitable habitat.
Sidalcea neomexicana Salt Spring checkerbloom	—	—	2B.2	No	Not expected to occur due to lack of suitable habitat.
Symphyotrichum defoliatum San Bernardino aster	—	—	1B.2	No	Not expected to occur due to lack of suitable habitat.

RWPS: Raw Water Pump Station; USFWS: U.S. Fish and Wildlife Service; CDFW: California Department of Fish and Wildlife; CRPR: California Rare Plant Rank.

LEGEND

Federal (USFWS)

FE Federally Endangered
FT Federally Threatened
FC Federal Candidate

State (CDFW)

SE Endangered

CRPR

1A Plants Presumed Extirpated in California and Either Rare or Extinct Elsewhere
1B Plants Rare, Threatened, or Endangered Throughout Their Range
2B Plants Rare, Threatened, or Endangered in California But More Common Elsewhere
3 Plants of About Which We Need More Information – A Review List
4 Plants of Limited Distribution – A Watch List

CRPR Threat Code Extensions

None Plants lacking any threat information
.1 Seriously Endangered in California (over 80% of occurrences threatened; high degree and immediacy of threat)
.2 Fairly Endangered in California (20–80% of occurrences threatened)
.3 Not Very Threatened in California (low degree/immediacy of threat or no current threats known)

Several species with a California Rare Plant Rank (CRPR) of 1B or 2B have been reported from the vicinity of the survey area (Table 1; CDFW 2015; CNPS 2015): chaparral sand-verbena (*Abronia villosa* var. *aurita*), Coulter's saltbush (*Atriplex coulteri*), South Coast saltscale (*Atriplex pacifica*), Davidson's saltscale (*Atriplex serenana* var. *davidsonii*), Malibu baccharis (*Baccharis malibuensis*), intermediate mariposa lily (*Calochortus weedii* var. *intermedius*), southern tarplant (*Centromadia parryi* ssp. *australis*), long-spined spineflower (*Chorizanthe polygonoides* var. *longispina*), many-stemmed dudleya (*Dudleya multicaulis*), Tecate cypress (*Hesperocyparis forbesii*), Coulter's goldfields (*Lasthenia glabrata* ssp. *coulteri*), heart-leaved pitcher sage (*Lepechinia cardiophylla*), intermediate monardella (*Monardella hypoleuca* ssp. *intermedia*), mud nama (*Nama stenocarpum*), chaparral nolina (*Nolina cismontana*), California beardtongue (*Penstemon californicus*), Allen's pentachaeta (*Pentachaeta aurea* ssp. *allenii*), white rabbit-tobacco (*Pseudognaphalium leucocephalum*), chaparral ragwort (*Senecio aphanactis*), Salt Spring checkerbloom (*Sidalcea neomexicana*), and San Bernardino aster (*Symphyotrichum defoliatum*). Many of these species have potential or limited potential to occur in the natural areas of the survey area. Malibu baccharis, San Diego mountain mahogany (*Cercocarpus minutiflorus*), Tecate cypress, and chaparral nolina would not be expected to occur because they are shrub species and were not observed during general surveys or vegetation mapping. Similarly, southern tarplant would have been blooming and detectable at the time of the general surveys and vegetation mapping, but it was not observed. South coast saltscale, Davidson's saltscale, Coulter's goldfields, heart-leaved pitcher sage, intermediate monardella, mud nama, California beardtongue, Salt Springs checkerbloom, and San Bernardino aster would not be expected to occur due to lack of suitable habitat. Los Angeles sunflower (*Helianthus nuttallii* ssp. *parishii*) is not expected to occur because it is believed to be extinct.

Although several species with a CRPR of 3 and 4 are also known from the vicinity, these species are not typically considered constraints to development.

Thread-Leaved Brodiaea

Thread-leaved brodiaea is a federally Threatened, California Endangered, and CRPR 1B.1 species. It is a perennial herb that occurs in vernal pools, valley and foothill grasslands, playas, coastal sage scrub, and openings in cismontane woodland and chaparral, often in clay soils (CNPS 2015). The thread-leaved brodiaea is known from one location near El Toro Road and Portola Parkway (CCH 2015). This species has potential to occur in the natural portions of the survey area.

On February 8, 2011, the USFWS published a Revised Final Rule designating critical habitat for thread-leaved brodiaea (USFWS 2011). This Final Rule designates 2,947 acres in Los Angeles, San Bernardino, Riverside, Orange, and San Diego counties as critical habitat. The survey area is not located within any areas designated as critical habitat for the thread-leaved brodiaea.

4.5.2 Special Status Wildlife

Several special status wildlife species have been reported from the Project vicinity (Table 2; CDFW 2015). The following federally and/or State-listed Endangered or Threatened species have been reported from the vicinity of the survey area: San Diego fairy shrimp (*Branchinecta sandiegonensis*), Santa Ana sucker (*Catostomus santaanae*), steelhead (*Oncorhynchus mykiss*), arroyo toad (*Anaxyrus californicus*), light-footed clapper rail (*Rallus longirostris levipes*), California black rail (*Laterallus jamaicensis coturniculus*), California least tern (*Sternula antillarum browni*), western yellow-billed cuckoo (*Coccyzus americanus occidentalis*), southwestern willow flycatcher (*Empidonax trailli extimus*), least Bell's vireo (*Vireo bellii pusillus*), coastal California gnatcatcher, and Pacific pocket mouse (*Perognathus longimembris pacificus*). No suitable habitat for San Diego fairy shrimp, Santa Ana sucker, steelhead, arroyo toad, light-footed clapper rail, California black rail, California least tern, or Pacific pocket mouse was observed in the survey area;

therefore, these species are not expected to occur. The southwestern willow flycatcher, western yellow-billed cuckoo, least Bell's vireo, and coastal California gnatcatcher have potential or limited potential to occur on or adjacent to the Project sites; these species will be discussed further below.

Though not designated as Threatened or Endangered, the western pond turtle (*Emys marmorata*), burrowing owl (*Athene cunicularia*), and coastal cactus wren (*Campylorhynchus brunneicapillus sandiegensis*) are also discussed below because these species are considered to meet the criteria discussed in Section 15380 of the California Environmental Quality Act (CEQA) Guidelines, which allows species that meet the definition of Threatened and Endangered to be treated as listed species even if they are not listed as such.

TABLE 2
SPECIAL STATUS WILDLIFE SPECIES REPORTED FROM THE PROJECT REGION

Species	Status		Covered by the NCCP?	Likelihood for Occurrence on the Survey Area
	Federal	State		
Invertebrates				
Branchinecta sandiegonensis San Diego fairy shrimp	FE	—	Conditionally Covered	Not expected to occur; no suitable habitat on any sites.
Fish				
Catostomus santaanae Santa Ana sucker	FT	SSC	No	Not expected to occur; no suitable habitat on any sites.
Oncorhynchus mykiss steelhead	FE	SSC	No	Not expected to occur; no suitable habitat on any sites.
Rhinichthys osculus ssp. 3 Santa Ana speckled dace	—	SSC	No	Not expected to occur; no suitable habitat on any sites.
Amphibians				
Taricha torosa Coast Range newt	—	SSC	No	Not expected to occur; no suitable habitat on any sites.
Spea hammondii western spadefoot	—	SSC	No	May occur at the Santiago Hills C+ Reservoir site, the ILP North Alignment near the Baker RWPS and habitat adjacent to the ILP North Alignment and the Rattlesnake Complex; potentially suitable foraging habitat; no suitable breeding habitat. Not expected on or adjacent to the Orchard Hills Facility; no suitable habitat.
Anaxyrus californicus arroyo toad	FE	SSC	Conditionally Covered	Not expected to occur; no suitable habitat on any sites.
Lithobates pipiens northern leopard frog	—	SSC	No	Not expected to occur; no suitable habitat on any sites.
Reptiles				
Emys marmorata western pond turtle	—	SSC	No	Limited potential to occur near the ILP North Alignment near the Baker RWPS; limited suitable habitat. Not expected to occur at the Santiago Hills C+ Reservoir site, the Rattlesnake Complex, the Orchard Hills Facility or in habitat along the ILP North Alignment; no suitable habitat.

TABLE 2
SPECIAL STATUS WILDLIFE SPECIES REPORTED FROM THE PROJECT REGION

Species	Status		Covered by the NCCP?	Likelihood for Occurrence on the Survey Area
	Federal	State		
Phrynosoma blainvillii coast [San Diego] horned lizard	—	SSC	Covered	May occur at the Santiago Hills C+ Reservoir site, the ILP North Alignment near the Baker RWPS and habitat adjacent to the ILP North Alignment, and the Rattlesnake Complex; suitable habitat. Not expected on or adjacent to the Orchard Hills Facility; no suitable habitat.
Aspidoscelis hyperythra orangethroat whiptail	—	SSC	Covered	May occur at the Santiago Hills C+ Reservoir site, the ILP North Alignment near the Baker RWPS and habitat adjacent to the ILP North Alignment and the Rattlesnake Complex; suitable habitat. Not expected on or adjacent to the Orchard Hills Facility; no suitable habitat.
Aspidoscelis tigris stejnegeri coastal [western] whiptail	—	SA	Covered	May occur at the Santiago Hills C+ Reservoir site, the ILP North Alignment near the Baker RWPS and habitat adjacent to the ILP North Alignment, and the Rattlesnake Complex; suitable habitat. Not expected on or adjacent to the Orchard Hills Facility; no suitable habitat.
Lichanura orcutti [Charina trivirgata] northern three-lined boa [coastal rosy boa]	—	SA	Covered	Limited potential to occur at the Santiago Hills C+ Reservoir site, the ILP North Alignment near the Baker RWPS and habitat adjacent to the ILP North Alignment, and the Rattlesnake Complex; marginally suitable habitat. Not expected on or adjacent to the Orchard Hills Facility; no suitable habitat.
Diadophis punctatus [San Bernardino] ringneck snake	—	SA	Covered	May occur at the Santiago Hills C+ Reservoir site, the ILP North Alignment near the Baker RWPS and habitat adjacent to the ILP North Alignment, and the Rattlesnake Complex; suitable habitat. Not expected on or adjacent to the Orchard Hills Facility; no suitable habitat.
Salvadora hexalepis virgultea coast patch-nosed snake	—	SSC	No	May occur at the Santiago Hills C+ Reservoir site, the ILP North Alignment near the Baker RWPS and habitat adjacent to the ILP North Alignment, and the Rattlesnake Complex; suitable habitat. Not expected on or adjacent to the Orchard Hills Facility; no suitable habitat.
Thamnophis hammondii two-striped garter snake	—	SSC	No	Limited potential to occur near the ILP North Alignment near the Baker RWPS; limited suitable habitat. Not expected to occur at the Santiago Hills C+ Reservoir site, the Rattlesnake Complex, the Orchard Hills Facility or in habitat along the ILP North Alignment; no suitable habitat.

TABLE 2
SPECIAL STATUS WILDLIFE SPECIES REPORTED FROM THE PROJECT REGION

Species	Status		Covered by the NCCP?	Likelihood for Occurrence on the Survey Area
	Federal	State		
Crotalus ruber red-diamond rattlesnake	—	SSC	Covered	May occur at the Santiago Hills C+ Reservoir site, the ILP North Alignment near the Baker RWPS and habitat adjacent to the ILP North Alignment, and the Rattlesnake Complex; suitable habitat. Not expected on or adjacent to the Orchard Hills Facility; no suitable habitat.
Birds				
Elanus leucurus white-tailed kite	—	FP	No	Limited potential to occur at all sites; suitable foraging habitat but marginally suitable nesting habitat on or adjacent to all sites.
Haliaeetus leucocephalus bald eagle	—	FP	No	May occur for foraging; suitable foraging habitat at or adjacent to all sites. Not expected to nest; no suitable nesting habitat on any sites.
Accipter cooperii Cooper's hawk	—	WL	No	Observed; suitable foraging and nesting habitat at or adjacent to all sites.
Buteo regalis ferruginous hawk	—	WL	No	May occur for foraging in winter; suitable foraging habitat at or adjacent to all sites. Not expected to nest; breeds outside the Project region.
Rallus longirostris levipes light-footed clapper rail	FE	SE	No	Not expected to occur; no suitable habitat on any sites.
Laterallus jamaicensis coturniculus California black rail	FT	FP	No	Not expected to occur; no suitable habitat on any sites.
Sternula antillarum browni California least tern	FE	SE	No	Not expected to occur; no suitable habitat on any sites.
Coccyzus americanus occidentalis western yellow-billed cuckoo	FT	SE	No	Limited potential to occur as a migrant near the ILP North Alignment near the Baker RWPS; limited suitable habitat. Not expected to occur at the Santiago Hills C+ Reservoir site, the Rattlesnake Complex, the Orchard Hills Facility, or in habitat along the ILP North Alignment; no suitable habitat.
Athene cunicularia burrowing owl	—	SSC	No	Limited potential to occur for foraging and nesting; suitable foraging and nesting habitat at or adjacent to all sites. Known from very few locations in Orange County.
Asio otus long-eared owl	—	SSC	No	Limited potential to occur at all sites; suitable foraging habitat but marginally suitable nesting habitat on or adjacent to all sites.
Empidonax traillii extimus southwestern willow flycatcher	FE	SE	Conditionally Covered	Limited potential to occur near the ILP North Alignment near the Baker RWPS; limited suitable habitat. Not expected to occur at the Santiago Hills C+ Reservoir site, the Rattlesnake Complex, the Orchard Hills Facility, or in habitat along the ILP North Alignment; no suitable habitat.

TABLE 2
SPECIAL STATUS WILDLIFE SPECIES REPORTED FROM THE PROJECT REGION

Species	Status		Covered by the NCCP?	Likelihood for Occurrence on the Survey Area
	Federal	State		
Vireo bellii pusillus least Bell's vireo	FE	SE	Conditionally Covered	Expected to occur near the ILP North Alignment near the Baker RWPS; may occur along East Santiago Canyon Road; limited suitable habitat. Not expected to occur at the Santiago Hills C+ Reservoir site, the Rattlesnake Complex, or the Orchard Hills Facility; no suitable habitat.
Eremophila alpestris actia California horned lark	—	WL	No	May occur at all sites; suitable habitat.
Campylorhynchus brunneicapillus sandiegensis coastal cactus wren	—	SSC	Covered	May occur at the Santiago Hills C+ Reservoir site, the ILP North Alignment near the Baker RWPS and habitat adjacent to the ILP North Alignment, and the Rattlesnake Complex; suitable habitat. Not expected on or adjacent to the Orchard Hills Facility; no suitable habitat.
Polioptila californica coastal California gnatcatcher	FT	SSC	Covered	Observed along the ILP North Alignment and near the Baker RWPS; not expected to occur at the Rattlesnake Complex or the Santiago Hills C+ Reservoir site because not observed during focused surveys; suitable habitat. Not expected to occur at the Orchard Hills Facility; no suitable habitat.
Dendroica petechia brewsteri yellow warbler	—	SSC	No	May occur near the ILP North Alignment near the Baker RWPS and along East Santiago Canyon Road; limited suitable habitat. Not expected to occur at the Santiago Hills C+ Reservoir site, the Rattlesnake Complex, the Orchard Hills Facility or in habitat along roadways; no suitable habitat.
Icteria virens yellow-breasted chat	—	SSC	No	May occur near the ILP North Alignment near the Baker RWPS and along East Santiago Canyon Road; limited suitable habitat. Not expected to occur at the Santiago Hills C+ Reservoir site, the Rattlesnake Complex, the Orchard Hills Facility, or in habitat along the ILP North Alignment; no suitable habitat.
Lanius ludovicianus loggerhead shrike	—	SSC	No	May occur at the Santiago Hills C+ Reservoir site, the ILP North Alignment near the Baker RWPS and habitat adjacent to the ILP North Alignment, the Rattlesnake Complex, and the Orchard Hills Facility; suitable habitat.
Aimophila ruficeps canescens Southern California rufous-crowned sparrow	—	WL	Covered	May occur at the Santiago Hills C+ Reservoir site, the ILP North Alignment near the Baker RWPS and habitat adjacent to the ILP North Alignment, and the Rattlesnake Complex; suitable habitat. Not expected on or adjacent to the Orchard Hills Facility; no suitable habitat.

TABLE 2
SPECIAL STATUS WILDLIFE SPECIES REPORTED FROM THE PROJECT REGION

Species	Status		Covered by the NCCP?	Likelihood for Occurrence on the Survey Area
	Federal	State		
Passerculus sandwichensis beldingi Belding's savannah sparrow	—	SE	No	Not expected to occur; no suitable habitat on any sites.
Ammodramus savannarum grasshopper sparrow	—	SSC	No	Limited potential to occur at the Santiago Hills C+ Reservoir site, the ILP North Alignment near the Baker RWPS and habitat adjacent to the ILP North Alignment, and the Rattlesnake Complex; suitable habitat. Not expected on or adjacent to the Orchard Hills Facility; no suitable habitat.
Mammals				
Perognathus longimembris pacificus Pacific pocket mouse	FE	—	No	Not expected to occur; lack of suitable habitat on all sites.
Neotoma lepida intermedia San Diego desert woodrat	—	SSC	Covered	Limited potential to occur at the Santiago Hills C+ Reservoir site, the ILP North Alignment near the Baker RWPS and habitat adjacent to the ILP North Alignment, and the Rattlesnake Complex; marginally suitable habitat. Not expected to occur at the Orchard Hills Facility; no suitable habitat.
Sorex ornatus salicornicus Southern California saltmarsh shrew	—	SSC	No	Not expected to occur; lack of suitable habitat on all sites.
Choeronycteris mexicana Mexican long-tongued bat	—	SSC	No	Not expected to occur; lack of suitable habitat for foraging and roosting on all sites.
Antrozous pallidus pallid bat	—	SSC	No	May occur for foraging at all sites; suitable foraging habitat; limited potential for roosting; limited suitable roosting habitat on or adjacent to all sites.
Myotis yumanensis Yuma myotis	—	SA	No	May occur for foraging and roosting near the ILP North Alignment near the Baker RWPS and the Rattlesnake Complex; suitable foraging and roosting habitat. Not expected to occur at the Santiago Hills C+ Reservoir site, Orchard Hills Facility, or along roadways; no suitable habitat.
Eumops perotis californicus western mastiff bat	—	SSC	No	May occur for foraging at all sites; suitable foraging habitat on or adjacent to all sites; Not expected to occur for roosting at any sites; no suitable roosting habitat.

RWPS: Raw Water Pump Station; USFWS: U.S. Fish and Wildlife Service; CDFW: California Department of Fish and Wildlife

LEGEND

Federal (USFWS)		**State (CDFW)**
FE	Endangered	SE Endangered
FT	Threatened	SSC Species of Special Concern
		FP Fully Protected
		WL Watch List
		SA Special Animal

Western Yellow-Billed Cuckoo

The western distinct population segment of the yellow-billed cuckoo is a federally listed Threatened and State-listed Endangered species. This species is migratory and occurs in California's riparian woodlands during the summer breeding season. The western yellow-billed cuckoo currently nests almost exclusively in low to moderate elevation riparian woodlands that cover 50 acres or more within arid to semiarid landscapes. In California, yellow-billed cuckoos are most likely to be found in patches of willow–cottonwood riparian habitat greater than 200 acres in size. Yellow-billed cuckoos rarely use smaller patches of habitat, particularly when they are distantly isolated from other patches of riparian habitat (USFWS 2013b). Peters Canyon Reservoir, adjacent to the ILP North Alignment near the Baker RWPS, could provide suitable habitat for migrants of this species; however, it would not be expected to nest at the Peters Canyon Reservoir because habitat is not extensive enough. Therefore, western yellow-billed cuckoo has a limited potential to occur in the vicinity of the ILP North Alignment near the Baker RWPS during migration. Focused surveys are not considered necessary because the species is not expected to nest within or adjacent to any of the Project sites.

On August 15, 2014, the USFWS published a proposed rule to designate Critical Habitat for the western distinct population segment of the yellow-billed cuckoo, designating approximately 546,335 acres of land in Arizona, California, Colorado, Idaho, Nevada, New Mexico, Texas, Utah, and Wyoming. In California, critical habitat has been designated in Humboldt, Colusa, Glenn, Butte, Sutter, Kern, Inyo, and Riverside Counties (USFWS 2014). The Project sites are not located within the proposed Critical Habitat area for this species.

Southwestern Willow Flycatcher

The southwestern willow flycatcher is a federally and State-listed Endangered species. This species is an NCCP/HCP Conditionally Covered Species. This species is migratory and occurs in California's riparian woodlands during the summer breeding season. Peters Canyon Reservoir, adjacent to the Baker RWPS, could provide suitable habitat for this species. Therefore, southwestern willow flycatcher has a limited potential to occur in the vicinity of the ILP North Alignment near the Baker RWPS during the summer breeding season (May 15 to September 15). Focused surveys are not considered necessary because there is no suitable riparian habitat within any of the Project sites. Suitable riparian habitat is located around the Rattlesnake Reservoir and southwestern willow flycatcher may occur there; however, this area is approximately 1,000 feet away from the Rattlesnake Complex.

On August 15, 2011, the USFWS published a final rule to designate revised Critical Habitat for the southwestern willow flycatcher. This revised critical habitat covers 2,090 stream miles in California, Nevada, Utah, Colorado, Arizona, and New Mexico. In California, critical habitat has been designated in Imperial, Inyo, Kern, Los Angeles, Mono, Orange, Riverside, Santa Barbara, San Bernardino, San Diego, and Ventura Counties (USFWS 2013a). The Project sites are not located within the proposed Critical Habitat area for this species.

Least Bell's Vireo

The least Bell's vireo is a federally and State-listed Endangered species. This species is an NCCP/HCP Conditionally Covered Species. This species is migratory and occurs in California's riparian woodland and riparian scrub habitats during the summer breeding season. Peters Canyon Reservoir, adjacent to the Baker RWPS, provides suitable habitat for this species and it is known to occur there. Therefore, the least Bell's vireo should be expected to occur in the vicinity of the ILP North Alignment near the Baker RWPS during the summer breeding season (March 15 to September 15); focused surveys are not considered necessary because presence of this species should be assumed in southern arroyo willow forest, southern willow scrub, mulefat

scrub, and disturbed mulefat scrub in this area. Additionally, the least Bell's vireo may occur in the mulefat scrub in and adjacent to the survey area along East Santiago Canyon Road. Focused surveys would be necessary to determine the presence or absence of this species in this location; in the absence of focused surveys, presence should be assumed. Least Bell's vireo is not expected to occur in the mulefat scrub in the Rattlesnake Complex because it is in an upland area not connected with other riparian habitat. Suitable riparian habitat is located is located around Rattlesnake Reservoir and least Bell's vireo may occur there; however, this area is approximately 1,000 feet away from the Project site. Least Bell's vireo is not expected to occur at the Santiago Hills C+ Reservoir site or Orchard Hills Facility.

On February 2, 1994, the USFWS published a final Critical Habitat for the least Bell's vireo, designating approximately 37,560 acres of land in Santa Barbara, Ventura, Los Angeles, San Bernardino, Riverside, and San Diego Counties, California (USFWS 1994). The Project sites are not located within the designated Critical Habitat area for this species.

Coastal California Gnatcatcher

The coastal California gnatcatcher is a federally listed Threatened species and a California Species of Special Concern. This species is an NCCP/HCP Covered Species. This species is a year-round resident in coastal sage scrub habitat. This species is known to occur in the project vicinity including locations at Peters Canyon Regional Park, Irvine Regional Park, Irvine Lake, and the Frank R. Bowerman FRB Landfill (CDFW 2015). Suitable habitat for this species is present in the survey area; focused surveys were conducted in August 2015. One pair of coastal California gnatcatchers was observed on the slopes adjacent to Santiago Canyon Road along the ILP North Alignment and one pair was observed near the Baker RWPS. No coastal California gnatcatchers were observed at the Santiago Hills C+ Reservoir site, or at the Rattlesnake Complex. Coastal California gnatcatcher is not expected to occur at the Orchard Hills Facility due to lack of suitable habitat.

On December 19, 2007, the USFWS published a final rule to designate 197,303 acres of land as Critical Habitat for the coastal California gnatcatcher (USFWS 2007). The Project sites are not located within Critical Habitat for the gnatcatcher.

Western Pond Turtle

The western pond turtle is a California Species of Special Concern. It occurs primarily in freshwater rivers, streams, lakes, ponds, vernal pools, and seasonal wetlands requiring basking sites such as logs, banks, or other suitable areas above water level. The western pond turtle is estimated to be in decline throughout 75 to 80 percent of its range (Stebbins 2003). In Orange County, this species has been reported from Bonita Reservoir, Aliso Creek, Upper Newport Bay, Oso Creek, San Diego Creek, San Joaquin Marsh, Laguna Hills Lakes, and Veeh Channel (Harmsworth Associates 1998). Peters Canyon Reservoir, adjacent to the Baker RWPS, could provide suitable habitat for this species. Therefore, western pond turtle has a limited potential to occur in the vicinity of the ILP North Alignment near the Baker RWPS. Focused surveys are not considered necessary because there is no suitable riparian habitat within any of the Project sites.

Burrowing Owl

The western burrowing owl is a grassland specialist distributed throughout western North America, where it occupies open areas with short vegetation and bare ground within shrub, desert, and grassland environments. Burrowing owls use a wide variety of arid and semi-arid environments, with well-drained, level to gently sloping areas characterized by sparse vegetation and bare ground (Haug et al. 1993; Dechant et al. 2003). Burrowing owls in Florida excavate their own burrows, but western burrowing owls depend on the presence of burrowing mammals whose

burrows are used for roosting and nesting (Haug et al. 1993). The presence or absence of colonial mammal burrows (e.g., California ground squirrels) is often a major factor that limits the presence or absence of burrowing owls. Where mammal burrows are scarce, burrowing owls have been found occupying man-made cavities, such as buried and non-functioning drain pipes, stand-pipes, and dry culverts. Burrowing mammals may burrow beneath rocks, debris, or large, heavy objects such as abandoned cars, concrete blocks, or concrete pads. Large, hard objects at burrow entrances stabilize the entrance from collapse, and may inhibit excavation by predators. Suitable habitat occurs in the ILP North Alignment near the Baker RWPS, the Santiago Hills C+ Reservoir site, and the Orchard Hills Facility, and occurs adjacent to the Rattlesnake Complex and the ILP North Alignment; however, this species is known from only a few locations in Orange County. Therefore, the burrowing owl has limited potential to occur within or adjacent to all Project sites. Focused burrow surveys should be conducted on the Project sites to determine whether focused surveys would be needed.

Coastal Cactus Wren

The coastal cactus wren is a California Species of Special Concern. This species is an NCCP/HCP Conditionally Covered Species. Coastal populations of the cactus wren are year-round residents of coastal sage scrub with patches of tall prickly pear (*Opuntia prolifera*) and cholla (*O. littoralis*) for nesting and breeding. Coastal cactus wrens are known to occur throughout the Project vicinity, including Peters Canyon Regional Park and Irvine Regional Park (CDFW 2015). No southern cactus scrub is located within or adjacent to any of the Project sites; however, a few small patches of southern cactus scrub are located along the ILP North Alignment. Because this species is covered by the NCCP/HCP, no focused surveys are required.

5.0 PROJECT IMPACTS

An impact boundary was developed from Project plans provided by IRWD; the impact boundary includes both permanent areas and areas that would be used for temporary construction access (Exhibits 4a–4f). The determination of impacts in this analysis is based on the comparison of maps depicting Project limits with maps of biological resources. All construction activities (including staging and equipment areas) are assumed to be within the Project limits identified on Exhibits 4a–4f. Should any of the impact areas extend beyond the limits shown, additional analysis would be required.

5.1 VEGETATION TYPES

A total of 3.19 acres of natural vegetation types (i.e., scrub and grassland) and 33.36 acres of developed and disturbed areas would be impacted by all Project elements (Exhibits 4a–4f; Table 3). These impacts are discussed further below.

TABLE 3
VEGETATION TYPES THAT WOULD BE IMPACTED BY THE PROPOSED PROJECT

Vegetation Types	Existing in the Survey Area (Acres)	ILP North Alignment Near the Baker RWPS (Acres)	Santiago Hills C+ Reservoir Site (Acres)	Rattlesnake Complex (Acres)	Orchard Hills Facility (Acres)	ILP North Alignment (Acres)	Total Impacted (Acres)
Scrub Habitats	*13.18*	*0.19*	*0.77*	*0.00*	*0.00*	*0.00*	***0.96***
California Sagebrush–California Buckwheat Scrub (2.3.1)	8.90	0.19	0.07	0.00	0.00	0.00	**0.26**
Disturbed California Sagebrush–California Buckwheat Scrub (2.3.1)	1.00	0.00	0.70	0.00	0.00	0.00	**0.70**
Black Sage Scrub (2.3.4)	0.57	0.00	0.00	0.00	0.00	0.00	**0.00**
Disturbed Sagebrush Scrub (2.3.6)	1.25	0.00	0.00	0.00	0.00	0.00	**0.00**
Buckwheat Scrub (2.3.7)	0.49	0.00	0.00	0.00	0.00	0.00	**0.00**
Southern Cactus Scrub (2.4)	0.72	0.00	0.00	0.00	0.00	0.00	**0.00**
Coastal Goldenbush–Grassland (2.8.3)	0.25	0.00	0.00	0.00	0.00	0.00	**0.00**
Grassland Habitats	*24.14*	*0.00*	*2.23*	*0.00*	*0.00*	*0.00*	***2.23***
Annual Grassland (4.1)	0.73	0.00	0.00	0.00	0.00	0.00	**0.00**
Ruderal (4.6)	21.44	0.00	2.23	0.00	0.00	0.00	**2.23**
Sumac Savannah (4.8)	1.97	0.00	0.00	0.00	0.00	0.00	**0.00**
Riparian Habitats	*3.08*	*0. 00*	*0.00*	*0.00*	*0.00*	*0.00*	***0.00***
Southern Willow Scrub (7.2)	0.12	0.00	0.00	0.00	0.00	0.00	**0.00**
Southern Arroyo Willow Forest (7.6)	0.78	0.00	0.00	0.00	0.00	0.00	**0.00**
Mulefat Scrub (7.3)	1.80	0.00	0.00	0.00	0.00	0.00	**0.00**
Disturbed Mulefat Scrub (7.3)	0.38	0.00	0.00	0.00	0.00	0.00	**0.00**
Agriculture	*0.74*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	***0.00***
Vineyards and Orchards (14.3)	0.74	0.00	0.00	0.00	0.00	0.00	**0.00**
Developed Areas	*66.13*	*0.48*	*0.37*	*2.95*	*0.20*	*29.01*	***33.01***
Urban (15.1)	4.75	0.00	0.00	0.22	0.00	0.00	**0.22**
Non-Urban Industrial (15.3)	5.44	0.48	0.27	1.62	0.20	0.01	**2.58**
Transportation (15.4)	33.43	0.00	0.10	0.38	0.00	27.68	**28.16**
Parks and Ornamental Plantings (15.5)	22.51	0.00	0.00	0.73	0.00	1.32	**2.05**
Disturbed Areas	*7.24*	*0.30*	*0.00*	*0.00*	*0.05*	*0.00*	***0.35***
Cleared or Graded (16.1)	3.68	0.00	0.00	0.00	0.00	0.00	**0.00**
Other Disturbed Areas (16.2)	3.56	0.30	0.00	0.00	0.05	0.00	**0.35**
Total Acres	***114.51***	***0.97***	***3.37***	***2.95***	***0.25***	***29.01***	***36.55***

5.1.1 Scrub Habitats

The ILP North Alignment near the Baker RWPS would impact 0.19 acre of California sagebrush–California buckwheat scrub of suitable habitat for the coastal California gnatcatcher. One pair of gnatcatchers were observed within 500 feet of this project impact area during focused surveys; thus, the coastal sage scrub on this project site would be considered occupied. Any impact on coastal sage scrub vegetation types would be considered significant because scrub habitats are considered to have special status because they support the coastal California gnatcatcher and could also support other special status plant and wildlife species. This area is part of the NCCP/HCP Reserve located in Peters Canyon Regional Park (Exhibits 5a–5b).The Baker RWPS and associated pipelines are existing permanent infrastructure within and adjacent to Peters Canyon Regional Park (i.e., NCCP/HCP Reserve). Construction of a recycled water pipeline is consistent with the provisions of Section 5.3 of the NCCP/HCP, which allows for operation, maintenance and repair, and reconstruction of existing infrastructure facilities in a Habitat Reserve. Section 5.3.3 of the Implementation Agreement states that activities related to the provision and operation of necessary public and quasi-public infrastructure facilities, construction of new infrastructure, and ongoing operations and maintenance, repair and reconstruction activities related to the new infrastructure facilities are "Permitted Activities" provided that they are consistent with adopted County and City general plans and provisions of the NCCP/HCP. Therefore, impacts on 0.19 acre of coastal sage scrub and one pair of gnatcatchers for construction of the ILP North Alignment near the Baker RWPS are considered fully mitigated with IRWD's participation in the NCCP/HCP. Implementation of Mitigation Measure 1 would be required during clearing of coastal sage scrub vegetation.

Construction of the Santiago Hills C+ Reservoir would impact 0.77 acre (0.07 acre of California sagebrush–California buckwheat scrub and 0.70 acre of disturbed California sagebrush–California buckwheat scrub). No coastal California gnatcatchers were observed within 500 feet of this project site during focused surveys; therefore, gnatcatchers are not expected to occur on this project site. Coastal sage scrub on this project site is limited in extent and small in stature and coastal California gnatcatchers are not expected to occur onsite in the future. Coastal sage scrub on the slopes and drainages offsite are much higher quality; any gnatcatchers would be expected to use those higher quality habitats rather than what is on the project site. Therefore, the impacts on 0.77 acre of coastal sage scrub at this facility would be considered less than significant because this portion of the project would impact a limited amount of low quality scrub that is not occupied by coastal California gnatcatcher. Implementation of Mitigation Measure 1 would be required during clearing of coastal sage scrub vegetation.

No scrub habitats would be impacted at the Rattlesnake Complex, the Orchard Hills Facility, or within the ILP North Alignment roadways.

5.1.2 Grassland Habitats

Construction of the Santiago Hills C+ Reservoir would impact 2.23 acres of grassland habitats (2.23 acres of ruderal vegetation[JM2]). Impacts on ruderal vegetation would be considered less than significant because of the relatively low biological value of this vegetation type, and impacts on sumac savannah would be considered less than significant due to the limited amount that would be removed by the proposed Project. Therefore, no mitigation would be required.

No grassland habitats would be impacted by the ILP North Alignment near the Baker RWPS, the Rattlesnake Complex, the Orchard Hills Facility, or within the ILP North Alignment roadways.

5.1.3 Riparian Habitats

None of the Project sites would impact areas mapped as riparian vegetation.

5.1.4 Agriculture

None of the Project sites would impact areas mapped as agriculture.

5.1.5 Developed/Disturbed

A total of 33.01 developed areas, including 0.48 acre at the ILP North Alignment near the Baker RWPS, 0.37 acre at the Santiago Hills C+ Reservoir site, 2.95 acres at the Rattlesnake Complex, 0.02 acre at the Orchard Hills Facility, and 29.01 acres within roadways, would be impacted by the Project. Of these developed areas, 0.73 acre of parks and ornamental plantings would be impacted within the Rattlesnake Complex and 1.32 acres would be impacted within roadways. A total of 0.35 acre of disturbed areas, including 0.30 acre at the ILP North Alignment near the Baker RWPS and 0.05 acre at the Orchard Hills Facility, would be impacted by the Project. Impacts on developed areas (including parks and ornamental plantings) and disturbed areas would be considered less than significant because of the relatively low biological value of these areas. Therefore, no mitigation would be required.

5.2 SPECIAL STATUS PLANT SPECIES

Suitable habitat for special status plant species is located within the Santiago Hills C+ Reservoir site, and limited suitable habitat for special status plants is located at the ILP North Alignment near the Baker RWPS. The ILP North Alignment near the Baker RWPS would impact 0.19 acre of suitable scrub habitat and construction of the Santiago Hills C+ Reservoir would impact 3.00 acres of suitable scrub and grassland habitats. One federally listed Threatened and State-listed Endangered species (thread-leaved brodiaea) has potential to occur in the scrub and grassland habitats; any impact on this species would be considered significant if it were to occur within the impact boundary.

Several CRPR List 1B, 2B, 3, and 4 species also have potential to occur in the habitats that would be impacted by the ILP North Alignment near the Baker RWPS and Santiago Hills C+ Reservoir; impacts on these species would be considered significant if they were present in the impact area and if the size of the population and the status of the species warrant a finding of significance. Impacts on Catalina mariposa lily, intermediate mariposa lily, Coulter's matilija poppy are covered or conditionally covered by the County's participation in the NCCP/HCP. Implementation of Mitigation Measure 2 would reduce this impact to a less than significant level.

No suitable habitat for special status plants is located at the Rattlesnake Complex, the Orchard Hills Facility, or within roadways. Therefore, these elements of the Project would not impact special status plant species.

5.3 SPECIAL STATUS WILDLIFE SPECIES

5.3.1 Riparian Birds

The Project would not impact riparian habitat with potential to support riparian bird species (i.e., western yellow-billed cuckoo, southwestern willow flycatcher, and least Bell's vireo). Therefore, the Project would not be expected to directly impact Threatened or Endangered riparian bird species.

Riparian habitat adjacent to the Baker RWPS (within Peters Canyon Regional Park and within the ILP North Alignment) is known to support least Bell's vireo and has potential to support southwestern willow flycatcher and migrants of western yellow-billed cuckoo. Additionally, a small drainage of mulefat scrub along East Santiago Canyon Road has potential to support least Bell's vireo. Construction noise and increased human activity for these portions of the Project could

indirectly impact habitat for Threatened or Endangered riparian birds adjacent to these facilities if they occurred during the summer breeding season (March 15 to September 15). If possible, noise-intensive portions of construction should be planned to occur outside the breeding season for these species. If construction would occur within 500 feet of suitable riparian habitat during the breeding season, Mitigation Measure 3 would be required to reduce impacts to less than significant.

5.3.2 Coastal California Gnatcatcher

As discussed above (see Scrub Habitats), habitat occupied by the coastal California gnatcatcher would be impacted at the ILP North Alignment near the Baker RWPS; habitat occupied by coastal California gnatcatcher is also adjacent to the ILP North Alignment (i.e., along Santiago Canyon Road) (Exhibit 4). As described above, impacts at the ILP North Alignment near the Baker RWPS would be covered by the NCCP/HCP. Mitigation Measure 1 would mitigate this impact to a less than significant level.

Scrub habitats are also located adjacent to the Baker RWPS in the ILP North Alignment, the Santiago Hills C+ Reservoir site, the Rattlesnake Complex, and along the ILP North Alignment roadways. Construction noise and increased human activity for these portions of the Project could indirectly impact coastal California gnatcatcher adjacent to these facilities. However, indirect impacts are considered fully covered by IRWD's participation in the NCCP/HCP as long as the measures listed in Mitigation Measure 1 are followed.

5.3.3 Western Pond Turtle

No open water or drainages would be impacted by the Project. As described above, the area of mulefat scrub that would be impacted at the Rattlesnake Complex occurs in an upland area that is not associated with a drainage feature. No suitable habitat for the western pond turtle would be impacted by the Project.

5.3.4 Burrowing Owl

Burrowing owl could occur at the ILP North Alignment near the Baker RWPS, the Santiago Hills C+ Reservoir site, the Rattlesnake Complex, the Orchard Hills Facility, and along the ILP North Alignment roadways. The ILP North Alignment near the Baker RWPS would impact 0.49 acre of suitable scrub and disturbed habitats; construction of the Santiago Hills C+ Reservoir would impact 3.00 acres of suitable scrub and grassland habitats; and the Orchard Hills Facility would impact 0.05 acre of suitable disturbed habitat. Additionally, suitable habitat for this species is located adjacent to these facilities, the Rattlesnake Complex, and along the ILP North Alignment roadways Construction noise and increased human activity associated with the Project could indirectly impact burrowing owl if it were nesting adjacent to the Project sites. As discussed above, burrowing owl are not common in Orange County and therefore only have a limited potential to occur. Mitigation Measure 4 would be required to ensure that this species is not impacted by construction.

5.3.5 Coastal Cactus Wren

Coastal cactus wren have potential to occur in coastal sage scrub habitat at the ILP North Alignment near the Baker RWPS and the Santiago Hills C+ Reservoir site, and in habitat adjacent to the Rattlesnake Complex, and along the ILP North Alignment roadways. Coastal cactus wrens nest in cactus habitat; no southern cactus scrub would be directly impacted by the Project. Construction noise and increased human activity for these portions of the Project could indirectly impact coastal cactus wren adjacent to these facilities. However, indirect impacts are considered

fully covered by IRWD's participation in the NCCP/HCP as long as the measures listed in Mitigation Measure 1 are followed.

5.3.6 Other Special Status Wildlife

A total of 3.19 acres of scrub and grassland habitats that provide potentially suitable habitat for special status species would be impacted by the proposed Project. This loss would be limited relative to the amount of habitat available for these species in the Project region, which includes large areas of native habitat set aside for the NCCP/HCP Reserve located immediately adjacent to the survey area. Therefore, the impact on special status wildlife species would be considered less than significant.

5.4 OTHER CONSIDERATIONS

5.4.1 Nesting Raptors

Several raptor species (i.e., birds of prey) have potential to nest in the trees within and adjacent to the survey area. This includes riparian trees, such as willows (*Salix* spp.), and those mapped as parks and ornamental plantings, such as pine (*Pinus* spp.) and gum (*Eucalyptus* spp.). If construction would occur during the raptor nesting season (i.e., February 1 to June 30), the loss of an active nest of any raptor species, including common raptor species, would be considered a violation of Sections 3503, 3503.5, and 3513 of the *California Fish and Game Code* and would be considered significant. Implementation of Mitigation Measure 5 would be required to reduce this impact to a less than significant level.

5.4.2 Nesting Birds

The Migratory Bird Treaty Act (MBTA) protects the taking of migratory birds and their nests and eggs. Bird species protected under the provisions of the MBTA are identified by the List of Migratory Birds (*Code of Federal Regulations,* Title 50, Section 10.13). Any impact on an active bird nest would be considered a violation of the MBTA and would be considered significant. Implementation of Mitigation Measure 6 would be required to reduce this impact to a less than significant level.

5.4.3 Water Quality

Any change to water quality could affect biological resources that occur adjacent to the Project sites. During construction, runoff carrying excessive silt or petroleum residues from construction equipment has the potential to impact water quality and, in turn, affect plant and wildlife species. Impacts on water quality or increases in dust would be considered potentially significant. Implementation of Mitigation Measure 7 would be required to reduce this impact to a less than significant level.

5.4.4 Noise/Human Activity

Noise levels and human activity in the survey area may increase over present levels during Project construction. The proposed Project sites are located in developed/disturbed habitat and along roadways that are heavily utilized; therefore, most wildlife species in the survey area are likely already acclimated to a high level of human activity and noise associated with traffic and construction activities. However, some construction noises are much louder than typical roadway traffic noise and may startle wildlife nearby. These temporary noise impacts have the potential to disrupt the foraging, nesting, roosting, and denning activities of a variety of wildlife species. Wildlife species startled or stressed by construction noise may disperse from the habitat near the survey area. For most species, although the indirect noise impact would be considered adverse,

it would be considered less than significant because it would be limited in extent, temporary in nature, and would not disrupt breeding activities for most species. Therefore, no mitigation would be required. However, for species listed as Threatened or Endangered, if the noise interferes with breeding activities, it could significantly impact the species as described above. Mitigation Measures1, 3, 4 and 5 would mitigate for indirect noise impacts for species that could be significantly affected.

5.4.5 Invasive Species

The proposed Project would not include landscaping. Therefore, no non-native invasive plant species would be planted adjacent to natural areas.

6.0 MITIGATION MEASURES

Implementation of the following mitigation measures would reduce impacts to less than significant levels for the special status plants and wildlife species discussed above.

6.1 MITIGATION MEASURE 1: SCRUB HABITATS AND COASTAL CALIFORNIA GNATCATCHER

Direct impacts to scrub habitats and coastal California gnatcatchers for the ILP North Alignment near the Baker Raw Water Pump Station (RWPS) and indirect impacts for the ILP North Alignment near the Baker RWPS, Santiago Hills C+ Reservoir site, Rattlesnake Complex, and along the ILP North Alignment are fully mitigated through IRWD's participation and contribution in the Central Coastal Natural Communities Conservation Plan (NCCP)/Habitat Conservation Plan (HCP). The participation not only provides mitigation for coastal sage scrub and coastal California gnatcatcher, but also other special status species designated as "Covered Species" by the NCCP/HCP. IRWD will follow the Construction Minimization Measures that are required by the NCCP/HCP listed below.

a. To the maximum extent practicable, no grading [removal] of coastal sage scrub habitat that is occupied by nesting gnatcatchers will occur during the breeding season (February 15 through July 15). It is expressly understood that this provision and the remaining provisions of these "construction-related minimization measures" are subject to public health and safety considerations. These considerations include unexpected slope stabilization, erosion-control measures, and emergency facility repairs. In the event of such public health and safety circumstances, landowners or public agencies/utilities will provide the U.S. Fish and Wildlife Service (USFWS) and the California Department of Fish and Wildlife (CDFW) with the maximum practicable notice (or such notice as is specified in the NCCP/HCP) to allow for capture of gnatcatchers, cactus wrens, and any other coastal sage scrub Identified Species that are not otherwise flushed and will carry out the following measures only to the extent as practicable in the context of the public health and safety considerations.

b. Prior to the commencement of grading operations or other activities involving significant soil disturbance, all areas of coastal sage scrub habitat to be avoided under the provisions of the NCCP/HCP shall be identified with temporary fencing or other markers clearly visible to construction personnel. Additionally, prior to the commencement of grading operations or other activities involving disturbance of coastal sage scrub [ILP North Alignment near the Baker RWPS and Santiago Hills C+ Reservoir site], a survey will be conducted to locate gnatcatchers and cactus wrens within 100 feet of the outer extent of projected soil disturbance activities, and the locations of any such species will be clearly marked and identified on the construction/grading plans.

c. A Monitoring Biologist that is familiar with USFWS/CDFW requirements will be on site during any clearing of coastal sage scrub. The landowner or relevant public agency/utility will advise the USFWS/CDFW at least 7 calendar days (and preferably 14 calendar days) prior to the clearing of any habitat occupied by Identified Species to allow the USFWS/CDFW to work with the Monitoring Biologist in connection with bird-flushing capture activities. The Monitoring Biologist will flush Identified Species (avian or other mobile Identified Species) from occupied habitat areas immediately prior to brush-clearing and earth-moving activities. If birds cannot be flushed, they will be captured in mist nets, if feasible, and relocated to areas of the site to be protected or to the NCCP/HCP Reserve System. It will be the Monitoring Biologist's responsibility to ensure that identified bird species will not be directly impacted by brush-clearing and earth-moving equipment in a manner that also allows for construction activities on a timely basis.

d. Following the completion of initial grading/earth-movement activities [ILP North Alignment near the Baker RWPS, Santiago Hills C+ Reservoir site, Rattlesnake Complex, and ILP North Alignment], all areas of coastal sage scrub habitat to be avoided by construction equipment and personnel will be marked with temporary fencing or other appropriate markers clearly visible to construction personnel. No construction access, parking, or equipment storage shall be permitted within such marked areas.

e. In areas bordering the NCCP Reserve System [ILP North Alignment and ILP North Alignment near the Baker RWPS] or Special Linkage/Special Management areas containing significant coastal sage scrub identified in the NCCP/HCP for protection, vehicle transportation routes between cut-and-fill locations will be restricted to a minimum number during construction consistent with Project construction requirements. Waste dirt or rubble will not be deposited on adjacent coastal sage scrub identified in the NCCP/HCP for protection. Pre-construction meetings involving the Monitoring Biologist, construction supervisors, and equipment operators will be conducted and documented to ensure maximum practicable adherence to these measures.

To the maximum extent practicable, IRWD will implement the following to minimize impacts:

1. Impacts on coastal sage scrub habitat should be minimized through the design process;

2. Noise-intensive construction should occur outside the gnatcatcher breeding season (the breeding season is from February 15 to August 31);

6.2 MITIGATION MEASURE 2: SPECIAL STATUS PLANT SPECIES

Prior to construction activities for the ILP North Alignment near the Baker RWPS and the Santiago Hills C+ Reservoir site, IRWD will retain a qualified Biologist to conduct focused surveys for special status plant species in Project impact areas that have potential to provide habitat for special status plant species. The survey will be done during the peak blooming period in accordance with the most current protocols approved by the CDFW and the California Native Plant Society (CNPS). Per requirements in the NCCP/HCP, if less than 20 individuals of Catalina mariposa lily or intermediate mariposa lily are observed in the impact area, no mitigation would be required; if more than 20 individuals are observed, mitigation will be required. If federally or State-listed species, or CRPR List 1B or 2 species are observed, mitigation will be required. To the greatest extent practicable, efforts shall be made to avoid any special status plant species observed. If avoidance is not feasible, corms/bulbs/seeds will be collected from the Project impact area and will be translocated to a mitigation site with the appropriate habitat for the species. The collection of corms/bulbs/seeds will be conducted at the appropriate time of year to maximize potential for success depending on the species of plant. IRWD will retain a qualified Biologist to

prepare a detailed Special Status Plant Mitigation Plan to describe the translocation. IRWD will implement the Mitigation Plan as approved and according to its specified materials, methods, and performance criteria. If thread-leaved brodiaea would be impacted, take authorization will be obtained from the USFWS and CDFW prior to impacting the species.

6.3 MITIGATION MEASURE 3: INDIRECT IMPACTS ON RIPARIAN BIRDS

If construction activities for the ILP North Alignment near the Baker RWPS or ILP North Alignment would occur during the breeding season for the least Bell's vireo and southwestern willow flycatcher (i.e., March 15 to September 15) within 500 feet of potential habitat for this species (e.g., southern willow scrub, southern arroyo willow forest, mulefat scrub, or disturbed mulefat scrub), IRWD will retain a qualified Biologist to conduct a pre-construction focused survey to determine whether habitat adjacent to the impact area is occupied at the time of construction. If active nests are found during the surveys, a qualified Biologist, in consultation with IRWD, will determine whether construction activities have the potential to disturb the nest(s) and will determine the appropriate construction limitations, which may include but would not be limited to erecting sound barriers, monitoring by a qualified Biologist, or establishing no construction buffers (usually 300 feet for special status song birds, and 500 feet for listed song birds or raptors). In addition, a qualified Biologist will serve as construction monitor, in consultation with IRWD, during those periods that occur near active nest areas to ensure no inadvertent impacts to the nest occur. If necessary, the limits of construction to avoid an active nest will be established in the field with flagging, fencing, or other appropriate barriers, and construction personnel will be instructed on the sensitivity of nest areas.

6.4 MITIGATION MEASURE 4: BURROWING OWLS

IRWD will retain a qualified Biologist to conduct a pre-construction survey for burrowing owl within seven days prior to construction activities to determine if there are any active burrowing owls within or adjacent to the impact area. If no active burrows are observed, construction work can proceed. If occupied burrowing owl habitat is detected on or adjacent to the Project impact area, measures to avoid, minimize, or mitigate impacts will be incorporated into the Project and may include the following:

- Construction monitoring will occur throughout the duration of ground-disturbing construction activities to ensure that no impacts occur on burrowing owl. The frequency of monitoring will be determined by IRWD through consultation with a qualified Biologist.
- Construction exclusion areas will be established around the occupied burrows in which no disturbance will be allowed to occur while the burrows are occupied. Buffer areas will be determined by IRWD through consultation with a qualified Biologist based on the recommendations outlined in the *Staff Report on Burrowing Owl Mitigation* (CDFW 2012).

If burrow avoidance is infeasible, a qualified Biologist will implement a passive relocation program in accordance with the *Example Components for Burrowing Owl Artificial Burrow and Exclusion Plans* (CDFW 2012).

6.5 MITIGATION MEASURE 5: NESTING RAPTORS

If construction initiation occurs during the raptor nesting season (i.e., February 1 to June 30), IRWD will retain a qualified Biologist to conduct a pre-construction survey within 500 feet of the limits of Project disturbance for the presence of any active raptor nests (common or special status). Any nest found during survey efforts will be mapped on construction plans. If no active nests are found, no further mitigation will be required.

If nesting activity is present at any raptor nest site, the following restrictions on construction will be required between February 1 and June 30 (or until nests are no longer active, as determined by IRWD, in consultation with a qualified Biologist): (1) clearing limits shall be established 500 feet in any direction from any occupied nest and (2) access and surveying shall be restricted to within 500 feet of any occupied nest. Any encroachment into the 500-foot buffer area around the known nest will only be allowed if IRWD, in consultation with a qualified Biologist, determines that the proposed activity will not disturb the nest occupants.

6.6 MITIGATION MEASURE 6: NESTING BIRDS

To the extent practicable, IRWD will plan vegetation removal efforts to occur between September 16 and February 14, which is outside the breeding season for nesting birds. If tree trimming or vegetation removal occurs during the breeding season for nesting birds (i.e., between February 15 and September 15), IRWD will retain a qualified Biologist to conduct a pre-construction nesting bird survey within three days prior to vegetation removal to ensure that no active bird nests would be impacted. If an active nest is observed within the proposed work area IRWD, in consultation with a qualified Biologist, will determine the appropriate size for a protective buffer around the nest based on the sensitivity of the species and the location of the nest. No construction activities will be allowed within the protective buffer until the nest is no longer active, as determined by a qualified Biologist.

6.7 MITIGATION MEASURE 7: WATER QUALITY

IRWD will require the construction contractor to include Best Management Practices (BMPs) in the Stormwater Pollution Prevention Plan for the Project to minimize soil erosion and sedimentation from the Project sites.

7.0 CONSISTENCY WITH CEQA PLUS GUIDELINES

Coastal Barrier Reef Systems: The Project would not impact any coastal barrier reef systems.

Coastal Zone: The Project is not located within the coastal zone.

Essential Fish Habitat: The Project would not impact Essential Fish Habitat.

Endangered Species Act: The Project could directly impact thread-leaved brodiaea and coastal California gnatcatcher; it could also indirectly impact least Bell's vireo and southwestern willow flycatcher. Mitigation Measures 1, 2, and 3 would ensure that impacts are reduced to less than significant levels.

Critical Habitat: The Project would not impact any critical habitat.

Migratory Bird Treaty Act: The Project could affect nesting birds. Mitigation Measures 5 and 6 ensure that the Project would not impact nesting birds or raptors.

Jurisdictional Resources: The Project would not impact any jurisdictional resources.

Wild and Scenic Rivers: The Project would not impact any wild and scenic rivers.

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ATTACHMENT A

REPRESENTATIVE SITE PHOTOGRAPHS

View of non-urban industrial area at the Baker Raw Water Pumping Station.

Disturbed area with a small area of California sagebrush-California buckwheat scrub at the Baker Raw Water Pumping Station.

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Representative Site Photos

Attachment A-1

IRWD ILP North Conversion Project

BonTerra PSOMAS

(07/07/2015 JAZ) R:\Projects\IRW_IRWD\3IRW000701\Graphics\BioConstraints\AttA1_SP.pdf

View of disturbed area at the Orchard Hills Facility.

Avocado orchard at the Orchard Hills Facility.

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Representative Site Photos

Attachment A-2

IRWD ILP North Conversion Project

BonTerra PSOMAS

(07/07/2015 JAZ) R:\Projects\IRW_IRWD\3IRW000701\Graphics\BioConstraints\AttA2_SP.pdf

Non-urban industrial area at the Rattlesnake Complex.

Mix of mulefat scrub and California sagebrush-California buckwheat scrub at the Rattlesnake Complex.

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Representative Site Photos

Attachment A-3

IRWD ILP North Conversion Project

BonTerra PSOMAS

(07/07/2015 JAZ) R:\Projects\IRW_IRWD\3IRW000701\Graphics\BioConstraints\AttA3_SP.pdf

California sagebrush-California buckwheat scrub on the slopes with mulefat scrub along the drainage adjacent to Santiago Canyon Road where pipelines would be installed in the roadway.

A small patch of southern cactus scrub on a slope adjacent to Santiago Canyon Road where pipelines would be installed in the roadway.

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Representative Site Photos

Attachment A-4

IRWD ILP North Conversion Project

BonTerra PSOMAS

(07/07/2015 JAZ) R:\Projects\IRW_IRWD\3IRW000701\Graphics\BioConstraints\AttA4_SP.pdf

Mulefat scrub (to the right of the dirt road) adjacent to Jamboree Road where pipelines would be installed. Southern California Willow Riparian Forest in Peters Canyon Regional Park (to the left of the dirt road) is offsite.

Ruderal area along Jamboree Road where pipelines would be installed.

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Representative Site Photos

Attachment A-5

IRWD ILP North Conversion Project

BonTerra PSOMAS

(07/07/2015 JAZ) R:\Projects\IRW_IRWD\3IRW000701\Graphics\BioConstraints\AttA5_SP.pdf

View of existing non-urban industrial areas at the Santiago Hills C+ Reservoir. California sagebrush-California buckwheat scrub is on the adjacent slope (to the left).

Rudeal area with sumac savannah in the background at the Santiago Hills C+ Reservoir.

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Representative Site Photos

Attachment A-6

IRWD ILP North Conversion Project

BonTerra PSOMAS

(07/07/2015 JAZ) R:\Projects\IRW_IRWD\3IRW000701\Graphics\BioConstraints\AttA6_SP.pdf

View of patch of disturbed California sagebrush-California buckwheat scrub and ruderal vegetation at the Santiago Hills C+ Reservoir.

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Representative Site Photos

Attachment A-7

IRWD ILP North Conversion Project

BonTerra PSOMAS

(07/07/2015 JAZ) R:\Projects\IRW_IRWD\3IRW000701\Graphics\BioConstraints\AttA7_SP.pdf

ATTACHMENT B

CNDDB, CNPS, AND USFWS SPECIES LISTS

Summary Table Report

California Department of Fish and Wildlife

California Natural Diversity Database

Query Criteria: Quad is (Black Star Canyon (3311776) or El Toro (3311766) or Orange (3311777) or Tustin (3311767))

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.
Abronia villosa var. aurita chaparral sand-verbena	G5T2T3 S2	None None	Rare Plant Rank - 1B.1 BLM_S-Sensitive USFS_S-Sensitive	150 350	81 S:4	0	0	0	0	4	0	4	0	0	0	4
Accipiter cooperii Cooper's hawk	G5 S4	None None	CDFW_WL-Watch List IUCN_LC-Least Concern	220 1,800	103 S:3	2	0	0	0	0	1	1	2	3	0	0
Aimophila ruficeps canescens southern California rufous-crowned sparrow	G5T3 S2S3	None None	CDFW_WL-Watch List	300 1,400	185 S:9	2	0	0	0	0	7	0	9	9	0	0
Ammodramus savannarum grasshopper sparrow	G5 S3	None None	CDFW_SSC-Species of Special Concern IUCN_LC-Least Concern	45 450	17 S:2	0	2	0	0	0	0	0	2	2	0	0
Anaxyrus californicus arroyo toad	G2G3 S2S3	Endangered None	CDFW_SSC-Species of Special Concern IUCN_EN-Endangered	1,000 1,000	134 S:1	0	1	0	0	0	0	1	0	1	0	0
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	700 700	402 S:1	0	1	0	0	0	0	1	0	1	0	0
Ardea herodias great blue heron	G5 S4	None None	CDF_S-Sensitive IUCN_LC-Least Concern	250 250	133 S:1	0	0	1	0	0	0	0	1	1	0	0
Asio otus long-eared owl	G5 S3?	None None	CDFW_SSC-Species of Special Concern IUCN_LC-Least Concern	700 800	42 S:2	0	0	0	0	0	2	2	0	2	0	0
Aspidoscelis hyperythra orangethroat whiptail	G5 S2	None None	CDFW_SSC-Species of Special Concern IUCN_LC-Least Concern USFS_S-Sensitive	480 1,221	346 S:17	5	2	0	0	0	10	9	8	17	0	0
Aspidoscelis tigris stejnegeri coastal whiptail	G5T3T4 S2S3	None None		540 1,400	113 S:5	0	0	1	0	0	4	0	5	5	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.
Astragalus brauntonii Braunton's milk-vetch	G2 S2	Endangered None	Rare Plant Rank - 1B.1 SB_RSABG-Rancho Santa Ana Botanic Garden SB_SBBG-Santa Barbara Botanic Garden	1,000 1,200	34 S:2	0	2	0	0	0	0	0	2	2	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	5 350	1870 S:7	1	0	1	3	1	1	3	4	6	1	0
Atriplex coulteri Coulter's saltbush	G2 S2	None None	Rare Plant Rank - 1B.2 SB_RSABG-Rancho Santa Ana Botanic Garden	50 50	75 S:2	0	0	0	1	0	1	1	1	2	0	0
Atriplex pacifica south coast saltscale	G3G4 S2	None None	Rare Plant Rank - 1B.2	5 5	77 S:1	0	0	0	0	0	1	1	0	1	0	0
Atriplex serenana var. davidsonii Davidson's saltscale	G5T1 S1	None None	Rare Plant Rank - 1B.2	50 50	28 S:1	0	0	0	1	0	0	0	1	1	0	0
Baccharis malibuensis Malibu baccharis	G1 S1	None None	Rare Plant Rank - 1B.1 SB_RSABG-Rancho Santa Ana Botanic Garden	1,040 1,040	7 S:1	0	0	0	0	0	1	0	1	1	0	0
Branchinecta sandiegonensis San Diego fairy shrimp	G2 S2	Endangered None	IUCN_EN-Endangered	1,200 1,200	119 S:1	1	0	0	0	0	0	0	1	1	0	0
Brodiaea filifolia thread-leaved brodiaea	G1 S1	Threatened Endangered	Rare Plant Rank - 1B.1 SB_RSABG-Rancho Santa Ana Botanic Garden	970 970	131 S:1	0	1	0	0	0	0	0	1	1	0	0
Buteo regalis ferruginous hawk	G4 S3S4	None None	CDFW_WL-Watch List IUCN_LC-Least Concern USFWS_BCC-Birds of Conservation Concern	500 520	102 S:2	0	0	0	0	0	2	0	2	2	0	0
California Walnut Woodland California Walnut Woodland	G2 S2.1	None None		680 720	76 S:2	0	0	0	0	0	2	2	0	2	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.
Calochortus plummerae Plummer's mariposa-lily	G4 S4	None None	Rare Plant Rank - 4.2 SB_RSABG-Rancho Santa Ana Botanic Garden	1,400 3,200	230 S:4	0	0	0	0	0	4	1	3	4	0	0
Calochortus weedii var. intermedius intermediate mariposa-lily	G3G4T2 S2	None None	Rare Plant Rank - 1B.2 SB_RSABG-Rancho Santa Ana Botanic Garden USFS_S-Sensitive	530 2,980	117 S:39	1	9	1	0	0	28	3	36	39	0	0
Campylorhynchus brunneicapillus sandiegensis coastal cactus wren	G5T3Q S3	None None	CDFW_SSC-Species of Special Concern USFS_S-Sensitive USFWS_BCC-Birds of Conservation Concern	200 1,200	150 S:24	1	13	5	0	0	5	15	9	24	0	0
Catostomus santaanae Santa Ana sucker	G1 S1	Threatened None	AFS_TH-Threatened CDFW_SSC-Species of Special Concern IUCN_VU-Vulnerable	260 500	27 S:5	0	0	0	0	0	5	3	2	5	0	0
Centromadia parryi ssp. australis southern tarplant	G3T2 S2	None None	Rare Plant Rank - 1B.1 SB_RSABG-Rancho Santa Ana Botanic Garden	5 385	78 S:12	0	1	2	3	1	5	4	8	11	1	0
Charina trivirgata rosy boa	G4G5 S3S4	None None	IUCN_LC-Least Concern USFS_S-Sensitive	850 850	48 S:1	0	0	0	0	0	1	0	1	1	0	0
Choeronycteris mexicana Mexican long-tongued bat	G4 S1	None None	CDFW_SSC-Species of Special Concern IUCN_NT-Near Threatened WBWG_H-High Priority	125 125	14 S:1	0	0	0	0	0	1	0	1	1	0	0
Chorizanthe parryi var. fernandina San Fernando Valley spineflower	G2T1 S1	Candidate Endangered	Rare Plant Rank - 1B.1 SB_RSABG-Rancho Santa Ana Botanic Garden USFS_S-Sensitive		21 S:1	0	0	0	0	1	0	1	0	0	1	0
Chorizanthe polygonoides var. longispina long-spined spineflower	G5T3 S3	None None	Rare Plant Rank - 1B.2 BLM_S-Sensitive SB_RSABG-Rancho Santa Ana Botanic Garden	500 500	130 S:1	0	0	0	0	0	1	0	1	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						Population Status		Presence		
						A	B	C	D	X	U	Historic > 20 yr	Recent <= 20 yr	Extant	Poss. Extirp.	Extirp.
Coccyzus americanus occidentalis western yellow-billed cuckoo	G5T3Q S1	Threatened Endangered	BLM_S-Sensitive NABCI_RWL-Red Watch List USFS_S-Sensitive USFWS_BCC-Birds of Conservation Concern	120 120	155 S:1	0	0	0	0	1	0	1	0	0	0	1
Crotalus ruber red-diamond rattlesnake	G4 S2?	None None	CDFW_SSC-Species of Special Concern USFS_S-Sensitive	500 1,520	148 S:4	0	0	0	0	0	4	0	4	4	0	0
Dudleya multicaulis many-stemmed dudleya	G2 S2	None None	Rare Plant Rank - 1B.2 BLM_S-Sensitive SB_RSABG-Rancho Santa Ana Botanic Garden USFS_S-Sensitive	5 2,280	147 S:40	2	8	1	1	5	23	19	21	35	1	4
Elanus leucurus white-tailed kite	G5 S3S4	None None	BLM_S-Sensitive CDFW_FP-Fully Protected IUCN_LC-Least Concern	12 870	158 S:15	0	1	0	0	0	14	0	15	15	0	0
Empidonax traillii extimus southwestern willow flycatcher	G5T2 S1	Endangered Endangered	NABCI_RWL-Red Watch List	370 370	70 S:1	1	0	0	0	0	0	0	1	1	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	5 1,300	1143 S:9	0	1	2	0	1	5	9	0	8	1	0
Eremophila alpestris actia California horned lark	G5T3Q S3	None None	CDFW_WL-Watch List IUCN_LC-Least Concern	220 1,000	81 S:5	0	1	0	3	0	1	0	5	5	0	0
Eriastrum densifolium ssp. sanctorum Santa Ana River woollystar	G4T1 S1	Endangered Endangered	Rare Plant Rank - 1B.1 SB_RSABG-Rancho Santa Ana Botanic Garden		30 S:1	0	0	0	0	1	0	1	0	0	1	0
Eumops perotis californicus western mastiff bat	G5T4 S3S4	None None	BLM_S-Sensitive CDFW_SSC-Species of Special Concern WBWG_H-High Priority	10 1,300	293 S:8	0	1	0	0	0	7	8	0	8	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.
Haliaeetus leucocephalus bald eagle	G5 S2	Delisted Endangered	BLM_S-Sensitive CDF_S-Sensitive CDFW_FP-Fully Protected IUCN_LC-Least Concern USFS_S-Sensitive USFWS_BCC-Birds of Conservation Concern	1,055 1,055	318 S:1	0	0	0	0	0	1	0	1	1	0	0
Helianthus nuttallii ssp. parishii Los Angeles sunflower	G5TH SH	None None	Rare Plant Rank - 1A		8 S:1	0	0	0	0	0	1	1	0	1	0	0
Hesperocyparis forbesii Tecate cypress	G2 S2	None None	Rare Plant Rank - 1B.1 BLM_S-Sensitive SB_RSABG-Rancho Santa Ana Botanic Garden SB_USDA-US Dept of Agriculture USFS_S-Sensitive	1,600 2,900	24 S:3	0	2	0	0	0	1	0	3	3	0	0
Icteria virens yellow-breasted chat	G5 S3	None None	CDFW_SSC-Species of Special Concern IUCN_LC-Least Concern	10 600	84 S:4	1	2	0	0	0	1	1	3	4	0	0
Lasthenia glabrata ssp. coulteri Coulter's goldfields	G4T2 S2	None None	Rare Plant Rank - 1B.1 BLM_S-Sensitive SB_RSABG-Rancho Santa Ana Botanic Garden		89 S:1	0	0	0	0	1	0	1	0	0	1	0
Laterallus jamaicensis coturniculus California black rail	G3G4T1 S1	None Threatened	BLM_S-Sensitive CDFW_FP-Fully Protected IUCN_NT-Near Threatened NABCI_RWL-Red Watch List USFWS_BCC-Birds of Conservation Concern	0 0	241 S:1	0	0	0	0	0	1	1	0	1	0	0
Lepechinia cardiophylla heart-leaved pitcher sage	G3? S2S3	None None	Rare Plant Rank - 1B.2 SB_RSABG-Rancho Santa Ana Botanic Garden USFS_S-Sensitive	1,750 3,560	18 S:8	1	1	0	0	0	6	6	2	8	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.
Lepidium virginicum var. robinsonii Robinson's pepper-grass	G5T3 S3	None None	Rare Plant Rank - 4.3	200 1,200	142 S:5	0	0	0	0	0	5	1	4	5	0	0
Lithobates pipiens northern leopard frog	G5 S2	None None	CDFW_SSC-Species of Special Concern IUCN_LC-Least Concern	1,100 1,100	22 S:1	0	0	0	0	0	1	1	0	1	0	0
Monardella hypoleuca ssp. intermedia intermediate monardella	G4T2T3 S2S3	None None	Rare Plant Rank - 1B.3	1,000 3,700	38 S:9	0	0	0	0	0	9	5	4	9	0	0
Myotis yumanensis Yuma myotis	G5 S4	None None	BLM_S-Sensitive IUCN_LC-Least Concern WBWG_LM-Low-Medium Priority	300 300	259 S:1	0	0	0	0	0	1	0	1	1	0	0
Nama stenocarpa mud nama	G4G5 S1S2	None None	Rare Plant Rank - 2B.2	49 440	22 S:2	0	0	0	2	0	0	0	2	2	0	0
Neotoma lepida intermedia San Diego desert woodrat	G5T3T4 S3S4	None None	CDFW_SSC-Species of Special Concern	500 500	115 S:1	0	0	0	0	0	1	0	1	1	0	0
Nolina cismontana chaparral nolina	G3 S3	None None	Rare Plant Rank - 1B.2 SB_RSABG-Rancho Santa Ana Botanic Garden SB_SBBG-Santa Barbara Botanic Garden USFS_S-Sensitive	750 2,200	49 S:19	0	3	1	0	0	15	5	14	19	0	0
Passerculus sandwichensis beldingi Belding's savannah sparrow	G5T3 S3	None Endangered		0 0	36 S:1	0	1	0	0	0	0	0	1	1	0	0
Penstemon californicus California beardtongue	G3 S2	None None	Rare Plant Rank - 1B.2 USFS_S-Sensitive	800 800	13 S:1	0	0	0	0	0	1	1	0	1	0	0
Pentachaeta aurea ssp. allenii Allen's pentachaeta	G4T1 S1	None None	Rare Plant Rank - 1B.1	350 1,700	8 S:5	0	0	0	0	1	4	3	2	4	1	0
Perognathus longimembris pacificus Pacific pocket mouse	G5T1 S1	Endangered None	CDFW_SSC-Species of Special Concern	500 500	13 S:1	0	0	0	0	1	0	1	0	0	0	1

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.
Phrynosoma blainvillii coast horned lizard	G3G4 S3S4	None None	BLM_S-Sensitive CDFW_SSC-Species of Special Concern IUCN_LC-Least Concern	135 1,800	728 S:14	2	2	1	0	1	8	11	3	13	1	0
Polioptila californica californica coastal California gnatcatcher	G3T2 S2	Threatened None	CDFW_SSC-Species of Special Concern NABCI_YWL-Yellow Watch List	50 1,660	809 S:76	9	12	4	5	3	43	19	57	73	3	0
Pseudognaphalium leucocephalum white rabbit-tobacco	G4 S2	None None	Rare Plant Rank - 2B.2	500 500	15 S:1	0	0	0	0	0	1	1	0	1	0	0
Rallus longirostris levipes light-footed clapper rail	G5T1T2 S1	Endangered Endangered	CDFW_FP-Fully Protected NABCI_RWL-Red Watch List	0 5	30 S:2	0	1	0	0	0	1	0	2	2	0	0
Rhinichthys osculus ssp. 3 Santa Ana speckled dace	G5T1 S1	None None	AFS_TH-Threatened CDFW_SSC-Species of Special Concern USFS_S-Sensitive	1,360 1,360	14 S:1	0	0	1	0	0	0	0	1	1	0	0
Riversidian Alluvial Fan Sage Scrub Riversidian Alluvial Fan Sage Scrub	G1 S1.1	None None		800 800	30 S:1	0	0	1	0	0	0	1	0	1	0	0
Salvadora hexalepis virgultea coast patch-nosed snake	G5T4 S2S3	None None	CDFW_SSC-Species of Special Concern	875 1,500	22 S:3	0	0	0	0	0	3	0	3	3	0	0
Senecio aphanactis chaparral ragwort	G3? S2	None None	Rare Plant Rank - 2B.2	300 600	47 S:2	0	0	0	0	0	2	1	1	2	0	0
Sorex ornatus salicornicus southern California saltmarsh shrew	G5T1? S1	None None	CDFW_SSC-Species of Special Concern	5 5	4 S:1	0	0	0	0	0	1	1	0	1	0	0
Southern California Arroyo Chub/Santa Ana Sucker Stream Southern California Arroyo Chub/Santa Ana Sucker Stream	GNR SNR	None None		570 570	4 S:1	0	0	0	0	0	1	1	0	1	0	0
Southern Coast Live Oak Riparian Forest Southern Coast Live Oak Riparian Forest	G4 S4	None None		450 2,100	246 S:15	0	0	0	0	3	12	15	0	12	0	3
Southern Coastal Salt Marsh Southern Coastal Salt Marsh	G2 S2.1	None None		0 0	24 S:1	0	0	0	0	0	1	1	0	1	0	0

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California Department of Fish and Wildlife

California Natural Diversity Database

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						A	B	C	D	X	U	Historic > 20 yr	Recent <= 20 yr	Extant	Poss. Extirp.	Extirp.
Southern Cottonwood Willow Riparian Forest Southern Cottonwood Willow Riparian Forest	G3 S3.2	None None		300 520	111 S:3	0	0	1	0	1	1	3	0	2	0	1
Southern Interior Cypress Forest Southern Interior Cypress Forest	G2 S2.1	None None		2,000 2,500	24 S:2	1	0	0	0	0	1	1	1	2	0	0
Southern Riparian Scrub Southern Riparian Scrub	G3 S3.2	None None		1,070 1,070	56 S:1	0	0	0	0	0	1	1	0	1	0	0
Southern Sycamore Alder Riparian Woodland Southern Sycamore Alder Riparian Woodland	G4 S4	None None		180 1,850	230 S:19	0	0	0	0	0	19	19	0	19	0	0
Southern Willow Scrub Southern Willow Scrub	G3 S2.1	None None		370 370	45 S:1	0	0	0	0	0	1	1	0	1	0	0
Spea hammondii western spadefoot	G3 S3	None None	BLM_S-Sensitive CDFW_SSC-Species of Special Concern IUCN_NT-Near Threatened	600 1,221	425 S:4	0	2	0	0	0	2	3	1	4	0	0
Sternula antillarum browni California least tern	G4T2T3Q S2	Endangered Endangered	CDFW_FP-Fully Protected NABCI_RWL-Red Watch List		67 S:1	0	0	0	0	0	1	1	0	1	0	0
Streptocephalus woottoni Riverside fairy shrimp	G1G2 S1S2	Endangered None	IUCN_EN-Endangered	700 1,000	82 S:2	0	1	0	0	0	1	0	2	2	0	0
Symphyotrichum defoliatum San Bernardino aster	G2 S2	None None	Rare Plant Rank - 1B.2 BLM_S-Sensitive USFS_S-Sensitive		76 S:3	0	0	0	0	2	1	3	0	1	0	2
Taricha torosa Coast Range newt	G4 S4	None None	CDFW_SSC-Species of Special Concern	1,800 2,040	62 S:2	0	2	0	0	0	0	0	2	2	0	0
Thamnophis hammondii two-striped garter snake	G4 S3S4	None None	BLM_S-Sensitive CDFW_SSC-Species of Special Concern IUCN_LC-Least Concern USFS_S-Sensitive	700 1,225	147 S:2	0	1	1	0	0	0	0	2	2	0	0
Tryonia imitator mimic tryonia (=California brackishwater snail)	G2 S2	None None	IUCN_DD-Data Deficient	0 0	39 S:1	0	0	0	0	0	1	0	1	1	0	0

Summary Table Report

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						A	B	C	D	X	U	Historic > 20 yr	Recent <= 20 yr	Extant	Poss. Extirp.	Extirp.
Vireo bellii pusillus least Bell's vireo	G5T2 S2	Endangered Endangered	IUCN_NT-Near Threatened NABCI_YWL-Yellow Watch List	10 835	467 S:25	3	7	5	2	0	8	0	25	25	0	0

CNPS California Native Plant Rare and Endangered Plant Inventory

Plant List

25 matches found. *Click on scientific name for details*

Search Criteria

Found in Quad 33117G6

Scientific Name	Common Name	Family	Lifeform	Rare Plant Rank	State Rank	Global Rank
Abronia villosa var. aurita	chaparral sand-verbena	Nyctaginaceae	annual herb	1B.1	S2	G5T3T4
Astragalus brauntonii	Braunton's milk-vetch	Fabaceae	perennial herb	1B.1	S2	G2
Baccharis malibuensis	Malibu baccharis	Asteraceae	perennial deciduous shrub	1B.1	S1	G1
Calandrinia breweri	Brewer's calandrinia	Montiaceae	annual herb	4.2	S34	G4
Calochortus catalinae	Catalina mariposa lily	Liliaceae	perennial bulbiferous herb	4.2	S4	G4
Calochortus plummerae	Plummer's mariposa lily	Liliaceae	perennial bulbiferous herb	4.2	S4	G4
Calochortus weedii var. intermedius	intermediate mariposa lily	Liliaceae	perennial bulbiferous herb	1B.2	S2	G3G4T2
Camissoniopsis lewisii	Lewis' evening-primrose	Onagraceae	annual herb	3	S4	G4
Chorizanthe parryi var. fernandina	San Fernando Valley spineflower	Polygonaceae	annual herb	1B.1	S1	G2T1
Chorizanthe polygonoides var. longispina	long-spined spineflower	Polygonaceae	annual herb	1B.2	S3	G5T3
Dudleya multicaulis	many-stemmed dudleya	Crassulaceae	perennial herb	1B.2	S2	G2
Eriastrum densifolium ssp. sanctorum	Santa Ana River woollystar	Polemoniaceae	perennial herb	1B.1	S1	G4T1
Harpagonella palmeri	Palmer's grapplinghook	Boraginaceae	annual herb	4.2	S3	G4
Hesperocyparis forbesii	Tecate cypress	Cupressaceae	perennial evergreen tree	1B.1	S2	G2
Hordeum intercedens	vernal barley	Poaceae	annual herb	3.2	S3S4	G3G4
Lepechinia cardiophylla	heart-leaved pitcher sage	Lamiaceae	perennial shrub	1B.2	S2S3	G3?
Lepidium virginicum var. robinsonii	Robinson's pepper-grass	Brassicaceae	annual herb	4.3	S3	G5T3
Lilium humboldtii ssp. ocellatum	ocellated Humboldt lily	Liliaceae	perennial bulbiferous herb	4.2	S3	G4T3
Monardella hypoleuca ssp. intermedia	intermediate monardella	Lamiaceae	perennial rhizomatous herb	1B.3	S2S3	G4T2T3
Nolina cismontana	chaparral nolina	Ruscaceae		1B.2	S3	G3

			perennial evergreen shrub			
Penstemon californicus	California beardtongue	Plantaginaceae	perennial herb	1B.2	S2	G3?
Pentachaeta aurea ssp. allenii	Allen's pentachaeta	Asteraceae	annual herb	1B.1	S1	G4T1
Pickeringia montana var. tomentosa	woolly chaparral-pea	Fabaceae	evergreen shrub	4.3	S3S4	G5T3T4
Polygala cornuta var. fishiae	Fish's milkwort	Polygalaceae	perennial deciduous shrub	4.3	S4	G5T4
Romneya coulteri	Coulter's matilija poppy	Papaveraceae	perennial rhizomatous herb	4.2	S4	G4

Suggested Citation

CNPS, Rare Plant Program. 2015. Inventory of Rare and Endangered Plants (online edition, v8-02). California Native Plant Society, Sacramento, CA. Website http://www.rareplants.cnps.org [accessed 10 July 2015].

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Plant List

15 matches found. *Click on scientific name for details*

Search Criteria

Found in Quad 33117F6

Scientific Name	Common Name	Family	Lifeform	Rare Plant Rank	State Rank	Global Rank
Brodiaea filifolia	thread-leaved brodiaea	Themidaceae	perennial bulbiferous herb	1B.1	S1	G1
Calochortus catalinae	Catalina mariposa lily	Liliaceae	perennial bulbiferous herb	4.2	S4	G4
Calochortus weedii var. intermedius	intermediate mariposa lily	Liliaceae	perennial bulbiferous herb	1B.2	S2	G3G4T2
Camissoniopsis lewisii	Lewis' evening-primrose	Onagraceae	annual herb	3	S4	G4
Deinandra paniculata	paniculate tarplant	Asteraceae	annual herb	4.2	S4	G4
Dodecahema leptoceras	slender-horned spineflower	Polygonaceae	annual herb	1B.1	S1	G1
Dudleya multicaulis	many-stemmed dudleya	Crassulaceae	perennial herb	1B.2	S2	G2
Hesperocyparis forbesii	Tecate cypress	Cupressaceae	perennial evergreen tree	1B.1	S2	G2
Hordeum intercedens	vernal barley	Poaceae	annual herb	3.2	S3S4	G3G4
Lepidium virginicum var. robinsonii	Robinson's pepper-grass	Brassicaceae	annual herb	4.3	S3	G5T3
Monardella hypoleuca ssp. intermedia	intermediate monardella	Lamiaceae	perennial rhizomatous herb	1B.3	S2S3	G4T2T3
Nama stenocarpa	mud nama	Boraginaceae	annual / perennial herb	2B.2	S1S2	G4G5
Nolina cismontana	chaparral nolina	Ruscaceae	perennial evergreen shrub	1B.2	S3	G3
Pentachaeta aurea ssp. allenii	Allen's pentachaeta	Asteraceae	annual herb	1B.1	S1	G4T1
Senecio aphanactis	chaparral ragwort	Asteraceae	annual herb	2B.2	S2	G3?

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About the Rare Plant Program
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Plant List

8 matches found. *Click on scientific name for details*

Search Criteria

Found in Quad 33117G7

Scientific Name	Common Name	Family	Lifeform	Rare Plant Rank	State Rank	Global Rank
Abronia villosa var. aurita	chaparral sand-verbena	Nyctaginaceae	annual herb	1B.1	S2	G5T3T4
Calochortus catalinae	Catalina mariposa lily	Liliaceae	perennial bulbiferous herb	4.2	S4	G4
Calochortus weedii var. intermedius	intermediate mariposa lily	Liliaceae	perennial bulbiferous herb	1B.2	S2	G3G4T2
Camissoniopsis lewisii	Lewis' evening-primrose	Onagraceae	annual herb	3	S4	G4
Centromadia parryi ssp. australis	southern tarplant	Asteraceae	annual herb	1B.1	S2	G3T2
Chorizanthe parryi var. fernandina	San Fernando Valley spineflower	Polygonaceae	annual herb	1B.1	S1	G2T1
Deinandra paniculata	paniculate tarplant	Asteraceae	annual herb	4.2	S4	G4
Dudleya multicaulis	many-stemmed dudleya	Crassulaceae	perennial herb	1B.2	S2	G2

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Plant List

16 matches found. *Click on scientific name for details*

Search Criteria

Found in Quad 33117F7

Scientific Name	Common Name	Family	Lifeform	Rare Plant Rank	State Rank	Global Rank
Atriplex coulteri	Coulter's saltbush	Chenopodiaceae	perennial herb	1B.2	S2	G2
Atriplex pacifica	South Coast saltscale	Chenopodiaceae	annual herb	1B.2	S2	G3G4
Atriplex serenana var. davidsonii	Davidson's saltscale	Chenopodiaceae	annual herb	1B.2	S1	G5T1
Calochortus catalinae	Catalina mariposa lily	Liliaceae	perennial bulbiferous herb	4.2	S4	G4
Calochortus weedii var. intermedius	intermediate mariposa lily	Liliaceae	perennial bulbiferous herb	1B.2	S2	G3G4T2
Camissoniopsis lewisii	Lewis' evening-primrose	Onagraceae	annual herb	3	S4	G4
Centromadia parryi ssp. australis	southern tarplant	Asteraceae	annual herb	1B.1	S2	G3T2
Convolvulus simulans	small-flowered morning-glory	Convolvulaceae	annual herb	4.2	S4	G4
Dudleya multicaulis	many-stemmed dudleya	Crassulaceae	perennial herb	1B.2	S2	G2
Hordeum intercedens	vernal barley	Poaceae	annual herb	3.2	S3S4	G3G4
Lasthenia glabrata ssp. coulteri	Coulter's goldfields	Asteraceae	annual herb	1B.1	S2	G4T2
Lepidium virginicum var. robinsonii	Robinson's pepper-grass	Brassicaceae	annual herb	4.3	S3	G5T3
Nama stenocarpa	mud nama	Boraginaceae	annual / perennial herb	2B.2	S1S2	G4G5
Senecio aphanactis	chaparral ragwort	Asteraceae	annual herb	2B.2	S2	G3?
Sidalcea neomexicana	salt spring checkerbloom	Malvaceae	perennial herb	2B.2	S2	G4
Symphyotrichum defoliatum	San Bernardino aster	Asteraceae	perennial rhizomatous herb	1B.2	S2	G2

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United States Department of the Interior

FISH AND WILDLIFE SERVICE
Carlsbad Fish and Wildlife Office
2177 SALK AVENUE - SUITE 250
CARLSBAD, CA 92008
PHONE: (760)431-9440 FAX: (760)431-5901
URL: www.fws.gov/carlsbad/

Consultation Code: 08ECAR00-2015-SLI-0512 June 24, 2015
Event Code: 08ECAR00-2015-E-00995
Project Name: IRWD ILP North Conversion Project

Subject: 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, and proposed species, designated critical habitat, and candidate species 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 U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

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

Official Species List

Provided by:

Carlsbad Fish and Wildlife Office
2177 SALK AVENUE - SUITE 250
CARLSBAD, CA 92008
(760) 431-9440
http://www.fws.gov/carlsbad/

Consultation Code: 08ECAR00-2015-SLI-0512
Event Code: 08ECAR00-2015-E-00995

Project Type: WATER SUPPLY / DELIVERY

Project Name: IRWD ILP North Conversion Project
Project Description: The Irvine Ranch Water District (IRWD) proposes to convert the northern section of the Irvine Lake Pipeline (ILP) to supply recycled water to existing customers and to extend the recycled water system. The project includes construction of a 2.2 million gallon C+ recycled water tank, improvements to pipelines along Santiago Canyon Road, and improvements at the existing Rattlesnake Reservoir facility.

Please Note: The FWS office may have modified the Project Name and/or Project Description, so it may be different from what was submitted in your previous request. If the Consultation Code matches, the FWS considers this to be the same project. Contact the office in the 'Provided by' section of your previous Official Species list if you have any questions or concerns.

Project Location Map:

Project Coordinates: The coordinates are too numerous to display here.

Project Counties: Orange, CA

Endangered Species Act Species List

There are a total of 9 threatened or endangered species on your species list. Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. Critical habitats listed under the **Has Critical Habitat** column may or may not lie within your project area. See the **Critical habitats within your project area** section further below for critical habitat that lies within your project. Please contact the designated FWS office if you have questions.

Amphibians	**Status**	**Has Critical Habitat**	**Condition(s)**
arroyo toad *(Anaxyrus californicus)* Population: Entire	Endangered	Final designated	
Birds			
Coastal California gnatcatcher *(Polioptila californica californica)* Population: Entire	Threatened	Final designated	
Least Bell's vireo *(Vireo bellii pusillus)* Population: Entire	Endangered	Final designated	
Crustaceans			
Riverside fairy shrimp *(Streptocephalus woottoni)* Population: Entire	Endangered	Final designated	
Fishes			
Santa Ana sucker *(Catostomus santaanae)* Population: 3 CA river basins	Threatened	Final designated	
steelhead *(Oncorhynchus (=salmo)*	Endangered	Final designated	

mykiss) Population: Southern California DPS			
Flowering Plants			
Laguna Beach liveforever *(Dudleya stolonifera)*	Threatened		
Santa Monica Mountains dudleyea *(Dudleya cymosa ssp. ovatifolia)*	Threatened		
Thread-Leaved brodiaea *(Brodiaea filifolia)*	Threatened	Final designated	

Critical habitats that lie within your project area

There are no critical habitats within your project area.

ATTACHMENT C

RESULTS OF COASTAL CALIFORNIA GNATCATCHER SURVEY

BonTerra PSOMAS

Balancing the Natural and Built Environment

September 9, 2015

Stacey Love
Recovery Permit Coordinator
U.S. Fish and Wildlife Service
2177 Salk Avenue, Suite 250
Carlsbad, California 92008

VIA EMAIL AND MAIL
Stacey_Love@fws.gov

Subject: Results of a Coastal California Gnatcatcher Survey for the Irvine Lake Pipeline North Conversion Project, Cities of Irvine and Orange, Orange County, California

Dear Ms. Love:

This Letter Report presents the results of focused surveys for the coastal California gnatcatcher (*Polioptila californica californica*) for Irvine Ranch Water District's (IRWD) Irvine Lake Pipeline (ILP) North Conversion Project (hereinafter referred to as "the proposed Project") located in the cities of Irvine and Orange, Orange County, California. A Biologist who holds the necessary Federal Endangered Species Act survey permit conducted the surveys to determine the presence or absence of the coastal California gnatcatcher on or immediately adjacent to the proposed Project according to guidelines established by U.S. Fish and Wildlife Service (USFWS) for a participant in a Natural Community Conservation Plan (NCCP) area.

PROJECT DESCRIPTION AND LOCATION

IRWD is proposing to convert the northern section of the ILP to a pipeline that can supply recycled water to existing customers and to extend the recycled water system. As part of this effort, a section of the ILP from the proposed Baker Raw Water Pump Station (RWPS) near the Peters Canyon Reservoir to the Rattlesnake Reservoir Complex would be converted to a recycled water line. The proposed Project would include the following:

- Construction of a buried, circular 2.4-million-gallon Zone C+ recycled water tank in the vicinity of the existing Zone 5 Santiago Hills reservoir.
- Construction of a 42-inch reservoir inlet transmission main along East Santiago Canyon Road from the ILP to the proposed Zone C+ tank.
- Construction of a 42-inch reservoir outlet transmission main along East Santiago Canyon Road from the proposed Zone C+ tank to the ILP, south of the suction piping to the Baker RWPS.
- Minor modifications to the existing booster pump station in the Rattlesnake Complex.
- Construction of a 20-inch recycled water pipeline northerly along Jamboree Road from its intersection with Chapman Avenue/Santiago Canyon Road to Santiago Canyon Road and a 10-inch pipeline along Santiago Canyon Road from Jamboree Road to the irrigation meter at the Cemetery of the Holy Sepulcher.

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- Reconfiguration of the Orchard Hills Facility to serve as a back-up source of recycled water for Zone C customers.

The proposed Project is located in the cities of Irvine and Orange (Exhibit 1), and is found on the U.S. Geologic Survey's (USGS) Orange and El Toro 7.5-minute quadrangle maps (Exhibit 2). The proposed Project extends along East Santiago Canyon Road from its intersection with Amopola Road southeast to its intersection with Jamboree Road, then along Jamboree Road south to the Baker RWPS located in Peters Canyon Regional Park. It also extends along East Santiago Canyon Road from its intersection with Jamboree Road east to the Santiago Hills C+ Reservoir site. The improvements at the Orchard Hills Facility and Rattlesnake Complex would both occur within the existing facilities. The Orchard Hills Facility is located north of the Orchard Hills community approximately 900 feet west of the terminus of Rembrandt Road and 2,300 feet southeast of State Route (SR) 261. The Rattlesnake Complex is located southeast of the intersection of Portola Parkway and Orchard Hills. In this report, the following terms are used to refer to these areas: (1) Santiago Hills C+ Reservoir site; (2) ILP North Alignment near the Baker RWPS; (3) ILP North Alignment (i.e., pipelines along East Santiago Canyon Road and Jamboree Road); (4) Rattlesnake Complex; and (5) Orchard Hills Facility. Topography in the proposed Project generally consists of rolling foothills; elevations range from approximately 313 feet above mean sea level (msl) at the Rattlesnake Complex to 733 feet above msl along East Santiago Canyon Road.

The coastal California gnatcatcher survey included all coastal sage scrub on the proposed Project sites including a 100-foot buffer around the entire ILP North alignment and a 500-foot buffer around the Santiago Hills C+ Reservoir, the Baker RPWS, and the Rattlesnake Complex; areas that were not accessible due to fencing were not surveyed (see Exhibits 3a–3f). No coastal sage scrub habitat was located on or adjacent to the Orchard Hills Facility; thus, it was not included in the gnatcatcher survey. Vegetation types and other areas in the proposed Project areas consist of California sagebrush–California buckwheat scrub, disturbed California sagebrush–California buckwheat scrub, black sage scrub, disturbed California sagebrush scrub, buckwheat scrub, southern cactus scrub, coastal goldenbush–grassland, annual grassland, ruderal, sumac savannah, southern willow scrub, southern arroyo willow forest, mulefat scrub, disturbed mulefat scrub, vineyards and orchards, urban, non-urban industrial, transportation, parks and ornamental plantings, cleared or graded, and other disturbed areas (Exhibits 4a–4f). Photographs of representative habitat in the proposed Project areas are provided in Attachment A.

At the Baker RWPS, California sagebrush–California buckwheat scrub surrounds the facility; the habitat within the survey area is contiguous with suitable sage scrub habitat in Peters Canyon Regional Park. This community is moderately dense with some open areas. This vegetation type is dominated by California sagebrush (*Artemisia californica*) and leafy California buckwheat (*Eriogonum fasciculatum* var. *foliolosum*) in the shrub layer, with some occurrence of other species such as laurel sumac (*Malosma laurina*) and black sage (*Salvia mellifera*). There is typically a high amount of human activity (e.g., noise, human interaction) associated with Peters Canyon Regional Park due to recreational use of the existing trails.

At the Rattlesnake Complex, there is a small patch of disturbed California sagebrush–California buckwheat scrub located on the slope adjacent to the facility. This community is open and low in stature and is dominated by sparse cover of California sagebrush and leafy California buckwheat with non-native species such as tocalote (*Centaurea melitensis*) and red brome (*Bromus madritensis* ssp. *rubens*), forming the understory. Irrigation pipelines were observed in the scrub habitat; therefore, it is assumed this area is a revegetation site. There is human activity (e.g., noise, work activities) associated with the Rattlesnake Complex and the adjacent fire department.

At the Santiago Hills C+ Reservoir, California sagebrush–California buckwheat scrub is present on the slopes below the existing tank site and IRWD facility. The areas on the slopes to the west and south of the facility are moderately dense, while the areas to the east and northeast are more open. These areas are

dominated by California sagebrush and leafy California buckwheat that is all fairly low in stature. The area of coastal sage scrub on the hilltop on the proposed Project site, consists of a small patch of disturbed California sagebrush–California buckwheat scrub. This area consists of a mix of non-native grasses with scattered individuals of California sagebrush and California buckwheat that are low in stature.

The ILP North Alignment contains several patches of suitable habitat for coastal California gnatcatcher along the roadway. The best quality coastal sage scrub areas for coastal California gnatcatcher are located along East Santiago Canyon Road, north of Newport Boulevard; along Jamboree Road, north of Chapman Avenue; and along Santiago Canyon Road, east of Jamboree Road. At East Santiago Canyon Road, north of Chapman Avenue, southern cactus scrub is present on an east-facing slope. At Jamboree Road, north of Chapman Avenue, California sagebrush-California buckwheat scrub is present on a west-facing slope. At Santiago Canyon Road, approximately 1,500 feet east of Jamboree Road, California sagebrush-California buckwheat scrub is present on the slopes and in drainages both north and south of the road. Although the area within the survey area is limited to 100 feet from the roadway, the sage scrub is contiguous with a fairly large patch of sage scrub habitat along the drainage north and south of the road. There is traffic noise associated with the roadways within the ILP North Alignment.

BACKGROUND

The coastal California gnatcatcher is a federally threatened species and a California Species of Special Concern. This species occurs in most of Baja California, Mexico's arid regions, but this subspecies is extremely localized in the United States, where it predominantly occurs in coastal regions of highly urbanized Los Angeles, Orange, Riverside, and San Diego Counties (Atwood 1992). In California, this subspecies is an obligate resident of coastal sage scrub vegetation types. The breeding season for the coastal California gnatcatcher ranges from late February to August. Nests are generally located in various materials in sagebrush about three feet above ground. Brood parasitism by brown-headed cowbirds (*Molothrus ater*) and loss of habitat to urban development have been cited as causes of coastal California gnatcatcher population decline (Unitt 1984; Atwood 1990).

Taxonomic studies indicate that the California gnatcatcher consists of four subspecies, which extend from southwestern California to southern Baja California, Mexico. The coastal California gnatcatcher, the northernmost gnatcatcher subspecies, is restricted to lowland areas from central Ventura County through Los Angeles, San Bernardino, Riverside, Orange, and San Diego counties to the Baja California, Mexico border (Atwood and Lerman 2006; Mellink and Rea 1994). Formerly, the coastal California gnatcatcher was common from the San Fernando Valley, east along the base of the San Gabriel Mountains to Claremont (Atwood 1990). The coastal California gnatcatcher is now rare in the northern part of its range with a few sightings from Santa Clarita to Tujunga Wash, though a small population persists near Moorpark in Ventura County. The USFWS has previously rejected petitions claiming that the coastal California gnatcatcher is not a valid subspecies (USFWS 2011); however, it is currently reviewing taxonomic data in response to a petition from the Pacific Legal Foundation requesting that the subspecies be delisted based on recent taxonomic studies (USFWS 2014).

The coastal California gnatcatcher has been recorded from sea level to approximately 3,000 feet above msl (USFWS 2003); however, greater than 90 percent of gnatcatcher records are from between sea level and 820 feet above msl along the coast and between sea level and 1,800 feet above msl inland (Atwood and Bolsinger 1992). USFWS estimates regarding the population size of the coastal California gnatcatcher in Southern California have been about 3,000 pairs (Atwood and Bontrager 2001). In the 5-Year Review: Summary and Evaluation for the gnatcatcher, the USFWS states that a study estimated that there were approximately 1,324 gnatcatcher pairs over approximately 111,000 acres on public and quasi-public lands in Orange and San Diego Counties (Winchell and Doherty 2008). Because the Winchell and Doherty study only covered a portion of the U.S. range (focusing on the coast and limited to one year), this study cannot extrapolate beyond the sampling region; however, the USFWS states that it is

likely there are more gnatcatchers in the U.S. portion of the range than was suggested by earlier estimates (USFWS 2010).

The coastal California gnatcatcher typically occurs within coastal and inland sage scrub vegetation types, which often occur in a patchy distribution pattern throughout the gnatcatcher's range. Coastal California gnatcatchers also use chaparral, grassland, and riparian habitats that are in proximity to sage scrub for dispersal and foraging (Atwood et al. 1998; Campbell et al. 1998; USFWS 2003). Availability of these non-sage scrub areas is essential during certain times of the year, particularly during drought conditions or for dispersal, foraging, or nesting (USFWS 2003).

USFWS published a Revised Final Rule designating critical habitat for the coastal California gnatcatcher in 2007 (USFWS 2007). This revised rule designates 197,303 acres of critical habitat in San Diego, Orange, Riverside, San Bernardino, Los Angeles, and Ventura Counties, California. The proposed Project is not located within designated critical habitat for the coastal California gnatcatcher.

SURVEY METHODS

USFWS survey protocol for the coastal California gnatcatcher requires three visits, conducted at least one week apart, to all potentially occupied habitat areas for surveys within an NCCP area (USFWS 1997a, 1997b). All visits must take place during the morning hours, and no more than 100 acres of suitable habitat may be surveyed per visit. BonTerra Psomas Biologist Jonathan Aguayo (USFWS Permit No. TE96514A-0) conducted three surveys for the gnatcatcher in all areas of potentially suitable habitat. Surveys for the coastal California gnatcatcher were conducted on August 10, 18, and 26, 2015.

Mr. Aguayo avoided weather conditions that were too cold (below 55 degrees Fahrenheit [°F]), too hot (i.e., above 95°F), or too windy (i.e., wind speed greater than 15 miles per hour) in order to meet the survey protocol's weather condition requirements for optimal gnatcatcher detection (Table 1). Mr. Aguayo conducted the surveys by slowly walking through all appropriate habitats while listening and watching for gnatcatcher activity and by using a combination of recordings of gnatcatcher vocalizations and "pishing" sounds to elicit responses from any gnatcatchers present. The frequency of vocalization playback and "pishing" varied depending on conditions such as habitat patch size, topography in each area, and ambient noise conditions. All wildlife species detected during the surveys were recorded (Attachment B).

TABLE 1
SUMMARY OF SURVEY CONDITIONS FOR THE
COASTAL CALIFORNIA GNATCATCHER SURVEYS

Survey Number	Date	Time (Start/End)	Surveyor	Weather Conditions		
				Temperature (°F) (Start/End)	Wind (mph) (Start/End)	Cloud Cover (%) (Start/End)
1	August 10, 2015	6:30 AM–12:15 PM	Aguayo	57/73	0–2/5–10	0/0
2	August 18, 2015	7:00 AM–12:00 PM	Aguayo	63/80	0–2/0–6	60/40
3	August 27, 2015	6:30 AM–10:45 AM	Aguayo	70/86	0–2/0–5	0/0

°F: Fahrenheit; mph: miles per hour; %: percent

RESULTS

A total of two pairs of coastal California gnatcatchers were observed during the surveys (Exhibit 5). A California Natural Diversity Database (CNDDB) form for the gnatcatchers is included in Attachment C and will be submitted to the California Department of Fish and Wildlife (CDFW).

Pair 1: This pair was observed foraging together during the second visit (August 18, 2015). They were observed visually and calling; there were no signs of breeding activity. The pair was located in Peters Canyon Regional Park, adjacent to the Baker RWPS. This area consists of California sagebrush–California buckwheat scrub dominated by California sagebrush and leafy California buckwheat, with some occurrence of other species such as laurel sumac and black sage. This pair likely moves within the larger patch of sage scrub habitat in Peters Canyon Regional Park.

Pair 2: This pair was observed foraging together during the third visit (August 27, 2015). They were observed visually and calling; there were no signs of breeding activity. The pair was located on the slopes below (i.e., south of) Santiago Canyon Road. This area consists of California sagebrush–California buckwheat scrub that is dominated by California sagebrush, with some occurrence of other species such as leafy California buckwheat in the shrub layer, laurel sumac, blue elderberry (*Sambucus nigra* spp. *caerulea*), and black sage. This pair of gnatcatchers likely moves within the large patch of sage scrub habitat along the drainages north and south of the road.

BonTerra Psomas appreciates the opportunity to assist on this project. If you have any comments or questions, please call Amber Heredia at (714) 751-7373.

Sincerely,
BonTerra Psomas

for Amber O. Heredia
Senior Project Manager

Jonathan Aguayo
Biologist

I certify that the information in this survey report and in the enclosed exhibits fully and accurately presents my work.

Jonathan Aguayo
(TE96514A-0)

Enclosures: Exhibits 1–5
Attachment A – Site Photographs
Attachment B – Wildlife Compendium
Attachment C – CNDDB Forms

cc: Jo Ann Corey, IRWD

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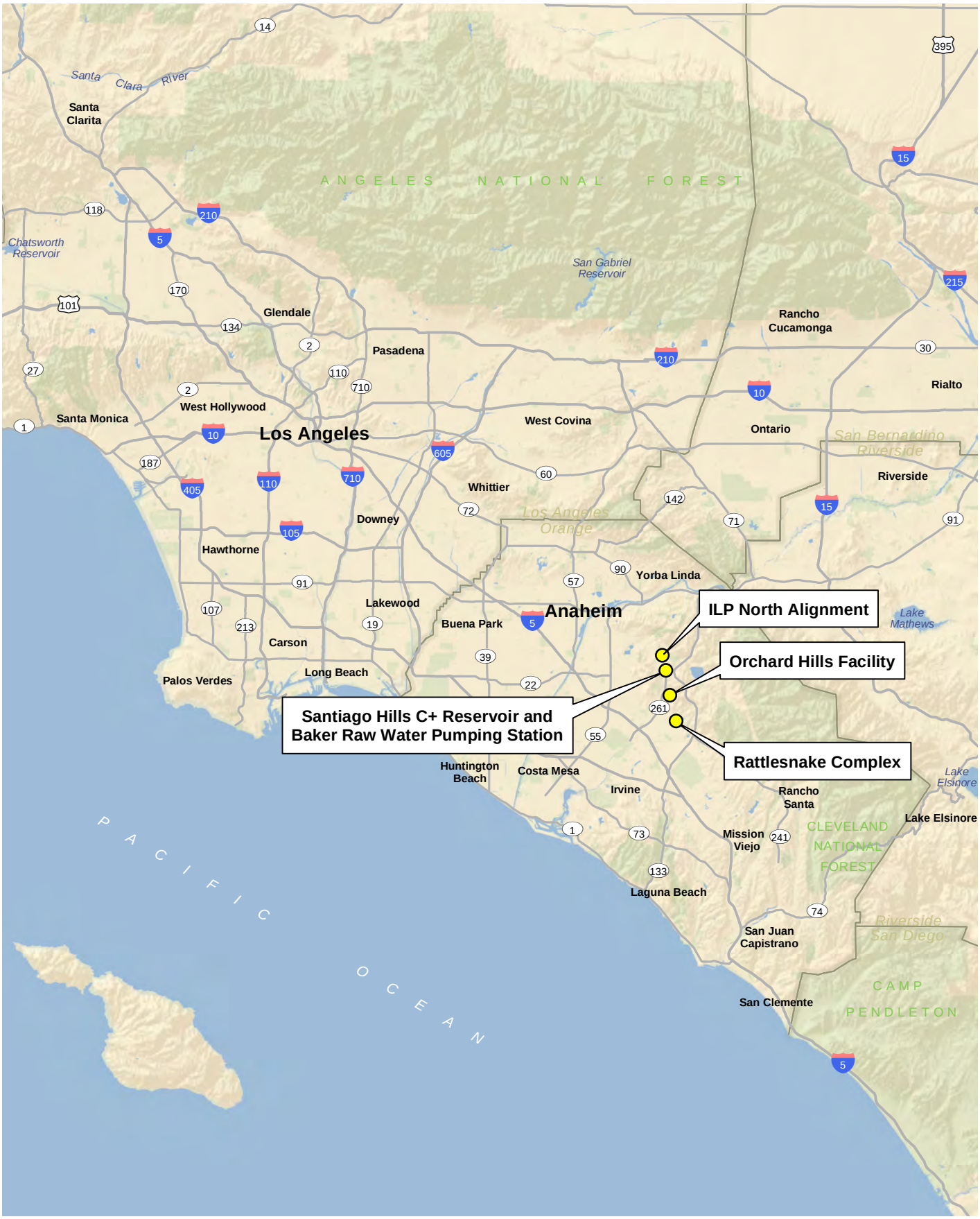

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Regional Location

Exhibit 1

IRWD ILP North Conversion Project

N W E S

10 5 0 10 Miles

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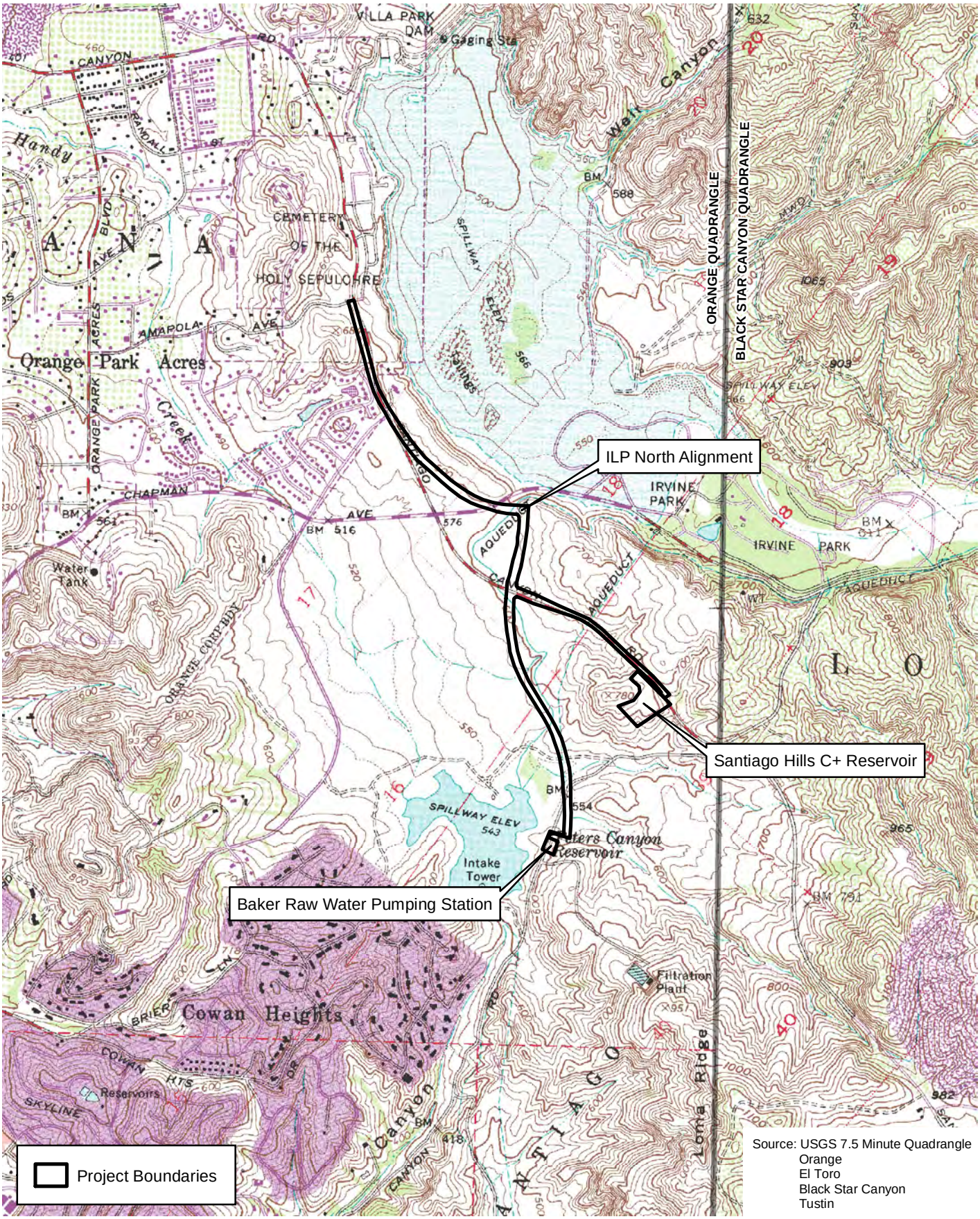

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Local Vicinity

Exhibit 2a

IRWD ILP North Conversion Project

N
W E
S

2,000 1,000 0 2,000

Feet

BonTerra PSOMAS

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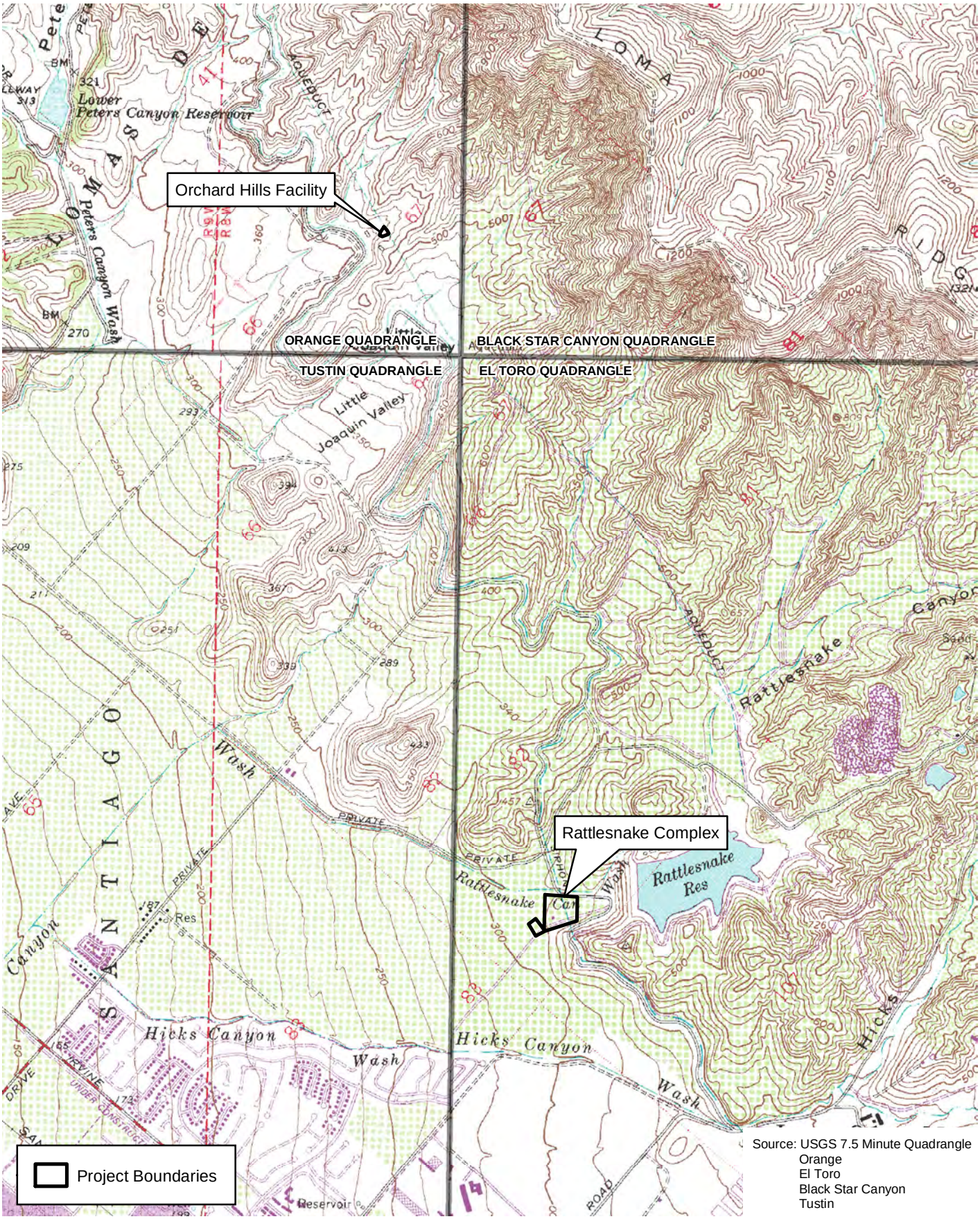

Source: USGS 7.5 Minute Quadrangle
Orange
El Toro
Black Star Canyon
Tustin

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Local Vicinity

Exhibit 2b

IRWD ILP North Conversion Project

N W E S

2,000 1,000 0 2,000

Feet

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Aerial Source: Aerials Express 2009

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Survey Area

Exhibit 3a

IRWD ILP North Conversion Project

N W E S

300 150 0 300

Feet

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Survey Area

Exhibit 3b

IRWD ILP North Conversion Project

N
W E
S

300 150 0 300

Feet

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Survey Area

Exhibit 3c

IRWD ILP North Conversion Project

N W E S

300 150 0 300

Feet

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Survey Area

Exhibit 3d

IRWD ILP North Conversion Project

N W E S

300 150 0 300

Feet

BonTerra PSOMAS

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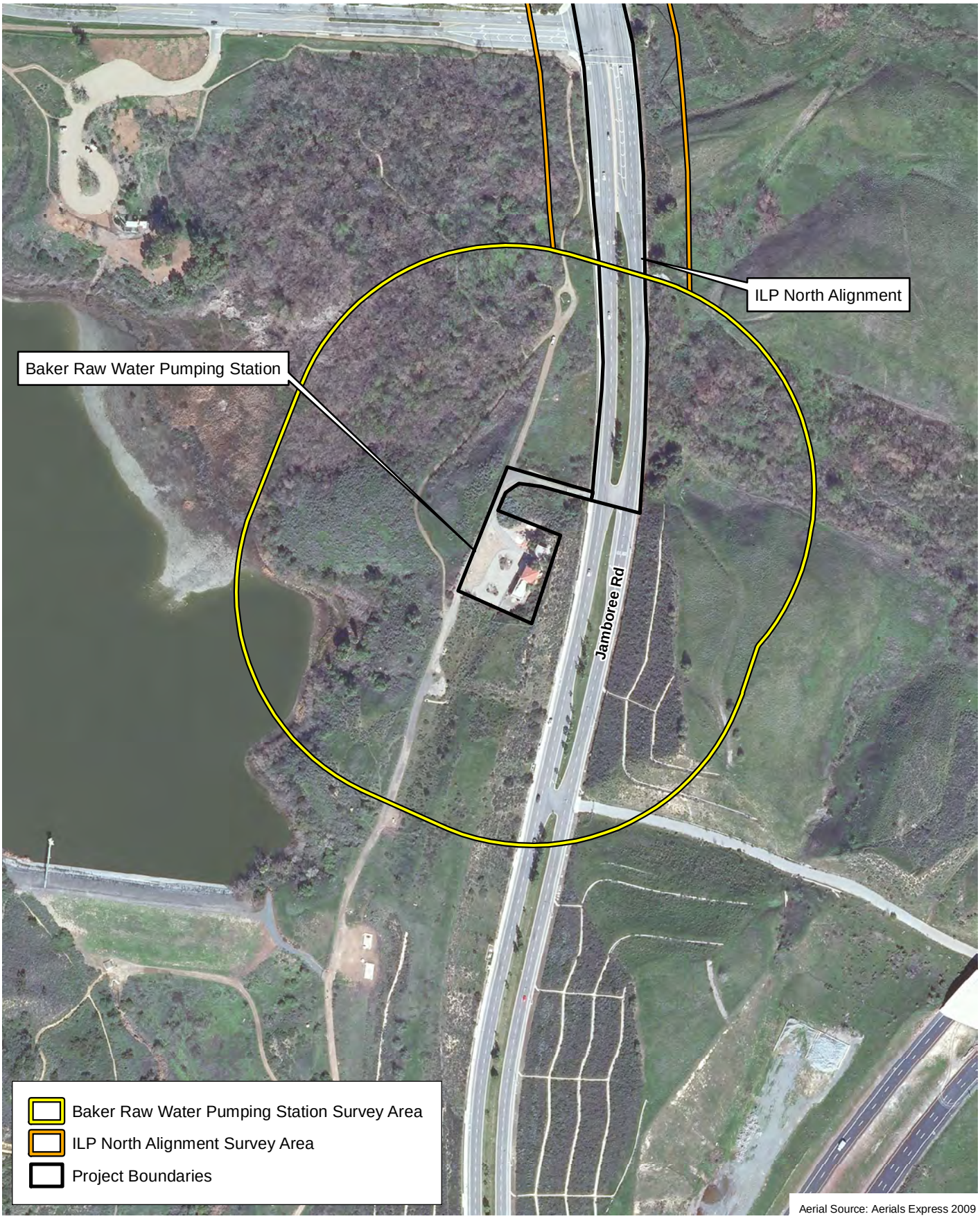

Survey Area

Exhibit 3e

IRWD ILP North Conversion Project

N
W E
S

300 150 0 300

Feet

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Survey Area

Exhibit 3f

IRWD ILP North Conversion Project

N W E S

300 150 0 300

Feet

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Survey Area

Project Boundaries

Vegetation Types and Other Areas

- Southern Cactus Scrub (2.4)
- Coastal Goldenbush-Grassland (2.8.3)
- Urban (15.1)
- Transportation (15.4)
- Parks and Ornamental Plantings (15.5)
- Cleared or Graded (16.1)
- Other Disturbed Areas (16.2)

Aerial Source: Google, March 2015/Aerials Express 2009

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Vegetation Types and Other Areas

Exhibit 4a

IRWD ILP North Conversion Project

N W E S

200 100 0 200 Feet

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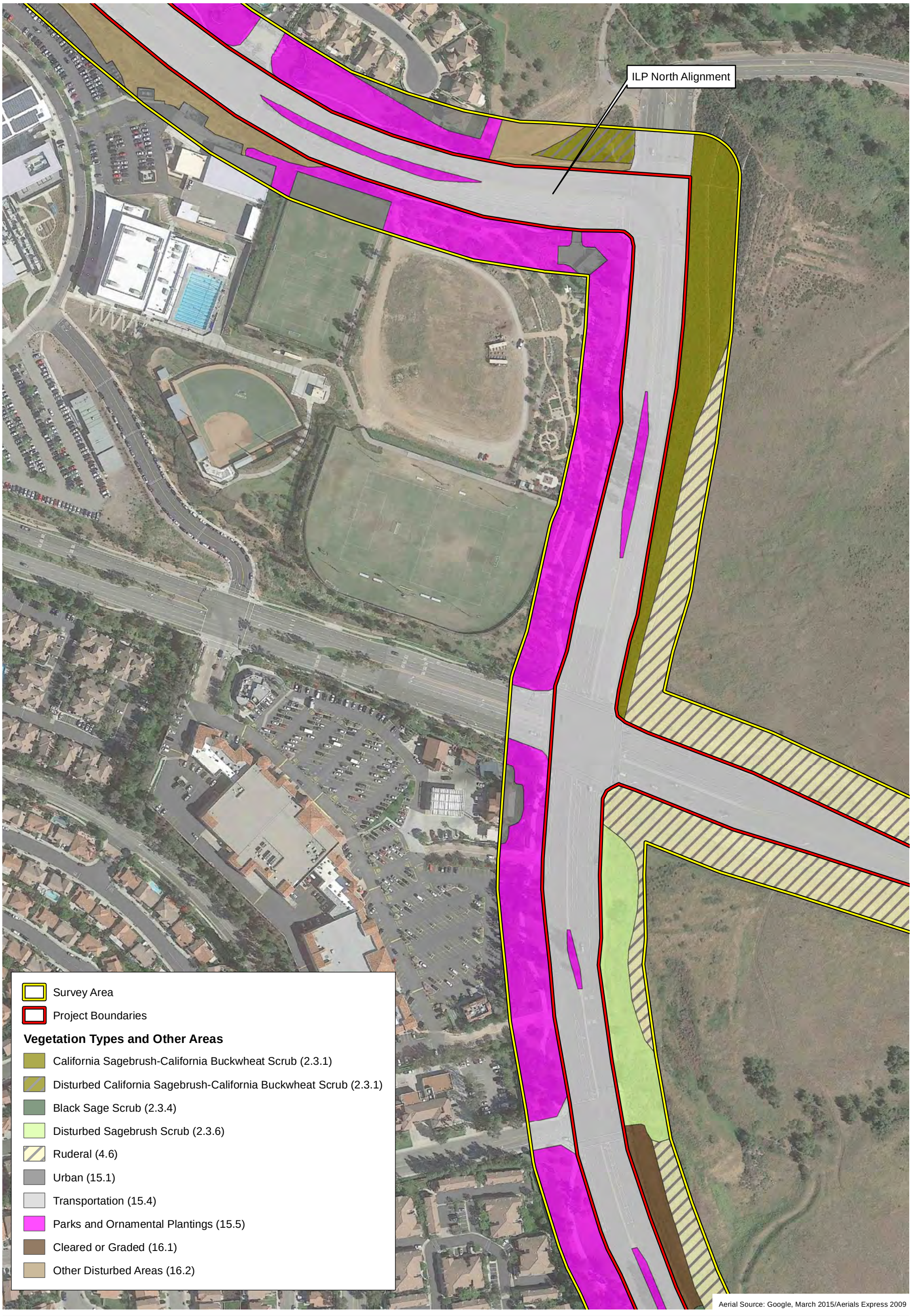

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Vegetation Types and Other Areas

Exhibit 4b

IRWD ILP North Conversion Project

N W E S

200 100 0 200 Feet

BonTerra PSOMAS

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Survey Area

Project Boundaries

Vegetation Types and Other Areas

- California Sagebrush-California Buckwheat Scrub (2.3.1)
- Disturbed California Sagebrush-California Buckwheat Scrub (2.3.1)
- Buckwheat Scrub (2.3.7)
- Southern Cactus Scrub (2.4)
- Annual Grassland (4.1)
- Ruderal (4.6)
- Sumac Savannah (4.8)
- Southern Willow Scrub (7.2)
- Mulefat Scrub (7.3)
- Non-urban Industrial (15.3)
- Transportation (15.4)
- Parks and Ornamental Plantings (15.5)
- Cleared or Graded (16.1)

Santiago Hills C+ Reservoir

Aerial Source: Google, March 2015/Aerials Express 2009

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Vegetation Types and Other Areas

Exhibit 4c

IRWD ILP North Conversion Project

N W E S

200 100 0 200 Feet

BonTerra PSOMAS

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Survey Area

Project Boundaries

Vegetation Types and Other Areas

- California Sagebrush-California Buckwheat Scrub (2.3.1)
- Black Sage Scrub (2.3.4)
- Southern Cactus Scrub (2.4)
- Annual Grassland (4.1)
- Ruderal (4.6)
- Sumac Savannah (4.8)
- Southern Willow Scrub (7.2)
- Mulefat Scrub (7.3)
- Disturbed Mulefat Scrub (7.3)
- Southern Arroyo Willow Forest (7.6)
- Urban (15.1)
- Non-urban Industrial (15.3)
- Transportation (15.4)
- Parks and Ornamental Plantings (15.5)
- Cleared or Graded (16.1)
- Other Disturbed Areas (16.2)

Baker Raw Water Pumping Station

Aerial Source: Google, March 2015/Aerials Express 2009

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Vegetation Types and Other Areas

Exhibit 4d

IRWD ILP North Conversion Project

N W E S

200 100 0 200 Feet

BonTerra PSOMAS

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Orchard Hills Facility

Survey Area

Project Boundaries

Vegetation Types and Other Areas

Ruderal (4.6)

Vineyards and Orchards (14.3)

Non-urban Industrial (15.3)

Other Disturbed Areas (16.2)

Aerial Source: Google, March 2015/Aerials Express 2009

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Vegetation Types and Other Areas

Exhibit 4e

IRWD ILP North Conversion Project

N W E S

100 50 0 100 Feet

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Rattlesnake Complex

Survey Area

Project Boundaries

Vegetation Types and Other Areas

- Disturbed California Sagebrush-California Buckwheat Scrub (2.3.1)
- Ruderal (4.6)
- Sumac Savannah (4.8)
- Mulefat Scrub (7.3)
- Urban (15.1)
- Non-urban Industrial (15.3)
- Transportation (15.4)
- Parks and Ornamental Plantings (15.5)
- Other Disturbed Areas (16.2)

Aerial Source: Google, March 2015/Aerials Express 2009

D:\Projects\3IRW0007\MXD\CAGNex_Veg.mxd

Vegetation Types and Other Areas

Exhibit 4f

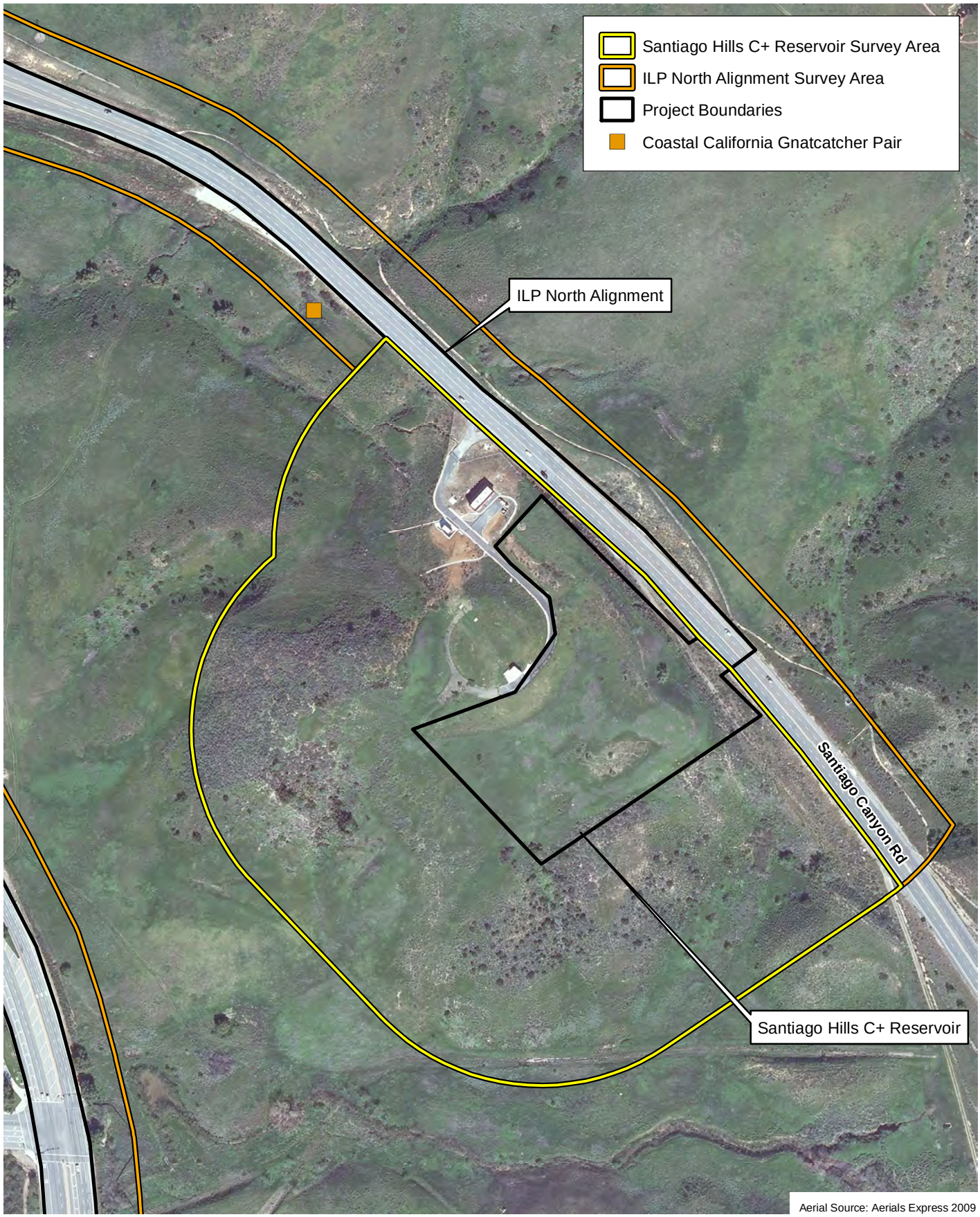
IRWD ILP North Conversion Project

N W E S

100 50 0 100 Feet

BonTerra PSOMAS

(Rev: 09-03-2015 LEW) R:\Projects\IRW_IRWD\3IRW000701\Graphics\CAGN\ex4_Veg.pdf



Aerial Source: Aerials Express 2009

D:\Projects\3IRW\00007\MXD\CAGN\ex_CAGNLocations.mxd

Coastal California Gnatcatcher Locations

Exhibit 5a

IRWD ILP North Conversion Project

N W E S

300 150 0 300

Feet

BonTerra PSOMAS

(Rev: 9-01-2015 JAZ) R:\Projects\IRW_IRWD\3IRW000701\Graphics\CAGN\ex5_CAGNLocations.pdf

D:\Projects\3IRW\0007\MXD\CAGN\ex_CAGNLocations.mxd

Coastal California Gnatcatcher Locations

Exhibit 5b

IRWD ILP North Conversion Project

N
W E
S

300 150 0 300

Feet

BonTerra PSOMAS

(Rev: 9-01-2015 JAZ) R:\Projects\IRW_IRWD\3IRW000701\Graphics\CAGN\ex5_CAGNLocations.pdf

ATTACHMENT A

SITE PHOTOGRAPHS

View of California sagebrush-California buckwheat scrub at the Rattlesnake Complex.

View of a patch of southern cactus scrub on a slope adjacent to Santiago Canyon Road where pipelines would be installed in the roadway.

D:\Projects\3IRW\0007\Graphics\CAGNlex_SP1.ai

Site Photographs

Attachment A-1

IRWD ILP North Conversion Project

BonTerra PSOMAS

View of California sagebrush-California buckwheat scrub on the slopes adjacent to Santiago Canyon Road where a coastal California gnatcatcher (Pair 2) was observed.

View of California sagebrush-California buckwheat scrub where a pair of coastal California gnatcatchers (Pair 1) was observed in Peters Canyon Regional Park, adjacent to Baker Raw Water Pumping Station.

D:\Projects\3IRW\0007\Graphics\CAGNlex_SP2.ai

Site Photographs

Attachment A-2

IRWD ILP North Conversion Project

BonTerra PSOMAS

(08/28/2015 JAZ) R:\Projects\IRW_IRWD\3IRW000701\Graphics\CAGN\AttA2_SP.pdf

ATTACHMENT B

WILDLIFE COMPENDIUM

WILDLIFE SPECIES OBSERVED DURING SURVEYS

Species	
REPTILES	
***LEPIDOSAURIA* – LIZARDS AND SNAKES**	
PHRYNOSOMATIDAE – ZEBRA-TAILED, FRINGE-TOED, SPINY, TREE, SIDE-BLOTCHED, AND HORNED LIZARDS	
Sceloporus occidentalis	western fence lizard
BIRDS	
***AVES* – BIRDS**	
ODONTOPHORIDAE – QUAILS	
Callipepla californica	California quail
CATHARTIDAE – NEW WORLD VULTURES	
Cathartes aura	turkey vulture
ACCIPITRIDAE – HAWKS, KITES, EAGLES, AND ALLIES	
Buteo jamaicensis	red-tailed hawk
Buteo lineatus	red-shouldered hawk
FALCONIDAE – FALCONS	
Falco sparverius	American kestrel
CHARADRIIDAE – PLOVERS	
Charadrius vociferus	killdeer
COLUMBIDAE – PIGEONS AND DOVES	
*Columba livia**	rock pigeon
*Streptopelia decaocto**	Eurasian collared-dove
Zenaida macroura	mourning dove
Columbina passerina	common ground-dove
APODIDAE – SWIFTS	
Aeronautes saxatalis	white-throated swift
TROCHILIDAE – HUMMINGBIRDS	
Calypte anna	Anna's hummingbird
Archilochus alexandri	black-chinned hummingbird
PICIDAE – WOODPECKERS	
Melanerpes formicivorus	acorn woodpecker
Picoides nuttallii	Nuttall's woodpecker
TYRANNIDAE – TYRANT FLYCATCHERS	
Sayornis nigricans	black phoebe
Sayornis saya	Say's phoebe
Myiarchus cinerascens	ash-throated flycatcher
Tyrannus vociferans	Cassin's kingbird
CORVIDAE – CROWS AND JAYS	
Aphelocoma californica	western scrub-jay
Corvus brachyrhynchos	American crow
Corvus corax	common raven
HIRUNDINIDAE – SWALLOWS	
Stelgidopteryx serripennis	northern rough-winged swallow
Petrochelidon pyrrhonota	cliff swallow
Hirundo rustica	barn swallow

WILDLIFE SPECIES OBSERVED DURING SURVEYS

Species	
AEGITHALIDAE – BUSHTITS	
Psaltriparus minimus	bushtit
TROGLODYTIDAE – WRENS	
Thryomanes bewickii	Bewick's wren
Troglodytes aedon	house wren
POLIOPTILIDAE – GNATCATCHERS AND GNATWRENS	
Polioptila caerulea	blue-gray gnatcatcher
Polioptila californica	coastal California gnatcatcher
MIMIDAE – THRASHERS	
Mimus polyglottos	northern mockingbird
Toxostoma redivivum	California thrasher
STURNIDAE – STARLINGS	
*Sturnus vulgaris**	European starling
SYLVIIDAE – SYLVIID WARBLERS	
Chamaea fasciata	wrentit
EMBERIZIDAE – SPARROWS AND JUNCOS	
Pipilo maculates	spotted towhee
Melozone [*Pipilo*] *crissalis*	California towhee
Melospiza melodia	song sparrow
ICTERIDAE – BLACKBIRDS	
Quiscalis mexicanus	great-tailed grackle
Agelaius phoeniceus	red-winged blackbird
Icterus cucullatus	hooded oriole
FRINGILLIDAE – FINCHES	
Carpodacus mexicanus	house finch
Spinus [*Carduelis*] *psaltria*	lesser goldfinch
Spinus [*Carduelis*] *tristis*	American goldfinch
MAMMALS	
***MAMMALIA* – MAMMALS**	
LEPORIDAE – HARES AND RABBITS	
Sylvilagus bachmani	brush rabbit
SCIURIDAE – SQUIRRELS	
Spermophilus beecheyi	California ground squirrel
CANIDAE – WOLVES AND FOXES	
Canis latrans	coyote
* introduced species	

ATTACHMENT C

CALIFORNIA NATURAL DIVERSITY DATABASE FORMS

Mail to:
California Natural Diversity Database
Department of Fish and Game
1807 13th Street, Suite 202
Sacramento, CA 95814
Fax: (916) 324-0475 email: CNDDB@dfg.ca.gov

Date of Field Work (mm/dd/yyyy): 08/27/2015

For Office Use Only
Source Code _____ Quad Code _____
Elm Code _____ Occ. No. _____
EO Index No. _____ Map Index No. _____

Reset

California Native Species Field Survey Form

Send Form

Scientific Name: *Polioptila californica californica*

Common Name: coastal California gnatcatcher

Species Found? ☑ Yes ☐ No _____ If not, why?

Total No. Individuals 4 Subsequent Visit? ☑ yes ☐ no

Is this an existing NDDB occurrence? _____ Yes, Occ. # ☐ no ☑ unk.

Collection? If yes: _____ Number _____ Museum / Herbarium

Reporter: Jonathan Aguayo, BonTerra Psomas
Address: 3 Hutton Centre Drive, Suite 200
Santa Ana, CA 92707
E-mail Address: Jonathan.Aguayo@psomas.com
Phone: (714) 751-7373

Plant Information

Phenology: _____% vegetative _____% flowering _____% fruiting

Animal Information

4 # adults _____ # juveniles _____ # larvae _____ # egg masses _____ # unknown

☐ breeding ☐ wintering ☐ burrow site ☐ rookery ☐ nesting ☐ other

Location Description ***(please attach map AND/OR fill out your choice of coordinates, below)***

The proposed Project is located in the cities of Irvine and Orange. One pair found in Peters Canyon Regional Park, and another pair found along East Santiago Canyon Road.

County: Orange County Landowner / Mgr.: County

Quad Name: Orange and El Toro Elevation: 313-733 ft

T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ Source of Coordinates (GPS, topo. map & type): GPS

T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ GPS Make & Model Garmin eTrek Vista

DATUM: **NAD27** ☐ **NAD83** ☑ **WGS84** ☐ Horizontal Accuracy ~ 15 ft meters/feet

Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☑ ***OR*** Geographic (Latitude & Longitude) ☐

Coordinates: CAGN Pair 1: E429674, N3738143: CAGN Pair 2: E429950, N3739147

Habitat Description *(plant communities, dominants, associates, substrates/soils, aspects/slope):*

California sagebrush–California buckwheat scrub dominated by California sagebrush (Artemisia californica) and leafy California buckwheat (Eriogonum fasciculatum var. foliolosum) in the shrub layer, with some occurrence of other species such as laurel sumac (Malosma laurina) and black sage (Salvia mellifera). The herb layer contains red brome (Bromus madritensis ssp. rubens) and rattail fescue (Festuca myuros).

Other rare taxa seen at THIS site on THIS date:
(separate form preferred)

Site Information Overall site/occurrence quality/viability (site + population): ☑ Excellent ☐ Good ☐ Fair ☐ Poor

Immediate AND surrounding land use: residential development, undeveloped open space, roadways

Visible disturbances:

Threats:

Comments:

Determination: *(check one or more, and fill in blanks)*

- ☐ Keyed (cite reference): _____
- ☐ Compared with specimen housed at: _____
- ☐ Compared with photo / drawing in: _____
- ☐ By another person (name): _____
- ☑ Other: Familiarity with species, visually and aurally

Photographs: *(check one or more)*

	Slide	Print	Digital
Plant / animal	☐	☐	☐
Habitat	☐	☐	☑
Diagnostic feature	☐	☐	☐

May we obtain duplicates at our expense? yes ☑ no ☐

Appendix D

Cultural Resources Appendices (Confidential)

BonTerra PSOMAS

CONFIDENTIAL

Phase I Cultural Resources Assessment

Irvine Lake Pipeline-North Conversion Project
Irvine and Orange, California

Prepared for

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Engineering Technician III
Water Resources & Environmental Policy
Irvine Ranch Water District
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Irvine, California 92618

Prepared by

David M. Smith
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www.Psomas.com

October 2015

Appendix E

Geotechnical Investigation

REPORT OF GEOTECHNICAL INVESTIGATION
ILP NORTH CONVERSION
PROPOSED SANTIAGO HILLS
ZONE C + RESERVOIR
IRVINE RANCH WATER DISTRICT
PROJECT NO. 30996 (5407)
CITY OF ORANGE
ORANGE COUNTY, CALIFORNIA
KLEINFELDER PROJECT NO. 20153742.001A

May 14, 2015

A Report Prepared for:

Mr. Jacob Moeder
Irvine Ranch Water District
15600 Sand Canyon Avenue
Irvine, CA 92618

REPORT OF GEOTECHNICAL INVESTIGATION
ILP NORTH CONVERSION
PROPOSED SANTIAGO HILLS
ZONE C + RESERVOIR
IRVINE RANCH WATER DISTRICT
PROJECT NO. 30996 (5407)
CITY OF ORANGE
ORANGE COUNTY, CALIFORNIA

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Reviewed by:

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Fax: 619.232.1039

May 14, 2015
20153742.001A

TABLE OF CONTENTS

TABLE OF CONTENTS (Continued)

Section **Page**

TABLES

FIGURES

APPENDICES

1 INTRODUCTION

Kleinfelder, Inc. (Kleinfelder) was retained by Irvine Ranch Water District (IRWD) to conduct engineering services for the Santiago Hills Zone C+ Reservoir and Rattlesnake Complex Improvements for the Irvine Lake Pipeline (ILP) North Conversion Project. As a component of our firm's services, our scope of work included a geotechnical investigation for the proposed new 2.4 million gallon (MG) reservoir. The project site is located at 1802 East Santiago Canyon Road, approximately ½ mile southeast of the intersection of Jamboree Road and East Santiago Canyon Road in the City of Orange, California. The location of the site is shown on Figures 1 and 2, Site Vicinity Map and Site Plan, respectively.

Our geotechnical services were performed in accordance with our proposal and subsequent modifications to conduct additional exploration. This report presents a summary of our geotechnical exploration, geotechnical engineering design support, and construction considerations.

1.1 PROJECT DATUM

Unless otherwise noted, elevation data presented in this report are in feet above mean sea level (MSL) based on the North American Vertical Datum of 1988 (NAVD88). The horizontal datum is North American Datum 1983 California State Plane Coordinate System Zone VI (CCS83, Zone 6).

1.2 PROPOSED PROJECT

We understand the project will include design and construction of a new 2.4 MG prestressed concrete reservoir for IRWD to be sited south to southeast of the existing Zone 5 buried 6 MG prestressed concrete reservoir. The site is situated on a plateau above Peter's Canyon Wash, and in a generally undeveloped area of the City of Orange (Figure 1, Site Vicinity Map). The existing site features include the pump station building, chemical storage facilities, and a 6MG reservoir, as well as associated piping for the system. East Santiago Canyon Road, which travels roughly northwest-southeast, is located east adjacent to the site.

The existing reservoir base is at approximate elevation 702 feet and is buried beneath fill material generated during the foundation excavation. The fill placed to the east and southeast of the reservoir is mounded at a slope flatter than 2H:1V (Horizontal:Vertical).

We understand that the proposed 2.4 MG reservoir will be constructed with a base at approximately elevation 670 feet, and similar to the existing reservoir, will be buried with excavated materials. Based on our understanding, the proposed reservoir will have an approximate inside diameter of 116 feet and a 7-inch thick concrete slab-on-grade base, with roof loads being transmitted to shallow foundations by columns and the exterior wall of the reservoir. The reservoir design will also include a ring drain located along the outer diameter of the reservoir and inlet and outlet piping. New piping will be brought onto the site from Santiago Canyon Road at a location to be determined during the final design phase. Additional pumping and straining facilities will also be constructed at the site.

Four siting alternatives, which are referred to as Alternatives 1 through 4 throughout this report, were evaluated by Kleinfelder as presented in our Draft Preliminary Design Technical Memorandum – Santiago Hills Site Master Plan, ILP North Conversion Project dated March 19, 2015. The memorandum also defines access roads to the reservoir which either extend from the existing northern gate to the site or from a new gate near the southern limits of the site, both entering from East Santiago Canyon Road. Temporary parking for several vehicles, including cars, heavier maintenance trucks or cranes, will also be provided at the new site. The access roadways will be paved with asphalt concrete similar to the existing site road. Specific road alignments have not been finalized as of the date of this report.

1.3 PURPOSE AND SCOPE OF WORK

The purpose of our geotechnical investigation was to evaluate the subsurface conditions at the project site and to provide recommendations for reservoir site suitability, geotechnical design, and construction of the reservoir. A description of the scope of work performed is presented below.

1.3.1 Literature Review

We reviewed the published and unpublished geologic literature in our files and the files of selected public agencies including publications prepared by the California Geological Survey (CGS) and the U.S. Geological Survey (USGS). We also reviewed available appropriate seismic and faulting information including designated earthquake fault zones and our in-house database of faulting in the general site vicinity. We reviewed several stereographic pairs of historic aerial photos taken of the site dating back to 1952 to observe apparent geologic changes at the site.

1.3.2 Site Reconnaissance

In conjunction with our geotechnical investigation, the project Certified Engineering Geologist (CEG) performed a site reconnaissance to evaluate geologic and geotechnical constraints that may affect reservoir site suitability (Figure 2, Site Plan - Alternatives 1, 2, and 3), design and construction of the project. Geologic and geotechnical constraints for Alternative 4 were not investigated on site, however existing documents were reviewed to research site suitability. The purpose of the site reconnaissance was to:

- Observe and become familiar with the project site,
- Characterize and distinguish exposed lithologic units,
- Identify and map geologic structure such as faults, shears, folds, geologic contacts, bedding, joints and foliation,
- Observe subtle topographic features not easily observed in photographs or on topographic maps,
- Observe fissures, springs, seeps, variable erosion and vegetation, and
- Verify features identified during the literature review and aerial photo review of the site.

1.3.3 Utility Clearance

Prior to our intrusive field exploration, we contacted Underground Service Alert (USA) to identify potential conflicts between the planned boring locations and existing, documented, underground utilities. We also coordinated boring locations with IRWD personnel knowledgeable about the onsite utilities.

1.3.4 Field Exploration

Our field exploration consisted of subsurface explorations (i.e., small and large diameter borings, and test pits) and geologic mapping. The field work was performed in late-January and mid-March of 2015.

The locations of the borings are shown on Figure 2, Site Plan. The subsurface explorations, drilling methods used and depths explored are summarized in Table 1-1. The exploration methods used include hollow stem auger combined with rock coring, bucket auger, and test pit excavations using a backhoe. The two hollow stem auger/rock core borings were advanced to a maximum depth of 60 feet. Rock coring was initiated at a depth of 20 and 25 feet at Borings B-1

and B-2, respectively. The four bucket auger borings were advanced to a depth of 60 feet. The eight test pits were excavated to depths between 5 and 15½ feet. More detailed information regarding the field explorations is included in Appendix A. The boring and test pit logs, and rock core photographs are presented in Appendix A.

The geologic information from the borings and test pits were supplemented with geologic mapping of rock exposures in the area and data from previous investigations onsite. A field exploration and geologic map (Figure C-1) and several interpretive geologic sections (Figures C-2 through C-4) are presented in Appendix C.

Table 1-1
Summary of Field Explorations

EXPLORATION IDENTIFICATION	DATE COMPLETED	EXPLORATION METHOD(S)	TOTAL DEPTH	SURVEYED SURFACE ELEV.*	APPROX. BOTTOM ELEV.
			FEET		
B-1	1-27-2015	Hollow Stem Auger & Rock Coring	60.0	713.9	653.9
B-2	1-26-2015	Hollow Stem Auger & Rock Coring	52.0	709.3	657.3
B-3	3-13-2015	Bucket Auger	60.0	703.6	643.6
B-4	3-17-2015	Bucket Auger	60.0	706.5	646.5
B-5	3-17-2015	Bucket Auger	60.0	708.0	648
B-6	3-16-2015	Bucket Auger	60.0	711.9	651.9
TP-1	3-5-2015	Backhoe	7.0	706.8	700
TP-2	3-5-2015	Backhoe	5.0	707.1-707.6	703
TP-3	3-5-2015	Backhoe	5.0	706.8-706.9	702
TP-4	3-6-215	Backhoe	8.4	708.1-708.2	700
TP-5	3-9-2015	Backhoe	15.5	711.7-712.6	697
TP-6	3-9-2015	Backhoe	8.5	712.5-713.7	705
TP-7	3-9-2015	Backhoe	10.5	713.9-714.5	704
TP-8	3-9-2015	Backhoe	9.5	709.2-712.2	701

Note: *Survey was performed by Bush & Associates on April 13, 2015.

1.3.5 Geotechnical Laboratory Testing

Laboratory testing was performed on representative bulk, drive, and core samples to substantiate field classifications and to provide engineering parameters for geotechnical design. Laboratory testing consisted of in-situ moisture content and dry unit weight, Atterberg limits, maximum density (modified Proctor), unconfined compressive strength, direct shear, point load, and corrosivity testing (pH, electrical resistivity, water-soluble sulfates, and water-soluble chlorides). Laboratory testing was performed by AP Engineering and Testing, Inc. (AP) in Pomona, California and by Kleinfelder in our Rock Mechanics laboratory located in Redmond, Washington. A summary of the testing performed and the results are presented in Appendix B.

1.3.6 Analysis and Report Preparation

Our report for the project presents the data obtained during the field exploration and laboratory testing, as well as descriptions, conclusions and recommendations. Design recommendations for use with the latest edition of the California Building Code (CBC, 2013) were considered and pertain to the following:

- Discussion of the surface conditions, subsurface materials encountered, groundwater levels, and anticipated excavation characteristics of the materials;
- A description of the site geologic setting and possible associated geologic-related hazards, including liquefaction potential, seismicity, fault rupture, landslides, expansive soil/rock, corrosive soil/rock;
- Description of local and regional active faults, their distances from the site, and their potential for future earthquakes;
- Guidelines for earthwork construction including recommendations for site preparation, remedial grading requirements, stockpiling restrictions, overexcavation requirements, suitability of on-site soils for use in compacted fills, fill placement, and compaction;
- Slope stability analysis of proposed temporary cut slopes and fill slopes;
- Foundation design parameters including allowable foundation bearing pressure, embedment depths, and associated settlement;

- Active, passive, and at-rest lateral earth pressure for design of temporary shoring and the reservoir structure;
- Recommendations for temporary trench excavations;
- Discussion of the soil corrosivity test results; and
- Excavation characteristics of the materials to be encountered in the excavation.

2 REGIONAL GEOLOGY

The site is located in the northern part of the Peninsular Ranges Geomorphic Province (CGS, 2002). This province is characterized by mountain ranges separated by northwest trending valleys in an area bounded to the north by the east-west trending Transverse Ranges, to the west by the Los Angeles Basin and offshore islands, and to the east by the Colorado Desert. The province extends through Southern California to the tip of Baja California. The northwest structural trend within the province is subparallel to the San Andreas Fault and other associated faults.

The northern Peninsular Ranges can be divided into three fault-bounded blocks, from west to east, they are the Santa Ana Mountains, Perris, and San Jacinto Mountains (Morton, 2004). The site is situated within the Santa Ana Mountains block that extends from the coastline to the Elsinore Fault Zone to the east. The Santa Ana Mountains structural block is the expression of a highly faulted anticline, the core comprising an assemblage of Mesozoic meta-sedimentary and Cretaceous volcanic and batholithic rocks. Overlying these is a thick sequence of primarily Upper Cretaceous marine rocks and Paleogene marine and non-marine rocks.

3 LOCAL GEOLOGIC CONDITIONS

3.1 SITE DESCRIPTION

The site is located at 1802 East Santiago Canyon Road, just ½ mile southeast of the intersection of Jamboree Road and East Santiago Canyon Road in Orange, California (Figure 1). The area surrounding the site is largely undeveloped, hilly terrain. The entrance to the project site, off of East Santiago Canyon Road, is at the northwest end of the property at an elevation of about 680 feet. From that entrance the paved access climbs southward to the top of the existing reservoir that forms a radial bench at an elevation of about 742 feet. The existing reservoir is approximately 6 MG in size (206 feet diameter), is buried and is founded on a level pad at an elevation of 702 feet. A topographic high point of approximately elevation 780 feet is located about 300 feet west of the existing reservoir. The final location for the proposed 2.4 MG Santiago Hills Zone C+ Reservoir, is being evaluated within the footprint of four hypothetical reservoir locations (Alternatives 1, 2, 3, and 4) within a 3.5 acre area (Figure 2, Site Plan, Alternative 4 not shown) that lies approximately 100-300 feet southeast of the existing reservoir. Ground surface elevations in the proposed reservoir area range from about 705 to 715 feet in the northern two-thirds of the site, and then slope southward to approximately 690 feet. Southwest- to southeast-facing slopes adjacent to the proposed alternatives have been mapped as “most susceptible” to landsliding in a CGS report (Tan, 1995). The slopes are observed to be steeper (approximately 3H:1V) to the southeast, and are somewhat more subdued (5H:1V) to the southwest. Drainage at the site, southeast of the existing reservoir, is generally to the southeast and to the south. During the field investigation, most of the proposed reservoir site was covered with mustard plants, milk thistle and scattered sagebrush. Additionally, the site is covered with gravel, cobbles and boulders ranging in size from a few inches to several feet. In Appendix A, we include several photographs of the site area.

3.2 GEOLOGIC UNITS

The geologic units underlying the proposed reservoir site are described in the following sections and are described in greater detail in the boring and test pit logs included in Appendix A. Descriptions of regional lithologic units, not including that for artificial fill, landslide debris, or residual soil are taken from the 1981 Professional Paper 420, Geology of the Santa Ana Mountains by Schoellhamer, Vedder, Yerkes and Kinney and are annotated to reflect the local site conditions. A Field Exploration and Geologic Map for the site (Figure C-1) are provided in Appendix C.

3.2.1 Artificial Fill (af)

Artificial fill soils include both engineered fill placed for the existing reservoir and miscellaneous undocumented fill soils that are approximately 0 to 7 feet thick across the site. The undocumented fill soils comprised medium dense dark yellowish brown clayey gravel (GC), olive brown gravelly clay (CL) and light olive brown silty gravel (GM). Gravel was fine to coarse and consisted of predominantly siltstone and claystone clasts, with little fine- to coarse-grained sand. The deepest fill was encountered in B-6 and TP-5 in the northeast portion of the site. For this project the undocumented fill was not considered a mappable unit due its minimal thickness across the site. Engineered fill placed during the construction of the existing 6MG reservoir is mapped based on previous work (Stoney Miller Consultants, Inc., 1993) at the site.

3.2.2 Residual Soil

Two to five feet of residual soil was observed in borings and test pits overlying bedrock, and usually underlying artificial fill. The soil was typically very dark brown lean clay that contained trace organics and with depth contained gravel-sized clasts of regolith. The soil had a medium plasticity and was very stiff to hard. For this project the residual soil was not considered a mappable unit due its minimal thickness across the site.

3.2.3 Landslide Debris (Qls)

Landslide areas were delineated on the Field Exploration and Geologic Map (Figure C-1) based on existing topographic features, historical aerial photography and observations made in boring B-3 where steep bedding, open fractures, extensive gypsum veining and caving of blocks from the borehole sidewalls were observed. The landslide debris is predominantly within the Puente Formation's La Vida and Soquel Members, and also within a sliver of Topanga Formation. The landslides mapped for this study are within an area deemed "most susceptible to landsliding" in a 1995 landslide study (Tan, 1995) and are also at least in part within a seismically induced landslides hazard zone (CDMG, 1998). The topography is subdued, lacking strongly delineated scarps or landslide margins; however, the site has endured anthropomorphic changes that may have obscured landslide features. From as early as 1952 the site has been stripped and/or plowed. The landslides may also be fault controlled based on their relative locations to faults.

3.2.4 Puente Formation: Soquel Member (Tps)

The Soquel Member of the Puente Formation was formed during the Upper Miocene and is predominantly a brownish-yellow to gray medium grained to pebbly sandstone, interbedded with

gray micaceous siltstone and local conglomerate. Where bedding conditions are adverse relative to existing slopes (e.g., on the slopes mapped as landslides southwest, south and south east of the reservoir locations), this unit is prone to landsliding. Soquel Member sandstone is not believed to have been excavated in borings or test pits during our investigation.

3.2.5 Puente Formation: La Vida Member (Tplv)

The La Vida Member of the Puente Formation was formed during the Upper Miocene and is the oldest member of the Puente Formation. It comprises a chocolate brown to black siltstone, locally containing phosphatic nodules and thin bedded sandstone, also white vitric tuff, and lenticular sandstone, conglomerate and breccia are mapped southeast of the project site and buff sandy andesitic tuff or volcanic sandstone locally lies between Puente and Topanga Formations. The La Vida Member is the predominant mapped unit in the area of the proposed reservoir locations, and as the description suggests is a lithologically variable unit. Typically in the upper portions of the borings (B-3 and B-5), the La Vida Member was observed to be a siltstone/claystone that is highly weathered, brecciated, contains carbonate-rich or limy siltstone and contains some sandstone clasts. Kleinfelder observed claystone and siltstone of the La Vida Member through the entire depth of boring B-3. The claystone and siltstone appeared moderately weathered, very weak, contained abundant gypsum veins, was intensely sheared and exhibited open fractures and caving. Boring B-3 is believed to have been drilled within a landslide mass. The La Vida Member claystones contain expansive montmorillonite as its predominant clay mineral (Morton, 1976). The La Vida Member is a fine-grained unit, however, outcrops along Santiago Canyon Road and in the eastern portion of the site appear to contain highly weathered sandstone, pebbly sandstone, and sandy siltstone (for example B-4) in contrast to the dark fine-grained rock observed in Boring B-3. Locally (B-2 and B-1), the La Vida Member also contained a tuffaceous sandstone. Yerkes describes a light yellow to buff or tan sandy tuff or volcanic sandstone in the basal La Vida Member (Yerkes, 1957) that seems to characterize this localized unit. Due to the weakness of the rock and the potentially expansive nature of the claystone and siltstone, landslides are often found within the La Vida Member.

3.2.6 El Modeno Volcanics: Andesite Flows and Flow Breccias (Tema)

Andesite flows and flow breccias were formed during the Mid-Upper Miocene and interfinger within the basal unit of the Puente Formation, La Vida Member. Red, buff and gray vesicular andesite flows and flow breccias with interbedded tuffaceous limy breccia characterize the youngest rocks of the El Modeno Volcanics. Andesite flows were encountered within a portion of TP-2 and at depth in boring B-1, and, based on borehole findings and historical aerial

photography from the early 1950s, is believed to be localized beneath a significant portion of Reservoir Alternative 2. Andesite dikes are also mapped throughout the site vicinity. Often the dikes are less than 10 feet thick and some follow fault zones. Andesite is reported to be difficult to excavate in weathered or partially weathered zones and may require blasting in the unweathered state (Morton, 1976).

3.2.7 Topanga Formation (Tt)

The Topanga Formation formed during the Mid-Lower Miocene and is characterized by predominantly brownish-yellow to gray sandstone, conglomerate and interbedded siltstone. Localized limy organic siltstone and white vitric tuff are also associated with the Topanga Formation. The Topanga Formation has been regionally mapped along parts of Santiago Canyon Road northwest of the proposed reservoir alternatives. During the excavation of the 6MG reservoir, Stoney Miller (1993) mapped a northeast-trending sliver of Topanga Formation (Figure C-1, Field Exploration and Geologic Map) along the northwest margin of the proposed reservoir alternatives, between the existing reservoir and the proposed. Test Pits TP-6, TP-7 and TP-8, were in part or completely excavated within this area and recovered both sandstone and siltstone consistent with this description. Although the rock is typically well cemented, the presence of rock at the site is presumed to be sheared within a faulted sliver and therefore weaker. Typically, few bedrock landslides occur in the Topanga Formation and generally, the formation is considered to have moderately low susceptibility with respect to erodability and expansivity. It is important to note however, that where claystone strata exist within the Topanga, the potential for highly expansive rock is present (Morton, 1976).

3.2.8 Vaqueros/Sespe Formation Undifferentiated (Tvs)

The Vaqueros and Sespe formations are mapped in this area as one formation (i.e. Undifferentiated) and are the oldest of the formations mapped in the project area. They formed contemporaneously during the Upper Eocene to Lower Miocene and are characterized by brownish-yellow, gray, green, red and white clayey sandstone, conglomerate and sandy claystone, both marine and non-marine. The upper part of the unit contains early Miocene marine invertebrate fossil beds. A wedge shaped area of Tvs is mapped in the vicinity of Alternative 1, east of the existing reservoir. Borings B-2, B-5, B-6 and Test pit TP-5 were in part or completely excavated within this formation and encountered rock consistent with this description. At the site, the rock is extremely weak to very weak, and lacks strong cementation. Both the Sespe and the Vaqueros Formation are known to form moderate to thick slope wash. During field mapping, along a roadcut parallel to Santiago Canyon Road, the Vaqueros and

Sespe Formations exhibited slope wash instead of exposures of rock. Limited testing reported by Morton, 1976, indicates the chief clay mineral in both Sespe and Vaqueros formations is montmorillonite and beidellite (less in the Vaqueros Formation) and with minor amounts of kaolinite and vermiculite (Sespe Formation). Moderate expansivity in siltstone strata is noted for Vaqueros Formation and critically expansive within the Sespe claystone, however, locally sandstones are generally low to rarely expansive in both Sespe and Vaqueros formations. Slope stability in the Vaqueros Formation is moderately poor and failures occur on siltstone strata, increasingly with heavy rainfall, whereas Sespe Formation is considered moderately stable (Morton, 1976).

3.3 STRUCTURAL GEOLOGY

Throughout the 1950's (1950-1957) Kinney and Yerkes mapped the Orange Quadrangle including the area of the project site (Schoellhamer, Vedder, Yerkes and Kinney, 1981). It has been portrayed as an area that is intensely faulted. Structurally, the site is mapped as divided by a northeast trending fault that separates Puente Formation (La Vida Member) and El Modeno Volcanics dipping southwest to southeast (west of the fault), from down-dropped south-southeast dipping strata of the La Vida and conformable Soquel Members of the Puente Formation (east of the fault). A small uplifted wedge of southwest dipping Vaqueros/Sespe Formation is exposed at the northeast end of the site. In 1995, a geologic map by Tan, excluded the northeast trending fault combining all mapped La Vida and Soquel Members into an undifferentiated Puente Formation (Tp) and included two southeast dipping faults, one separating the La Vida Member from a wedge of the Vaqueros/Sespe Formation and one within the Puente Formation units. During the excavation of the existing 6MG Santiago Hills Reservoir Stoney Miller Consultants, Inc. (Stoney Miller) mapped a sliver of faulted Topanga Formation sandstone along the southern margin of the reservoir excavation and extended northeast to another north-northeast trending fault. East of this fault Stoney Miller Consultants, Inc. mapped La Vida Member, however this area was previously mapped as a wedge of Vaqueros/ Sespe Formation on previously mentioned geologic maps. Based on information from our borings and field mapping, the wedge is the Vaqueros/ Sespe Formation.

Figure C-1 is a compilation of the aforementioned mapping. This mapping has been used in concert with field mapping, subsurface data and photographic and cross sectional analysis in preparation of the map. As with the mapping by Tan, due to limited supporting field data and the presence of apparent landslides, the extension of the main northeast trending fault has not been mapped. In contrast to the regional mapping, bedding orientations from bucket auger borings within the La Vida Member, indicates folding and northwest to northeast dipping beds.

Additionally, an exposure of andesite was identified in the Alternative 2 area and is postulated to be an isolated exposure.

3.4 GROUNDWATER

Published groundwater information typically reports occurrence in alluvial sediments and not at bedrock sites. Thus, published information is of little use for the proposed reservoir site but is summarized for completeness. The California Department of Water Resources maintains an online Water Data Library that provides information for state wells and historical groundwater information. The nearest well on the database was nearly 3 miles northwest of the site and therefore too far away to provide useful information. Additionally, the Seismic Hazard Report for the Orange Quadrangle publishes historical high groundwater; however, no contours are shown for the project site. The nearest reported groundwater is offsite, 10 feet below the ground surface in the east-west trending drainage channel (approximately 1000 feet south of the project site) that drains toward Peter's Canyon Reservoir. The corresponding elevation is about 570 feet, which is about 100 feet below the proposed base of the 2.4 MG reservoir (CDMG, 1997).

Although published groundwater information provided no relevant information regarding the project site, groundwater and/or saturated rock conditions were encountered in three of the four bucket auger borings drilled for this investigation. Wet rock was observed during downhole logging of borings B-5 and B-3, however, during drilling, spoils did not appear saturated. Both borings were drilled to 60 feet below ground surface (bgs), which corresponds to approximate elevations 648 and 642, respectively. Although the bottom five feet of each boring was very moist, no standing water was observed. During drilling of boring B-6, the last bucket removed at 59-60 feet bgs depth was saturated. The boring was left open over the weekend to assess the water level at this location. Upon returning to the site, free standing water was measured at 52 feet below the ground surface. This corresponds to an elevation of 659.

Based on the borings drilled for this investigation, groundwater is likely to be encountered within 10 feet of the design base elevation (670 feet) of the proposed reservoir. The anticipated elevation of maximum overexcavation is approximately 663 feet. Conditions during construction are likely to encounter increasingly moist materials as the proposed base elevation is reached. Fluctuations of the groundwater level, localized zones of perched or seepage water and elevated moisture content should be anticipated during and following the rainy season or from irrigation.

3.5 GEOLOGIC HAZARDS

3.5.1 Landslides

According to the California Geological Survey's 1998 Seismic Hazards Zones Map for the Orange, California Quadrangle, slopes adjacent to the proposed reservoir location are considered zones of required investigation for earthquake–induced landslides. These are areas where previous occurrence of landslide movement or local topographic, geological 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. Additionally, the 1995 Landslide Hazards in the Orange Quadrangle, Orange County California Open-File Report (DMG OFR 95-11) identifies the majority of the proposed reservoir site (Alternatives 2 and 3, and as much as a third of Alternative 1) as being located within an area "most susceptible to landsliding".

Aerial views of the project site were evaluated in stereographic paired photographs dating from 1952 through 1999 for geomorphic evidence of past landslides at the site. In the earliest photographs, a well-defined landslide is enveloped by what appears to be the margins of a larger slide, south-southeast of the proposed alternatives. The features are suggested on multiple photograph sets and on the detailed site topographic maps for the Orange quadrangle (USGS, 1981). Boring B-3 was drilled into mapped Puente Formation (La Vida Member). The borehole was observed to contain sheared and fractured claystone, with pervasive open fractures at depths of 36 to 60 feet bgs. We interpret this boring as being drilled completely within the limits of a previous landslide. The rupture surface of the landslide, which may or may not have been within the drilled depths, was not directly observed in the borehole due to life-safety concerns posed by the borehole walls collapsing. Based on geomorphic evaluation of the stereo-paired aerial photographs and the topographic map, and the findings within boring B-3, the potential for landslides to be present within the natural slopes and hillsides adjacent to the site are considered to be very high, particularly within the Alternative 3 area and adjacent to Alternative 2. The landslides (Qls) on Figure C-1 pose a hazard of instability to roads, pipelines and structures located within their mapped limits as they are exposed at ground surface. It should be noted that the mapped limits are inferred from geomorphologic appearance and topography and would need further field confirmation if critical to the final design layouts in Figure C-1.

3.5.2 Flooding

The site is not located in a flood hazard zone as currently designated by Federal Emergency Management Agency (FEMA, 2009), nor is it located in overflow areas for the Santa Ana River and Santiago Creek, or within downstream inundation hazard zones for the Santiago Reservoir (Irvine Lake) and Prado Dam according to maps included in the Safety Element of the County of Orange General Plan (County of Orange, 2005).

3.5.3 Subsidence

Subsidence can occur as a result of the extraction of groundwater or oil and to a degree is common in groundwater basins. The project site lies outside of the Orange County Basin area, where subsidence has been recorded. No significant pumping of groundwater or oil is known to exist at the site, therefore the potential for subsidence due to fluid extraction is considered nil.

3.6 SEISMIC HAZARDS

The project site is located in a seismically active region in Southern California. It is very likely that the project site will experience strong earthquakes during the lifespan of the proposed structure.

3.6.1 Primary Seismic Hazards

Based on our screening and geologic studies, the primary seismic hazards for the proposed site are ground rupture, ground displacement and seismic shaking.

In an effort to mitigate surface faulting to structures constructed for human occupancy, in 1972, the State of California enacted the Alquist-Priolo Earthquake Fault Zoning Act. Since that time they have produced maps that designate active fault zones, usually ¼ mile wide along active fault traces. Active faults are defined as those which have ruptured in the last 11,000 years. Based on the information provided in the AP Maps and Special Publication 42 by Bryant and Hart (2007), the site is not located within a State-designated Alquist-Priolo Earthquake Fault Zone where site-specific studies addressing the potential for surface fault rupture are required. The faults mapped at site are not designated as active based on the Alquist-Priolo maps.

In addition to fault rupture, these active faults are also important sources of seismic shaking. The nearest AP zones are associated with the Whittier Fault / Elsinore fault zone (about 6.9 miles northeast of the site and the Newport-Inglewood Fault / Newport-Inglewood-Rose Canyon Fault Zone (about 14.4 miles southwest of the site). The Whittier Fault is a northern

continuation (segment) of the Elsinore Fault Zone and is capable of generating a 7.2 magnitude earthquake. A significant 6.0 magnitude earthquake associated with the Elsinore Fault (Elsinore earthquake), south of the Whittier Segment occurred in 1910, in the vicinity of Lake Elsinore. The Newport Inglewood Fault is capable of generating a maximum 7.4 magnitude earthquake and is associated with the 1933 Long Beach Earthquake that had a 6.4 Richter magnitude. There are also faults that do not exhibit a surface rupture, such as blind faults. Blind faults such as the Puente Hills blind thrust fault, located approximately 27.5 miles northwest of the site, also pose a significant hazard. The Puente Hills blind thrust generated the 5.9 magnitude Whittier Narrows earthquake in 1987, and was responsible for 8 fatalities and over 350 million dollars in property damage (Southern California Earthquake Center (SCEDC), 2013).

As shown on Figure 3, Fault Map, there are many faults mapped in the site vicinity. Two faults nearest to the site, the El Modeno and Peralta Hills faults, both approximately 6.2 miles long (SCEDC, 2013) located approximately 0.5 miles west, and 3 miles northwest, respectively, are both reverse faults that have been evaluated for zoning purposes but were found to fall short of the zoning criteria (CDMG, 1977, 1978, Wills, C.J., 1988). These are faults that have had Quaternary (within the last 2 to 3 million years) ruptures, and were suspected of having more recent ruptures, however sufficient evidence was not found to zone them as active.

Over the lifespan of the project, strong seismic shaking is possible from many fault sources in the region. Significant active faults in the region are listed in Table 3-1 with approximate distances to the project site and the maximum earthquake magnitude attributed each fault.

Table 3-1
Significant Faults

ABBREVIATED FAULT NAME	APPROX. DISTANCE[1] (MI.)	FAULT LENGTH (MI.)	MAXIMUM EARTHQUAKE MAGNITUDE[2]	SLIP RATE (MM/YR)	RECURRENCE INTERVAL (YRS)
Peralta Hills Fault	2.8	6.2	NA	NA	NA
Elsinore-Whittier Section (Whittier Fault)	6.8	24.8	7.2	2.5-3	unknown
Elsinore Fault	7.4	111.8	7.5	4.0	250
Chino Fault	9.6	13	7.0	1	unknown
Newport-Inglewood-Fault Zone	12.8	46.6	7.4	0.6	unknown
Sierra Madre Fault	23.4	34.1	7.0[3]	0.36 - 4.0	unknown
Puente Hills Fault (Blind Thrust)	11.1	27.3	7.1[4]	0.44-1.7[4]	unknown

Table 3-1 (continued)

Significant Faults

ABBREVIATED FAULT NAME	APPROX. DISTANCE[1] (MI.)	FAULT LENGTH (MI.)	MAXIMUM EARTHQUAKE MAGNITUDE[2]	SLIP RATE (MM/YR)	RECURRENCE INTERVAL (YRS)
San Jose Fault	19.2	11.1	6.5	0.2 - 2.0	unknown
Palos Verdes Fault	29.8	49.7	7.0	0.1 -3.0	unknown
Raymond Fault	29.9	16.1	7.0	0.1 -0.22	~4500
San Jacinto-San Bernardino Mountains Section	30.3	130.4	7.5	7-17	100 and 300
Crafton Hills Fault	33.8	12.4	NA	NA	NA
San Andreas-San Bernardino Section South Branch	37.2	341.7	8.0	20-35	140-300
Cucamonga Fault	42.8	18.6	7.0	5 -14	600-700

Source: (SCEDC, 2013)

Notes: 1. Closest distance to potential rupture
2. Moment magnitude: an estimate of an earthquake's magnitude based on the seismic moment
3. Maximum Earthquake Magnitude is not well constrained.
4. (Shaw et al., 2002)
5. NA – not available

3.6.2 Secondary Seismic Hazards

Secondary seismic hazards can be induced by primary seismic hazards and include liquefaction, lateral spreading, lurching, slope failure, tsunami, seiche and dam failures.

Soil liquefaction is a phenomenon in which saturated, cohesionless soils lose their strength due to the build-up of excess pore water pressure during cyclic loading such as that induced by earthquakes. The primary factors affecting the liquefaction potential of a soil deposit are: 1) intensity and duration of earthquake shaking, 2) soil type and relative density, 3) overburden pressures, and 4) depth to groundwater. Soils most susceptible to liquefaction are clean, loose, uniformly graded, fine-grained sands, and non-plastic silts that are saturated. Silty sands, under certain site conditions, may also be susceptible to liquefaction. The State of California Seismic Hazard Zones Map for the Orange Quadrangle delineates areas of required investigation for liquefaction. Based on this mapping and supporting field data for soil types, depth to groundwater and density, liquefaction is not considered a hazard at the site. Lateral spreading is horizontal displacement of surficial soil layers as a consequence of liquefaction of a

subsurface granular deposit and ground lurching results when soft, water-saturated surface soils are agitated. Since the subsurface units are not considered liquefiable and are not in a saturated condition, the potential for lateral spreading and ground lurching are also considered nil.

The State of California Seismic Hazard Zones Map for the Orange Quadrangle delineates areas of required investigation for earthquake-induced landslides in addition to liquefaction. The site is bounded on the south and southeast by areas of required investigation that may encroach into the southern portion of the site. Based on aerial photography and field data obtained during the field investigation, landslide areas were also mapped in the Alternative 3 area and extending up to the southeast boundary of Alternative 2. Pre-existing landslides increase the potential for earthquake induced landslide deformations. Based on published maps, aerial photography and field data, the potential for earthquake-induced landslides is considered high to very high.

Tsunamis are seismic sea waves resulting from the displacement of the ocean floor during a seismic event. Orange County is shielded by the Channel Islands and by Point Conception reducing significantly the potential for a tsunami hazard. Due to the elevated, inland location of the project site from the coastline the hazard is considered nil.

Seiches occur when seismic activity or landslides cause oscillation of sloshing water in a lake, bay, reservoir or other enclosed body of water. Seiche occurs where an impounded body of water, as a result of an earthquake sloshes as the seismic waves move through it. The project site is not located within the Prado Dam and Santiago Reservoir Inundation areas according to Maps included in the Safety Element of the County of Orange General Plan (County of Orange, 2014). However, seiching or sloshing may occur within either the existing or proposed reservoir structures at the subject site.

3.7 EXPANSIVE BEDROCK

Expansive bedrock generally contains clay particles that swell considerably when wetted and shrink when dried. Structures constructed on these soils are subjected to uplifting forces caused by the swelling. Based on literature review, limited testing of claystones within the La Vida Member of the Puente Formation, and Vaqueros and Sespe formations have shown that montmorillonite is the predominant clay mineral where claystone and siltstone is observed within these units and therefore it is likely that expansive bedrock may be encountered.

Based on a single expansion test completed on a composite of fine-grained bedrock lithologies from Boring B-5 and B-6 at depths between 30 and 50 feet (approximate elevations 678 to 661

feet), there are highly expansive (Expansion Index of 140, Very High) materials on-site. The potential for expansive claystone layers is further substantiated by an Atterberg Limits Test performed on a core sample of claystone bedrock of Puente Formation – La Vida Member at Boring B-1 at a depth of 53.5 to 54 feet (elevation of 657.5 to 657 feet).

The expansion potential of final subgrade materials should be evaluated further during grading and, if necessary, the recommendations, presented herein, should be modified. Strategies for mitigating expansive bedrock and backfill are described further in Section 5.3.

3.8 CORROSIVE ENVIRONMENTS

The potential effects of corrosion should be considered in the design and performance of the reservoir. Limited corrosivity testing was performed on two samples of silty sandstone (Puente Formation - La Vida Member) at boring locations B-1 and B-2. The results are summarized in Table 3-2, and the laboratory test results are included in Appendix B.

Based on Caltrans criteria (2012), soil/rock and/or groundwater are considered corrosive to structures if one or more of the following conditions exist:

- pH ≤ 5.5
- Sulfate concentration ≥ 2,000 parts per million (ppm)
- Chloride concentration ≥ 500 ppm

Low resistivity is sometimes used as a preliminary test to screen for ions. However, the concentration of chloride and sulfate ions should be considered when evaluating the corrosive environment posed to steel. In addition, sulfate ions and high acidity (pH≤ 5.5) cause chemical reactions that ultimately weaken concrete.

Based on these criteria, the limited rock materials analyzed do not appear to be corrosive. However, in our field exploration, we noted the presence of gypsum [$CaSO_4 \cdot H_2O$] precipitated in joints and fissures within the La Vida Member and landslide debris. Bedrock or excavated material containing appreciable amounts of gypsum should be considered as being corrosive to concrete. Kleinfelder has completed laboratory testing to provide data regarding corrosivity of on-site rock materials. Kleinfelder's scope of services does not include corrosion engineering and, therefore, a detailed analysis of corrosion is not included in this report.

Table 3-2

Summary of Corrosivity Testing

BORING NO.	SAMPLE DEPTH		PH	RESISTIVITY	SULFATES	CHLORIDES
	FEET			OHM-CM	PARTS PER MILLION (PPM)	
B-1	10.0	11.5	NP	1964	NP	NP
B-2	20.0	21.5	7.6	4437	36	90

Note: NP – not performed because of limited sample quantity.

4 GEOTECHNICAL ANALYSES

The geotechnical analyses completed to develop recommendations in support of the reservoir design and construction include site characterization for developing ground motion parameters, temporary slope stability, excavatability of rock materials, bearing capacity and settlement for the reservoir slab and shallow foundations, and lateral earth pressures for the reservoir and temporary shoring (if necessary). Recommendations based on our analyses are presented in Section 5.0.

Kleinfelder's geotechnical scope of work included evaluation of three alternatives for reservoir siting as shown on Figure 2. A fourth location was identified in the Site Master Plan Preliminary Design Technical Memorandum but was not investigated from a geotechnical perspective. . Because Alternative 3 is sited within an area that was identified as a landside during our investigation, we do not consider this a suitable location for the reservoir and did not evaluate this alternative as thoroughly as Alternatives 1 and 2.

4.1 SITE CHARACTERIZATION FOR SEISMIC DESIGN

Based on the exploratory borings and geologic mapping, the subsurface conditions within the project area consist predominately of lesser amounts of artificial fill and residual soil (regolith or weathered bedrock), overlying either sedimentary or volcanic Tertiary-age rock formations. We classify the subsurface according to Section 1613.3.2 of 2013 CBC and Table 20.3-1 of ASCE/SEI 7-10 (2010) as Site Class C, very dense soil and soft rock with shear wave velocities between 1,200 to 2,500 feet per second (fps).

4.2 SLOPE STABILITY

Our slope stability analyses are limited to the temporary slopes required for constructing the reservoir (either Alternative 1 or 2) and for proposed engineered fill slopes to restore grade on-site. The proposed temporary cut slope heights for reservoir construction range from approximately 30 to 75 feet (from reservoir base elevations as shown in Figures in Appendix D).

For the Tertiary-age rock formations, design shear strength parameters were developed from the geotechnical laboratory testing performed for this investigation and in the previous investigations on site, rock mass classifications, and published shear test data reported by the CGS in the Seismic Hazard Zone Reports for the Orange (McMillan et al., 1997) and Black Star Canyon (Wilson et al., 2000) 7.5-Minute Quadrangles. These shear strengths are sited in our analyses included in Appendix D.

The temporary stability of the proposed cut slopes was evaluated using limit equilibrium methods facilitated by the computer program Slide Version 6.0 by RocScience®. These analyses are for temporary conditions and do not include effects of ground shaking during earthquakes. Based on the current understanding of the project and design information available to date, the analyses indicate the recommended cut slopes satisfy the temporary static factors of safety with respect to the project criteria of 1.25. The slope stability calculations are included in Appendix D. Our analyses do not consider surcharges from stockpiles and we assume that any stockpiles will be located outside the area of influence for the temporary cut slopes. Stockpile locations and restrictions due to geotechnical conditions should be evaluated when a specific reservoir location is selected.

Engineered fill slopes were evaluated for both static and pseudostatic conditions. In the pseudostatic analysis, a seismic coefficient (k_h) is used to simulate increased horizontal driving force during an earthquake. We estimate k_h to be about 0.19 using the methods recommended by the CGS in Special Publication 117A (CGS, 2008). This assumes an allowable slope deformation of about 4 inches (5 centimeters). The analyses indicate the recommended fill slopes satisfy the static and pseudostatic factors of safety with respect to the project criteria of 1.5 and 1.1, respectively.

The surficial and global stability of the existing slopes and landslides do not appear to impact Alternative 1 and was therefore not addressed as part of this study. Alternative 2, in its present configuration, could be impacted by the nearby mapped landslide if it is reactivated and the location of the reservoir is not moved away or “setback” from the mapped landslide limits. Our recommendations for setback are included in Section 5.0.

4.3 ROCK EXCAVATION

The excavation characteristics of the rock formations were evaluated from field explorations, geologic mapping, laboratory testing, and rock mass characterization.

Because of the bedded and predominately weak lithologies of the sedimentary rock formations, favorable excavation conditions that mostly require conventional excavation equipment are anticipated. We assigned four unconfined compressive strength tests within the sedimentary rock. Two of the four samples selected had defects that didn’t allow for a valid test to be completed, but the remaining tests resulted in unconfined compressive strengths of 88 and 105 pounds per square inch (psi), which is considered extremely weak from a rock mechanics perspective.

From previous study (Pacific Soils Engineering, Inc., 1988) for the existing reservoir, seismic wave (compression or P-wave) velocities were surveyed to range from 1,900 to 3,700 fps within the andesite member of the El Modeno Volcanics. Based on Caterpillar's Handbook of Ripping (2000), rock exhibiting seismic velocities in this range is rippable using a D9 dozer equipped with multi or single shank ripper(s).

The volcanic rock (andesite) generally exhibits greater rock strength with a point load index of approximately 133 to 512 psi, which is considered weak to very strong. However, the rock quality designation (RQD) is nil and the rock core is predominately intensely to highly fractured (i.e., fractures are spaced less than 2 to 8 inches apart.) Based on the rock strength, degree of fracturing, and the seismic velocity from previous study, we anticipate that the volcanic rock (andesite) will require ripping.

4.4 SHALLOW FOUNDATIONS

Shallow foundations (spread footings) were evaluated using conventional bearing capacity formulas that consider the shear strength of the foundation materials, the groundwater conditions, and the preliminary dimensions of the footings and their tolerable settlement as provided by our Structural Engineer. Based on our understanding of the proposed reservoir, the foundations will be comprised of a 7-inch-thick reinforced concrete membrane slab with upturned either 7-foot column footings (interior) or 6-foot by 8-foot column footings (exterior), and a 5-foot-wide by 1.5-foot-deep ring footing. In our analyses, we assume the column footings will transmit vertical loads exerted by the roof and soil cover through the slab to the subgrade. The effects from the weight of the water within the reservoir, which assumes a maximum height of water of 30 feet, and filling and draining during operation is also considered in our analyses.

The shallow foundations were analyzed with respect to the project settlement requirements, imposed by the membrane slab, which limit the tolerable differential settlement to ¼ inch over 20 feet. The total static settlement is estimated under the proposed loading to be less than ½ inch. However, based on the analyses performed, a uniform bearing material must be prepared to satisfy the differential settlement requirements. As discussed in Section 5.5, overexcavation of the bedrock of up to 6 feet (or more if determined to be highly expansive) and replacement with engineered fill will be necessary to achieve a uniform bearing material.

4.5 EARTH PRESSURES

Geotechnical analyses to estimate earth pressures for the buried reservoir and temporary shoring were completed. The earth pressures developed for the reservoir include at-rest and dynamic (seismic) loads. Recommended earth pressures for active, at-rest and passive conditions have also been developed for use in temporary shoring design, which do not include seismic forces.

5 CONCLUSIONS AND RECOMMENDATIONS

Based on our field investigation, laboratory testing and geotechnical analyses conducted for this study, it is our opinion that it is geotechnically feasible to construct the project as planned on sites designated as Alternative 1 or 2 (Figure 2), provided the recommendations presented in this report are incorporated into project design and construction. Construction on the site designated as Alternative 3 is not recommended due to the potential impacts of an existing landslide and development of this alternative would require additional study outside our current scope. Further, stockpiling is not recommended on the site of Alternative 3 due to the potential to induce landslide deformations. Our recommendations regarding the geotechnical aspects of project design and construction are presented in the following sections.

Table 5-1 summarizes the positive and negative attributes of both alternatives from a geotechnical standpoint. We consider Alternative 1 as more suitable for reservoir siting for the following reasons:

- Alternative 1 is setback up to 60 feet or more from the expected limits of existing landslides
- Alternative 1 is less likely to expose volcanic rock (andesite) within the bearing zone, thus requiring less overexcavation to create a uniform bearing material

Alternatively, a modified Alternative 2 is suitable, if it is relocated to the northwest to increase the setback to at least 30 feet from the existing landslide.

Table 5-1

Comparison of Alternatives 1 and 2

GEOTECHNICAL CONSTRAINT	ALTERNATIVE 1	ALTERNATIVE 2
Temporary Stability	**Negative** South and east dipping cut slopes at 1.25H:1V. Other cut slopes at 1H:1V. Shoring (more than Alternative 2) will be required to maintain access road and existing reservoir cover.	**Positive** Slopes require cuts inclined at 1H:1V. Shoring will be required to maintain access road and existing reservoir cover.
Landslides	**Positive** Existing setback is greater than 60 feet (Figure C-1).	**Negative** Existing set back is nil (Figure C-1).
Expansive Bedrock	**Negative** More potential for expansive bedrock within bearing zone.	**Positive** Lower potential for expansive bedrock within bearing zone.
Settlement	**Positive** The sedimentary bedrock units within the bearing zone present a fairly uniform bearing material for the reservoir and require less overexcavation.	**Negative** The presence of both volcanic bedrock and sedimentary bedrock within the bearing zone presents a non-uniform bearing material.
Excavatibility	**Positive** Lower potential for encountering resistant volcanic rock within the excavation area that requires ripping.	**Negative** Higher potential for encountering resistant volcanic rock within the excavation area that requires ripping.
Groundwater Conditions	**Negative** Higher moisture contents were observed in borings.	**Positive** Less moisture contents were observed in the borings.

5.1 CBC SEISMIC DESIGN CONSIDERATIONS

According to the seismic design provisions in Section 1613 of the 2013 California Building Code (CBC), the Seismic Design Category for a structure may be determined in accordance with Section 1613.3.5 of the 2013 CBC. Approximate coordinates for the site are:

Latitude: 33.787363° N

Longitude: 117.7546138° W

The Risk-Targeted Maximum Considered Earthquake (MCE_R) mapped spectral accelerations for 0.2 seconds and 1 second periods (S_s and S_1) were estimated using Section 1613.3 of the 2013 CBC and the U.S. Geological Survey (USGS) web based application (available at http://earthquake.usgs.gov/designmaps/us/application.php). The mapped acceleration values and associated soil amplification factors (F_a and F_v) based on the 2013 CBC and corresponding site modified spectral accelerations (S_{MS} and S_{M1}) and design spectral accelerations (S_{DS} and S_{D1}) are presented in Table 5-2.

Table 5-2
2013 CBC Seismic Design Parameters

DESIGN PARAMETER	RECOMMENDED VALUE
Site Class (Table 1613.5.2)	C
S_s (Figure 1613.5(3)) (g)	1.500
S_1 (Figure 1613.5(4)) (g)	0.591
F_a (Table 1613.5.3(1))	1.000
F_v (Table 1613.5.3(2))	1.300
S_{MS} (Equation 16-36) (g)	1.500
S_{M1} (Equation 16-37) (g)	0.768
S_{DS} (Equation 16-38) (g)	1.000
S_{D1} (Equation 16-39) (g)	0.512

5.2 SLOPE STABILITY

To avoid impacts from nearby mapped landslides, we recommend a setback of at least 30 feet from the nearest mapped limits of identified or postulated landslides (Figure C-1). The location of Alternative 1 appears to satisfy this criterium. To satisfy this criterium, Alternative 2 will need to be moved to the northwest, closer to the existing reservoir. In addition, to reduce the potential for reactivation of existing landslides, we recommend, wherever feasible, that surface water and water from drain or reservoir discharges not be directed toward any mapped landslide(s). For planning purposes, we recommend that stockpile locations be setback a minimum of 40 to 60 feet from the crest of any temporary cut slope or existing slope and that selected locations be approved by the geotechnical engineer prior to construction.

Recommendations for Alternative 1 and 2 temporary cut slopes and final fill slopes are included below. At locations where cut slope inclinations and orientations change, we recommend gradual transitions. For locations where resistant rock or andesite is exposed, locally steeper inclinations may be feasible. This should be evaluated further during construction if/where applicable. We understand it is necessary to maintain the existing access road; however, the temporary cut slopes for both alternatives require limited areas that impact the existing reservoir and access road. Therefore, the use of shoring will be required in these areas.

For Alternative 1 temporary cut slopes, we recommend the cut slopes dipping east and south be graded at a maximum ratio of 1¼H:1V (38.7 degrees). The cut slopes dipping north and west can be oriented at a maximum ratio of 1H:1V (45 degrees). Where temporary cut slopes conflict with the existing reservoir, a shoring solution will be required. We anticipate volcanic rock (andesite) will comprise part of the southern cut slope.

For Alternative 2 temporary cut slopes, we recommend the cut slopes be graded at a maximum ratio of 1H:1V (45 degrees). Where temporary cut slopes conflict with the existing reservoir and access road, a shoring solution is necessary. In general, the western portion of the reservoir excavations will require shoring to maintain the existing access road. We anticipate volcanic rock (andesite) will be encountered within the west-central part of the Alternative 2 excavation to a depth of about 50 feet.

For Alternatives 1 and 2, we estimate global stability of temporary cantilevered shoring systems would require substantial embedment to achieve a factor of safety of 1.25. For a shoring system installed at the shoulder of the existing access road, we estimate a maximum 65 foot tall system (25 feet exposed and 40 feet embedded) that satisfies internal factors of safety is required. The

embedment depth of soldier piles would be related to the exposed height as it decreases in a similar manner, but will in all cases require some minimum embedment into the bedrock formational materials. The specifics of embedment or sizing of members of the soldier pile wall are not within our current scope of work. We believe this exposed plus embedded height could be substantially reduced by excavating at allowable cut slope ratios and installing the shoring system closer to the proposed reservoir.

In general, 2H:1V engineered permanent fill slopes are considered geotechnically feasible up to 60 feet in height. The stability of such slopes assumes the following:

- Minimum strength and material properties: effective friction angle (ϕ') = 32 degrees, effective cohesion (c') = 150 pounds per square foot (psf), and total unit weight (γ_{tot}) = 110 pounds per cubic foot (pcf),
- The fill slope is comprised entirely of engineered fill
- No surcharge loads
- Drained slope conditions

The assumed minimum shear strength properties for the proposed engineered fill should be confirmed by testing in accordance with ASTM Standard Test Method D3080 during construction.

For long-term performance of fill slopes, normal deterioration of the slope surfaces may be reduced by landscaping the slope face or equivalent as soon as possible after completion of grading. Proper vegetative cover, watering, and drainage control, along with adequate maintenance, will reduce the potential for surficial instability of fill slopes. Any burrowing rodent/animal activity on the slopes should be controlled. Landscaping should consist of drought-resistant varieties of grasses or ground cover as recommended by a landscape architect. The use of any sprinkler system should be restricted to provide minimum water necessary for plant growth, and to maintain a fairly constant soil moisture content within the outer 4 feet of the slope surface.

5.3 FOUNDATIONS

The proposed structure may be supported as planned, provided that the recommendations presented in this report are incorporated in the design. We recommend that the proposed reservoir footings and slab be supported on an approximately 12-inch-thick layer of crushed rock, aggregate base, or gravel material overlying a minimum of 3 feet of engineered fill.

Foundations and structures that are located at the top of slopes should be located in accordance with the setback requirements of the 2013 CBC, Section 1805. For structures at the top of or embedded in a slope, the minimum setback is the least of H/3 or 40 feet. For embedded structures, the setback distance is measured horizontally at the bearing elevation.

5.3.1 Allowable Bearing Pressures

The engineered fill and sedimentary bedrock can be considered capable of supporting a net allowable bearing pressure of 4,500 psf for foundations with a minimum embedment depth of 1½ feet and minimum footing width of 5 feet. For column footings and slabs, a net allowable bearing pressure of 4,000 psf is recommended.

These recommended bearing values are for total dead plus live loads and may be increased by one-third for wind, seismic or other transient loading conditions. Ultimate bearing capacity can be calculated by increasing the presented values by a factor of 3.

5.3.2 Estimated Foundation Settlements

The anticipated total settlement across the radius of the reservoir due to the proposed loads is estimated to be on the order of ½ inch. Static settlement of all foundations is expected to be primarily elastic and should be essentially completed shortly after initial application of structural loads. Elastic settlements resulting from filling and draining of the reservoir are estimated to be nearly ¼ inch.

The integrity of the floor membrane limits the tolerable differential settlement to ¼ inch over 20 feet. Alternative 2 is anticipated to be comprised of both sedimentary and volcanic rock at the foundation elevation. However, the elastic properties of the sedimentary rock formations and volcanic rock are not compatible (i.e., the rock mass deformation moduli differ by at least an order of magnitude). Similarly, locally concreted or resistant zones of sedimentary rock will exhibit increased stiffness. Therefore, under operational loading, the sedimentary rock would deform more than the volcanic rock or more resistant zones of sedimentary rock, resulting in differential settlements that exceed the tolerable threshold. We anticipate that bearing material will be predominately extremely weak to weak, sedimentary rock. Therefore, to create uniform bearing conditions and limit the differential settlement to less than ¼ inch over 20 feet, we recommend the following overexcavation, site preparation (Section 5.5.1), and replacement of the subsurface material with structure backfill (Section 5.6.1):

- For subgrade comprised of sedimentary rock, 4 feet below bottom of slab, or

- For subgrade comprised of volcanic rock, 6 feet below bottom of slab or to a depth of 4 feet if sufficient to remove the volcanic rock.

5.3.3 Lateral Load Resistance

Resistance to lateral loads (including those due to wind or seismic forces) may be provided by frictional resistance between the bottom of concrete foundations and the underlying subgrade materials, and by passive soil pressure against the sides of the foundations. An allowable coefficient of friction of 0.33 may be used between cast-in-place concrete foundations and the crushed rock, aggregate base, or engineered fill. The allowable passive pressure may be taken as equivalent to the pressure exerted by a fluid weighing 400 pcf. Friction and passive resistance may be combined without reduction. The allowable coefficient of friction and passive earth pressure include a factor of safety of 1.5.

The passive resistance of the subgrade materials will diminish or be non-existent if trench or footing sidewalls slough, cave or are over-widened during or following excavations. If this condition is encountered, our firm should be notified to review the condition and provide remedial recommendations, if necessary.

5.3.4 Footing Observation

Prior to placing steel and concrete, footing excavations should be cleaned of all debris, loose or soft rock or soil, and water. All footing excavations should be observed by a qualified representative of the Geotechnical Engineer of Record just prior to placing steel or concrete to verify that the recommendations contained herein are implemented during construction.

5.3.5 Expansive Bedrock and Backfill

The potential for expansive bedrock is being further evaluated. During construction, additional testing should be performed on the final subgrade materials. If these materials are expansive, additional measures would be required to mitigate the potential for differential settlement or heave that would exceed the threshold for the proposed reservoir membrane slab. Potential strategies for mitigating expansive bedrock are summarized in Table 5-3. Depending on the degree of swelling that is anticipated, some combination of mitigation measures may be necessary to mitigate the potential for differential heave/settlement.

Table 5-3

Additional Design Considerations for Expansive Bedrock

DESIGN STRATEGY	DESIGN MEASURES
Replace Expansive Subgrade with Non-expansive Fill to Eliminate or Counteract Heaving Pressure	• Increase depth of overexcavation to 10 feet (or other depth to be determined) across the entire footprint of the reservoir foundations
Subgrade Preparation	• Scarify 6 to 8 inches (or other depth to be determined), compact subgrade to 90 percent and at 2 to 5 percentage points above optimum • Cover with 6-inch layer of crushed rock or aggregate base within 24 hours to reduce moisture loss within subgrade during construction
Reduce Potential Moisture Changes in Expansive Subgrade	• Improve site drainage by grading and installing subsurface drains • Reduce or manage infiltration with landscaping measures • Use geomembrane liners directly over the expansive subgrade to reduce changes in moisture beneath the reservoir foundations • Lime stabilization of subgrade

Furthermore, if a substantial quantity of the excavated bedrock material is expansive, it would not meet the specifications for structure backfill as described in Section 5.7.1.

5.4 RESERVOIR DESIGN LATERAL EARTH PRESSURES

We recommend that the reservoir is designed for at-rest (restrained) conditions developed from horizontal backfills on walls that are restrained using an equivalent fluid pressure of 60 pcf. The load applications are shown in Figure 4. Where additional soil surcharges exist (i.e., non-level ground surface overlying the reservoir), a uniform load of up to 885 psf should be applied over the depth of the excavation. This 885 psf uniform load simulates the lateral load exerted by a fill soil surcharge (height of 30 feet) within the zone of influence for the reservoir walls. This additional loading should only be applied where the ground surface is sloped and need not be considered for the reservoir wall where the ground surface is level. If other alternatives are selected, the soil surcharge resulting from non-level backfill should be considered on a case-by-case basis by the geotechnical engineer.

Dynamic loading from backfills for the at-rest conditions should be applied as a uniform load with magnitude 30H psf, where H is the excavation depth in feet. For locations where there are additional soil surcharges (fill slopes overlying the reservoir), a uniform dynamic load of 220 psf should be applied over the depth of the excavation.

If additional loads are anticipated, these should be communicated to the geotechnical engineer and additional recommendations can be supplied. The recommended values do not include compaction or construction traffic induced wall pressures. Care must be taken during the compaction operations not to overstress the walls. Heavy construction equipment should be maintained a distance of at least 5 feet away from the walls while the backfill soils are being placed. Hand-operated compaction equipment should be used to compact the backfill soils within a 5-foot wide zone adjacent to the walls.

The recommended lateral earth pressures assume that drainage is sufficient to prevent accumulation of hydrostatic pressures. The backfill area adjacent to the reservoir walls should be provided with a ring drain to reduce the potential for the accumulation of hydrostatic pressures. The ring drain may consist of a 2 foot wide zone of permeable material located in front of the reservoir wall. Perforated pipe (Schedule 40 PVC) should be installed at the base of the ring drain and sloped to discharge to a suitable collection facility.

5.5 GROUNDWATER

Based on the geotechnical explorations completed on site, we recommend elevation 660 feet be considered as the groundwater elevation in design of the reservoir.

5.6 EARTHWORK

Site preparation and earthwork operations should be performed in accordance with applicable codes, safety regulations and other local, state or federal specifications, and the recommendations included in this report. References to maximum unit weights are established in accordance with the latest version of ASTM Standard Test Method D1557. The earthwork operations should be observed and tested by a representative of Kleinfelder.

Excavated soil and rock may be considered for re-use in fills. However, corrosive soil or bedrock, expansive bedrock, and oversize materials (e.g., clasts or excavated rock pieces) if encountered will require segregation, and either processing or export.

During construction, stockpile of earth materials should not be placed in the areas of the mapped landslides because the loads may activate movement of the landslide(s). Landslides that have been stable (inactive) will tend to remain stable unless site conditions are changed. Changes that can cause a landslide to become unstable include loading of the landslide by construction of temporary construction roads, stockpiling, excavation within the landslide mass, and addition of water either naturally or artificially. To avoid activation of the landslides adjacent

to the reservoir sites, temporary or permanent stockpile of earth materials or placement of fill for road embankments or toes of fill slopes should be avoided. Also, irrigation of slopes above the landslides should be avoided.

Grading for the selected alternative will require construction of a temporary access road. Because of site limitations, locating this road within mapped landslide areas may be desired. In addition, a stockpile area will be needed for soil generated from the foundation excavation. Stockpiling of fill in the mapped landslide areas should be not be allowed. Grading of a temporary access road may be allowed if filling is limited and all fill used is generated from excavations within the landslide area. The intention of this is to not allow additional weight or driving force to be added in the upper portions of the landslides to reduce the potential for reactivation of these landslides. In any case, all temporary grading proposed in mapped landslide areas should be evaluated and approved by the geotechnical engineer prior to it being approved for construction.

5.6.1 Site Preparation

After site preparation and prior to placement of compacted fills, the excavation bottom should be proof-rolled using a non-vibratory roller to disclose soft areas and approved by the geotechnical engineer. After approval, the subgrade should be scarified to a depth of 6 inches, moisture conditioned, and compacted to 95 percent of the materials maximum dry unit weight (ASTM D1557). If areas to receive structure backfill encounter expansive bedrock, we recommend the subgrade be scarified to a depth of 6 to 8 inches, moisture conditioned, and compacted to 90 percent of the material's maximum dry unit weight (ASTM D1557) and at least 2 to 5 percent above the optimum moisture content. Within 24 hours of preparing expansive subgrade, a 4 inch layer of crushed rock should be placed over the subgrade to prevent this material from drying out.

Where practical, we recommend that placement of fill including temporary stockpiles avoid potentially unstable ground identified as landslide debris (Qls) on the geologic map and sections (Appendix C). In no instance should structural fill be placed within the landslide limits without confirmation of landslide debris removal before backfill placement. These areas are suspected of being the limits of landslides, which could be activated by fill or stockpile placement. If backfill is planned to encroach into these designated landslide areas, the geometry and mass of such fills should not exceed the current geometry or mass, and continuous geologic monitoring should be performed during grading unless stability analyses demonstrate gross stability of the design grades. The combined effects from fill placement and construction activity should be

limited to avoid adding driving weight that may de-stabilize the existing landslides. (It should be noted that insufficient information about the properties and geometry of the landslides presently exists to make any estimates of stability of the stability of the landslides when further loaded.)

Where fill is placed on ground with a slope exceeding 5H:1V, the new fill should be benched into the hillside in accordance with Section 19-6.01 of Caltrans Standard Specifications (2010).

5.6.1.1 Areas to Receive Structure Backfill

We recommend that the improvement area be overexcavated to a depth of at least 4 feet below the bottom of the slab and replaced as structure backfill. The overexcavation should extend the full width of the improved area or at least of 5 feet outside the reservoir pad, whichever is greater. For areas where volcanic rock is exposed at the bottom of the footings or slab, the recommended 4 feet of overexcavation should be extended to 6 feet below the bottom of the slab or to sufficient depth to remove the volcanic rock, whichever is least. Depending on the amount of disturbance, the overexcavation may have to be deepened. If, during grading, highly expansive materials are observed, additional depth of overexcavation and structural backfill should be evaluated by the geotechnical engineer.

5.6.1.2 Areas to Receive Non-Structure Backfill

For non-structural areas, such as minor structures (i.e., inlet or outlet works and other appurtenant structures), we recommend that the existing soil or rock be overexcavated a minimum of 1 foot below existing grade or finished subgrade, whichever is greater, and be replaced as non-structure backfill. Depending on the observed condition of the existing soil or rock, deeper overexcavation may be required in some areas. The overexcavation should extend beyond the proposed improvements a horizontal distance of at least 2 feet.

5.6.2 Excavation Characteristics

We anticipate the majority of the excavated material will be comprised of sedimentary rock. Kleinfelder anticipates that excavation of the sedimentary rock formations can be performed using conventional heavy-duty earth-moving equipment. However, the contractor should be satisfied as to the difficulty involved and the type of equipment needed. Local zones of moderate to strong cementation will likely be encountered in the sedimentary rock formations.

For planning purposes, excavating the volcanic rock (andesite) will require conventional ripping equipment, e.g. a D-9N Caterpillar tractor or equivalent equipped with a multi- or single shank

ripping attachment. Similarly, trenching in the volcanic rock (andesite) will require conventional rock excavation equipment, which can be considered as a 235C Caterpillar excavator equipped with a medium stick and a rock ripping bucket, or equivalent. A pneumatic chisel, jackhammer, or Cat Hammer may be necessary for smaller areas of less fractured rock that are difficult to excavate or cause slow production with rippers, alone. Though not observed in our limited exploration, it is possible that more highly resistant zones may be encountered requiring additional effort, heavier equipment or even blasting to complete excavations.

5.6.3 Trench Excavations

Trench excavations must expose a firm and unyielding subgrade that is free of significant voids, loose soil, oversize material, and organics. The subgrade soil or rock exposed at the bottom of each excavation for the proposed pipelines should be observed by a representative from our firm prior to the placement of any fill. Additional removal and soil replacement may be required as a result of observation and testing of the exposed subgrade soils.

Borings were advanced with moderate effort within the existing soil cover and sedimentary bedrock. Conventional trenching equipment, such as an excavator or backhoe is expected to be capable of performing shallow excavations required. Within areas where andesite bedrock occurs, ripping is anticipated to be required.

Other existing underground utilities, including other pipelines, electrical, sewer, and other infrastructure installations could be present within the project area. Fill soils associated with these improvements may exist that may require special attention during construction to avoid trench wall collapse, undermining, and damage to existing facilities. Shoring of trench walls or alternate methods of trench stability should be incorporated into the project planning. We recommend that all individuals utilizing this report review the boring logs presented in Appendix A for greater detail.

The soil or rock exposed at the bottom of the trench excavations should be in a firm, and unyielding condition or as evaluated to be suitable by the geotechnical engineer. Voids within the trench subgrade or sidewalls should be filled with material compacted in accordance with the recommendations presented herein or with sand-cement slurry. A representative from our firm should be present during excavation and fill placement operations to observe the materials uncovered during excavation, substantiate the proper use of materials, and verify or modify the recommendations presented herein. Additional removal and replacement of trench bottom soils may be required to provide a stable trench bottom to uniformly support the pipe. To allow for

adequate bedding material, trenches should be overexcavated to a depth of at least 1 foot below the bottom of the pipe invert section.

All excavations must comply with applicable local, state, and federal safety regulations including the current OSHA Excavation and Trench Safety Standards. Construction site safety generally is the sole responsibility of the Contractor, who shall also be solely responsible for the means, methods, and sequencing of construction operations. We are providing the information below solely as a service to our client. Under no circumstances should the information provided be interpreted to mean that Kleinfelder is assuming responsibility for construction site safety or the Contractor's activities; such responsibility is not being implied and should not be inferred.

The Contractor should be aware that slope height, slope inclination, or excavation depths (including utility trench excavations) should in no case exceed those specified in local, state, and/or federal safety regulations (e.g., OSHA Health and Safety Standards for Excavations, 29 CFR Part 1926, or successor regulations). The Contractor should also be aware that conditions along any utility trench alignment are likely to differ and may require different safety approaches.

Due to the potential for local trench wall instability, we recommend that temporary cut slopes needed to achieve the proposed subgrade elevations be constructed at inclinations no steeper than 1.5H:1V in the existing soils and 1H:1V in the sedimentary bedrock formations. Heavy construction equipment, building materials, excavated soil, and vehicular traffic should not be allowed within 1/3 the slope height from the top of any excavation. Shoring, bracing, or underpinning required for the project (if any) should be designed by a professional engineer registered in the State of California.

During wet weather, earthen berms or other methods should be used to prevent runoff water from entering all excavations. All runoff water and/or groundwater encountered within excavations should be collected and disposed of outside the construction limits.

Excavations which parallel structures, pavements, or other improvements, should be planned so that they do not extend below a plane having a downward slope of 1H:1V from the bottom edge of the footings, pavements, or flatwork. Also, no excavations should be closer than 1.5 feet from the closest edge of any footings, pavements, or flatwork.

5.6.4 Temporary Shoring

Temporary shoring may be required where space or other restrictions do not allow a sloped excavation. A braced or cantilevered shoring system may be used. A temporary cantilevered

shoring system should be designed to resist an active earth pressure equivalent to a fluid weighing 30 pounds per cubic foot (pcf). Braced excavations should be designed to resist a uniform horizontal soil pressure of 27H psf where H is the excavation depth in feet. The values provided above assume a level ground surface adjacent to the top of the shoring.

Fifty percent of an aerial surcharge placed adjacent to the shoring may be assumed to act as a uniform horizontal pressure against the shoring. In general, we recommend including a nominal areal surcharge of 250 psf for traffic, construction loads, and uncertainties. Special cases such as combinations of slopes and shoring or other surcharge loads (not specified above) will likely require an increase in the design values recommended above. These conditions should be evaluated by the project geotechnical engineer on a case-by-case basis.

Cantilevered shoring must extend to a sufficient depth below the excavation bottom to provide the required lateral resistance. We recommend required embedment depths be determined using methods for evaluating sheet pile walls and based on the principles of force and moment equilibrium. For this method, the allowable passive pressure against shoring, which extends below the level of excavation, may be assumed to be equivalent to fluid weighing 400 pcf. Additionally, we recommend a factor of safety of at least 1.2 be applied to the calculated embedment depth and that passive pressure be limited to 4,500 psf.

Shoring systems typically are removed as part of the backfill process. Depending on the shoring system used, the removal process may create voids along the sides of the trench excavation. If these voids are left in place and are significantly large, backfill may shift laterally into the voids resulting in settlement of the backfill and overlying pavements. Therefore, care should be taken to remove the shoring system and backfill the excavation in such a way as to not create these voids. If the shoring system requires removal after backfill is in place, resulting voids should be filled with sand-cement slurry or grout.

The contractor should be responsible for the structural design and safety of all temporary shoring systems. Detailed design of the shoring system shall be performed by an experienced licensed Civil Engineer in the State of California. Kleinfelder should be retained to review the shoring system design and plans prior to construction.

We recommend a pre-construction survey of all existing improvements adjacent to shored excavations be performed. The purpose of this survey would be to establish the baseline condition in case of damage.

5.7 FILL MATERIALS

On-site soil and excavated bedrock material may be suitable for re-use as structure or non-structure backfill provided these meet or exceed the requirements described in Section 5.7.1 and 5.7.2. Figure 5 shows the zones considered as structure and non-structure backfill zones. If, during excavation, quality tests indicate an abundance of undesirable materials, such that sufficient structure backfill is not available from the excavation, import soil may be required.

All fill soils should be moisture conditioned to at least 2 percent over the optimum moisture content and compacted to a firm, unyielding condition. Imported fill materials should be approved by the geotechnical engineer prior to importing. Prior to placing any fill, the subgrade should be observed by the geotechnical engineer to observe that all unsuitable materials have been removed and the exposed soils are in a firm, unyielding condition.

Compaction control of soils with oversize materials (i.e., particles with dimensions greater than three-quarters inch) is often difficult using conventional laboratory and field tests. If conventional compaction control techniques are used, correction of the density for presence of oversized material should be performed in accordance with American Society for Testing and Materials guidelines.

5.7.1 Structure Backfill

On-site material used for structure backfill should be free of any contaminated soil (e.g., hydrocarbon-impacted), debris, organic matter, and have no particles greater than 3 inches in dimension, or other deleterious materials. Structure backfill should have an expansion index (EI) less than 20 (ASTM 4829).

Foundation Zone Structure Backfill

Foundation zone structure backfill is defined as backfill placed to support foundations as shown in Figure 5. We recommend foundation zone structure backfill be compacted to at least 95 percent of the maximum dry unit weight (ASTM D1557). Fill should be placed in loose horizontal lifts not more than 8 inches thick (loose measurement). The moisture content of the fill should be maintained at least 2 percent above optimum during compaction.

Reservoir Zone Structure Backfill

Reservoir zone structure backfill is defined as backfill that is placed directly adjacent to the reservoir structure creating an annular zone of about 10 feet width from the exterior of the

reservoir wall, between the bottom of the reservoir foundation to within 4 feet of finish grade as shown in Figure 5. Reservoir zone structure backfill should be compacted to no more than 90 percent of the maximum dry unit weight (ASTM D1557), have a sand equivalent of at least 20 with particle size gradation that meets the requirements in Table 5-4. Placement of the structure backfill within the reservoir zone should utilize lightweight handheld equipment, and should not be permitted until the structure has achieved full strength.

Table 5-4
Reservoir Zone Structure Backfill

SIEVE SIZE	PERCENTAGE PASSING BY WEIGHT
3”	100
No. 4	35-100
No. 30	20-100

5.7.2 Non-structure Backfill

Non-structure backfill can be considered as fill that is placed in areas that do not support or interact with structures as shown in Figure 5. On-site material used for non-structure backfill should be free of any contaminated soil (e.g., hydrocarbon-impacted), debris, organic matter, and have no particles greater than 6 inches in dimension, or other deleterious materials.

We recommend engineered fill soils in non-structural areas be compacted to at least 90 percent of the maximum dry unit weight (ASTM D1557). Fill should be placed in loose horizontal lifts not more than 10 inches thick (loose measurement). The moisture content of the fill should be maintained at around optimum during compaction. Non-structure backfill placed adjacent to the Reservoir Zone Structure Backfill should have an Expansion Index of 50 or less.

5.7.3 Crushed Rock and Aggregate Base

At a minimum, crushed rock base materials should meet current IRWD specifications (Section 02220 and Section 02223). Similarly, aggregate base should meet current IRWD specifications (Section 02578).

5.7.4 Pipe Backfill

The following subsections present recommendations for bedding material, pipe-zone, and above pipe-zone backfill. At a minimum, bedding materials and all backfill should meet current IRWD specifications (Section 02223). Recommendations provided below for backfill are minimum requirements only. More stringent material specifications may be required to fulfill local building requirements and/or bedding requirements for specific types of pipes. We recommend the project civil engineer develop these material specifications based on planned pipe types, bedding conditions, and other factors beyond the scope of this study. All bedding and backfill materials should be free of vegetation, debris, organics and other deleterious material.

In general, bedding and pipe-zone backfill should consist of well-graded mixtures of sand, gravel, or crushed aggregate material with a maximum particle size of 1-inch. Poorly graded coarse-grained sand or gravel, and/or open-graded gravel (i.e. ¾-inch, ½-inch, etc. clean rock) should not be used for bedding or pipe zone backfill due to the potential for soil migration into the relatively large void spaces present in this type of material, and the potential for the material to act as a conduit for water seepage. Materials that may impart excessive point loading on the pipe walls should also be avoided. Imported or native pipe bedding should consist of soils with a sand equivalent (SE) of at least 30. The pipe-zone backfill area includes the full width of the trench from the top of the bedding to a horizontal level 12 inches above the top of the pipe. There should exist a minimum of 6 inches of bedding material uniformly below the pipe invert. Backfill material should be free of vegetation, oversize material, debris, organics and other deleterious materials.

We recommend imported material used for pipe bedding and pipe-zone backfill consist of granular material with a sand equivalent of at least 30. Import materials should have a “very low” expansion potential, i.e., have an expansion index of less than 20. The import material should be uniformly graded with no greater than 30 percent of the particles passing the No. 200 sieve and no particles greater than 6 inches in dimension (2-½” if within the upper 18” below the street section) if placed above the pipe-zone, or a maximum dimension of 1 inch if placed in the pipe-zone (including bedding). Import materials should be tested for corrosion potential before placement or importing. All imported fill should be compacted to the general recommendations provided in the following section.

On-site granular material or an imported granular fill may be used as backfill above the pipe zone (one foot above the pipe) in the trench zone. If on-site material is used, it should be free

of any contaminated soil (e.g., hydrocarbon-impacted), debris, organic matter, have no particles greater than 6 inches in dimension, or other deleterious materials.

Pipe-zone and above pipe-zone backfill should be moisture conditioned to near optimum moisture content and placed in horizontal lifts less than 8 inches in loose thickness and compacted to at least 90 percent of the maximum dry unit weight (ASTM Test Method D 1557). Under pavement or flatwork sections, the upper 12 inches of backfill below any pavement section should be compacted to at least 95 percent of the maximum dry unit weight (ASTM D 1557). Backfill materials should be brought up at substantially the same rate on both sides of the pipe. Reduction of the lift thickness may be necessary to achieve the above recommended compaction. Mechanical compaction is recommended; ponding or jetting is not recommended, especially in areas supporting structural loads or beneath concrete slabs supported on grade, pavements, or other improvements.

5.7.5 Drainage

It is important that positive surface drainage be provided to prevent ponding and/or saturation of the soils and rock formations in the proximity of the buried reservoir. Surface water should not be allowed seep downward along the reservoir or toward foundations. We recommend that the site be graded to carry surface water away from the improvements and that positive measures be implemented to carry away any runoff.

At present, we understand a ring drain will be constructed at the foot of and along the perimeter of the reservoir. The ring drain should be sized to provide drainage within the reservoir backfill zone. The ring drain should not discharge collected water to a mapped landslide area.

If planted areas adjacent to the structure are desired, we suggest that care be taken not to over-irrigate and to maintain a leak-free sprinkler piping system. In addition, it is recommended that planter areas near the reservoir have a minimum of five percent positive fall away from the reservoir to a distance of at least five feet. Landscaping after construction should not promote ponding of water adjacent to structures. Potential sources of water such as water pipes, drains, and the like should be frequently examined for signs of leakage or damage. Any such leakage or damage should be promptly repaired.

Positive drainage or other appropriate erosion control techniques should be provided by the civil designer to avoid erosion of slopes. Adequate provisions should be made to control and limit the flow of runoff water across the site. Appropriate drainage devices should be placed at the top of all slopes such that water does not flow over slope faces in an uncontrolled manner.

Uncontrolled runoff water should not be allowed to flow freely from the site over slope faces. All runoff water should be controlled, collected, and drained away from the slopes and into proper drain outlets. Control methods may include curbing, slope facing (such as reinforced Portland Cement concrete or shotcrete, ribbon gutters, 'V' ditches, or other suitable containment and redirection devices. A surface drainage interceptor ditch should be considered between the slope away from the existing reservoir wall toward the new reservoir. Additionally, appropriate erosion control techniques should be provided by the civil designer to avoid erosion in the vicinity of the site and runoff water discharge areas. Slopes should be constructed using typical slope drainage systems in accordance with CBC (2013) including mid-slope drainage swales and brow ditches.

The drainage pattern should be established at the time of final grading and maintained throughout the life of the project. Structural performance is dependent on many drainage-related factors such as landscaping, irrigation, lateral drainage patterns and other improvements.

5.8 ASPHALT CONCRETE PAVEMENT

The required pavement structural sections will depend on the expected wheel loads, volume of traffic, and subgrade soils. We developed pavement design recommendations using the following traffic loading parameters and assumed R-value:

- A 20-year pavement design life
- Standard-duty and Heavy-duty pavements with Traffic Index (TI) of 5.5 and 7.0, respectively
- For asphalt concrete pavements: an R-value of 15 based on the anticipated soil type (existing fill comprised of clayey gravel to sandy clay)

The asphalt concrete placement and materials should meet or exceed the current IRWD specifications (Section 02578). We designed the asphalt concrete pavement, using the design criteria of the State of California, Department of Transportation, and also considered the pavement sections from the standard plans and specifications for the City of Orange. Table 5-5 summarizes the recommended thickness for the pavement sections. Prior to placement of aggregate base, pavement subgrade should be prepared in accordance with Section 5.5.1.

Table 5-5
Recommended Asphalt Concrete Pavement Sections
(Assumed R-Value = 15)

TRAFFIC USE	TRAFFIC INDEX, TI	ASPHALT CONCRETE (INCHES)	AGGREGATE BASE (INCHES)
Standard-duty Pavement	5.5	4.0	8.0
		5.0	6.0
Heavy-duty Pavement	7.0	4.0	13.0
		5.0	11.0
City of Orange - Minimum Rural Street Improvements	NA	6.0	6.0

5.9 CONCRETE

Based on the limited corrosion testing performed, the degree of sulfate exposure due to contact with on-site soil/rock and groundwater appears to be negligible per the 2013 CBC. Therefore from a geotechnical perspective, the use of Type II/V cement with a maximum water to cement ratio of 0.42 is recommended for structural concrete in contact with bedrock, or on-site soil and groundwater. If large volumes of gypsum bearing bedrock are encountered during grading and this material is considered for use as backfill, it may be necessary to change this recommendation to allow for only Type V cement with a maximum water to cement ratio of 0.45 to improve the concrete durability.

5.10 GEOLOGIC OBSERVATION DURING GRADING

Our subsurface exploration and geologic interpretation indicate unusually complex and variable geologic conditions underlying the alternative sites for the proposed reservoir. As such it is critical that construction excavations, cut slopes and exposed foundation conditions be observed and mapped under the supervision of a Certified Engineering Geologist from Kleinfelder to confirm our understanding of the subsurface conditions or modify our recommendations to accommodate the conditions observed.

6 ADDITIONAL SERVICES

6.1 CONSTRUCTION OBSERVATION AND TESTING

Geotechnical design is usually based on direct knowledge of only limited amounts of information from widely spaced boreholes or surface mapping. The limitations to the ability to explore are based on practical considerations such as accessibility, cost, time, environmental conditions, property ownership, and reasonability. In general, geotechnical engineering recommendations are always considered preliminary until conditions are verified by observations during construction by the responsible geotechnical engineer (ASFE).

We recommend that Kleinfelder provide observation of cut slope and general site excavation and as-built geologic mapping to validate our design recommendations. Our geoprofessional(s) will observe rock features such as jointing, faulting, and orientation. If conditions are found to differ from those assumed in our design, additional analyses and modifications may be required. It is also recommended that Kleinfelder be retained to provide observation and testing services during site earthwork and construction of foundations and structures (Special Inspection). This will allow us the opportunity to compare actual subsurface conditions with those encountered during the field exploration and, if necessary, to provide supplemental recommendations, if warranted due to unanticipated subsurface conditions. The recommended services include, but are not necessarily limited to, the following services which can be performed in accordance with our agreed upon fee schedule:

- Observation and testing during site preparation, placement of engineered fill, foundation excavation, and backfill of utility trenches.
- Consultation as required during construction.
- Materials testing, observation, and Special Inspection services (concrete, masonry, steel, welding, rebar, etc.) during construction.

6.2 CONSTRUCTION MONITORING

We recommend that prior to grading of temporary excavations, survey benchmarks are established and baseline surveys are taken of any existing facilities to monitor any deformation related to construction.

As an additional safety measure, slope inclinometers or slope monitoring points should be considered for monitoring the stability of the temporary slopes during construction. We

recommend the installation of two or more slope inclinometers and that these be monitored during grading. The slope inclinometers should extend at a minimum beneath the proposed depth of the excavation. If slope monitoring points are selected, we recommend a minimum of six locations be installed on the finished temporary slope and surveyed during grading at least once per week or per 15 feet of excavation. Survey data should be provided to the geotechnical engineer within 24 hours of completing the survey.

7 LIMITATIONS

Recommendations contained in this report are based on our field observations and subsurface explorations, laboratory tests, and our present knowledge of the proposed construction. It is possible that soil and bedrock conditions could vary between or beyond the points explored. If soil and/or bedrock conditions are encountered during construction, which differ from those described herein, we should be notified immediately in order that a review may be made and any supplemental recommendations provided. If the scope of the proposed construction, including the proposed foundation systems or structural locations, changes from that described in this report, our recommendations should also be reviewed and a response issued. We have not reviewed the grading plans or foundation plans for the project. References to elevations and locations provided within this report were based upon general information provided for our use. Kleinfelder did not provide surveying services and, therefore an opinion regarding the accuracy of the surface location or elevations with respect to the approved plans and current site surveying is not provided.

Our corrosion recommendations are preliminary in general. Kleinfelder is not a corrosion engineering consultant. Specific recommendations for corrosion protection should be obtained from a corrosion specialist.

Our evaluation of subsurface conditions at the site has considered subgrade soil, bedrock, and groundwater conditions present at the time of our investigation. The influence(s) of post-construction changes to these conditions such as introduction of water into the subsurface will likely influence future performance of the proposed project. Whereas our scope of services addresses present groundwater conditions; future irrigation, broken water pipelines, etc. may adversely influence the project and should be addressed and mitigated, as necessary.

Other standards or documents referenced in any given standard cited in this report, or otherwise relied upon by the authors of this report, are only mentioned in the given standard; they are not incorporated into it or "included by reference", as the latter term is used relative to contracts or other matters of law.

We have prepared the findings, conclusions, and recommendations in this report in a manner consistent with the standards of care and skill ordinarily exercised by members of Kleinfelder's profession practicing under similar conditions in the geographic vicinity and at the time the services were performed. No warranty or guarantee, express or implied, is made. The recommendations provided in this report are based on the assumption that Kleinfelder will be

retained to provide a program of tests and observations during the construction phase in order to evaluate compliance with our recommendations and to evaluate the site conditions exposed. Information and recommendations presented in this report should not be extrapolated to other areas or be used for other projects without our prior review and response.

This report may be used only by the client and only for the purposes stated, within a reasonable time from its issuance. Land use, site conditions (both on site and off site) or other factors may change over time, and additional work may be required with the passage of time. Any party other than the client who wishes to use this report shall notify Kleinfelder of such intended use. Based on the intended use of the report, Kleinfelder may require that additional work be performed and that an updated report be issued. Non-compliance with any of these requirements by the client or anyone else will release Kleinfelder from any liability resulting from the use of this report by any unauthorized party.

The scope of our geotechnical services did not include any environmental site assessment for the presence or absence of hazardous/toxic materials. Kleinfelder will assume no responsibility or liability whatsoever for any claim, damage, or injury which results from pre-existing hazardous materials being encountered or present on the project site, or from the discovery of such hazardous materials.

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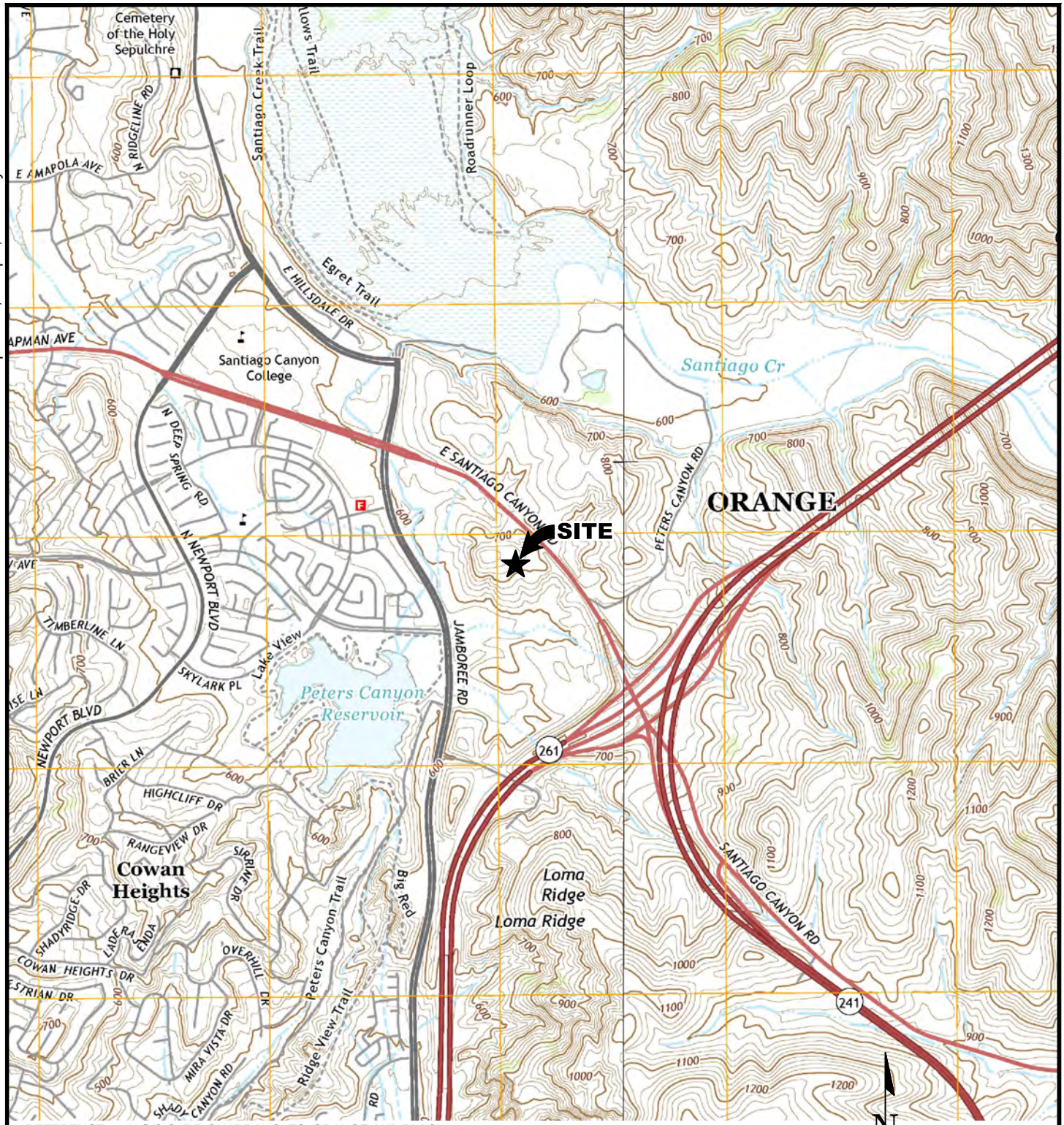
AERIAL PHOTOGRAPHS REVIEWED

DATE	TYPE	FLIGHT	FRAMES	APPROXIMATE SCALE	SOURCE
12-12-1952	B&W	AXK-2K	102, 103	1":1,800'	USDA
3-26-1959	B&W	261-5-21	28, 29, 30	1":1,000'	Continental Aerial Surveys
3-28-1959	B&W	261-6-R22	40,41,42	1":1,000'	Continental Aerial Surveys
3-30-1967	B&W		77-78-79	1":1,800	Continental Aerial Surveys
2-18-1970	B&W	61-6	272, 273	1":4,000	Continental Aerial Surveys
10-29-1973	B&W	132	9-8, 9-7	1":1,800	Continental Aerial Surveys
1-13-1975	B&W	157	9-11-12, 10-10-11	1":2,800	Continental Aerial Surveys
1-24-1977	B&W	181	10-11-12, 9-10-11	1":1,800	Continental Aerial Surveys
12-14-1978	B&W	203-10	14, 15	1":2,000	Continental Aerial Surveys
2-25-1980	B&W	80033	96,97	1":3,500	Continental Aerial Surveys
1-31-1981	B&W	211-10	12,13,14	1":2,000'	Continental Aerial Surveys
5-17-1983	B&W	218	9-16-17, 10-14-15	1":2,000'	Continental Aerial Surveys
1-9-1987	B&W	F	229,230	1":3,500'	Continental Aerial Surveys
1-29-1992	B&W	C85-7	10,11	1":2,000'	Continental Aerial Surveys
6-9-1993	B&W	C93-12	184,185	1":2,000'	Continental Aerial Surveys
1-29-1995	B&W	C103-36	27,28	1":2,000'	Continental Aerial Surveys
10-15-1997	B&W	C117-36	156,157	1":2,000'	Continental Aerial Surveys
2-24-1999	B&W	C134-36	172,173,174	1":2,000'	Continental Aerial Surveys

FIGURES



REFERENCE: U.S.G.S. 7.5' QUADRANGLES, ORANGE AND BLACK STAR CANYON, CALIFORNIA, DATED 2015

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2,000 1,000 0 2,000

APPROXIMATE SCALE (feet)

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PROJECT NO.	20143742
DRAWN:	04/2015
DRAWN BY:	DMF
CHECKED BY:	MG
FILE NAME:	20143742_1-SVM.dwg

SITE VICINITY MAP

IRVINE RANCH WATER DISTRICT
ILP NORTH CONVERSION RESERVOIR - ZONE C+
IRVINE, CALIFORNIA

FIGURE
1

ATTACHED IMAGES: Images: CA_Black_Star_Canyon_20150310_TM_geo.png Images: CA_Orange_20150310_TM_geo.png
ATTACHED XREFS:
RIVERSIDE, CA
CAD FILE: L:\2015\CADD\20143742\ LAYOUT: 1
PLOTTED: 01 Apr 2015, 4:35pm, dfahrney

SANTIAGO CANYON ROAD

ACCESS ROAD

EXISTING 6MG
RESERVOIR

ALTERNATIVE 1

ALTERNATIVE 2

ALTERNATIVE 3

TP1
TP2
TP3
TP4
TP5
TP6
TP7
TP8

B1
B2
B3
B4
B5
B6

Qls

680
690
700
710
720
730
740
750
760
670

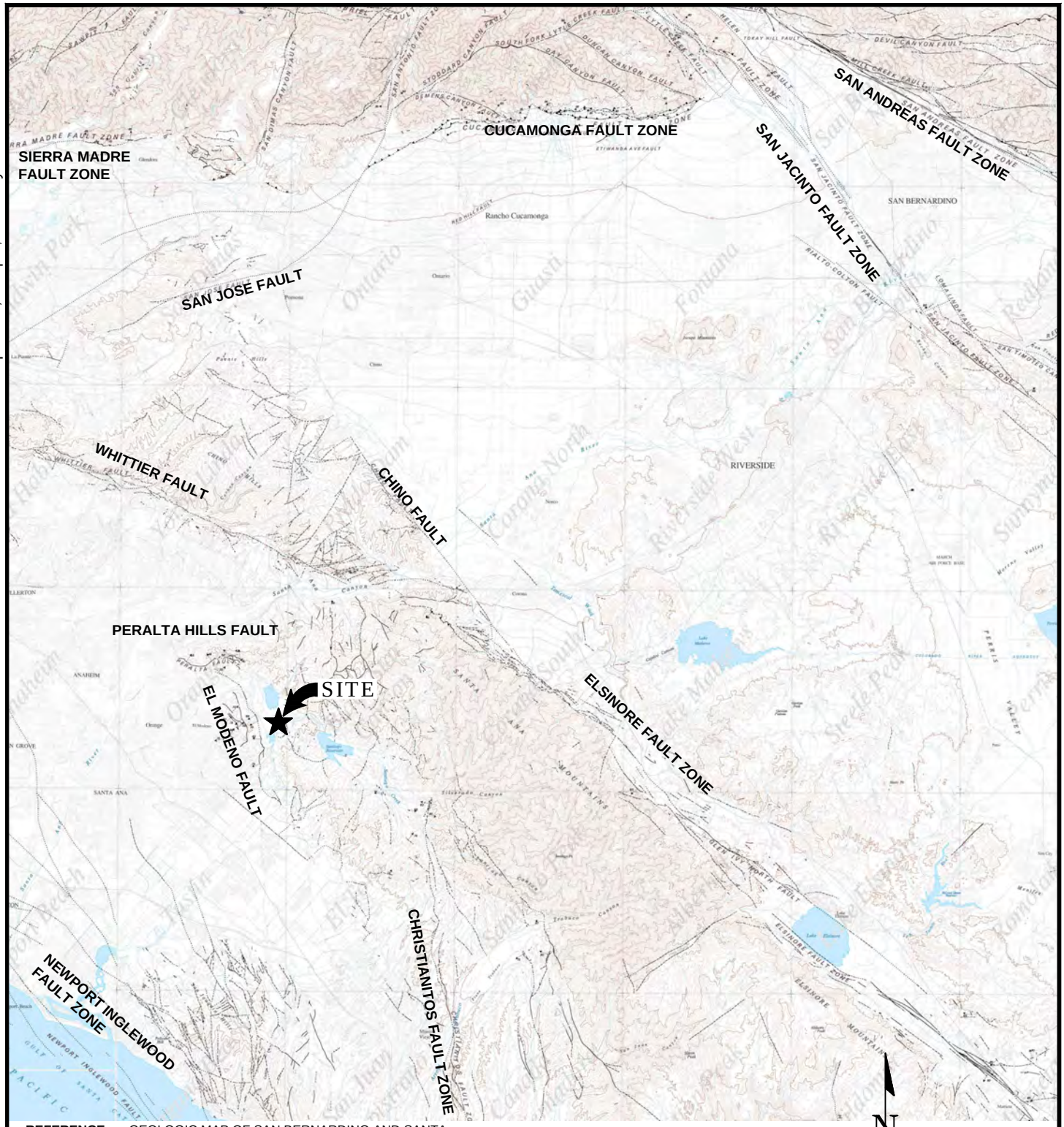
N

0 60 120

SCALE: 1" = 60' SCALE IN FEET

KLEINFELDER Bright People. Right Solutions.	PROJECT NO. 20153742	SITE PLAN	FIGURE
	DRAWN BY JAT		
	CHECKED BY RRS	IRVINE RANCH WATER DISTRICT ILP NORTH CONVERSION RESERVOIR ZONE C+	2
	DATE: 02-09-2015		
	REVISED: —		PAGE: XX of XX

PLOTTED: 5/13/2015 9:04 AM BY: rdixon (Kleinfelder)
CAD FILE: C:\Documents\20153742\Graphics\20153742 Screens.dwg LAYOUT: SITE PLAN



REFERENCE: GEOLOGIC MAP OF SAN BERNARDINO AND SANTA ANA 30'x60' QUADRANGLES, CALIFORNIA, MAJOR FAULTS, MORTON AND MILLER, DATED 2006

N

6 3 0 6

APPROXIMATE SCALE (miles)

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PROJECT NO.	20143742
DRAWN:	04/2015
DRAWN BY:	DMF
CHECKED BY:	MG
FILE NAME:	20143742_Fault.dwg

REGIONAL FAULT MAP

IRVINE RANCH WATER DISTRICT
ILP NORTH CONVERSION RESERVOIR - ZONE C+
IRVINE, CALIFORNIA

FIGURE
3

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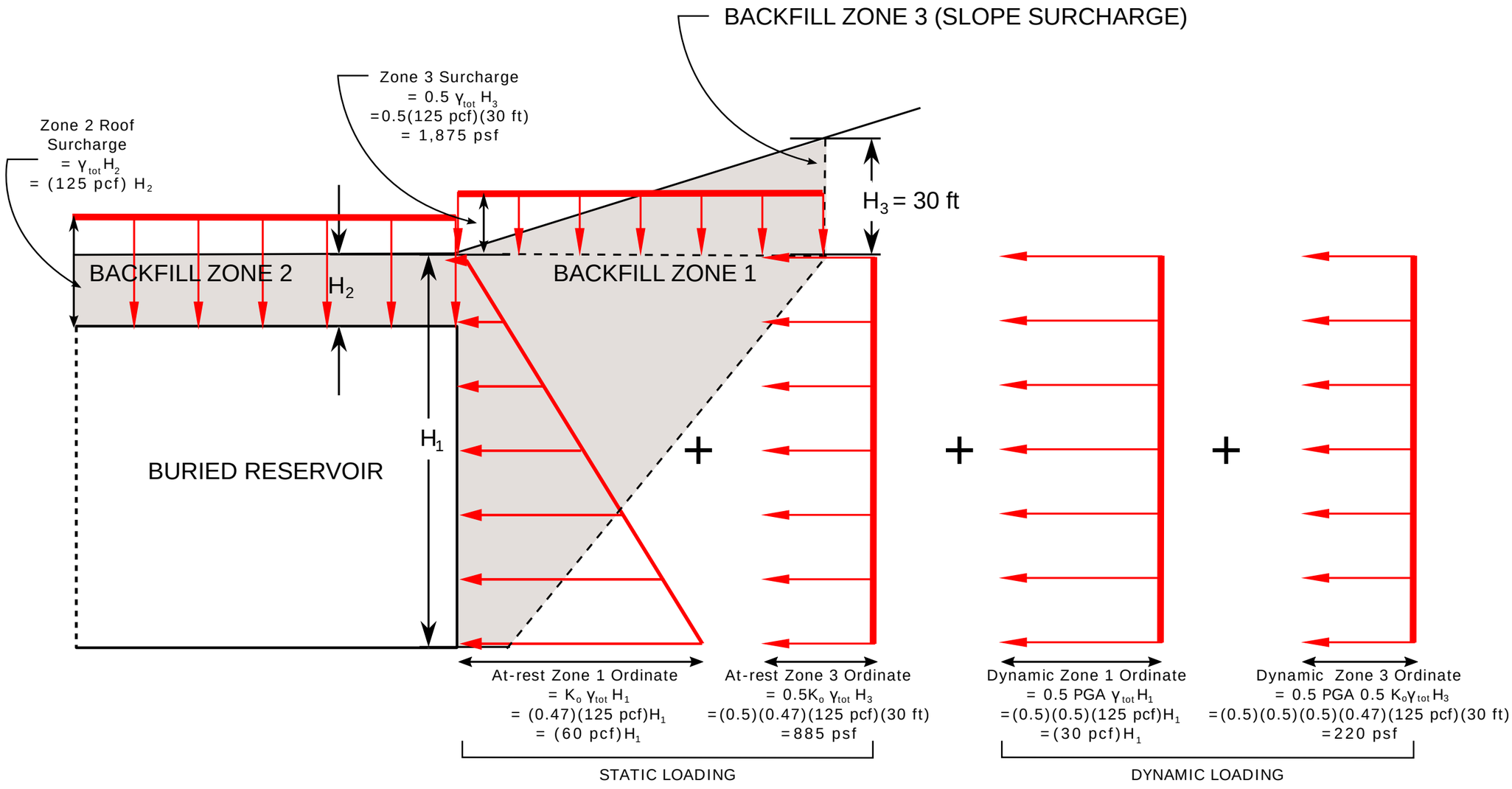
CAD FILE: L:\2015\CADD\20143742\ LAYOUT: 1
Images: of2006-1217_major_flts.png
ATTACHED IMAGES:
ATTACHED XREFS:
RIVERSIDE, CA



NOTES:
1. DRAWING IS NOT TO SCALE.
2. SURCHARGE FROM SLOPING BACKFILL (ZONE 3) IS ONLY APPLICABLE WHERE SLOPES ARE PROPOSED.

IRVINE,CA

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PROJECT NO. 20153742.001A	
DRAWN: 3/26/2015	
DRAWN BY: A.Williams	
CHECKED BY: L.Perko	
FILE NAME: Fig 4 - Lateral Earth Press.svg	

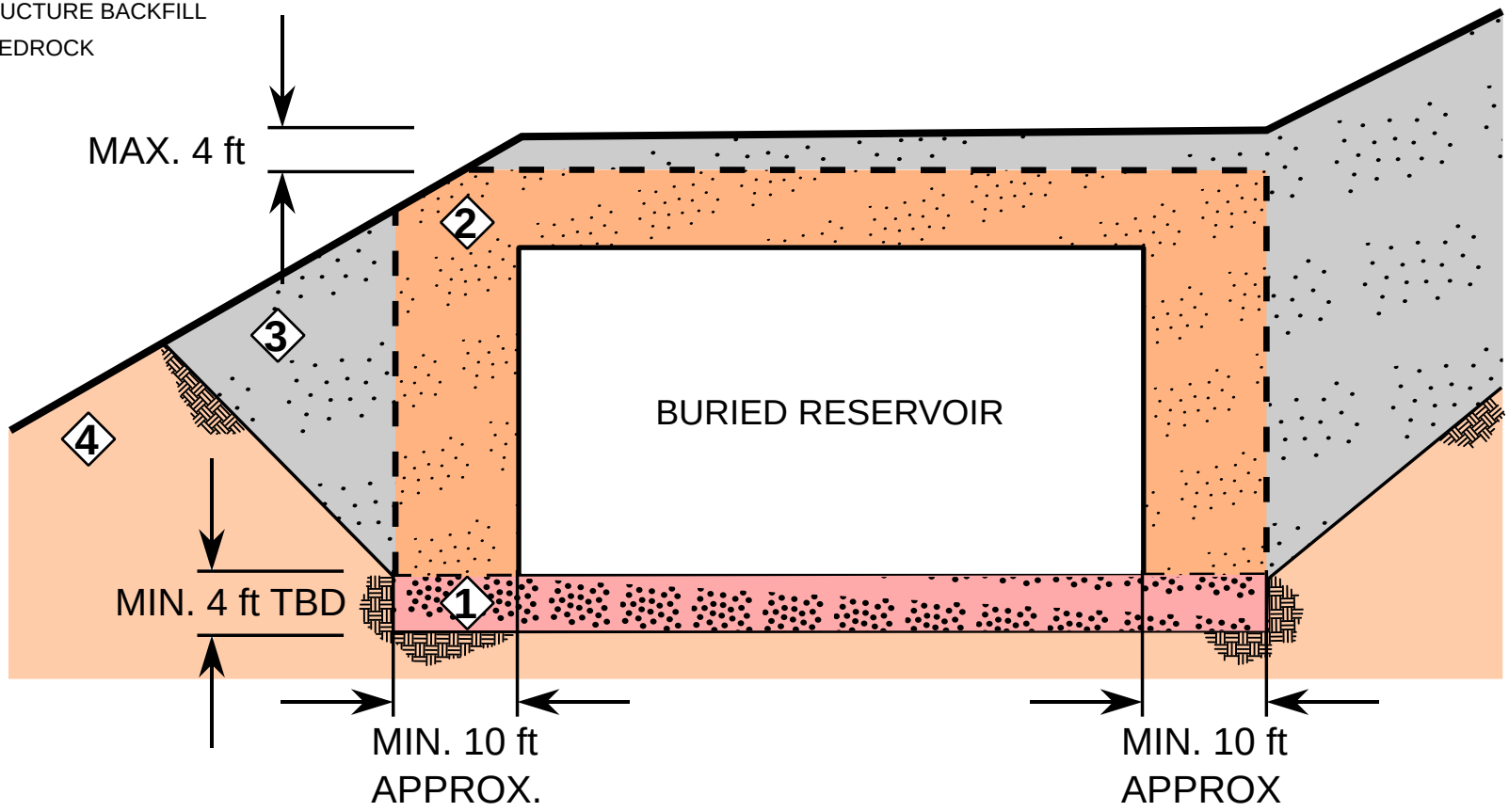
LATERAL EARTH PRESSURES
BURIED RESERVOIR STRUCTURE

IRVINE RANCH WATER DISTRICT
ILP NORTH CONVERSION RESERVOIR
ZONE C+

FIGURE
4

DEFINTION OF BACKFILL ZONES:

1. FOUNDATION ZONE STRUCTURE BACKFILL
2. RESERVOIR ZONE STRUCTURE BACKFILL
3. NON-STRUCTURE BACKFILL
4. NATIVE BEDROCK



ADDITIONAL NOTES:

1. DRAWING IS NOT TO SCALE
2. TEMPORARY EXCAVATION AND BENCHING ARE NOT ACTUAL
3. TBD - TO BE DETERMINED; APPROX. - APPROXIMATE; AND ft - FEET

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PROJECT NO.	20153742.001a
DRAWN:	5-07-2015
DRAWN BY:	A.Williams
CHECKED BY:	L.Perko
FILE NAME:	Fig 5 - Backfill Zones.svg

BACKFILL ZONES

IRVINE RANCH WATER DISTRICT
ILP NORTH CONVERSION RESERVOIR
ZONE C+

FIGURE
5

IRVINE, CA

APPENDIX A
FIELD EXPLORATION

APPENDIX A
FIELD EXPLORATION

The proposed reservoir site is largely undeveloped, gently sloping, and sparsely covered with mustard plants, milk thistle and scattered sagebrush. Additionally, the site is covered with gravel, cobbles and boulders ranging in size from a few inches to several feet. Attached are several photographs of the site.

The initial phase of our field investigation consisted of drilling, logging and sampling two 6-inch hollow stem auger borings which were converted to NQ (1.875-inch diameter core) rock core borings when the augers were sufficiently into bedrock materials. These two borings, identified as B-1 and B-2 on the Site Exploration Plan were each drilled to a termination elevation of at least 660 feet. Drilling was conducted on January 26 and 27, 2015 The borings were drilled by Pacific Drilling, using their limited access Fraste Multidrill rig.

In the hollow stem auger portion of the borings, samples were recovered using split spoon samplers, both standard penetration test and Modified California (ring) samplers. Both samplers were driven using a 140-pound hammer falling freely for 30 inches. In addition, representative bulk samples were collected from the drill cuttings. Each soil sample was observed and described in general accordance with the Unified Soil Classification System (USCS).

When reasonably competent bedrock was encountered, the drilling method was switched to coring. Coring was done using a double tube coring system with a 5-foot NQ core barrel with a diamond bit. Upon completion of each 5 foot run of core, the inner tube was retrieved, and core was logged then placed into fiberglass core boxes. Core boxes were photographed at the site. The rock core photographs are included in Appendix A. The apparent dip relative to the horizontal core axis of rock joints and bedding planes were recorded on the field logs. Following drilling, sampling and logging, cuttings and drill mud were drummed and borings were backfilled with cement-bentonite grout using a tremie-pipe method. The locations of the borings are shown on Figure 2, Site Plan.

The second phase of exploration was undertaken under additional authorization and comprised excavation of eight test pits TP-1 through TP-8, to identify faults and shallow lithology across the potential reservoir sites area. Our engineering geologist used the test pit excavations to site the locations of two bucket auger borings (24-inch diameter), B-3 and B-4. Subsequent to completion of the two bucket borings, we advanced two additional bucket auger borings on the site to better understand the complexities of the geology of the site, B-5 and B-6. These latter

two additional borings were completed within the authorized additional budget for drilling and were logged less thoroughly than the initially programmed boreholes.

The test pits were excavated by Chamberlain Backhoe Services under subcontract with Kleinfelder. Test pit excavations were completed March 5 through 9, 2015. Bucket Auger borings were drilled by Alroy Drilling Services under subcontract with Kleinfelder. These borings were completed March 12th through 17th, 2015. Test pits were logged by a Kleinfelder Engineering Geologist by entry to the trench at depths of up to 4 feet, and from the ground surface below a depth of 4 feet due to Kleinfelder's internal safety protocols. Bucket auger boring cuttings were observed during drilling and the walls of the boreholes were logged downhole by Kleinfelder Engineering Geologists to various depths, depending on the conditions of the boring.

Following completion of the investigation, the boring locations and test pit locations were staked, and on April 13, 2015 the locations and elevations were surveyed by Bush and Associates Inc.. The surveyed boring and test pit locations based on NAVD88 datum are shown on Appendix C-1 Field Exploration and Geologic Map and surveyed elevations are recorded on the Appendix A boring logs.

SAMPLE/SAMPLER TYPE GRAPHICS

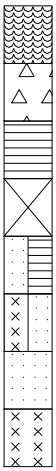
BULK SAMPLE

CORE SAMPLER

MODIFIED CALIFORNIA SAMPLER
(2 or 2-1/2 in. (50.8 or 63.5 mm.) outer diameter)

STANDARD PENETRATION SPLIT SPOON SAMPLER
(2 in. (50.8 mm.) outer diameter and 1-3/8 in. (34.9 mm.) inner diameter)

ROCK LITHOLOGY GRAPHICS



ANDESITE

BRECCIA

CLAYSTONE

CORE LOSS

INTERBEDDED SANDSTONE-CLAYSTONE

INTERBEDDED SILTSTONE-SANDSTONE

SANDSTONE

SILTSTONE

GROUND WATER GRAPHICS

WATER LEVEL (level where first observed)

WATER LEVEL (level after exploration completion)

WATER LEVEL (additional levels after exploration)

OBSERVED SEEPAGE

NOTES

- The report and graphics key are an integral part of these logs. All data and interpretations in this log are subject to the explanations and limitations stated in the report.
- Lines separating strata on the logs represent approximate boundaries only. Actual transitions may be gradual or differ from those shown.
- No warranty is provided as to the continuity of soil or rock conditions between individual sample locations.
- Logs represent general soil or rock conditions observed at the point of exploration on the date indicated.
- In general, Unified Soil Classification System designations presented on the logs were based on visual classification in the field and were modified where appropriate based on gradation and index property testing.
- Fine grained soils that plot within the hatched area on the Plasticity Chart, and coarse grained soils with between 5% and 12% passing the No. 200 sieve require dual USCS symbols, ie., GW-GM, GP-GM, GW-GC, GP-GC, GC-GM, SW-SM, SP-SM, SW-SC, SP-SC, SC-SM.
- If sampler is not able to be driven at least 6 inches then 50/X indicates number of blows required to drive the identified sampler X inches with a 140 pound hammer falling 30 inches.

UNIFIED SOIL CLASSIFICATION SYSTEM (ASTM D 2487)

COARSE GRAINED SOILS (More than half of material is larger than the #200 sieve)	**GRAVELS** (More than half of coarse fraction is larger than the #4 sieve)	CLEAN GRAVEL WITH <5% FINES	Cu ≥4 and 1≤ Cc≤3		**GW**	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE OR NO FINES
			Cu <4 and/ or 1>Cc >3		**GP**	POORLY GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE OR NO FINES
		GRAVELS WITH 5% TO 12% FINES	Cu ≥4 and 1≤ Cc≤3		**GW-GM**	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE FINES
					GW-GC	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE CLAY FINES
			Cu <4 and/ or 1>Cc >3		**GP-GM**	POORLY GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE FINES
					GP-GC	POORLY GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE CLAY FINES
		GRAVELS WITH > 12% FINES			**GM**	SILTY GRAVELS, GRAVEL-SILT-SAND MIXTURES
					GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES
					GC-GM	CLAYEY GRAVELS, GRAVEL-SAND-CLAY-SILT MIXTURES
	SANDS (More than half of coarse fraction is smaller than the #4 sieve)	CLEAN SANDS WITH <5% FINES	Cu ≥6 and 1≤ Cc≤3		**SW**	WELL-GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE OR NO FINES
			Cu <6 and/ or 1>Cc >3		**SP**	POORLY GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE OR NO FINES
		SANDS WITH 5% TO 12% FINES	Cu ≥6 and 1≤ Cc≤3		**SW-SM**	WELL-GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE FINES
					SW-SC	WELL-GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE CLAY FINES
			Cu <6 and/ or 1>Cc >3		**SP-SM**	POORLY GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE FINES
					SP-SC	POORLY GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE CLAY FINES
		SANDS WITH > 12% FINES			**SM**	SILTY SANDS, SAND-GRAVEL-SILT MIXTURES
					SC	CLAYEY SANDS, SAND-GRAVEL-CLAY MIXTURES
					SC-SM	CLAYEY SANDS, SAND-SILT-CLAY MIXTURES

FINE GRAINED SOILS (More than half of material is smaller than the #200 sieve)	SILTS AND CLAYS (Liquid Limit less than 50)	**ML**	INORGANIC SILTS AND VERY FINE SANDS, SILTY OR CLAYEY FINE SANDS, SILTS WITH SLIGHT PLASTICITY
		CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
		CL-ML	INORGANIC CLAYS-SILTS OF LOW PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
		OL	ORGANIC SILTS & ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS (Liquid Limit greater than 50)	**MH**	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILT
		CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
		OH	ORGANIC CLAYS & ORGANIC SILTS OF MEDIUM-TO-HIGH PLASTICITY

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PROJECT NO.:	20153742
DRAWN BY:	MP
CHECKED BY:	MG
DATE:	3/25/2015
REVISED:	4/2/2015

GRAPHICS KEY

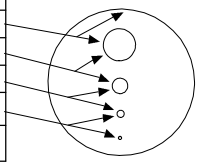
ILP North Conversion Reservoir Project
Irvine, CA

PLATE

A-1

GRAIN SIZE

DESCRIPTION		SIEVE SIZE	GRAIN SIZE	APPROXIMATE SIZE
Boulders		>12 in. (304.8 mm.)	>12 in. (304.8 mm.)	Larger than basketball-sized
Cobbles		3 - 12 in. (76.2 - 304.8 mm.)	3 - 12 in. (76.2 - 304.8 mm.)	Fist-sized to basketball-sized
Gravel	coarse	3/4 -3 in. (19 - 76.2 mm.)	3/4 -3 in. (19 - 76.2 mm.)	Thumb-sized to fist-sized
	fine	#4 - 3/4 in. (#4 - 19 mm.)	0.19 - 0.75 in. (4.8 - 19 mm.)	Pea-sized to thumb-sized
Sand	coarse	#10 - #4	0.079 - 0.19 in. (2 - 4.9 mm.)	Rock salt-sized to pea-sized
	medium	#40 - #10	0.017 - 0.079 in. (0.43 - 2 mm.)	Sugar-sized to rock salt-sized
	fine	#200 - #10	0.0029 - 0.017 in. (0.07 - 0.43 mm.)	Flour-sized to sugar-sized
Fines		Passing #200	<0.0029 in. (<0.07 mm.)	Flour-sized and smaller



Munsell Color

NAME	ABBR
Red	R
Yellow Red	YR
Yellow	Y
Green Yellow	GY
Green	G
Blue Green	BG
Blue	B
Purple Blue	PB
Purple	P
Red Purple	RP
Black	N

ANGULARITY

DESCRIPTION	CRITERIA
Angular	Particles have sharp edges and relatively plane sides with unpolished surfaces
Subangular	Particles are similar to angular description but have rounded edges
Subrounded	Particles have nearly plane sides but have well-rounded corners and edges
Rounded	Particles have smoothly curved sides and no edges

Particles Present

Amount	Percentage
trace	<5
few	5-10
little	15-25
some	30-45
and	50
mostly	50-100

PLASTICITY

DESCRIPTION	LL	FIELD TEST
Non-plastic	NP	A 1/8-in. (3 mm.) thread cannot be rolled at any water content.
Low (L)	< 30	The thread can barely be rolled and the lump or thread cannot be formed when drier than the plastic limit.
Medium (M)	30 - 50	The thread is easy to roll and not much time is required to reach the plastic limit. The thread cannot be rerolled after reaching the plastic limit. The lump or thread crumbles when drier than the plastic limit
High (H)	> 50	It takes considerable time rolling and kneading to reach the plastic limit. The thread can be rerolled several times after reaching the plastic limit. The lump or thread can be formed without crumbling when drier than the plastic limit

MOISTURE CONTENT

DESCRIPTION	FIELD TEST
Dry	Absence of moisture, dusty, dry to the touch
Moist	Damp but no visible water
Wet	Visible free water, usually soil is below water table

REACTION WITH HYDROCHLORIC ACID

DESCRIPTION	FIELD TEST
None	No visible reaction
Weak	Some reaction, with bubbles forming slowly
Strong	Violent reaction, with bubbles forming immediately

APPARENT / RELATIVE DENSITY - COARSE-GRAINED SOIL

APPARENT DENSITY	SPT-N_{60} (# blows/ft)	MODIFIED CA SAMPLER (# blows/ft)	CALIFORNIA SAMPLER (# blows/ft)	RELATIVE DENSITY (%)
Very Loose	<4	<4	<5	0 - 15
Loose	4 - 10	5 - 12	5 - 15	15 - 35
Medium Dense	10 - 30	12 - 35	15 - 40	35 - 65
Dense	30 - 50	35 - 60	40 - 70	65 - 85
Very Dense	>50	>60	>70	85 - 100

NOTE: AFTER TERZAGHI AND PECK, 1948

CONSISTENCY - FINE-GRAINED SOIL

CONSISTENCY	UNCONFINED COMPRESSIVE STRENGTH (q_u)(psf)	CRITERIA
Very Soft	< 1000	Thumb will penetrate soil more than 1 in. (25 mm.)
Soft	1000 - 2000	Thumb will penetrate soil about 1 in. (25 mm.)
Firm	2000 - 4000	Thumb will indent soil about 1/4-in. (6 mm.)
Hard	4000 - 8000	Thumb will not indent soil but readily indented with thumbnail
Very Hard	> 8000	Thumbnail will not indent soil

STRUCTURE

DESCRIPTION	CRITERIA
Stratified	Alternating layers of varying material or color with layers at least 1/4-in. thick, note thickness
Laminated	Alternating layers of varying material or color with the layer less than 1/4-in. thick, note thickness
Fissured	Breaks along definite planes of fracture with little resistance to fracturing
Slickensided	Fracture planes appear polished or glossy, sometimes striated
Blocky	Cohesive soil that can be broken down into small angular lumps which resist further breakdown
Lensed	Inclusion of small pockets of different soils, such as small lenses of sand scattered through a mass of clay; note thickness
Homogeneous	Same color and appearance throughout

CEMENTATION

DESCRIPTION	FIELD TEST
Weakly	Crumbles or breaks with handling or slight finger pressure
Moderately	Crumbles or breaks with considerable finger pressure
Strongly	Will not crumble or break with finger pressure

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DRAWN BY:	MP
CHECKED BY:	MG
DATE:	3/25/2015
REVISED:	4/2/2015

SOIL DESCRIPTION KEY

ILP North Conversion Reservoir Project
Irvine, CA

PLATE

A-2

INFILLING TYPE

NAME	ABBR	NAME	ABBR
Albite	Al	Muscovite	Mus
Apatite	Ap	None	No
Biotite	Bi	Pyrite	Py
Clay	Cl	Quartz	Qz
Calcite	Ca	Sand	Sd
Chlorite	Ch	Sericite	Ser
Epidote	Ep	Silt	Si
Iron Oxide	Fe	Talc	Ta
Manganese	Mn	Unknown	Uk

BEDDING CHARACTERISTICS

TERM	Thickness (in.)	Thickness (mm.)
Very Thick Bedded	> 36	> 915
Thick Bedded	12 - 36	305 - 915
Moderately Bedded	4 - 12	102 - 305
Thin Bedded	1 - 4	25 - 102
Very Thin Bedded	0.4 - 1	10 - 25
Laminated	0.1 - 0.4	2.5 - 10
Thinly Laminated	< 0.1	< 2.5

Bedding Planes — Planes dividing the individual layers, beds, or stratigraphy of rocks.
Joint — Fracture in rock, generally more or less vertical or traverse to bedding.
Seam — Applies to bedding plane with unspecified degree of weather.

DENSITY/SPACING OF DISCONTINUITIES

DESCRIPTION	SPACING CRITERIA
Unfractured	> 6 ft. (> 1.83 meters)
Slightly Fractured	2 - 6 ft. (.061 - 1.83 meters)
Moderately Fractured	8 in - 2 ft. (203.20 - 609.60 mm.)
Highly Fractured	2 - 8 in. (50.80 - 203.30 mm.)
Intensely Fractured	< 2 in. (< 50.80 mm.)

APERTURE

DESCRIPTION	CRITERIA [in.(mm.)]
Tight	< 0.04 (< 1)
Open	0.04 - 0.20 (1 - 5)
Wide	> 0.20 (> 5)

ADDITIONAL TEXTURAL ADJECTIVES

DESCRIPTION	RECOGNITION
Pit (Pitted)	Pinhole to 0.03 ft. (3/8 in.) (>1 to 10 mm.) openings
Vug (Vuggy)	Small openings (usually lined with crystals) ranging in diameter from 0.03 ft. (3/8 in.) to 0.33 ft. (4 in.) (10 to 100 mm.)
Cavity	An opening larger than 0.33 ft. (4 in.) (100 mm.), size descriptions are required, and adjectives such as small, large, etc., may be used
Honeycombed	If numerous enough that only thin walls separate individual pits or vugs, this term further describes the preceding nomenclature to indicate cell-like form
Vesicle (Vesicular)	Small openings in volcanic rocks of variable shape and size formed by entrapped gas bubbles during solidification

DISCONTINUITY TYPE

DESCRIPTION
Fault
Joint
Shear
Foliation
Vein
Bedding

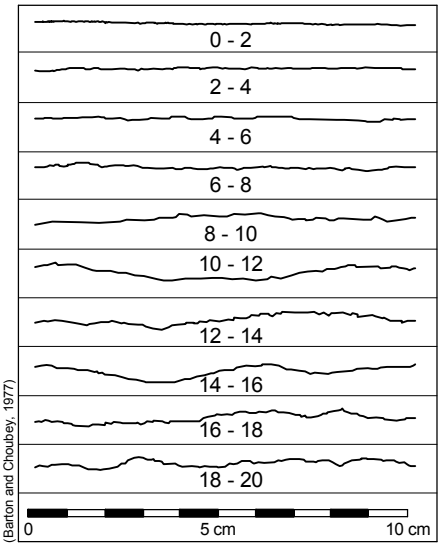
INFILLING AMOUNT

DESCRIPTION
Surface Stain
Spotty
Partially Filled
Filled
None

ROCK QUALITY DESIGNATION (RQD)

DESCRIPTION	RQD (%)
Very Poor	0 - 25
Poor	25 - 50
Fair	50 - 75
Good	75 - 90
Excellent	90 - 100

JOINT ROUGHNESS COEFFICIENT (JRC)



RQD — Rock-quality designation (RQD) Rough measure of the degree of jointing or fracture in a rock mass, measured as a percentage of the drill core in lengths of 10 cm. or more.

DEGREES OF WEATHERING

DESCRIPTION	CRITERIA
Unweathered	No evidence of chemical/mechanical alternation; rings with hammer blow.
Slightly Weathered	Slight discoloration on surface; slight alteration along discontinuities; <10% rock volume altered.
Moderately Weathered	Discoloring evident; surface pitted and alteration penetration well below surface; Weathering "halos" evident; 10-50% rock altered.
Highly Weathered	Entire mass discolored; Alteration pervading most rock, some slight weathering pockets; some minerals may be leached out.
Decomposed	Rock reduced to soil with relict rock texture/structure; Generally molded and crumbled by hand.

RELATIVE HARDNESS / STRENGTH DESCRIPTIONS

GRADE		UCS (MPa)	FIELD TEST
R0	Extremely Weak	0.25 - 1.0	Indented by thumbnail
R1	Very Weak	1.0 - 5.0	Crumbles under firm blows of geological hammer, can be peeled by a pocket knife
R2	Weak	5.0 - 25	Can be peeled by a pocket knife with difficulty, shallow indentations made by firm blow with point of geological hammer
R3	Medium Strong	25 - 50	Cannot be scraped or peeled with a pocket knife, specimen can be fractured with a single firm blow of a geological hammer
R4	Strong	50 - 100	Specimen requires more than one blow of geological hammer to fracture it
R5	Very Strong	100 - 250	Specimen requires many blows of geological hammer to fracture it
R6	Extremely Strong	> 250	Specimen can only be chipped with a geological hammer

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PROJECT NO.:	20153742
DRAWN BY:	MP
CHECKED BY:	MG
DATE:	3/25/2015
REVISED:	4/2/2015

ROCK DESCRIPTION KEY

ILP North Conversion Reservoir Project
Irvine, CA

PLATE
A-3

Date Begin - End:	1/27/2015	**Drilling Company:**	Pacific Drilling
Logged By:	M. Garde	**Drill Crew:**	C. Lavarreda, G. Melcetor
Hor.-Vert. Datum:	CCS83 - NAVD88	**Drilling Equipment:**	Fraste Multidrill XL
Plunge:	-90 degrees	**Coring Method:**	NQ Dual Tube Conventional Coring
Weather:	Sunny	**Core Bit Type:**	Diamond (6)

ROCK CORING LOG B-1

ROCK CORING INFORMATION

Northing: 2,233,536.338 (ft)
Easting: 6,104,406.013 (ft)
Surveyed Ground Surface Elevation (ft.): 713.90

Surveyed Elevation (feet) / Depth (feet)	Graphical Log	Formation and Rock Type, Color, Grain/Particle Size, Weathering, Bedding, Density or Spacing	Box Number	Run Number	Sample Type	Recovery (NR=No Recovery)	Drill Rate (ft/min)	RQD (%)	Relative Strength	Discontinuity Description Fracture#: (Depth), Type, Relative Dip, Density or Spacing. Degree of Infilling, Infilling Type, Aperture, Surface Weathering, JRC
		[ARTIFICIAL FILL] **Clayey GRAVEL (GC)**: dark yellowish brown (10YR 4/4), dry to moist, medium dense, mostly fine, angular claystone gravel, little fine to coarse sand, little clay								Bulk Sample B1- 0-5 ft bgs.
						5"				Drive Sample S1, Blow Counts = 4,6,7
710		**Gravelly Lean CLAY (CL)**: olive brown (2.5Y 4/4), gray brown (2.5Y 5/2 when dry), moist, hard, little claystone gravel, few fine sand, medium plasticity				12"				Drive Sample S2, Blow Counts = 11,12,18
5		**Fat CLAY (CH)**: black (10YR 2/1), moist, hard, medium to high plasticity				18"				
		PUENTE FORMATION - LA VIDA MEMBER (Tplv) **BRECCIA / VOLCANIC SANDSTONE**: dark yellowish brown (10YR 4/6), fine to coarse, moderately to highly weathered, massive, with gravel-sized clasts of fine-grained sandstone, weak, some clay in matrix, little fine to coarse-grained sand, contains vesicular, tuffaceous, sandy clasts							R0	Drive Sample S3, Blow Counts = 6,12,38
705										
10		Mostly fine to coarse gravel-sized clasts of sandy tuff, trace medium strong clasts, little fine to coarse sand				6"				Drive Sample S4, Blow Counts = 40,50/2"
700										
15		Gray (10YR 5/1) to grayish brown (10YR 5/2), fine to medium grained, moderately to highly weathered, contains weak, fine to coarse-grained, angular, gravel-sized sandy tuff clasts, coated with abundant iron oxides				6"				Drive Sample S5, Blow Counts = 32,50/3"
695										

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PROJECT NO.:	20153742
DRAWN BY:	DC
CHECKED BY:	MG
DATE:	2/16/2015
REVISED:	5/12/2015

ROCK CORING LOG B-1

ILP North Conversion Reservoir Project
Irvine, CA

PLATE
A-4

Date Begin - End:	1/27/2015	**Drilling Company:**	Pacific Drilling
Logged By:	M. Garde	**Drill Crew:**	C. Lavarreda, G. Melcetor
Hor.-Vert. Datum:	CCS83 - NAVD88	**Drilling Equipment:**	Fraste Multidrill XL
Plunge:	-90 degrees	**Coring Method:**	NQ Dual Tube Conventional Coring
Weather:	Sunny	**Core Bit Type:**	Diamond (6)

ROCK CORING LOG B-1

ROCK CORING INFORMATION

Northing: 2,233,536.338 (ft)
Easting: 6,104,406.013 (ft)
Surveyed Ground Surface Elevation (ft.): 713.90

Surveyed Elevation (feet)	Depth (feet)	Graphical Log	Formation and Rock Type, Color, Grain/Particle Size, Weathering, Bedding, Density or Spacing	Box Number	Run Number	Sample Type	Recovery (NR=No Recovery)	Drill Rate (ft/min)	RQD (%)	Relative Strength	Discontinuity Description Fracture#: (Depth), Type, Relative Dip, Density or Spacing. Degree of Infilling, Infilling Type, Aperture, Surface Weathering, JRC
			No recovery from 20' to 20.75'	1	1		20"	0.16	0		@20' begin coring Run 1 20.0-22.5'
			EL MODENO VOLCANICS (Tema) **ANDESITE**: olive (5Y 4/4), moderately weathered, intensely fractured, strong, a few unaltered olivine crystals, iron oxide around mineral grains, iron and manganese oxides coat joint surfaces Olive brown (2.5Y 4/4), moderately to highly weathered, highly weathered along joints, highly to intensely fractured, strong, iron / manganese oxides	1	2		30"	0.13	0	R4	(21.25'), J, 35°, surface stain, Fe & Mn, JRC=14-16, planar, rough (21.5'), J, 20°, surface stain, Fe & Mn, JRC=14-16, planar, rough (21.6'), J, 5°, surface stain, Fe & Mn, JRC=14-16, stepped, rough (21.7'), J, 35°, Fe & Mn <mm crust, JRC=14-16, rough, planar (21.8'), J, 50°, Fe & Mn <mm crust, JRC=8-10, planar (22.1'), J, 70°, Fe & Mn <mm crust, JRC=6-8, planar (22.25'), J, 35°, JRC=6-8, planar, smooth, clean Run 2 - 22.5-25' (22.75'), J, 40°, 1/4" crushed rock infill, oxides, Fe & Mn, JRC=8-10, planar, rough (23.1'), J, 15°, JRC=16-18, planar, rough, clean (23.3'), J, 35°, JRC=10-12, curvi-planar, rough, clean (23.65'), J, 35°, JRC=10-12, curvi-planar, rough, clean (23.9'), J, 15°, JRC=10-12, planar, clean (24.5'), J, 45°, JRC=4-6, planar, smooth, clean Run 3 - 25-30.0' (27.5'), J, 45°, surface stain, Fe ox, JRC=4-6, planar, rough (28'), J, 50°, surface stain, Fe ox, JRC=4-6, planar, rough (28.6'), J, 70°, surface stain, Mn ox, JRC=6-8, undulating-planar, rough Run 4 - 30-35' (33'), J, 45°, surface stain, Mn, planar, rough, gray-black oxide stain (33.15'), J, 45°, surface stain, Mn, planar, rough, gray-black oxide stain (33.3'), J, 45°, surface stain, Mn, planar, rough, gray-black oxide stain (34'), J, 15°, surface stain, Mn, planar, rough, gray-black oxide stain (34.5'), J, 55°, surface stain, Mn, planar, rough, gray-black oxide stain Run 5 - 35-40' (37'), J, 45°, Mn oxide stain, JRC=6-8, planar, rough, black oxide stain (37.2'), J, 60°, Mn oxide stain, JRC=6-8, planar, rough, black oxide stain (37.55'), J, 65°, Mn oxide stain, JRC=6-8, planar, rough, black oxide stain (37.9'), J, 60°, Mn oxide stain, JRC=8-10, planar, rough, black oxide stain
690	25		No recovery from 25' to 27'	1	3		36"	0.2	0		
			Strong brown (7.5YR 4/6) to light olive brown (2.5Y 5/6), highly weathered, intensely fractured, manganese stains prevalent on joint surfaces, medium strong to strong							R3	
685	30		No recovery from 30' to 32.5'	1	4		30"	0.15	0		
			Same as above							R4	
680	35		No recovery from 35' to 37'	2	5		36"	0.09	0		
			Olive (5Y 4/4) to dark yellowish brown (10YR 4/6-3/6) to strong brown (7.5YR 4/6), highly weathered, opaque feldspars, intensely fractured							R3	
675											

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PROJECT NO.:	20153742
DRAWN BY:	DC
CHECKED BY:	MG
DATE:	2/16/2015
REVISED:	5/12/2015

ROCK CORING LOG B-1

ILP North Conversion Reservoir Project
Irvine, CA

PLATE
A-4

Date Begin - End:	1/27/2015	**Drilling Company:**	Pacific Drilling
Logged By:	M. Garde	**Drill Crew:**	C. Lavarreda, G. Melcetor
Hor.-Vert. Datum:	CCS83 - NAVD88	**Drilling Equipment:**	Fraste Multidrill XL
Plunge:	-90 degrees	**Coring Method:**	NQ Dual Tube Conventional Coring
Weather:	Sunny	**Core Bit Type:**	Diamond (6)

ROCK CORING LOG B-1

ROCK CORING INFORMATION

Surveyed Elevation (feet) / Depth (feet)	Graphical Log	Northing: 2,233,536.338 (ft) Easting: 6,104,406.013 (ft) Surveyed Ground Surface Elevation (ft.): 713.90 Formation and Rock Type, Color, Grain/Particle Size, Weathering, Bedding, Density or Spacing	Box Number	Run Number	Sample Type	Recovery (NR=No Recovery)	Drill Rate (ft/min)	RQD (%)	Relative Strength	Discontinuity Description Fracture#: (Depth), Type, Relative Dip, Density or Spacing. Degree of Infilling, Infilling Type, Aperture, Surface Weathering, JRC
670		No recovery from 40' to 45', clay observed on cutting bit, loss of circulation	2	6		NR	0.06	0		(38.1'), J, 45°, Mn oxide stain, JRC=6-8, planar, rough, black oxide stain (38.2'), J, 70°, Mn oxide stain, JRC=8-10, planar, rough, black oxide stain (38.6'), J, 70°, Mn oxide stain, JRC=8-10, planar, rough, black oxide stain (39.1'), J, 50°, Mn oxide stain, JRC=8-10, planar, rough, black oxide stain Run 6 - 40-45'
45		No recovery from 45' to 49'	2	7		12"	0.11	0		Run 7 - 45-50'
665		**PUENTE FORMATION - LA VIDA MEMBER (Tplv)** **CLAYSTONE**: pale olive (5Y 6/3), highly weathered, intensely fractured, with iron/manganese oxides, medium strong							R3 R2	(49'), J, 40°, Mn oxide stain, JRC=16-18, irregular, rough
50		**Interbedded SANDSTONE and SANDY SILTSTONE:** strong brown (7.5YR 4/6) light yellowish brown (2.5Y 6/4) and yellowish red (5YR 4/6), fine-grained, very thinly bedded to thinly bedded, highly weathered, intensely fractured, medium strong to weak, 1"x1/2" rounded sandstone clast within bedding	2	8		27"	0.16	0	R2-R3	(49.4'), B, 50°, JRC=2-4, planar, smooth, with fine hairline cracks with gray infill silica (no fizz) perpendicular to bedding Run 8 - 50-55'
		No recovery, 50-52.75'							R3	
660		Interbedded fine-grained **SANDSTONE, SILTSTONE and CLAYSTONE**, yellowish brown (10YR 5/8) to olive 5Y 4/4 and light olive brown, thinly bedded, highly weathered, medium strong to 53.5', then decomposed to 54', then extremely weak.								(53.5'), B, 50°, planar, smooth, possibly sheared (54'), B, 40°-55°, surface stain, Mn, JRC=6-8, planar, smooth
55		No recovery, 55-56.3'	2/3	9		46"	0.33	0		Run 9 - 55-60'
655		Predominantly **SANDSTONE**, mixed hues of olive (5Y) and yellowish brown (10YR), fine-grained, highly weathered, very weak to weak, manganese and iron oxides mottled, hard to see bedding Yellowish brown (10YR 5/8) to brownish yellow (10YR 4/6), traces of pale olive 5Y 6/3 - 6/4 in bottom 1' Extremely weak, intensely fractured							R1-R2 R0	(56.3'), B, 10°, oxide stain, JRC=2-4, planar, smooth (set of 4) (56.75'), J, 65°, surface stain, Fe, JRC=2-4, planar, smooth (57'), J, 45°, JRC=4-6, planar, rough (57.7'), J, 20°, Fe oxide <mm crust, JRC=2-4, planar, smooth (58.28'), J, 55°, curviplanar, clean, JRC=10-12 (58.5'), J, (set of 5), 55°-60°, curvi-planar to planar, clean, JRC=12

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ROCK CORING LOG B-1

ILP North Conversion Reservoir Project
Irvine, CA

PLATE
A-4

Date Begin - End:	1/27/2015	**Drilling Company:**	Pacific Drilling	**ROCK CORING LOG B-1**
Logged By:	M. Garde	**Drill Crew:**	C. Lavarreda, G. Melcetor	
Hor.-Vert. Datum:	CCS83 - NAVD88	**Drilling Equipment:**	Fraste Multidrill XL	
Plunge:	-90 degrees	**Coring Method:**	NQ Dual Tube Conventional Coring	
Weather:	Sunny	**Core Bit Type:**	Diamond (6)	

Surveyed Elevation (feet)	Depth (feet)	Graphical Log	ROCK CORING INFORMATION Northing: 2,233,536.338 (ft) Easting: 6,104,406.013 (ft) Surveyed Ground Surface Elevation (ft.): 713.90 Formation and Rock Type, Color, Grain/Particle Size, Weathering, Bedding, Density or Spacing	Box Number	Run Number	Sample Type	Recovery (NR=No Recovery)	Drill Rate (ft/min)	RQD (%)	Relative Strength	Discontinuity Description Fracture#: (Depth), Type, Relative Dip, Density or Spacing. Degree of Infilling, Infilling Type, Aperture, Surface Weathering, JRC
											(58.6'), J, 40°-45°, planar, smooth, clean, JRC=6
650	65		The exploration was terminated at approximately 60 ft. below ground surface. The exploration was backfilled with Portland - bentonite grout on January 28, 2015. NQ Dual Tube Conventional Coring started at a depth of 20 ft.								
645	70										
640	75										
635											

GROUNDWATER LEVEL INFORMATION:
Groundwater was not measured.

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ROCK CORING LOG B-1

ILP North Conversion Reservoir Project
Irvine, CA

PLATE
A-4

Date Begin - End:	1/26/2015	**Drilling Company:**	Pacific Drilling
Logged By:	M. Garde	**Drill Crew:**	C. Lavarreda, G. Melcetor
Hor.-Vert. Datum:	CCS83 - NAVD88	**Drilling Equipment:**	Fraste Multidrill XL
Plunge:	-90 degrees	**Coring Method:**	NQ Dual Tube Conventional Coring
Weather:	Sunny	**Core Bit Type:**	Diamond (6)

ROCK CORING LOG B-2

ROCK CORING INFORMATION

Northing: 2,233,607.809 (ft)
Easting: 6,104,575.161 (ft)
Surveyed Ground Surface Elevation (ft.): 709.30

Surveyed Elevation (feet)	Depth (feet)	Graphical Log	Formation and Rock Type, Color, Grain/Particle Size, Weathering, Bedding, Density or Spacing	Box Number	Run Number	Sample Type	Recovery (NR=No Recovery)	Drill Rate (ft/min)	RQD (%)	Relative Strength	Discontinuity Description Fracture#: (Depth), Type, Relative Dip, Density or Spacing. Degree of Infilling, Infilling Type, Aperture, Surface Weathering, JRC
			ARTIFICIAL FILL (af) **Silty GRAVEL (GM)**: light olive brown (2.5Y 5/3), dry to slightly moist, little fine to coarse sand, little fines, mostly fine to coarse SILTSTONE gravel, reacts with HCL								Bulk Sample B1 0-5 ft.
							9"				Drive Sample S1 Blow Counts = 5,6,7
							12"				Drive Sample S2 Blow Counts = 9,13,14
705	5						7"				Drive Sample S3 Blow Counts = 10,6,7
			RESIDUAL SOIL **Lean CLAY (CL)**: medium to high plasticity, dark brown, moist, firm to hard, medium plasticity							R0	
			PUENTE FORMATION: LA VIDA MEMBER (Tplv) **BRECCIA / VOLCANIC SANDSTONE**: light olive brown (2.5Y 5/4), fine to medium-grained SANDSTONE clasts, silty, highly weathered, extremely weak, predominately fine-grained, with clasts of coarser sandy tuff within fine grained matrix, some calcite veins along irregular fractures, iron oxides, little fines								
700	10						15"				Drive Sample S4 Blow Counts = 18,13,19
695	15		Becomes yellowish brown (10YR 5/6), fine to medium grained sand, little fines, trace fine subangular gravel (sandy tuff), extremely weak, dark manganese oxide in top 6" and iron oxide throughout				18"				Drive Sample S5 Blow Counts = 20,18,13
690											

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ROCK CORING LOG B-2

ILP North Conversion Reservoir Project
Irvine, CA

PLATE
A-5

Date Begin - End:	1/26/2015	**Drilling Company:**	Pacific Drilling
Logged By:	M. Garde	**Drill Crew:**	C. Lavarreda, G. Melcetor
Hor.-Vert. Datum:	CCS83 - NAVD88	**Drilling Equipment:**	Fraste Multidrill XL
Plunge:	-90 degrees	**Coring Method:**	NQ Dual Tube Conventional Coring
Weather:	Sunny	**Core Bit Type:**	Diamond (6)

ROCK CORING LOG B-2

ROCK CORING INFORMATION

Northing: 2,233,607.809 (ft)
Easting: 6,104,575.161 (ft)
Surveyed Ground Surface Elevation (ft.): 709.30

Surveyed Elevation (feet)	Depth (feet)	Graphical Log	Formation and Rock Type, Color, Grain/Particle Size, Weathering, Bedding, Density or Spacing	Box Number	Run Number	Sample Type	Recovery (NR=No Recovery)	Drill Rate (ft/min)	RQD (%)	Relative Strength	Discontinuity Description Fracture#: (Depth), Type, Relative Dip, Density or Spacing. Degree of Infilling, Infilling Type, Aperture, Surface Weathering, JRC
			BRECCIA / VOLCANIC SANDSTONE: becomes light olive brown (2.5Y 5/4), moderately weathered, fine to coarse SANDSTONE clasts, extremely weak, subangular to angular, slightly moist, friable, trace fines in matrix, appears homogeneous Hard drilling				6"				Drive Sample S6 Blow Counts = 50/5"
685	25		No recovery from 25' to 30' Dark yellowish brown (10YR 4/4), slough mostly fine to medium grained, dark manganese and ferrous oxides		1		NR NR	0.83			Drive Sample S7 Blow Counts = 50/2", recovered only slough. Convert to coring operation at 25 ft. Convert to coring Run 1 - 25-30'
680	30		No recovery from 30' to 33.5'		2		18"	0.29			Run 2 - 30-35'
675	35		**SESPE / VAQUEROS FORMATION: UNDIFFERENTIATED (Tvs)** **SILTY SANDSTONE**: olive (5Y 4/3), fine-grained, moderately weathered, extremely weak, thinly bedded, intensely to highly fractured, micaceous, subangular quartz grains, SANDSTONE slakes No recovery from 35' to 36.75'		3		39"	0.42		R0	(34.4'), J, 60°, 1/8" thick sand-filled, Fe, JRC=8-10, discontinuous / planar (34.6'), J, 55°, 1/16" thick sand-filled, Fe, JRC=8-10, planar Run 3 - 35-40
670			**Interbedded SANDSTONE and CLAYSTONE/SILTSTONE**: olive (5Y 4/4), fine-grained, moderately weathered, extremely weak, thinly to moderately bedded, highly to intensely fractured							R0	(37'), J, 45°, JRC=8-10, stepped, polished (37.7'), J, 15°, JRC=4-6, planar, smooth, clay film (37.8'), J, 60°, JRC=8-10, stepped, polished (38'), J, 40°, JRC=10-12, clean, planar (38.5'), J, 75° to vertical, JRC=16-18, irregular

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ROCK CORING LOG B-2

ILP North Conversion Reservoir Project
Irvine, CA

PLATE
A-5

ROCK CORING LOG B-2

Date Begin - End:	1/26/2015	**Drilling Company:**	Pacific Drilling
Logged By:	M. Garde	**Drill Crew:**	C. Lavarreda, G. Melcetor
Hor.-Vert. Datum:	CCS83 - NAVD88	**Drilling Equipment:**	Fraste Multidrill XL
Plunge:	-90 degrees	**Coring Method:**	NQ Dual Tube Conventional Coring
Weather:	Sunny	**Core Bit Type:**	Diamond (6)

ROCK CORING INFORMATION

Northing: 2,233,607.809 (ft)
Easting: 6,104,575.161 (ft)
Surveyed Ground Surface Elevation (ft.): 709.30

Surveyed Elevation (feet)	Depth (feet)	Graphical Log	Formation and Rock Type, Color, Grain/Particle Size, Weathering, Bedding, Density or Spacing	Box Number	Run Number	Sample Type	Recovery (NR=No Recovery)	Drill Rate (ft/min)	RQD (%)	Relative Strength	Discontinuity Description Fracture#: (Depth), Type, Relative Dip, Density or Spacing. Degree of Infilling, Infilling Type, Aperture, Surface Weathering, JRC
			SILTY SANDSTONE to SANDY SILTSTONE: dark olive gray (5Y 3/2), fine-grained, slightly weathered, extremely weak, moderately bedded, slightly fractured to 41'		4		57"	0.33		R0	Run 4 - 40-45' (40'), J, 85° (40.5'), J, 50°, 1/8" sandy clay, smooth, planar
			Becomes moderately fractured								(41.4'), J, 30°, rough
			Becomes moderately weathered								(41.6'), J, 60°, rough
			Becomes SANDSTONE, light olive brown (2.5Y 5/6), fine to coarse-grained, highly weathered, moderately fractured								(43'), J, 70°, JRC=0-2, polished, smooth, planar, clayey (44'), J, 75°, healed, planar, smooth
665	45		Becomes olive (5Y 4/3), moderately to highly weathered, extremely weak, highly to intensely fractured		5		60"	0.25			Run 5 - 45-50' (45.5'), J, 10°, JRC=4-6, planar, smooth, polished, clayey
			SILTY SANDSTONE: olive (5Y 4/3), fine-grained, highly weathered, extremely weak, moderately fractured							R0	(45.6'), J, 40°, irregular, rough, healed
			SANDY SILTSTONE: olive (5Y 4/3), fine-grained, highly weathered, extremely weak, moderately fractured							R0	(47'), J, 75°, JRC=16-18, polished, stepped
			Becomes intensely fractured							R0	(48.6'), J, 45°, JRC=16, rough
660	50		**SANDSTONE**: light olive brown (2.5Y 5/4), fine to medium-grained, highly weathered, thickly bedded, moderately fractured, few coarse grained, subangular grains		6		NR				Run 6 - 50-52'
			No recovery from 50' to 52'								
655	55										
650											

The exploration was terminated at approximately 52 ft. below ground surface. The exploration was backfilled with Portland - bentonite grout on January 27, 2015. NQ Dual Tube Conventional Coring started at a depth of 25 ft.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not measured.

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PROJECT NO.:	20153742
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ROCK CORING LOG B-2

ILP North Conversion Reservoir Project
Irvine, CA

PLATE
A-5

BORING LOG B-3

Date Begin - End:	3/12/2015 - 3/13/2015	**Drilling Company:**	Alroy Drilling Services
Logged By:	M. Garde	**Drill Crew:**	R. Rigney, T. Seabold
Hor.-Vert. Datum:	CCS83 - NAVD88	**Drilling Equipment:**	Earthdrill
Plunge:	-90 degrees	**Drilling Method:**	Bucket Auger
Weather:	Sunny	**Exploration Diameter:**	24 in. O.D.

Surveyed Elevation (feet)	Depth (feet)	Orientation Data	Graphic Log N50E	DESCRIPTION Northing: 2,233,476.472 (ft) Easting: 6,104,403.335 (ft) Surveyed Ground Surface Elevation (ft.): 703.60	Sample Location	Sample Number	Moisture Content (%)	Dry Unit Weight (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Drilling Method	Remarks
				RESIDUAL SOIL **Lean CLAY (CL)**: very dark grayish brown (10YR 3/2), moist, 10% sand and gravel clasts, medium plasticity, very stiff to hard									
				@2.75' grades to										
700				**PUENTE FORMATION: LA VIDA MEMBER (Tplv)** **BRECCIATED CLAYSTONE**: light olive brown (2.5Y 5/3), highly weathered, extremely to very weak (R0-R1), intensely fractured, medium plasticity, cuttings lightweight and disturbed, reacts with HCL										
	5	B: N57W/38SW												Fault enters bore at 4.6'
695														
		F: N55W/60NE		@9.25' seeing powdered carbonate-rich layers along shears up to 1' thick										Fault exits bore at 9.25'
	10	F: N60W/70-90NE		@10.2' SANDSTONE boulder (~1.3' diameter) SSW wall - between 10.2' and 15' ~10" thick disturbed/sheared clay observed, steeply dipping 70-90° between boulders (dips NNE), strong brown iron oxide @12' several 50-70° dipping shears with 3/4"-3" thick carbonate-rich layers, appear offset, dipping NNW										
690				@13.5' SANDSTONE boulder (~1.5' diameter)										
		B: N40W/67NE		**CLAYSTONE**, becomes olive (5Y 4/4), becomes denser, less disturbed, highly weathered, planar bedding, laminated, very weak (R1)										
	15	F: N70W/70NE Sh: N58W/75SW		@16' fish fossil										
		Sh: N44W/72NE B: N67W/80NE Sh: N58W/75SW		@16.25' set of 3-4 shears approximately 8" apart to 18', oxide and gypsum 1/8", carbonate-rich 1/8-1/4" on SW-SSW wall										
685		Sh: N43W/75NE												
	20			- 6"x8" nodule and oxides dip 40-55° north, seen on ESE wall										
		J/B: E-W/80N B: N83W/V		@22' massive (no laminae)										
		B: E-W/85N												
680		B: N80E/54NW B: N85W/70-75NE		- becomes olive (5Y 5/4) and harder SILTSTONE/CLAYSTONE **SANDSTONE**, fine grained, 1' thick at N (0/360)										

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BORING LOG B-3

ILP North Conversion Reservoir Project
Irvine, CA

PLATE
A-6

BORING LOG B-3

Date Begin - End:	3/12/2015 - 3/13/2015	**Drilling Company:**	Alroy Drilling Services
Logged By:	M. Garde	**Drill Crew:**	R. Rigney, T. Seabold
Hor.-Vert. Datum:	CCS83 - NAVD88	**Drilling Equipment:**	Earthdrill
Plunge:	-90 degrees	**Drilling Method:**	Bucket Auger
Weather:	Sunny	**Exploration Diameter:**	24 in. O.D.

Surveyed Elevation (feet) / Depth (feet)	Orientation Data	Graphic Log N50E	DESCRIPTION Northing: 2,233,476.472 (ft) Easting: 6,104,403.335 (ft) Surveyed Ground Surface Elevation (ft.): 703.60	Sample Location	Sample Number	Moisture Content (%)	Dry Unit Weight (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Drilling Method	Remarks
			wall, not seen on SW quadrant and in only ~1/2 of SE quadrant										
			CLAYSTONE, olive (5Y 4/3), moderately weathered, very weak (R1), intensely fractured, increase in moisture										
			@27' increase in iron oxides, highly weathered, 1/2" thick, flaking, intense fracturing										
	B: N80E/56NW B: N82E/68NW												
675													
	J: N25W/68NE SET OF JOINTS		@28.75' gypsum 1/4" thick @29' becomes olive (5Y 4/3), no longer flaking, pervasive gypsum veins, massive, joint-prominent, spacing every 2-4", planar @29.2' gypsum 1/4" thick										
30													
	Sh: N85W/79SW		- undulating shear, many polished surfaces, increase in gypsum - pockets/veinlets										
670													
35	J: N55E/40NW B/J: N85E/87SE B: E-W/86S												
	B: N85W/83NE Sh: N55E/80NW		@36' polished wedges 6-8"x3" thick falling out of sidewalls, gypsum along bedding, shearing along bedding, decreasing gypsum										
	Sh: N83W/80NE (SET) J: N27W/V		@~38' at least 5 shears with 4-5" spacing										
665													
40	B: N70W/80SW		- CLAYSTONE, becomes olive gray to dark olive gray (5Y 4/2-3/2)										Bedding dips into borehole at N50E (Tape)
	F: N40E/78NW		@42' moderately weathered, intensely fractured, polished, slickensides, sheared pieces, 1" to 4-5" wide, open fractures to 49'										
	B/Sh: N60W/73SW Sh: N45E/82NW B: N83W/82SW												
660													
45													
			@46' increased caving/polished wedges, open fractures										
655													
	Sh: N85W/85SW Sh: N45E/77SE		- becomes laminated, moderately weathered										

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PROJECT NO.:	20153742
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DATE:	3/23/2015
REVISED:	5/12/2015

BORING LOG B-3

ILP North Conversion Reservoir Project
Irvine, CA

PLATE

A-6

BORING LOG B-3

Date Begin - End:	3/12/2015 - 3/13/2015	**Drilling Company:**	Alroy Drilling Services
Logged By:	M. Garde	**Drill Crew:**	R. Rigney, T. Seabold
Hor.-Vert. Datum:	CCS83 - NAVD88	**Drilling Equipment:**	Earthdrill
Plunge:	-90 degrees	**Drilling Method:**	Bucket Auger
Weather:	Sunny	**Exploration Diameter:**	24 in. O.D.

Surveyed Elevation (feet)	Depth (feet)	Orientation Data	Graphic Log N50E	DESCRIPTION Northing: 2,233,476.472 (ft) Easting: 6,104,403.335 (ft) Surveyed Ground Surface Elevation (ft.): 703.60	Sample Location	Sample Number	Moisture Content (%)	Dry Unit Weight (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Drilling Method	Remarks
650				**CLAYSTONE**: olive gray (5Y 4/2) to dark olive gray (5Y 3/2), laminated, moderately weathered, intensely fractured										
	55			@54' increased caving @55' CLAYSTONE, becomes dark to very dark grayish brown to brown (10YR 4/2-3/2-3/3), very moist, very thinly bedded										On 3/12/15 at approximately 3:45 pm SSW wall below ~54' had experienced signs of significant caving. Did not proceed deeper to investigate. On 3/13/15 ~4' of caving/slough on bottom of borehole.
645														
	60			@59' or 59.5' (observed in cuttings) **SANDSTONE**, dark grayish brown (10YR 4/2), very fine grained, strong (R4)										
				Bottom of borehole at 60.0 ft bgs Groundwater seepage suspected below 53 feet, wetness observed on downhole equipment below 53 feet. Borehole downhole logged by M. Garde on 3/12/2015 and P. Guptil on 3/13/2015.										
640														
	65													
635														
	70													
630														

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PROJECT NO.:	20153742
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CHECKED BY:	MG
DATE:	3/23/2015
REVISED:	5/12/2015

BORING LOG B-3

ILP North Conversion Reservoir Project
Irvine, CA

PLATE
A-6

BORING LOG B-4

Date Begin - End:	3/16/2015 - 3/17/2015	**Drilling Company:**	Alroy Drilling Services
Logged By:	M. Garde	**Drill Crew:**	R. Rigney, T. Seabold
Hor.-Vert. Datum:	CCS83 - NAVD88	**Drilling Equipment:**	Earthdrill
Plunge:	-90 degrees	**Drilling Method:**	Bucket Auger
Weather:	Sunny	**Exploration Diameter:**	24 in. O.D.

Surveyed Elevation (feet)	Depth (feet)	Orientation Data	Graphic Log N14W	DESCRIPTION Northing: 2,233,516.029 (ft) Easting: 6,104,540.255 (ft) Surveyed Ground Surface Elevation (ft.): 706.50	Sample Location	Sample Number	Moisture Content (%)	Dry Unit Weight (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Drilling Method	Remarks
705				**ARTIFICIAL FILL (af)** **Silty GRAVEL (GM) to Gravelly SILT (ML)**: light olive brown (2.5Y 5/3), slightly moist, 10% gravel/cobbles comprise mostly SILTSTONE with minor SANDSTONE, dense, medium plasticity fines										
				RESIDUAL SOIL **Lean CLAY (CL)**: very dark brown (10YR 2/2), moist, medium plasticity, trace organics, sand and gravel, very stiff to hard										
	5			Grades to **SANDY SILTSTONE**										
700				**PUENTE FORMATION: LA VIDA MEMBER (Tplv)** **BRECCIATED**: comprises predominant **SANDY SILTSTONE** clasts, pale yellow (5Y 7/4), fine grained, highly weathered, extremely to very weak, intensely fractured @8' iron oxides dip to N85E direction, undulating, mottled with carbonate rich white silty nodules and veining										
	10			@9.75' dark brown clay mottling dips NW, still undulating @10.3' 1/8" to 1/4" thick oxides and carbonate deposits along shears (also at 10.5', 10.9', 11.25', 11.8', and 12.5')										
695		J/Sh: N67W/25NE		**Interbedded SILTY SANDSTONE**: yellowish brown (10YR 5/6-5/8), and **SANDY SILTSTSONE**, pale olive (5Y 6/3), fine grained sand, highly weathered, extremely to very weak										
	15	B: N55E/25NW		- becomes more gray (SILTSTONE)										
690		B: N42E/45NW		- oxides										
	20			**SANDSTONE**: light olive brown (2.5Y 5/6), highly weathered, extremely to very weak, massive - becomes yellow to brownish yellow (10YR 7/6-6/6)										
685		B: E-W/65N F: N45W/89NE clay lined		- vertical to nearly vertical white sandy shears beneath fault to 27'										
				@24.7' discontinuous rip up bed, dips ~35-40° (apparent dip)										

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PROJECT NO.:	20153742
DRAWN BY:	MP
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DATE:	3/24/2015
REVISED:	5/12/2015

BORING LOG B-4

ILP North Conversion Reservoir Project
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PLATE
A-7

BORING LOG B-4

Date Begin - End:	3/16/2015 - 3/17/2015	**Drilling Company:**	Alroy Drilling Services
Logged By:	M. Garde	**Drill Crew:**	R. Rigney, T. Seabold
Hor.-Vert. Datum:	CCS83 - NAVD88	**Drilling Equipment:**	Earthdrill
Plunge:	-90 degrees	**Drilling Method:**	Bucket Auger
Weather:	Sunny	**Exploration Diameter:**	24 in. O.D.

Surveyed Elevation (feet)	Depth (feet)	Orientation Data	Graphic Log N14W	DESCRIPTION Northing: 2,233,516.029 (ft) Easting: 6,104,540.255 (ft) Surveyed Ground Surface Elevation (ft.): 706.50	Sample Location	Sample Number	Moisture Content (%)	Dry Unit Weight (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Drilling Method	Remarks
680				**SANDSTONE**: yellow to brownish yellow (10YR 7/6-6/6), highly weathered, extremely to very weak, massive										
				@26.75' 1.5" thick grayish brown **CLAYSTONE** layer truncated by fault at west side wall (~N85W) SW quadrant is sheared with abundant iron oxides and white carbonate deposits - dip NE										
				@29' increase in light-colored to white low density deposits and oxides										
		B/Sh: N17W/40NE												
	30			@~30' becomes pale yellow to light yellowish brown (2.5Y 7/4-6/4)										
675				@32' becomes pale yellow (5Y 8/4), silty, fine grained, moderately to highly weathered, very homogeneous, quartz sand										
		B: N5E/23NW B: N15E/23NW												
	35			@35' becomes yellowish brown (10YR 5/6-5/8)										
670														
		B: N60W/48NE												
				- increased moisture										
	40			- harder, stronger cementation										
		B: N10W/15SW		@41' increased moisture and clay, attitude on 1-2 mm thin clay laminae in massive unit										
665				**SANDY SILTSTONE**: light olive brown (2.5Y 5/6), highly weathered, very weak										
	45			@44.5' concretion on NE side of bore, 6-8" long, 2" thick, increase in clay										
				@45.75' oxide coated nodule										
660														
				@48' becomes olive (5Y 5/4), cuttings are lightweight but downhole rock is harder, some strong brown oxide mottling, very fine grained										
				@49.5' increase in oxides, less fines										

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DATE:	3/24/2015
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BORING LOG B-4

ILP North Conversion Reservoir Project
Irvine, CA

PLATE
A-7

BORING LOG B-4

Date Begin - End:	3/16/2015 - 3/17/2015	**Drilling Company:**	Alroy Drilling Services
Logged By:	M. Garde	**Drill Crew:**	R. Rigney, T. Seabold
Hor.-Vert. Datum:	CCS83 - NAVD88	**Drilling Equipment:**	Earthdrill
Plunge:	-90 degrees	**Drilling Method:**	Bucket Auger
Weather:	Sunny	**Exploration Diameter:**	24 in. O.D.

Surveyed Elevation (feet)	Depth (feet)	Orientation Data	Graphic Log N14W	DESCRIPTION Northing: 2,233,516.029 (ft) Easting: 6,104,540.255 (ft) Surveyed Ground Surface Elevation (ft.): 706.50	Sample Location	Sample Number	Moisture Content (%)	Dry Unit Weight (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Drilling Method	Remarks
655				**SANDY SILTSTONE**: olive (5Y 5/4), highly weathered, very weak @51' becomes hard, 4" cemented zone, light olive brown (2.5Y 5/6), very weak to weak, increase of sand content										
	55	Sh/J: N85W/60NE		- 1/8" to 1/4" thick layer of oxide										
650		Sh/J: N80W/80-90NE		- polished surface										
	60			Bottom of borehole at 60.0 ft bgs No groundwater encountered. Downhole logged by M. Garde on 3/16/2015 and R. Lemmer on 3/17/2015.										
645														
	65													
640														
	70													
635														

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BORING LOG B-4

ILP North Conversion Reservoir Project
Irvine, CA

PLATE
A-7

BORING LOG B-5

Date Begin - End:	3/17/2015	**Drilling Company:**	Alroy Drilling Services
Logged By:	M. Garde	**Drill Crew:**	
Hor.-Vert. Datum:	CCS83 - NAVD88	**Drilling Equipment:**	Earthdrill
Plunge:	-90 degrees	**Drilling Method:**	Bucket Auger
Weather:	Not Available	**Exploration Diameter:**	24 in. O.D.

Surveyed Elevation (feet) / Depth (feet)	Orientation Data	Graphic Log (N45W)	DESCRIPTION Northing: 2,233,572.843 (ft) Easting: 6,104,516.581 (ft) Surveyed Ground Surface Elevation (ft.): 708.00
705 / 0			**RESIDUAL SOIL** **Lean CLAY (CL)**: very dark brown (10YR 2/2), moist, medium plasticity, very stiff to hard, trace organics, sand and gravel dips SE
5			@5' transition to bedrock light olive brown (2.5Y 5/4-4/4)
	Sh: N-S/38E Sh: N53E/53SE, dies out at ~10'		@6.5' 1/4" thick iron oxide **PUENTE FORMATION; LA VIDA MEMBER (Tplv)** **CLAYSTONE/SILTSTONE**: light brownish gray (2.5Y 6/2) to light yellowish brown (2.5Y 6/3) with yellowish brown oxides, highly weathered, extremely weak, intensely fractured, moderately to thickly bedded
700			
10			**SANDY SILTSTONE**: olive (5Y 4/3), moist, highly weathered, extremely weak, very fine grained sand
			@11' oxide laminae
	B: N81E/50NW		
695			@13' 7" increase white carbonate mottling
			@14' becomes pale yellow (5Y 7/3) to pale olive (5Y 6/3), decrease in sand content (10-15%), highly weathered, extremely weak, intensely fractured, "punky"
15			
			@17' becomes olive (5Y 5/4) and yellowish brown (10YR 5/8), increase in oxides, fine grained sand, highly weathered, extremely to very weak
690			
	Sh: N80E/64SE		@19' bottom of shear 1/8" thick clay (not seen on N45W wall)
20	Sh: N45W/70NE		- 3/4" ferric oxide and white carbonate clay near shear
685			
	B: N80W/30SW		@24.2 increase in oxides

Sample Location	Sample Number	Moisture Content (%)	Dry Unit Weight (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Drilling Method	Remarks

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BORING LOG B-5

ILP North Conversion Reservoir Project
Irvine, CA

PLATE
A-8

BORING LOG B-5

Date Begin - End:	3/17/2015	**Drilling Company:**	Alroy Drilling Services
Logged By:	M. Garde	**Drill Crew:**	
Hor.-Vert. Datum:	CCS83 - NAVD88	**Drilling Equipment:**	Earthdrill
Plunge:	-90 degrees	**Drilling Method:**	Bucket Auger
Weather:	Not Available	**Exploration Diameter:**	24 in. O.D.

Surveyed Elevation (feet)	Depth (feet)	Orientation Data	Graphic Log (N45W)	DESCRIPTION Northing: 2,233,572.843 (ft) Easting: 6,104,516.581 (ft) Surveyed Ground Surface Elevation (ft.): 708.00	Sample Location	Sample Number	Moisture Content (%)	Dry Unit Weight (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Drilling Method	Remarks
		B: N82E/60NW/Sh?		**@25.5' VAQUEROS/SESPE FORMATION (Tvs)** @25.5' 4" thick CLAYSTONE, reddish brown (5YR 4/4) and white										
680		F: N50E/65SE		**Interbedded CLAYSTONE/SILTSTONE**: reddish brown (5YR 4/4, 4/3, 3/3) and very dark greenish gray (5BG 3/1-10BG 3/1), and **SILTY to CLAYEY SANDSTONE**, fine grained, olive (5Y 4/4), olive gray (5Y 5/2-4/2) and yellowish brown (10YR 5/8), highly weathered, extremely to very weak, intensely to highly fractured, moderately bedded										
	30			@31' thickly bedded SANDSTONE and CLAYSTONE										
675				@34' some caving of polished reddish brown **CLAYSTONE**										
	35			- polished **CLAYSTONE**, thinly to moderately bedded										
				- 7" to 12" thick **CLAYSTONE** (reddish brown and olive gray), polished, sand above and below										
670		F: N75E/70SE to N60E/70SE		**SILTY to CLAYEY SANDSTONE**: olive gray (5Y 5/2-4/2), fine grained, moderately to highly weathered, extremely to very weak										
	40			- becomes olive (5Y 5/3), very thickly bedded										
				@42' becomes olive gray (5Y 4/2), micaceous										
665				@44' becomes olive (5Y 4/4)										
	45													
660				**CLAYEY SANDSTONE**										

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BORING LOG B-5

ILP North Conversion Reservoir Project
Irvine, CA

PLATE
A-8

BORING LOG B-5

Date Begin - End:	3/17/2015	**Drilling Company:**	Alroy Drilling Services
Logged By:	M. Garde	**Drill Crew:**	
Hor.-Vert. Datum:	CCS83 - NAVD88	**Drilling Equipment:**	Earthdrill
Plunge:	-90 degrees	**Drilling Method:**	Bucket Auger
Weather:	Not Available	**Exploration Diameter:**	24 in. O.D.

Surveyed Elevation (feet) / Depth (feet)	Orientation Data	Graphic Log (N45W)	DESCRIPTION Northing: 2,233,572.843 (ft) Easting: 6,104,516.581 (ft) Surveyed Ground Surface Elevation (ft.): 708.00	Sample Location	Sample Number	Moisture Content (%)	Dry Unit Weight (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Drilling Method	Remarks
655 / 55	Sh: N80E/73SE F: N35E/65NW		@49' **CLAYEY SANDSTONE**: olive (5Y 4/3) to very dark olive gray (5Y 3/2), interbedded with reddish brown **CLAYSTONE**, carbonate-rich (white) layers, increased moisture @54' clay lined fault, clay ~6" thick **SANDY CLAYSTONE/SILTSTONE** (beneath fault), very dark greenish gray (10Y 3/1), fine grained sand, highly to moderately weathered, extremely to very weak										
650 / 60			Becomes **SILTY to CLAYEY SANDSTONE**: very dark greenish gray (10Y 3/1), wet, fine grained Bottom of borehole at 60.0 ft bgs Saturated soil encountered at approximately 58 feet bgs. Downhole logged by M. Garde on 3/17/2015.										
645 / 65													
640 / 70													
635													

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BORING LOG B-5

ILP North Conversion Reservoir Project
Irvine, CA

PLATE
A-8

BORING LOG B-6

Date Begin - End:	3/13/2015 - 3/16/2015	**Drilling Company:**	Alroy Drilling Services		
Logged By:	M. Garde	**Drill Crew:**			
Hor.-Vert. Datum:	CCS83 - NAVD88	**Drilling Equipment:**	Earthdrill	**Hammer Type - Drop:**	850 lb. Kelly Bar - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	Bucket Auger		
Weather:	Not Available	**Exploration Diameter:**	18 in. O.D.		

Surveyed Elevation (feet)	Depth (feet)	Orientation Data	Graphic Log	DESCRIPTION Northing: 2,233,652.437 (ft) Easting: 6,104,565.056 (ft) Surveyed Ground Surface Elevation (ft.): 711.90	Sample Location	Sample Number	Moisture Content (%)	Dry Unit Weight (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Drilling Method	Remarks
710	0			**ARTIFICIAL FILL (af)** **Silty GRAVEL (GM) to Gravelly SILT (ML)**: light olive brown (2.5Y 5/3), moist, fine to coarse gravel (siltstone and fine to coarse grained sandstone) and 10% cobbles and boulders of same, medium dense to dense, low to medium plasticity										
	5			**RESIDUAL SOIL** **Lean CLAY (CL)**: very dark grayish brown (2.5Y 3/2), moist, hard, medium plasticity, contains trace sand and gravel (mostly siltstone clasts), trace organics										
705	6													
	10			**VAQUEROS/SESPE FORMATION (Tvs)** **SANDSTONE**: light olive brown (2.5Y 4/3), moist, fine grained, highly weathered, extremely to very weak (R0-R1)										
700	11													
	15													
695	16			**CLAYSTONE**: olive gray (5Y 5/2-4/2) with some white nodules/veins, moist, highly weathered, extremely weak to weak (R0-R2), "punky" texture, may be disturbed										
	20													
690	21													

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BORING LOG B-6

ILP North Conversion Reservoir Project
Irvine, CA

PLATE

A-9

Date Begin - End: 3/13/2015 - 3/16/2015 **Drilling Company:** Alroy Drilling Services **BORING LOG B-6**

Logged By: M. Garde **Drill Crew:**

Hor.-Vert. Datum: CCS83 - NAVD88 **Drilling Equipment:** Earthdrill **Hammer Type - Drop:** 850 lb. Kelly Bar - 30 in.

Plunge: -90 degrees **Drilling Method:** Bucket Auger

Weather: Not Available **Exploration Diameter:** 18 in. O.D.

Surveyed Elevation (feet) / Depth (feet)	Orientation Data	Graphic Log	DESCRIPTION Northing: 2,233,652.437 (ft) Easting: 6,104,565.056 (ft) Surveyed Ground Surface Elevation (ft.): 711.90	Sample Location	Sample Number	Moisture Content (%)	Dry Unit Weight (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Drilling Method	Remarks
685			**Interbedded SANDSTONE**: yellow (10YR 7/6) to brownish yellow (10YR 6/8), and **SILTSTONE/CLAYSTONE**, grayish brown (2.5Y 5/2), moist, appears disturbed/brecciated, medium plasticity, highly weathered, extremely to very weak (R0-R1), intensely fractured?										
30 / 680			**Predominantly SILTSTONE/CLAYSTONE**: olive gray (5Y 4/2) to dark gray (5Y 4/1), with iron oxides, medium plasticity, intensely fractured @30' becomes light olive gray to olive gray (5Y 5/2-6/2), moderately weathered, polished, with oxides (clasts observed from ~28' to 34')										
35 / 675			**Interbedded SILTSTONE**: olive gray (5Y 5/2) to olive (5Y 5/3), and **SANDSTONE**, pale yellow (2.5Y 7/4) to yellow (2.5Y 7/6) and light yellowish brown (2.5Y 6/4), fine grained, moderately to highly weathered, extremely to very weak (R0-R1) @35' polished CLAYSTONE interbeds in cuttings @37' polished CLAYSTONE interbeds in cuttings										
40			**SILTY CLAYSTONE**: olive gray (5Y 4/2-5/2), white (carbonate-rich) nodules and veining, highly weathered, extremely to very weak										
670			**SILTY SANDSTONE**: pale yellow (2.5Y 7/3-7/4) to light yellowish brown, moist, fine grained, moderately to highly weathered, extremely weak @44' highly weathered, increased ferric oxide										
45 / 665													

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BORING LOG B-6

ILP North Conversion Reservoir Project
Irvine, CA

PLATE
A-9

BORING LOG B-6

Date Begin - End:	3/13/2015 - 3/16/2015	**Drilling Company:**	Alroy Drilling Services		
Logged By:	M. Garde	**Drill Crew:**			
Hor.-Vert. Datum:	CCS83 - NAVD88	**Drilling Equipment:**	Earthdrill	**Hammer Type - Drop:**	850 lb. Kelly Bar - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	Bucket Auger		
Weather:	Not Available	**Exploration Diameter:**	18 in. O.D.		

Surveyed Elevation (feet)	Depth (feet)	Orientation Data	Graphic Log	DESCRIPTION Northing: 2,233,652.437 (ft) Easting: 6,104,565.056 (ft) Surveyed Ground Surface Elevation (ft.): 711.90	Sample Location	Sample Number	Moisture Content (%)	Dry Unit Weight (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Drilling Method	Remarks
660	0			**SANDSTONE**: brownish yellow (10YR 5/8), fine grained, highly weathered, extremely weak, interbedded with **CLAYSTONE**, light olive gray (5Y 6/2) to olive gray (5Y 5/2), laminated, ~1/4" thick, steeply dipping beds		S1								Drive Sample S1, Blow Counts = 18,35
655	5			Increase in **SILTSTONE/CLAYSTONE**: olive gray (5Y 4/2) to dark gray (5Y 4/1), medium plasticity, moderately to highly weathered, extremely to very weak										
				- light olive gray (5Y 6/2) to olive gray (5Y 5/2), very weak to weak, some iron oxides										
650	10			Bottom of borehole at 60.0 ft bgs Groundwater encountered at 59 feet during drilling 3/13/15/ at 2:30pm, measured at 52 feet bgs on 3/16/15 at 730am.										
645	15													
640	20													
	25													
	30													
	35													
	40													
	45													
	50													
	55													
	60													
	65													
	70													

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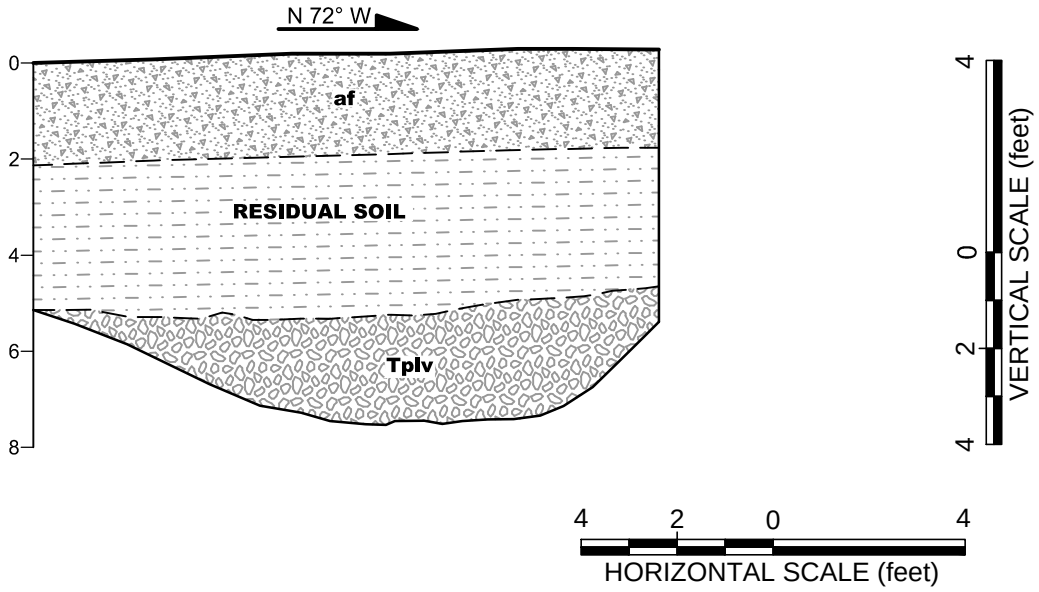
BORING LOG B-6

ILP North Conversion Reservoir Project
Irvine, CA

PLATE
A-9



TP-1		
UNIT	DEPTH	DESCRIPTION
af	~0-2'	SILTY GRAVEL (GM) to GRAVELLY SILT (ML); pale yellow to light gray, medium dense, 10% sand, gravel clasts are SILTSTONE/ CLAYSTONE pieces.
Residual Soil	~2-5'	LEAN CLAY (CL) - very dark gray, moist, firm, locally with sand, medium plasticity
Tplv	~5-7'	BRECCIA- comprises predominantly SILTSTONE clasts, up to boulder-sized, pale yellow to yellowish brown, dry to slightly moist, 10-15% SANDSTONE brownish yellow to yellowish brown, highly weathered. very weak to weak (R1-R2) some R3-R4 cobbles, highly fractured.

PLOTTED: 02 Apr 2015, 12:42pm, dfahrney
CAD FILE: L:\2015\CADD\20143742\ LAYOUT: 1
ATTACHED IMAGES:
ATTACHED XREFS:: RIVERSIDE, CA

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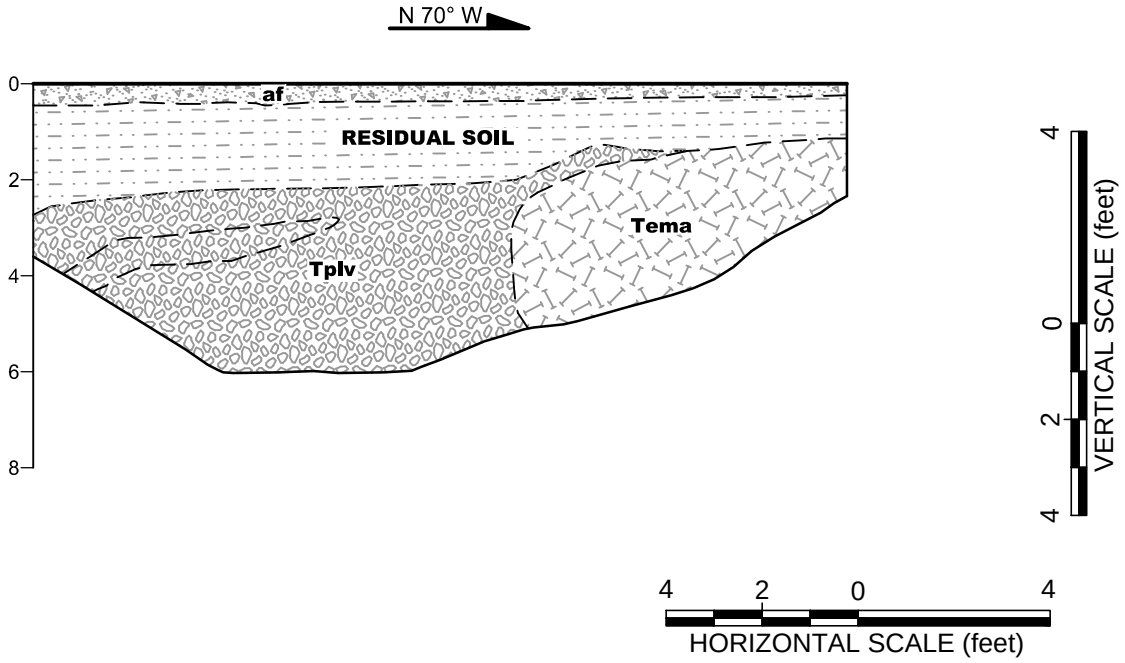
DRAWN:	04/2015
DRAWN BY:	DMF
CHECKED BY:	MG
FILE NAME:	20143742_Testpits.dwg

TEST PIT LOG
TP-1

IRVINE RANCH WATER DISTRICT
ILP NORTH CONVERSION RESERVOIR - ZONE C+
IRVINE, CALIFORNIA

FIGURE
A-10



TP-2		
UNIT	DEPTH	DESCRIPTION
af	~0-0.5'	SILTY GRAVEL (GM) to GRAVELLY SILT (ML); pale yellow to light gray, medium dense, 10% sand, gravel clasts are SILTSTONE/ CLAYSTONE pieces.
Residual Soil	~0.5-2.7'	LEAN CLAY (CL) - very dark gray, moist, firm to hard, locally with sand, gravel and organics, medium plasticity
Tplv	~1.3-6'	BRECCIA- comprises CLAYSTONE, SILTSTONE and SANDSTONE clasts, up to boulder-sized, light yellowish brown and dark yellowish brown, slightly moist, thinly to thickly bedded, highly weathered. Clasts are weak to strong (R2-R4). @ 3-3.5' B: N55W/18SW, B80E/63SE, E-W/47S, N65W/40SW (irregular, undulating beds)
Tema	~1.1-5'	BRECCIA- comprises CLAYSTONE, SILTSTONE and SANDSTONE clasts, up to boulder-sized, light yellowish brown and dark yellowish brown, slightly moist, thinly to thickly bedded, highly weathered. Clasts are weak to strong (R2-R4). @ 3-3.5' B: N55W/18SW, B80E/63SE, E-W/47S, N65W/40SW (irregular, undulating beds)

PLOTTED: 02 Apr 2015, 12:43pm, dfahrney
CAD FILE: L:\2015\CADD\20143742\ LAYOUT: 2
ATTACHED IMAGES:
ATTACHED XREFS:
RIVERSIDE, CA

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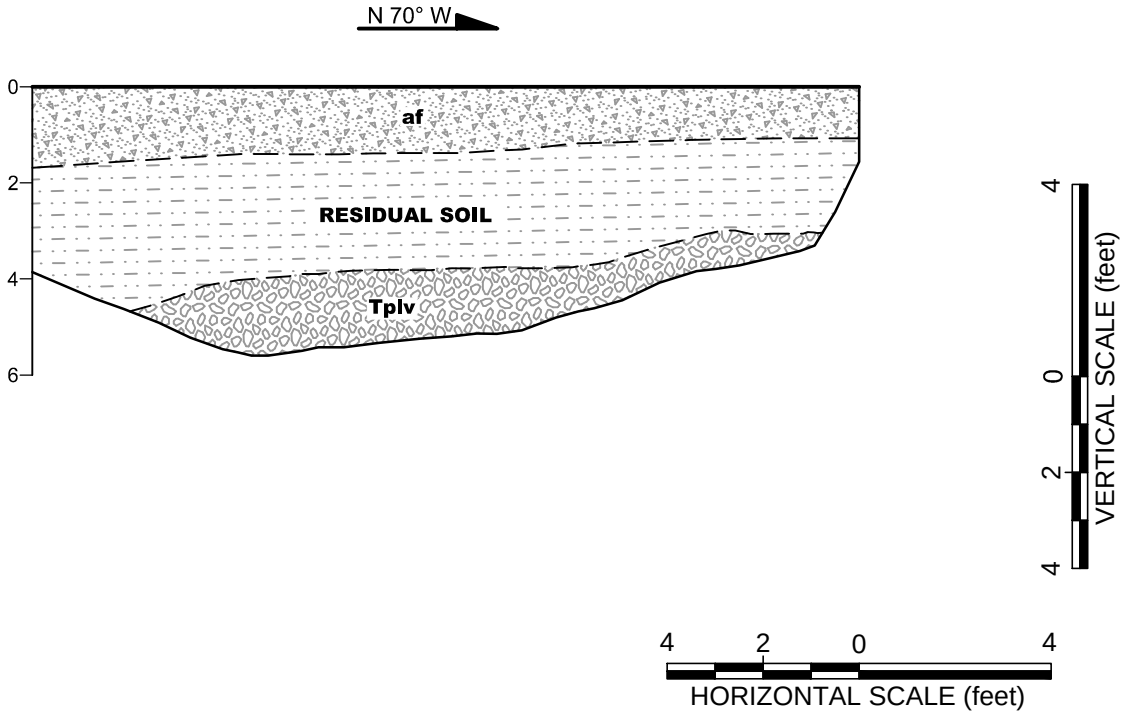
FILE NAME:	20143742_Testpits.dwg

TEST PIT LOG
TP-2

IRVINE RANCH WATER DISTRICT
ILP NORTH CONVERSION RESERVOIR - ZONE C+
IRVINE, CALIFORNIA

FIGURE
A-11



TP-3		
UNIT	DEPTH	DESCRIPTION
af	~0-1.6'	SILTY GRAVEL (GM) to GRAVELLY SILT (ML); pale yellow to light gray, medium dense, 10% sand, gravel clasts are SILTSTONE/ CLAYSTONE pieces.
Residual Soil	~1-4.5'	LEAN CLAY (CL) - very dark gray, moist, firm-hard, locally with trace organics, sand and gravel, medium plasticity
Tplv	~3-5.5'	BRECCIA- comprises predominantly SILTSTONE clasts, gravel and cobble sized, trace boulders, olive brown to light olive brown, dry to slightly moist, moderately to highly weathered, weak to strong (R2-R4) highly fractured

PLOTTED: 02 Apr 2015, 12:43pm, dfahrney
CAD FILE: L:\2015\CADD\20143742\ LAYOUT: 3
ATTACHED IMAGES:
ATTACHED XREFS:: RIVERSIDE, CA

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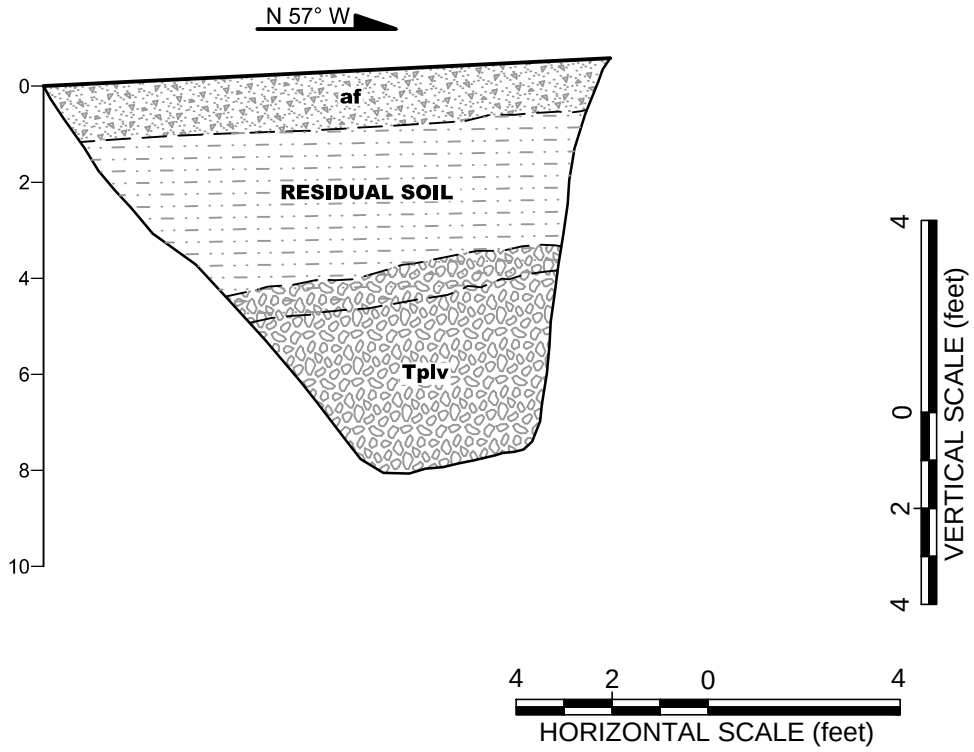
FILE NAME:	20143742_Testpits.dwg

TEST PIT LOG
TP-3

IRVINE RANCH WATER DISTRICT
ILP NORTH CONVERSION RESERVOIR - ZONE C+
IRVINE, CALIFORNIA

FIGURE
A-12



TP-4		
UNIT	DEPTH	DESCRIPTION
af	~0-1.2'	SILTY GRAVEL (GM) to GRAVELLY SILT (ML); pale yellow to light gray, medium dense, 10% sand, gravel clasts are SILTSTONE pieces.
Residual Soil	~1-5.1'	LEAN CLAY (CL) - very dark gray, moist, firm, locally with trace organics, little gravel and cobbles, medium plasticity, bottom foot grades to lithology below.
Tplv	~4.5-8.4'	SANDY CLAYSTONE, light olive brown, moist, fine-grained, highly weathered, extremely weak to very weak (R0-R1), iron oxides abundant. @ 6.CLAYEY SANDSTONE, light olive brown, light yellowish brown and yellowish brown, fine grained, moderately weathered, very weak (R1), iron oxides on joint surfaces, highly to intensely fractured.

PLOTTED: 02 Apr 2015, 12:43pm, dfahrney
CAD FILE: L:\2015\CADD\20143742\ LAYOUT: 4
ATTACHED IMAGES:
ATTACHED XREFS:
RIVERSIDE, CA

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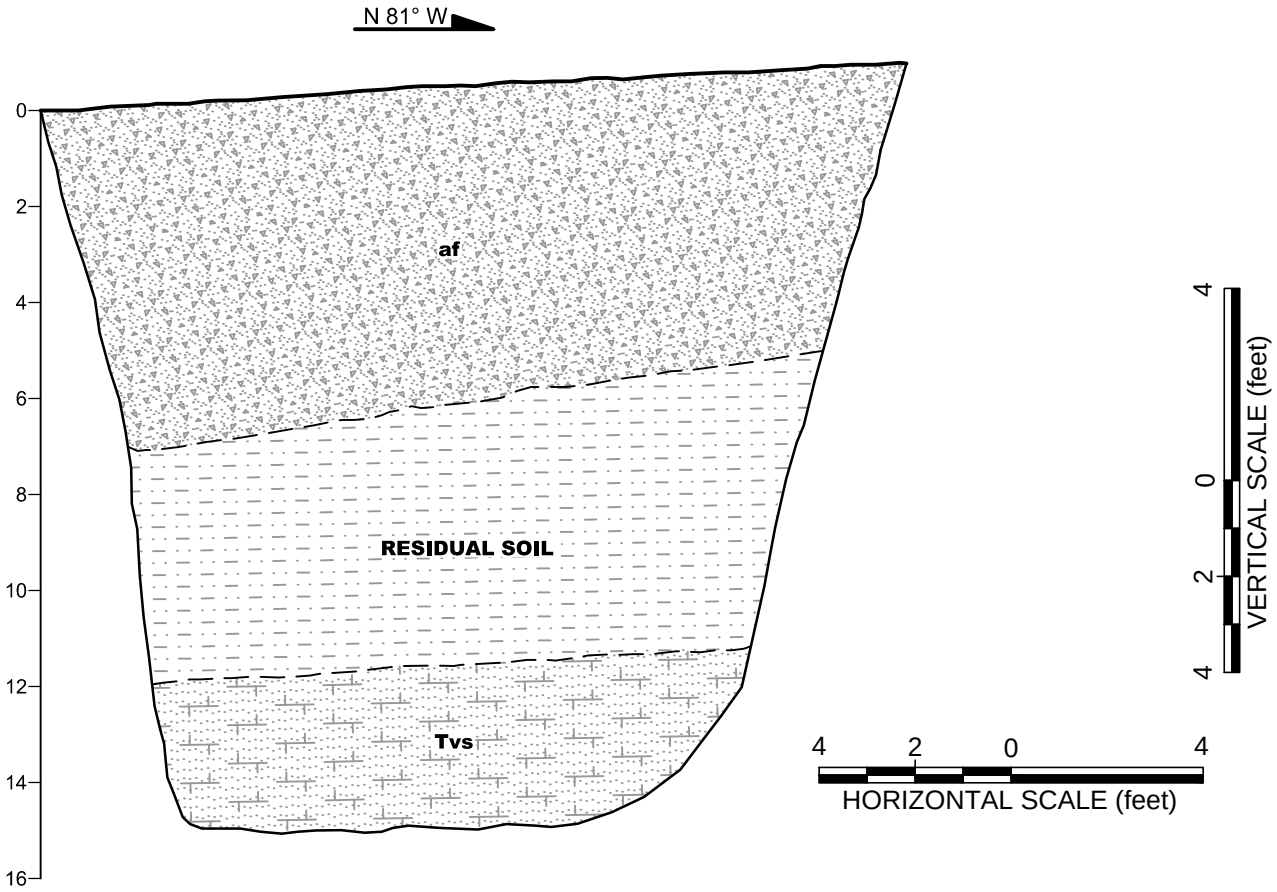
TEST PIT LOG
TP-4

IRVINE RANCH WATER DISTRICT
ILP NORTH CONVERSION RESERVOIR - ZONE C+
IRVINE, CALIFORNIA

FIGURE
A-13



TP-5		
UNIT	DEPTH	DESCRIPTION
af	~0-7'	SILTY GRAVEL (GM); light olive brown, slightly moist, medium dense to dense, predominantly SILTSTONE AND SANDSTONE fine to coarse gravel with 20% cobbles and boulders, weak to strong (R2-R4). Sandstone is fine-coarse-grained.
Residual Soil	~5.8-12'	LEAN CLAY (CL) - black, moist, ~10% sand, firm-hard, locally with trace gravel, medium plasticity, coarser in bottom foot.
Tvs	~12-15.5'	SANDY SILTSTONE AND SILTY SANDSTONE dark olive gray, moist, fine-grained, slightly to moderately weathered., very weak (R1), highly fractured, carbonate deposits along fracture surfaces.

PLOTTED: 02 Apr 2015, 12:44pm, dfahrney
CAD FILE: L:\2015\CADD\20143742\ LAYOUT: 5
ATTACHED IMAGES:
ATTACHED XREFS:: RIVERSIDE, CA

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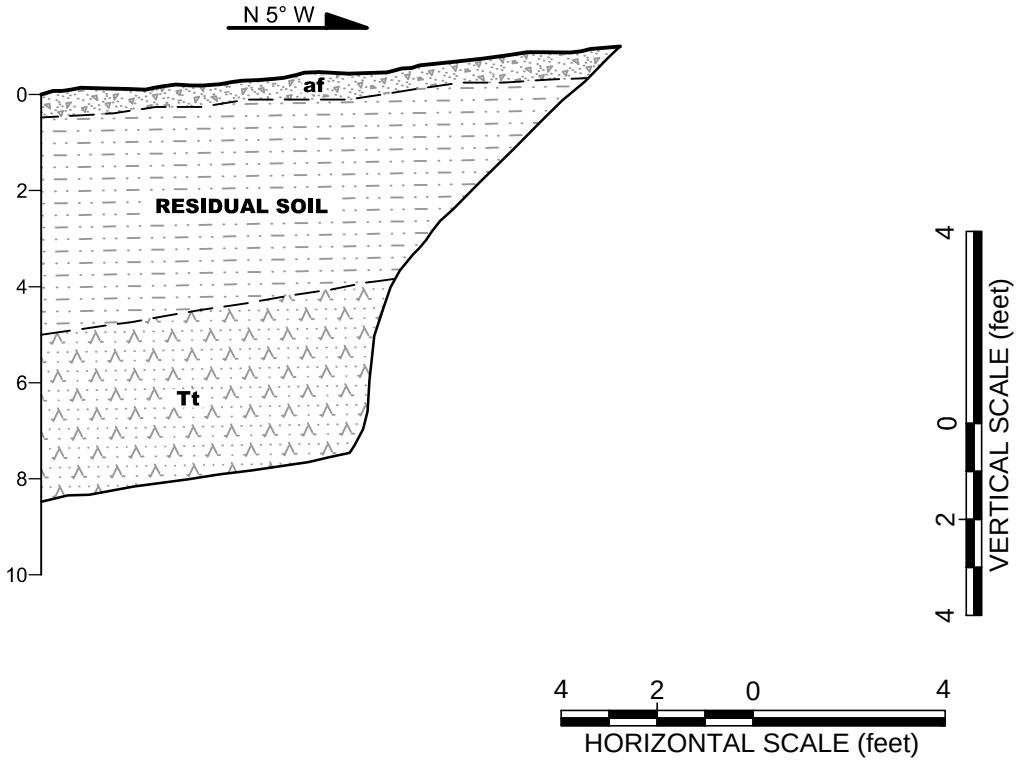
PROJECT NO.	20143742
DRAWN:	04/2015
DRAWN BY:	DMF
CHECKED BY:	MG
FILE NAME:	20143742_Testpits.dwg

TEST PIT LOG
TP-5

IRVINE RANCH WATER DISTRICT
ILP NORTH CONVERSION RESERVOIR - ZONE C+
IRVINE, CALIFORNIA

FIGURE
A-14



TP-6		
UNIT	DEPTH	DESCRIPTION
af	~0-0.5'	SILTY GRAVEL (GM); light olive brown, slightly moist, medium dense to dense, predominantly SILTSTONE
Residual Soil	~0.5-5'	LEAN CLAY (CL) – very dark brown to black, moist, medium plasticity, firm to hard, grades to lithology below.
Tt	~4.5-8.5'	SILTSTONE AND SANDSTONE, light olive brown, to brownish yellow, fine grained, moderately to highly weathered, extremely to very weak (R0-R1), highly fractured.

PLOTTED: 02 Apr 2015, 12:44pm, dfahrney
CAD FILE: L:\2015\CADD\20143742\ LAYOUT: 6
ATTACHED IMAGES:
ATTACHED XREFS:
RIVERSIDE, CA

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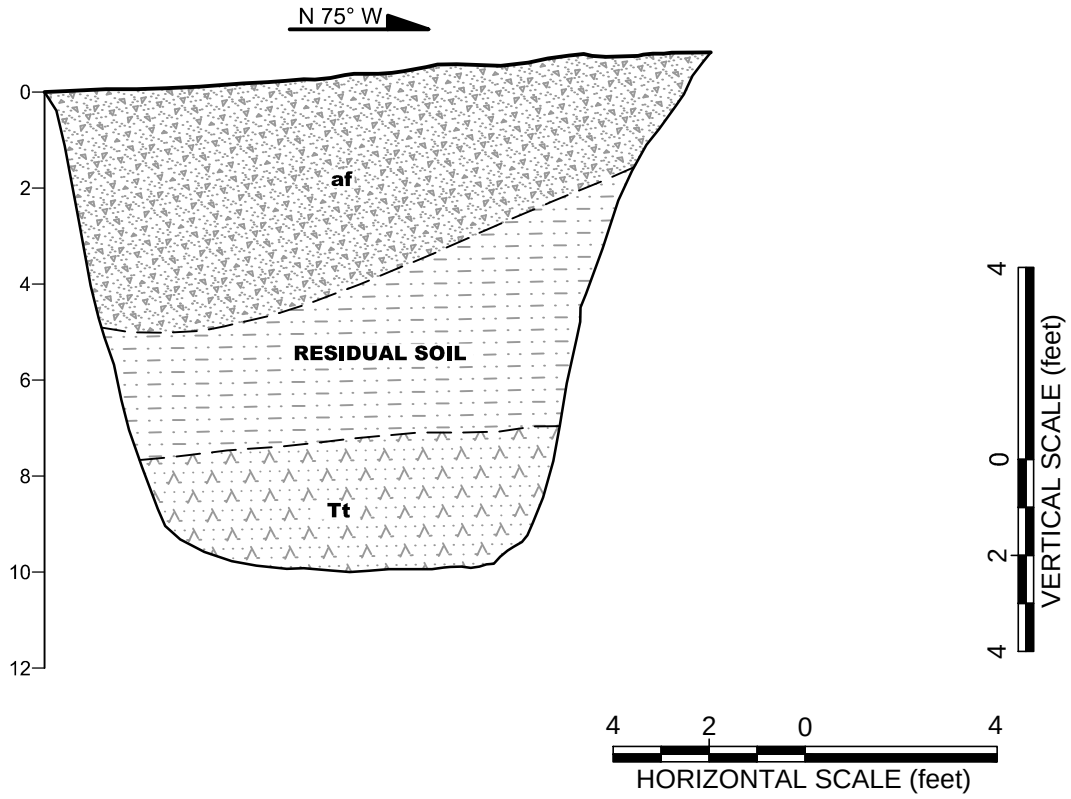
FILE NAME:	20143742_Testpits.dwg

TEST PIT LOG
TP-6

IRVINE RANCH WATER DISTRICT
ILP NORTH CONVERSION RESERVOIR - ZONE C+
IRVINE, CALIFORNIA

FIGURE
A-15



TP-7		
UNIT	DEPTH	DESCRIPTION
af	~0-5'	SILTY GRAVEL (GM); light olive brown, slightly moist, medium dense to dense, predominantly SILTSTONE AND SANDSTONE fine to coarse gravel with 20% cobbles and boulders, weak to strong (R2-R4). Sandstone is fine-coarse-grained.
Residual Soil	~2.4-7.7'	LEAN CLAY (CL) – very dark gray, moist, trace organics, sand and gravel, firm-hard, medium plasticity.
Tvs	~7.6-10.5'	SANDY SILTSTONE olive-yellow to light olive brown, fine-grained, thin to moderately bedded, moderately weathered, very weak to weak (R1-R2), highly fractured, carbonate deposits. Interbedded with SANDSTONE, olive yellow, fine to coarse-grained, thin to moderately bedded, moderately weathered, very weak to weak (R1-R2) highly fractured.

PLOTTED: 02 Apr 2015, 12:44pm, dfahrney
CAD FILE: L:\2015\CADD\20143742\ LAYOUT: 7
ATTACHED IMAGES:
ATTACHED XREFS:: RIVERSIDE, CA

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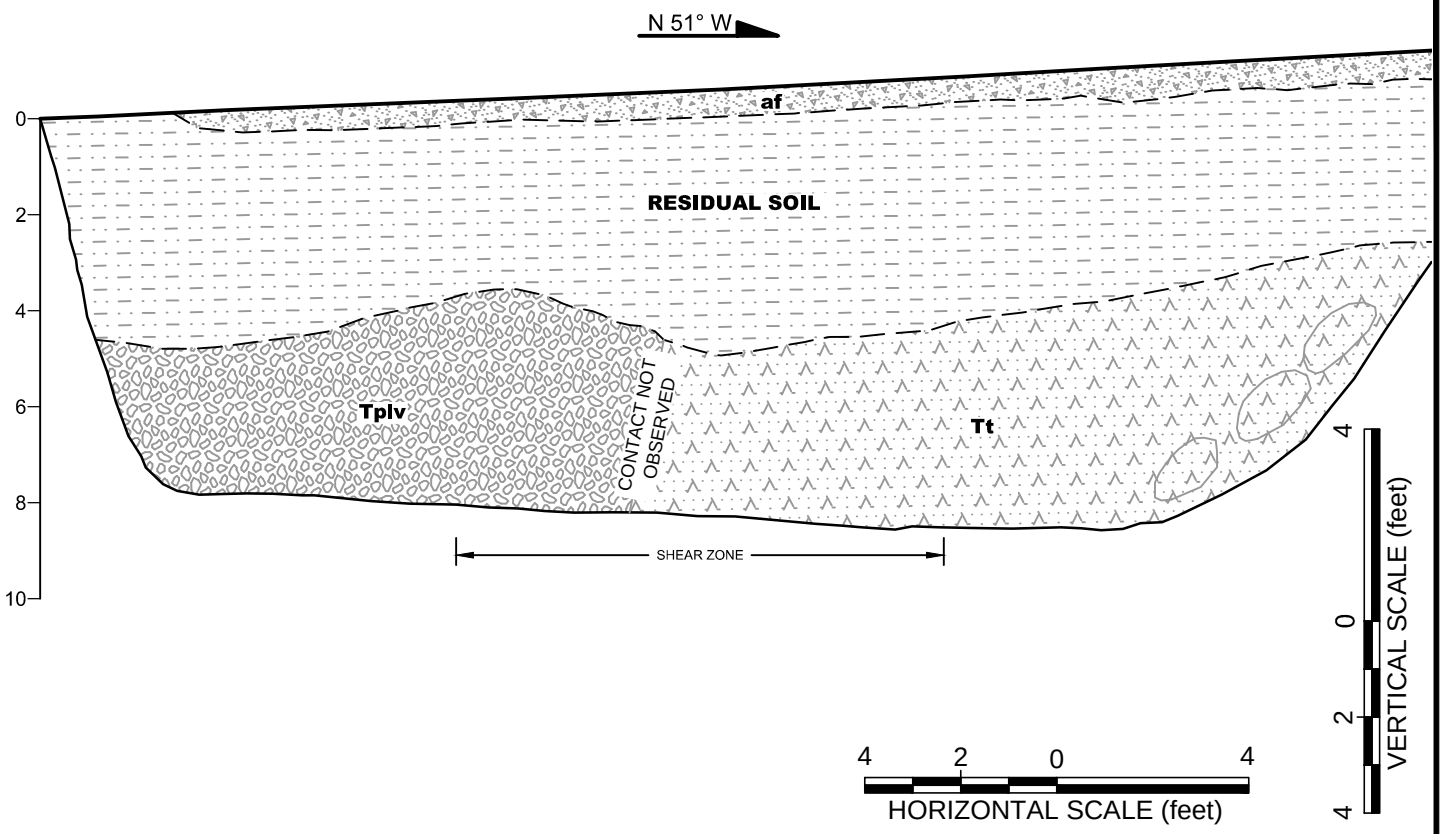
PROJECT NO.	20143742
DRAWN:	04/2015
DRAWN BY:	DMF
CHECKED BY:	MG
FILE NAME:	20143742_Testpits.dwg

TEST PIT LOG
TP-7

IRVINE RANCH WATER DISTRICT
ILP NORTH CONVERSION RESERVOIR - ZONE C+
IRVINE, CALIFORNIA

FIGURE
A-16



TP-8		
UNIT	DEPTH	DESCRIPTION
af	~0-0.5'	SILTY GRAVEL (GM); light olive brown, slightly moist, medium dense to dense, predominantly SILTSTONE
Residual Soil	~0.5-5.5'	LEAN CLAY (CL) – very dark brown, moist, medium plasticity, firm to hard, grades to lithology below.
Tplv	~4-8.75'	Upper 1 ' SILTSTONE/CLAYSTONE , pale olive to olive, "punky" possibly bentonitic, highly weathered, extremely weak to very weak,(R0-R1), highly to intensely fractured, carbonate-rich undulating laminae. Beneath is SANDSTONE, pale olive to olive, fine to medium grained, moderately weathered, extremely weak to very weak (R0-R1), highly fractured.
Tt (?)	~4-9.5'	Predominantly SILTSTONE, pale olive to pale yellow, moderately to highly weathered, very weak to weak (R1-R2), highly to intensely fractured with more resistant brittle claystone cobbles dipping southeast.

PLOTTED: 02 Apr 2015, 12:44pm, dfahrney
CAD FILE: L:\2015\CADD\20143742\ LAYOUT: 8
ATTACHED IMAGES:
ATTACHED XREFS:: RIVERSIDE, CA

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PROJECT NO.	20143742
DRAWN:	04/2015
DRAWN BY:	DMF
CHECKED BY:	MG
FILE NAME:	20143742_Testpits.dwg

TEST PIT LOG
TP-8

IRVINE RANCH WATER DISTRICT
ILP NORTH CONVERSION RESERVOIR - ZONE C+
IRVINE, CALIFORNIA

FIGURE
A-17

Alternative 1 Vicinity
Looking southwest, existing reservoir in background

Alternative 2 Vicinity
Looking south

KLEINFELDER Bright People. Right Solutions.	PROJECT NO. DRAWN BY: CHECKED BY: DATE: REVISED:	SITE PHOTOGRAPHS Alternatives 1 & 2	FIGURE A-18

Alternative 1 & 2 Vicinity
Looking north-northeast, B1 location marked with orange flagging

Alternative 2 & 3 Vicinity
Looking south, Alternative 2 at left, Alternative 3 at right

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PROJECT NO.
DRAWN BY:
CHECKED BY:
DATE:
REVISED:

SITE PHOTOGRAPHS

Alternatives 1, 2 & 3

FIGURE

A-19

B1- Run 1

B1- Run 2

KLEINFELDER Bright People. Right Solutions.	PROJECT NO. DRAWN BY: CHECKED BY: DATE: REVISED:	CORE PHOTOGRAPHS	FIGURE
		B1	A-20

B1-Run 3

B1- Run 4

KLEINFELDER Bright People. Right Solutions.	PROJECT NO. DRAWN BY: CHECKED BY: DATE: REVISED:	CORE PHOTOGRAPHS	FIGURE
		B1	A-21

B1- Run 5

B1 - Run 7

KLEINFELDER Bright People. Right Solutions.	PROJECT NO. DRAWN BY: CHECKED BY: DATE: REVISED:	CORE PHOTOGRAPHS B1	FIGURE A-22

B1- Run 8

B1 - Run 9

KLEINFELDER Bright People. Right Solutions.	PROJECT NO. DRAWN BY: CHECKED BY: DATE: REVISED:	CORE PHOTOGRAPHS B1	FIGURE A-23

B2- Run1/Run 2

B2-Run 3

KLEINFELDER Bright People. Right Solutions.	PROJECT NO. DRAWN BY: CHECKED BY: DATE: REVISED:	CORE PHOTOGRAPHS	FIGURE
		B2	A-24

B2 - Run 4

B2 - Run 5

KLEINFELDER Bright People. Right Solutions.	PROJECT NO. DRAWN BY: CHECKED BY: DATE: REVISED:	CORE PHOTOGRAPHS B2	FIGURE A-25

APPENDIX B
LABORATORY TESTING

APPENDIX B
LABORATORY TESTING

Geotechnical laboratory tests were performed on selected drive and bulk soil samples, and select intervals of intact rock core to estimate engineering characteristics of various earth materials encountered at the site. Testing was performed in general accordance with procedures outlined by the American Society for Testing and Materials (ASTM) and Caltrans Standard Test Methods (CTM).

IN-SITU MOISTURE CONTENT AND DRY UNIT WEIGHT

In-situ moisture content and dry unit weight tests were performed on ten samples that were recovered in a relatively undisturbed condition. Moisture content was evaluated in general accordance with ASTM D2216; dry unit weight was evaluated using procedures similar to ASTM D2937. The results are presented on the Boring Logs (Appendix A).

ATTERBERG LIMITS

Plastic limit and liquid limit testing was performed on one sample to evaluate behavior conditions at varying water contents. Testing was performed in general accordance with ASTM Standard Test Method D4318. The test results are presented in the Table B-1 below. The test results are included.

Table B-1
Summary of Atterberg Limit Test Results

Location	Depth (feet)	Liquid Limit (LL)	Plastic Limit (PL)	Plasticity Index (PI)	USCS Group Symbol
B-1	53.5-54	103	42	61	CH

MAXIMUM DENSITY/OPTIMUM MOISTURE CONTENT

A single laboratory compaction test (ASTM D1557) was performed on a representative bulk sample of the existing fill material to evaluate the maximum dry unit weight and optimum moisture content. The test result is summarized in Table B-2. The test data is included.

Table B-2
Summary of ASTM D 1557 Test Results

LOCATION	DEPTH (FEET)	USCS SOIL TYPE	MAXIMUM DRY UNIT WEIGHT (PCF)	OPTIMUM MOISTURE CONTENT (%)
B-1	0-2	Sandy Clay with Gravel	101.6	19.2

DIRECT SHEAR

Five multipoint direct shear tests were performed on representative in-situ soil and rock samples, to evaluate the drained shear strength of the soil and rock materials. The samples were tested in a near-saturated condition in general accordance with ASTM D3080 (consolidated, drained test). The test results are attached.

UNCONFINED COMPRESSIVE STRENGTH

Unconfined compressive strength testing was performed on two selected samples of sedimentary rock in accordance with ASTM D2166. Two additional samples were sent to the laboratory, however these were unsuitable for testing. The test results are attached.

POINT LOAD INDEX

Rock core samples were tested for point load strength by Kleinfelder in accordance with ASTM D5731. Four point load index tests were attempted from the samples delivered to the laboratory. The test results are attached.

EXPANSION INDEX

One expansion index test was performed on a composite of bulk samples of Vaqueros-Sespe claystone bedrock collected from borings B-5 and B-6 at depths between 30 and 50 feet were tested to establish the expansion index in accordance with ASTM D4829. Table B-3 summarizes the expansion index and expansion potential defined in this ASTM D4829 standard. The result of this test was an Expansion Index of 140, which is considered as “Very High” in Table B-3. The test result is attached.

Table B-3
Expansion Index and Expansion Potential

EXPANSION INDEX, EI	EXPANSION POTENTIAL
0-20	Very Low
21-50	Low
51-90	Medium
90-130	High
>131	Very High

CORROSIVITY

Two corrosivity tests were performed on a two samples of sedimentary rock material. The tests were conducted to estimate pH, resistivity, soluble sulfate, and chloride contents of encountered earth materials, in general accordance with the following Caltrans Standard Test Methods: CTM 643 for electrical resistivity, CTM 532 for pH, CTM 417 for sulfate content, and CTM 422 for chloride content. The test results are attached. Because of the limited quantity of material obtained from sample 4 of Boring B-1, the laboratory was unable to perform the full suite of testing for corrosivity.

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Moisture and Density

AP Engineering & Testing, Inc.

MOISTURE AND DENSITY TEST RESULTS

Client: Kleinfelder
Project Name: IRWD - Santiago Reservoir C+
Project No.: 20153742

Laboratory No.: 15-0208
Date: 02/09/15

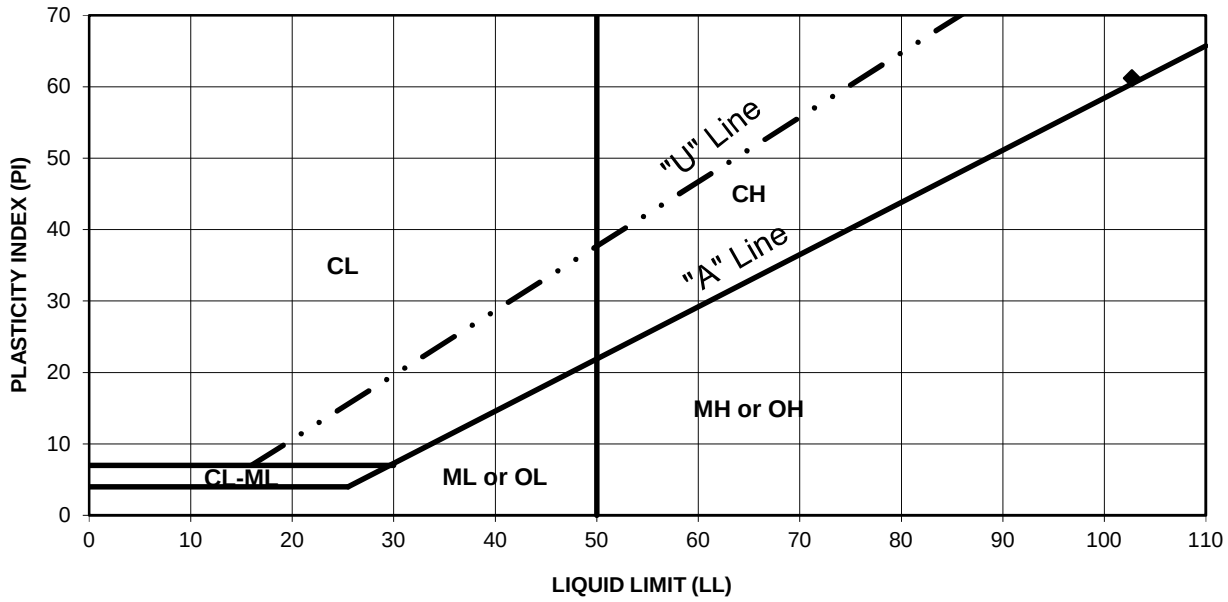
Boring No.	Sample No.	Sample Depth (ft.)	Moisture Content (%)	Dry Density (pcf)
B-1	S-2	3.5-5	16.2	93.6
B-1	S-4	10-11.5	17.7	81.3
B-1	-	53.5-54	44.7	NA
B-2	S-2	3.5-5	19.0	78.9
B-2	S-4	10-11.5	4.0	107.4
B-2	S-6	20-21.5	9.6	95.5
B-2	-	33.5-34	13.3	108.0
B-2	-	36.5-37	13.0	113.5
B-2	-	37.5-38	14.1	89.2
B-2	-	40-41	14.0	115.0

Atterberg Limits

AP Engineering & Testing, Inc.

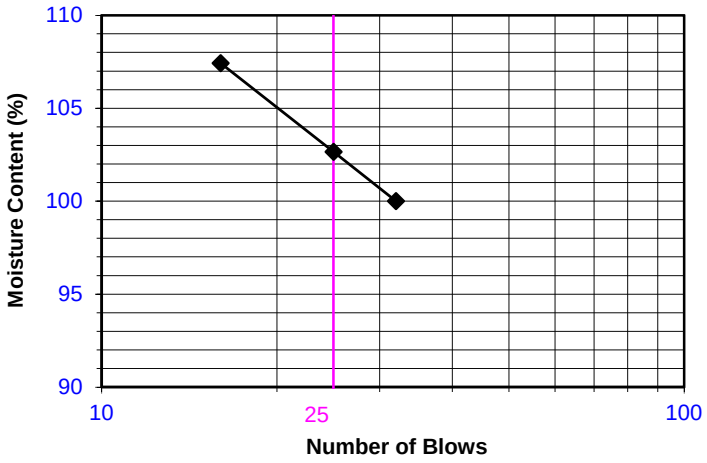
ATTERBERG LIMITS
ASTM D 4318

Project Name: IRWD - Santiago Reservoir C+ **Tested By:** LS Date: 02/10/15
Project No.: 20153742 **Checked By:** AP Date: 02/11/15



PROCEDURE USED

- ☐ Wet Preparation
- ☒ Dry Preparation
- ☒ Procedure A Multipoint Test
- ☐ Procedure B One-point Test



Symbol	Boring Number	Sample Number	Depth (feet)	LL	PL	PI	Plasticity Chart Symbol
♦	B-1	-	53.5-54	103	42	61	CH

Maximum Density (Compaction)

AP Engineering & Testing, Inc.

COMPACTION TEST

Client:	Kleinfelder			AP Number:	15-0208
Project Name:	IRWD - Santiago Reservoir C+	Tested By:	LS	Date:	02/09/15
Project No. :	20153742	Calculated By:	JP	Date:	02/11/15
Boring No.:	B-1	Checked By:	AP	Date:	02/11/15
Sample No.:	Bulk	Depth(ft.):	0-5		

Visual Sample Description: Sandy Clay w/gravel

		Compaction Method	X	ASTM D1557
				ASTM D698
METHOD	C	Preparation Method		Moist
MOLD VOLUME (CU.FT)	0.0752		X	Dry

Wt. Comp. Soil + Mold (gm.)	6810	6801	6696	6569		
Wt. of Mold (gm.)	2666	2666	2666	2666		
Net Wt. of Soil (gm.)	4144	4136	4031	3904		
Container No.						
Wt. of Container (gm.)	150.36	144.67	150.72	148.94		
Wet Wt. of Soil + Cont. (gm.)	367.68	376.49	402.57	417.14		
Dry Wt. of Soil + Cont. (gm.)	331.61	335.76	365.05	380.64		
Moisture Content (%)	19.90	21.31	17.51	15.75		
Wet Density (pcf)	121.49	121.24	118.16	114.44		
Dry Density (pcf)	101.32	99.94	100.56	98.86		

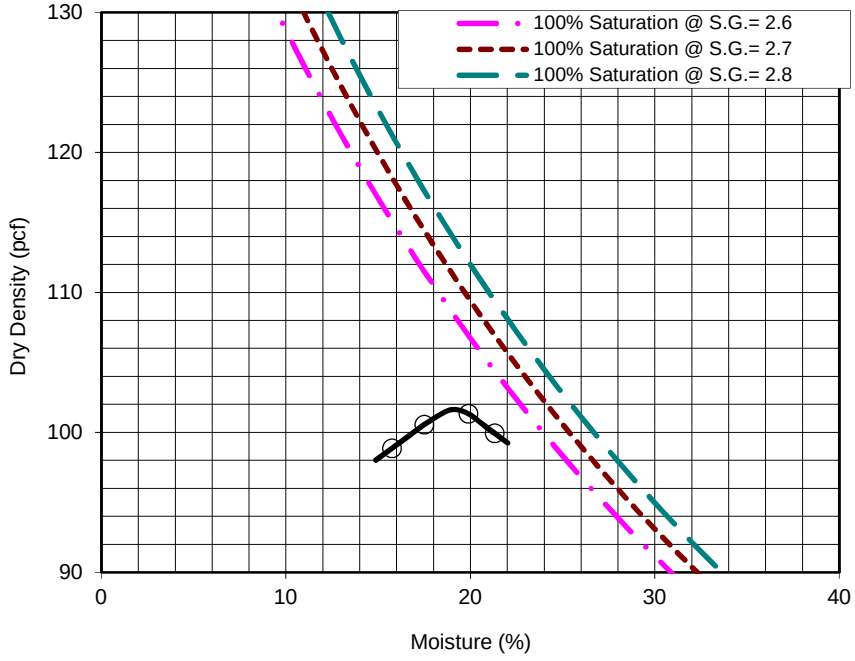
Maximum Dry Density (pcf)	**101.6**	Optimum Moisture Content (%)	**19.2**
Maximum Dry Density w/ Rock Correction (pcf)	**N/A**	Optimum Moisture Content w/ Rock Correction (%)	**N/A**

PROCEDURE USED

☐ *METHOD A: Percent of Oversize:* *N/A*
Soil Passing No. 4 (4.75 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)

☐ *METHOD B: Percent of Oversize:* *N/A*
Soil Passing 3/8 in. (9.5 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)

☒ *METHOD C: Percent of Oversize:* *4.3%*
Soil Passing 3/4 in. (19.0 mm) Sieve
Mold : 6 in. (152.4 mm) diameter
Layers : 5 (Five)
Blows per layer : 56 (fifty-six)



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Direct Shear

AP Engineering & Testing, Inc.

DIRECT SHEAR TEST DATA
ASTM D 3080

Project Name: IRWD - Santiago Reservoir C+ Tested By ST Date: 02/09/15

Boring No.: B-1 Checked By AP Date: 02/11/15

Sample No.: S-2 Depth (ft): 3.5-5

Description: Sandy Claystone

Sample Type: Mod. Cal.

Test Condition: Inundated

Sample Diameter (in)	2.415
Sample Height (in)	1.00
Total Soil+Ring Weight(g)	521.46
Total Ring Weight (g)	137.84
Wet Density (pcf)	106.34
Dry Density (pcf)	91.48

Moisture Determination	Before Test	After Test
Cont. Weight (g)	49.60	141.82
Wet Soil+Cont. (g)	117.88	558.38
Dry Soil+Cont. (g)	108.34	462.54
Moisture Content (%)	16.2	29.9
Degree Saturation	52.0	98.0

METHOD OF SHEARING

[X] Regular Shearing

[ ] Residual Shearing 5 Passes

Shear Rate (in/min): **0.005**

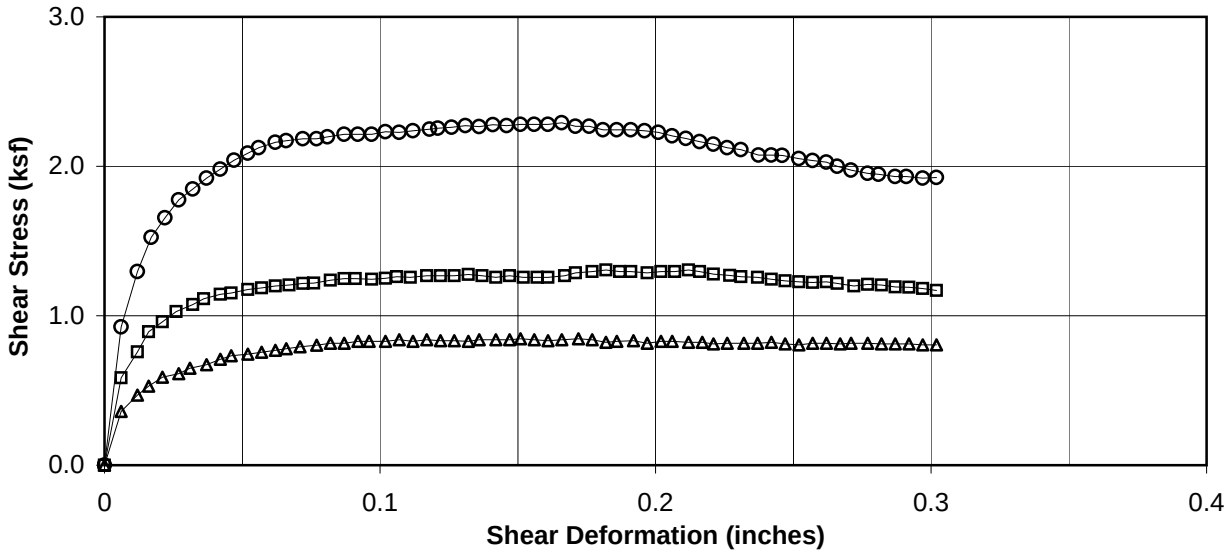
Shear Distance (in): **0.3**

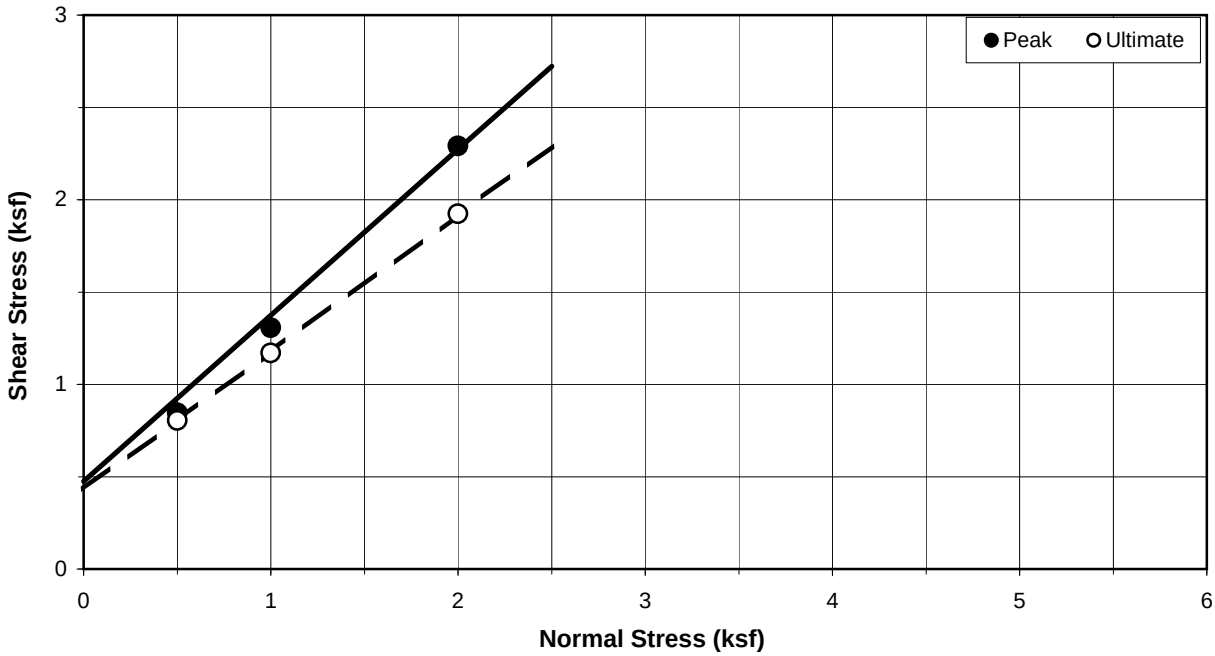
Sample Number	Sample + Ring Wt.	Ring Wt.	Normal Load (ksf)	Max. Shear Reading (psf)	Ultimate Shear Reading (psf)	Remarks
1	**166.80**	**45.99**	**0.5**	**845**	**805**	
2	**173.66**	**46.12**	**1.0**	**1306**	**1170**	
3	**181.00**	**45.73**	**2.0**	**2292**	**1924**	

AP Engineering & Testing, Inc.

DIRECT SHEAR TEST RESULTS
ASTM D 3080

Project Name:	IRWD - Santiago Reservoir C+	Initial Dry Density:	91.5	pcf
Boring No.:	B-1	Moisture Content (before):	16.2	%
Sample No.:	S-2	Moisture Content (after):	29.9	%
Depth (ft):	3.5-5			
Sample Type:	Mod. Cal.			
Soil Description:	Sandy Claystone			
Test Condition:	Inundated			





Strength Parameters	Peak	Ultimate
Cohesion (psf):	500	450
Friction Angle:	42 °	37 °

AP Engineering & Testing, Inc.

DIRECT SHEAR TEST DATA
ASTM D 3080

Project Name: IRWD - Santiago Reservoir C+ Tested By JT Date: 02/09/15

Boring No.: B-1 Checked By AP Date: 02/11/15

Sample No.: S-4 Depth (ft): 10-11.5

Description: Bedrock

Sample Type: Mod. Cal.

Test Condition: Inundated

			Moisture Determination	Before Test	After Test
Sample Diameter (in)			Cont. Weight (g)		
Sample Height (in)			Wet Soil+Cont. (g)		
Total Soil+Ring Weight(g)			Dry Soil+Cont. (g)		
Total Ring Weight (g)			Moisture Content (%)		
Wet Density (pcf)			Degree Saturation		
Dry Density (pcf)					

SAMPLE CONTAINS TOO MUCH GRAVEL

ME

[X] R

[ ] R

						marks

AP Engineering & Testing, Inc.

DIRECT SHEAR TEST DATA
ASTM D 3080

Project Name: IRWD - Santiago Reservoir C+ Tested By JT Date: 02/10/15

Boring No.: B-2 Checked By AP Date: 02/11/15

Sample No.: S-2 Depth (ft): 3.5-5

Description: Silty Sandstone

Sample Type: Mod. Cal.

Test Condition: Inundated

Sample Diameter (in)	2.415
Sample Height (in)	1.00
Total Soil+Ring Weight(g)	467.94
Total Ring Weight (g)	137.60
Wet Density (pcf)	91.57
Dry Density (pcf)	76.96

Moisture Determination	Before Test	After Test
Cont. Weight (g)	49.92	149.59
Wet Soil+Cont. (g)	152.38	514.77
Dry Soil+Cont. (g)	136.03	410.03
Moisture Content (%)	19.0	40.2
Degree Saturation	43.1	92.7

METHOD OF SHEARING

[X] Regular Shearing — Shear Rate (in/min): **0.01**

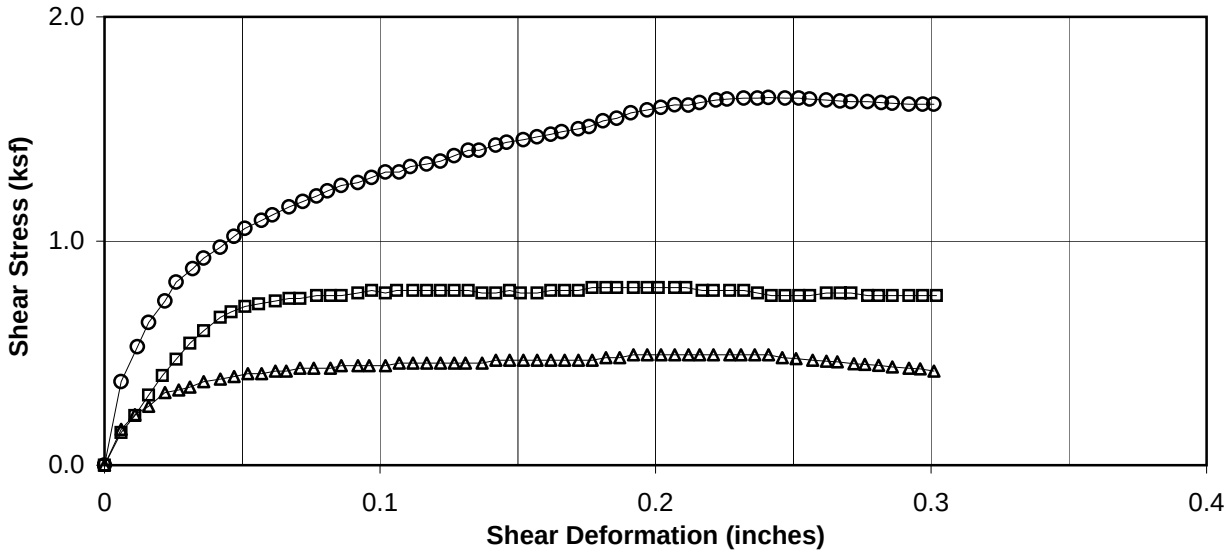
[ ] Residual Shearing 5 Passes — Shear Distance (in): **0.3**

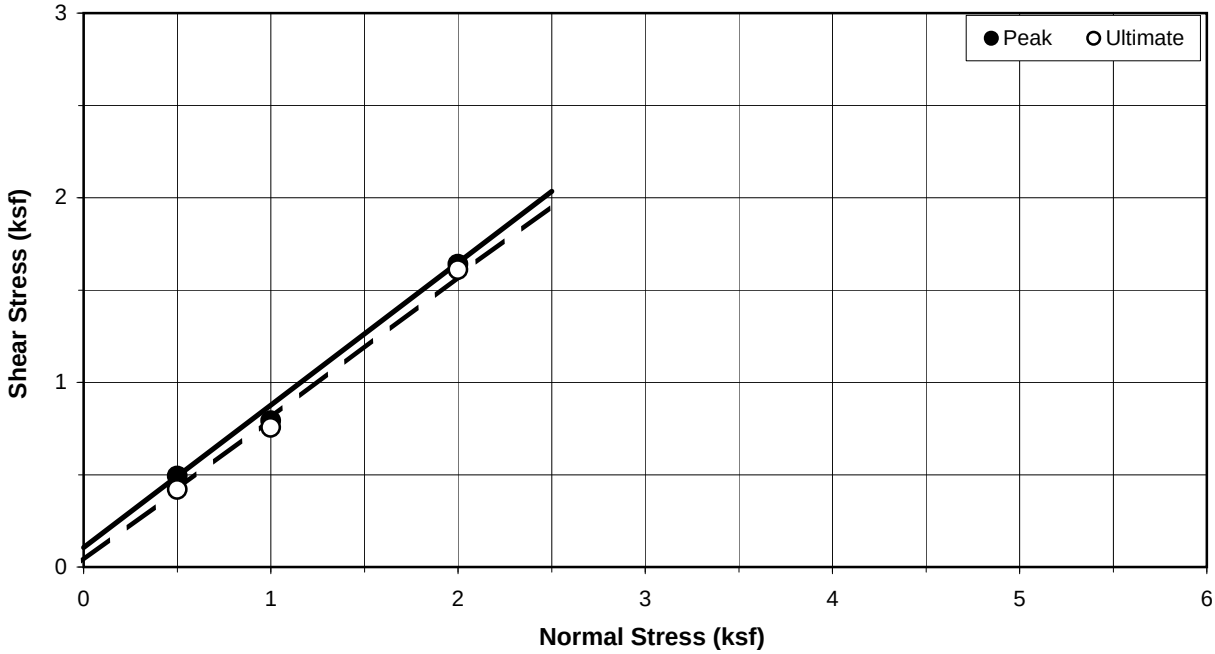
Sample Number	Sample + Ring Wt.	Ring Wt.	Normal Load (ksf)	Max. Shear Reading (psf)	Ultimate Shear Reading (psf)	Remarks
1	**158.38**	**45.84**	**0.5**	**492**	**420**	
2	**152.43**	**45.98**	**1.0**	**792**	**756**	
3	**157.13**	**45.78**	**2.0**	**1640**	**1610**	

AP Engineering & Testing, Inc.

DIRECT SHEAR TEST RESULTS
ASTM D 3080

Project Name:	IRWD - Santiago Reservoir C+	Initial Dry Density:	77.0	pcf
Boring No.:	B-2	Moisture Content (before):	19.0	%
Sample No.:	S-2	Moisture Content (after):	40.2	%
Depth (ft):	3.5-5			
Sample Type:	Mod. Cal.			
Soil Description:	Silty Sandstone			
Test Condition:	Inundated			





Strength Parameters	Peak	Ultimate
Cohesion (psf):	100	50
Friction Angle:	38 °	38 °

AP Engineering & Testing, Inc.

DIRECT SHEAR TEST DATA
ASTM D 3080

Project Name: IRWD - Santiago Reservoir C+ Tested By JT Date: 02/11/15

Boring No.: B-2 Checked By AP Date: 02/12/15

Sample No.: S-4 Depth (ft): 10-11.5

Description: Sandy Silt w/gravel

Sample Type: Mod. Cal.

Test Condition: Inundated

Sample Diameter (in)	2.415
Sample Height (in)	1.00
Total Soil+Ring Weight(g)	532.52
Total Ring Weight (g)	137.64
Wet Density (pcf)	109.46
Dry Density (pcf)	105.24

Moisture Determination	Before Test	After Test
Cont. Weight (g)	50.07	141.83
Wet Soil+Cont. (g)	179.79	574.73
Dry Soil+Cont. (g)	174.78	498.81
Moisture Content (%)	4.0	21.3
Degree Saturation	18.0	98.5

METHOD OF SHEARING

[X] Regular Shearing

[ ] Residual Shearing 5 Passes

Shear Rate (in/min): **0.01**

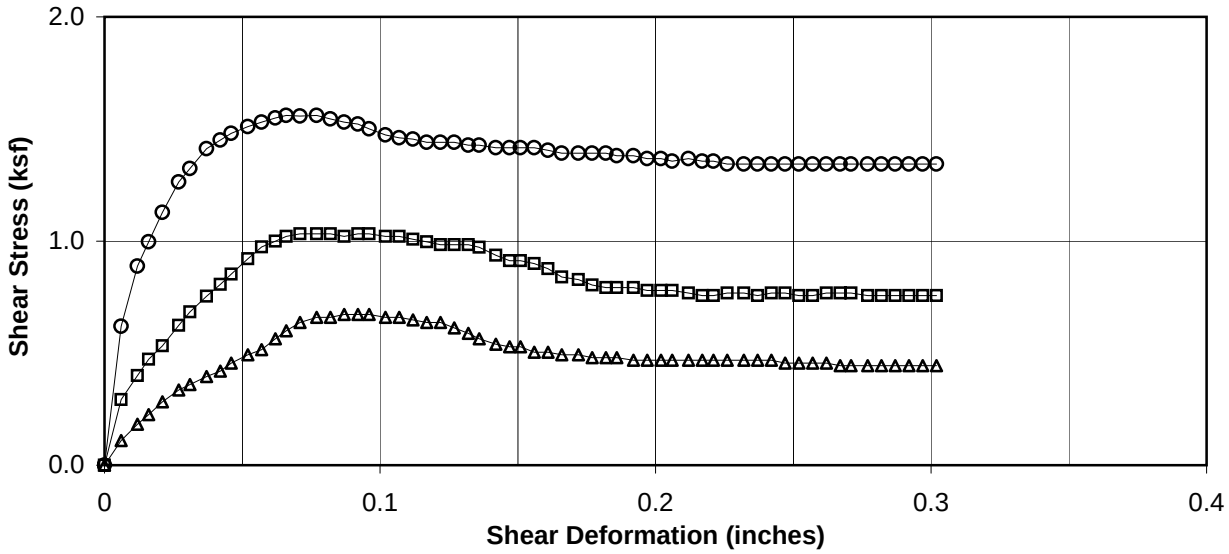
Shear Distance (in): **0.3**

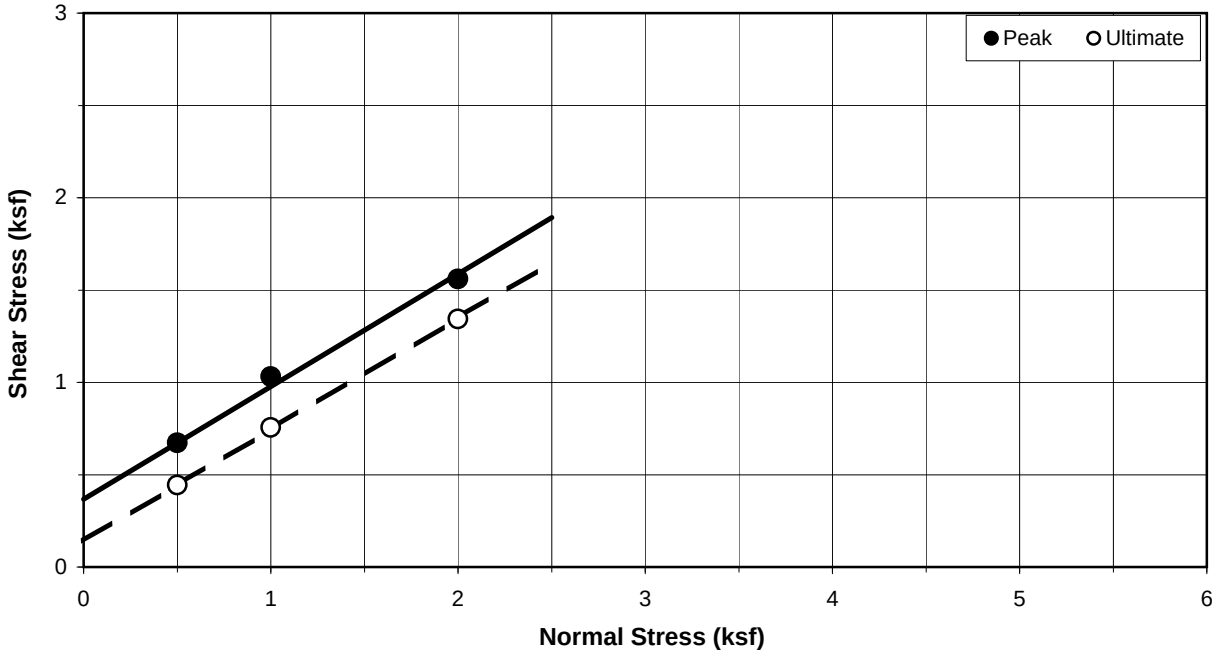
Sample Number	Sample + Ring Wt.	Ring Wt.	Normal Load (ksf)	Max. Shear Reading (psf)	Ultimate Shear Reading (psf)	Remarks
1	**176.34**	**45.84**	**0.5**	**672**	**444**	
2	**176.60**	**45.95**	**1.0**	**1032**	**756**	
3	**179.58**	**45.85**	**2.0**	**1560**	**1344**	

AP Engineering & Testing, Inc.

DIRECT SHEAR TEST RESULTS
ASTM D 3080

Project Name:	IRWD - Santiago Reservoir C+	Initial Dry Density:	105.2	pcf
Boring No.:	B-2	Moisture Content (before):	4.0	%
Sample No.:	S-4	Moisture Content (after):	21.3	%
Depth (ft):	10-11.5			
Sample Type:	Mod. Cal.			
Soil Description:	Sandy Silt w/gravel			
Test Condition:	Inundated			





Strength Parameters	Peak	Ultimate
Cohesion (psf):	350	150
Friction Angle:	31 °	31 °

AP Engineering & Testing, Inc.

DIRECT SHEAR TEST DATA
ASTM D 3080

Project Name: IRWD - Santiago Reservoir C+ Tested By JT Date: 02/10/15

Boring No.: B-2 Checked By AP Date: 02/11/15

Sample No.: S-6 Depth (ft): 20-21.5

Description: Silty Sand

Sample Type: Mod. Cal.

Test Condition: Inundated

Sample Diameter (in)	2.415
Sample Height (in)	1.00
Total Soil+Ring Weight(g)	506.89
Total Ring Weight (g)	137.68
Wet Density (pcf)	102.35
Dry Density (pcf)	93.41

Moisture Determination	Before Test	After Test
Cont. Weight (g)	49.99	149.17
Wet Soil+Cont. (g)	187.53	286.56
Dry Soil+Cont. (g)	175.52	257.94
Moisture Content (%)	9.6	26.3
Degree Saturation	32.1	90.4

METHOD OF SHEARING

[X] Regular Shearing

[ ] Residual Shearing 5 Passes

Shear Rate (in/min): **0.01**

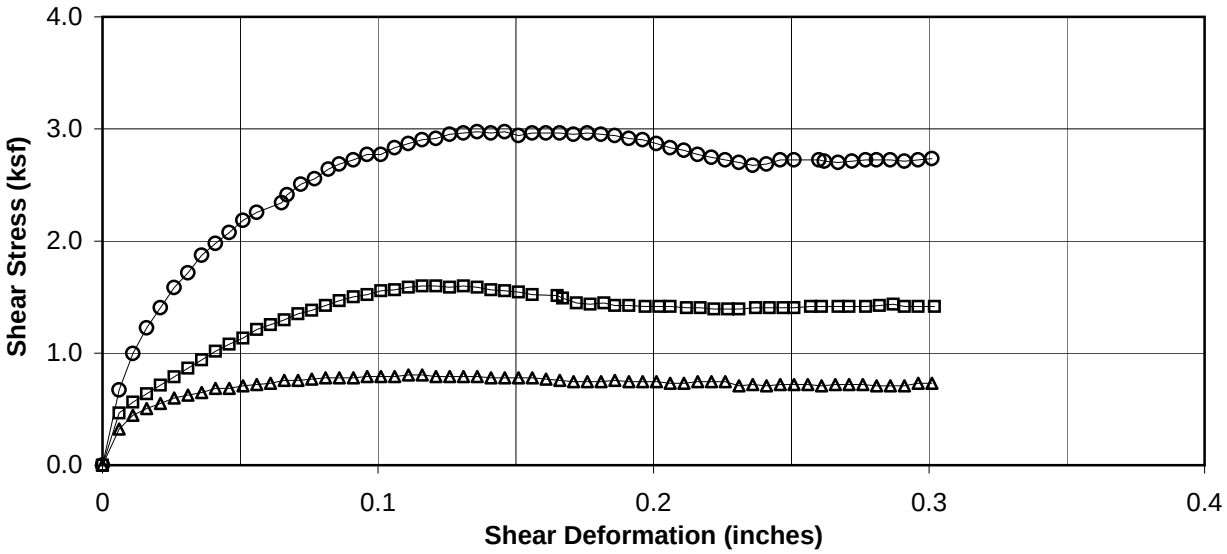
Shear Distance (in): **0.3**

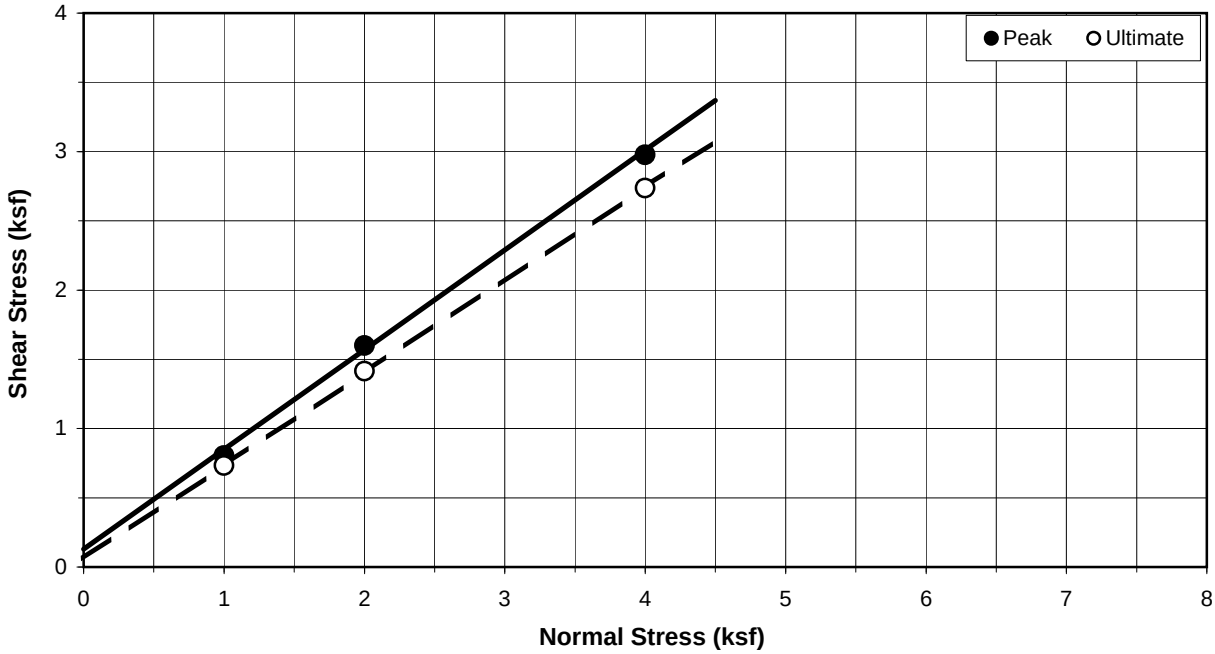
Sample Number	Sample + Ring Wt.	Ring Wt.	Normal Load (ksf)	Max. Shear Reading (psf)	Ultimate Shear Reading (psf)	Remarks
1	**167.62**	**45.84**	**1.0**	**804**	**732**	
2	**168.91**	**45.98**	**2.0**	**1598**	**1415**	
3	**170.36**	**45.86**	**4.0**	**2976**	**2736**	

AP Engineering & Testing, Inc.

DIRECT SHEAR TEST RESULTS
ASTM D 3080

Project Name:	IRWD - Santiago Reservoir C+	Initial Dry Density:	93.4	pcf
Boring No.:	B-2	Moisture Content (before):	9.6	%
Sample No.:	S-6	Moisture Content (after):	26.3	%
Depth (ft):	20-21.5			
Sample Type:	Mod. Cal.			
Soil Description:	Silty Sand			
Test Condition:	Inundated			





Strength Parameters	Peak	Ultimate
Cohesion (psf):	150	50
Friction Angle:	36 °	34 °

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Unconfined Compressive Strength

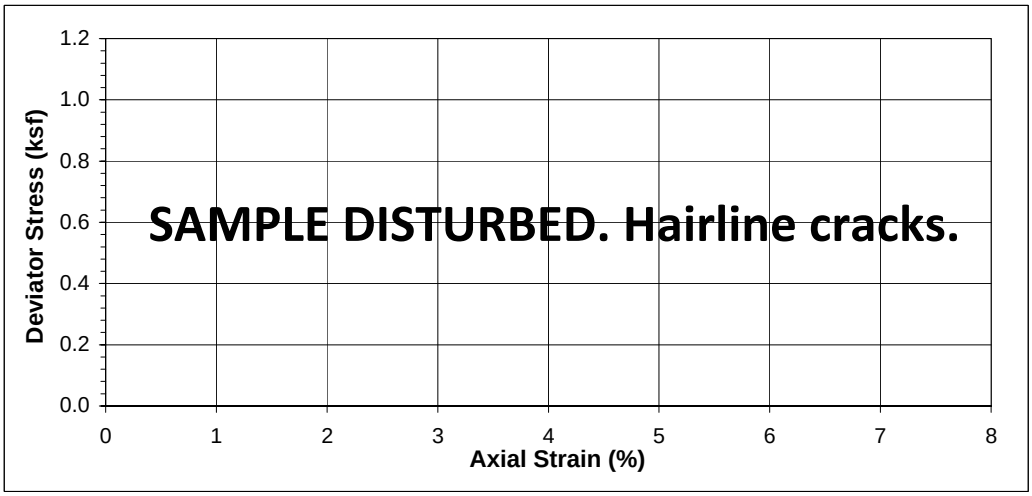
AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS
ASTM D 2166

Project Name:	IRWD - Santiago Reservoir C+	Sample Type:	Core
Project No.:	20153742	Soil Description	
Boring No.:	B-2	Dry Density (pcf):	
Sample No.:	-	Moisture Content (%)	
Depth (feet):	33.5-34	Test Date:	02/09/15

Sample Diameter (inch):
Sample Height (inch):
Sample Weight (gms):

Wt. Wet Soil+Container(gms)
Wt. Dry Soil+Container(gms)
Wt. Container (gms)



After Test

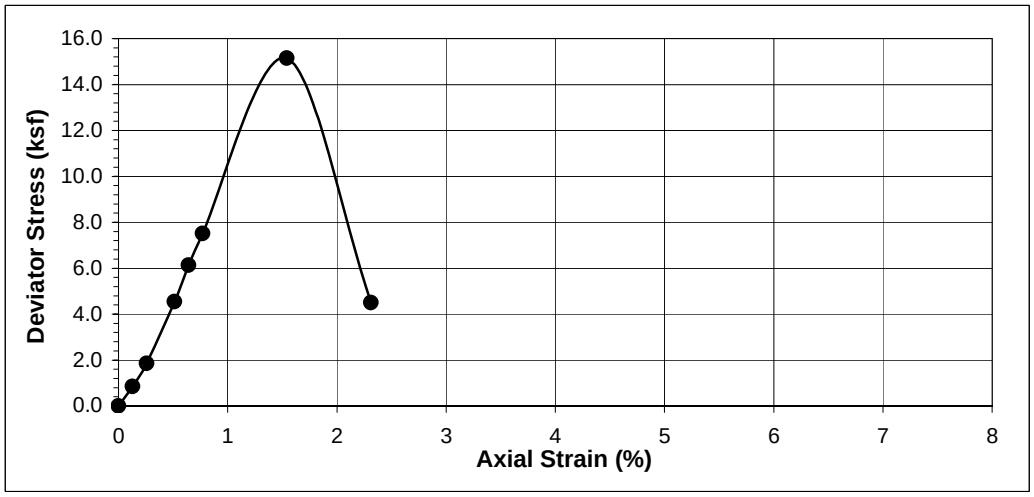
Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS
ASTM D 2166

Project Name:	IRWD - Santiago Reservoir C+	Sample Type:	Core
Project No.:	20153742	Soil Description	Sandy Siltstone
Boring No.:	B-2	Dry Density (pcf):	113.4
Sample No.:	-	Moisture Content (%)	13.0
Depth (feet):	36.5-37	Test Date:	02/09/15

Sample Diameter (inch):	1.913	Wt. Wet Soil+Container(gms)	555.27
Sample Height (inch):	3.891	Wt. Dry Soil+Container(gms)	512.09
Sample Weight (gms):	376.13	Wt. Container (gms)	179.60



After Test

Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	2.87	0.00	0.00
17	0.005	2.88	0.85	0.13
37	0.010	2.88	1.85	0.26
91	0.020	2.89	4.54	0.51
123	0.025	2.89	6.13	0.64
151	0.030	2.90	7.51	0.77
307	0.060	2.92	15.15	1.54
92	0.090	2.94	4.50	2.31

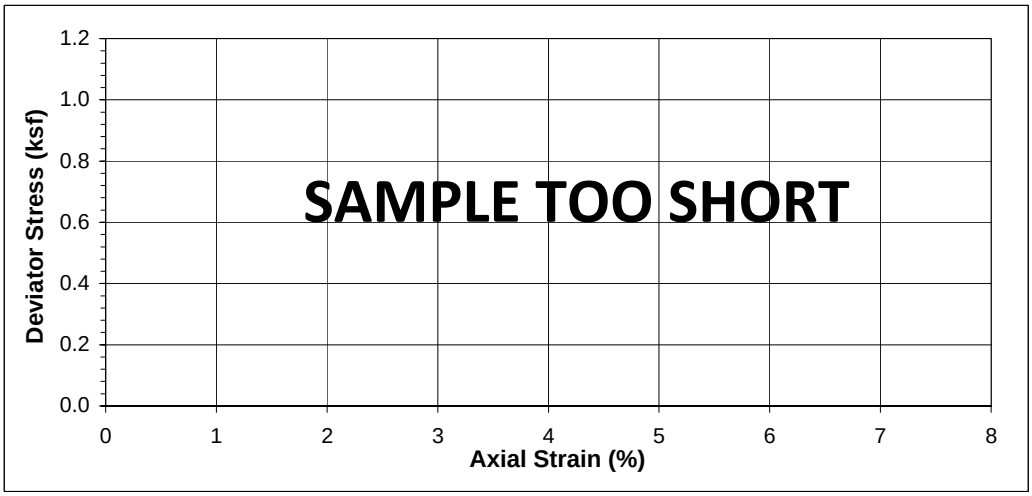
AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS
ASTM D 2166

Project Name:	IRWD - Santiago Reservoir C+	Sample Type:	Core
Project No.:	20153742	Soil Description	
Boring No.:	B-2	Dry Density (pcf):	
Sample No.:	-	Moisture Content (%)	
Depth (feet):	37.5-38	Test Date:	02/09/15

Sample Diameter (inch):
Sample Height (inch):
Sample Weight (gms):

Wt. Wet Soil+Container(gms)
Wt. Dry Soil+Container(gms)
Wt. Container (gms)



After Test

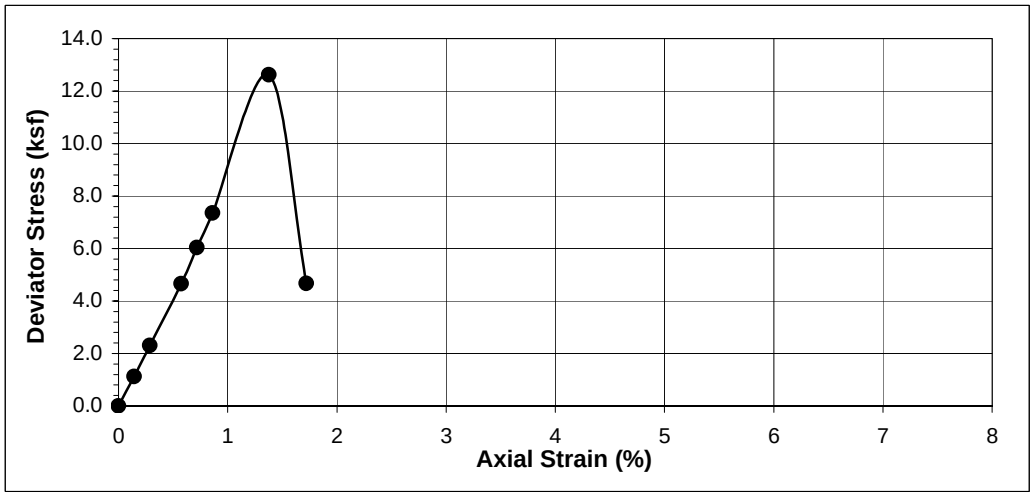
Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)

AP Engineering & Testing, Inc.

UNCONFINED COMPRESSION TEST RESULTS
ASTM D 2166

Project Name:	IRWD - Santiago Reservoir C+	Sample Type:	Core
Project No.:	20153742	Soil Description	Sandy Siltstone
Boring No.:	B-2	Dry Density (pcf):	115.0
Sample No.:	-	Moisture Content (%)	14.0
Depth (feet):	40-41	Test Date:	02/09/15

Sample Diameter (inch):	1.619	Wt. Wet Soil+Container(gms)	396.17
Sample Height (inch):	3.488	Wt. Dry Soil+Container(gms)	365.85
Sample Weight (gms):	247.19	Wt. Container (gms)	149.46



After Test

Load (lbs)	Deformation (inch)	Area (sq.in)	Compressive Stress (ksf)	Axial Strain (%)
0	0.000	2.06	0.00	0.00
16	0.005	2.06	1.12	0.14
33	0.010	2.06	2.30	0.29
67	0.020	2.07	4.66	0.57
87	0.025	2.07	6.04	0.72
106	0.030	2.08	7.35	0.86
183	0.048	2.09	12.62	1.38
68	0.060	2.09	4.67	1.72

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Point Load Index

Data checked by:_CRL_____ Date:_02/11/15_____

Point Load Strength Index Test Results ASTM D-5731

PROJECT:	**IRWD - Santiago Reservoir**	**LAB SAMPLE NO.:**	11743A
PROJECT NO.:	**20153742**	**SAMPLE NO.:**	B-1 @ 23'
PROJECT LOCATION:	**Santiago, CA**	**SAMPLE DESCRIP:**	Andesite
SAMPLED BY:	**KLF**	**DATE TESTED:**	2/6/2015
DATE SAMPLED:	**1/26/2015**	**REPORTED BY:**	M. Dawson

Boring No.	Depth (ft)	Test Number	Test Type*	Rock Type	Width, W (in)	Depth or Diameter, D (in)	Failure Load, P (lbs)	De^2 (in^2)	Point Load Strength Index, $I_{s(50)}$ (PSI)	Uniaxial Compressive Strength, UCS (PSI)	Valid/ Invalid
B1	23'	1	a	Andesite	1.97	1.14	1.6	2.86	512	11787	Valid
B1	23'	2	i	Andesite	1.94	0.83	1.2	2.05	491	11299	Valid
B1	23'	3	i	Andesite	1.99	1.11	0.8	2.81	257	5919	Valid
		4									
		5									
		6									
		7									
		8									
		9									
		10									

Point Load Strength Index

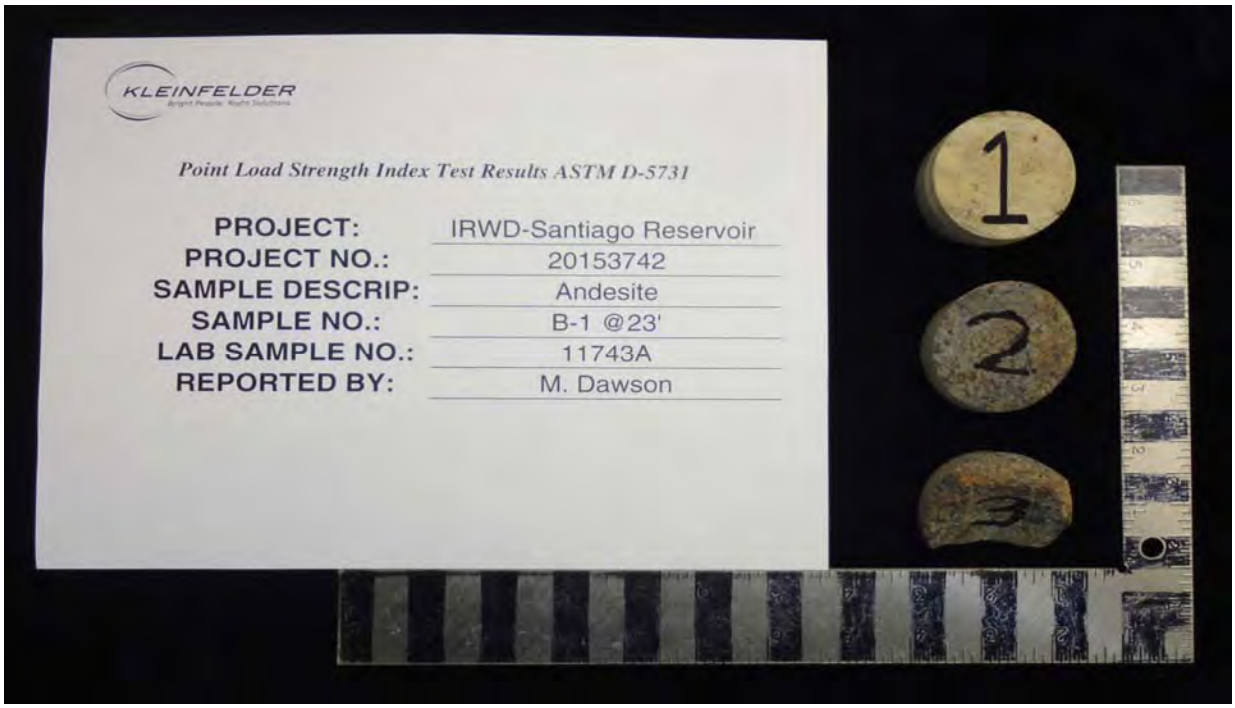
$I_{s(50)}$	**psi**	or	**0**	**psf**	or	**0.00**	**MPa**

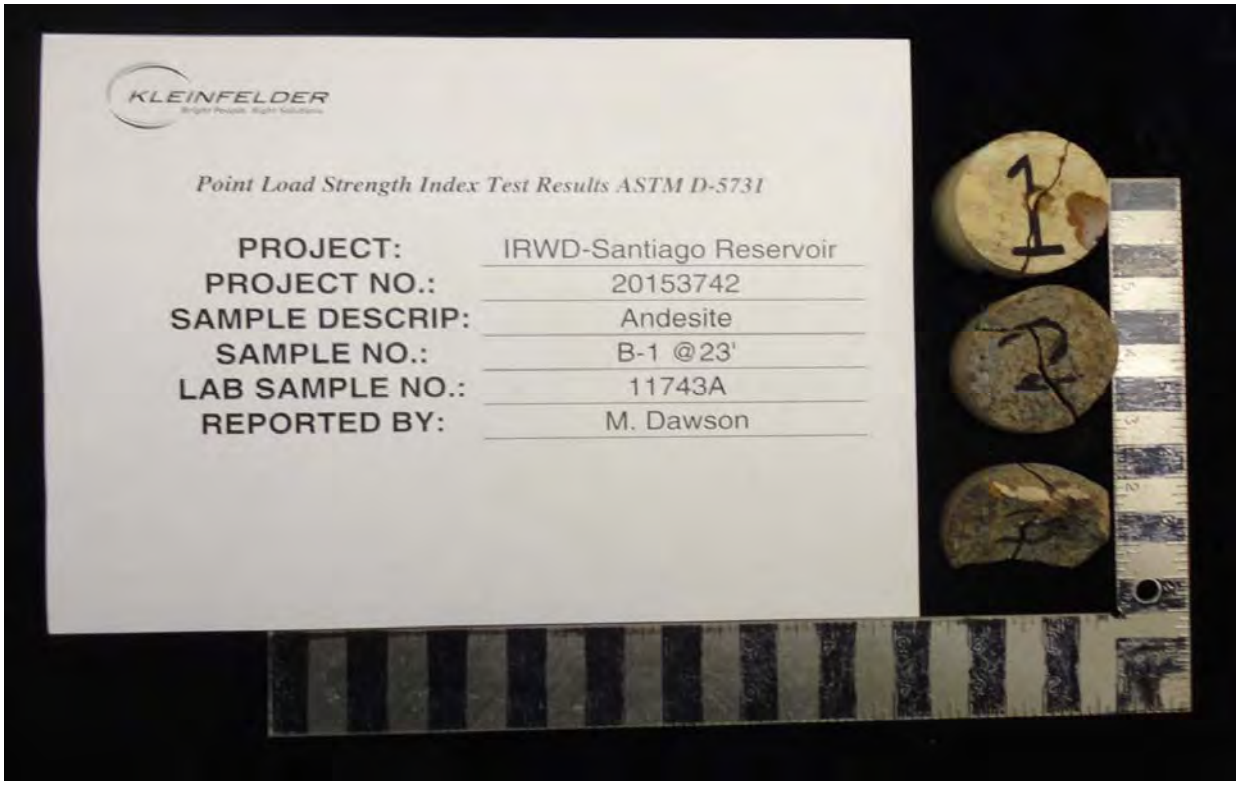
Uniaxial Compressive Strength

σ_c=	**psi**	or	**0**	**psf**	or	**0**	**MPa**

*Test Type
d = diametral
a = axial
b = block
i = irregular lump

Point Load Strength Index Test Results ASTM D-5731





Data checked by:_CRL_____ Date:_02/11/15_____

Point Load Strength Index Test Results ASTM D-5731

PROJECT:	**IRWD - Santiago Reservoir**	**LAB SAMPLE NO.:**	11743B
PROJECT NO.:	**20153742**	**SAMPLE NO.:**	B-1 @ 27.5'
PROJECT LOCATION:	**Santiago, CA**	**SAMPLE DESCRIP:**	Andesite
SAMPLED BY:	**KLF**	**DATE TESTED:**	2/6/2015
DATE SAMPLED:	**1/26/2015**	**REPORTED BY:**	M. Dawson

Boring No.	Depth (ft)	Test Number	Test Type*	Rock Type	Width, W (in)	Depth or Diameter, D (in)	Failure Load, P (lbs)	De^2 (in^2)	Point Load Strength Index, $I_{s(50)}$ (PSI)	Uniaxial Compressive Strength, UCS (PSI)	Valid/ Invalid
B1	27.5'	1	i	Andesite	0.97	1.97	1.3	2.43	499	11483	Valid
B1	27.5'	2	i	Andesite	1.36	1.97	1.1	3.41	306	7040	Valid
B1	27.5	3	i	Andesite	1.15	1.96	1.0	2.87	312	7174	Valid
B1	27.5'	4	i	Andesite	1.08	1.96	1.1	2.70	386	8875	Valid
		5									
		6									
		7									
		8									
		9									
		10									

Point Load Strength Index

$I_{s(50)}$	**psi**	or	**0**	**psf**	or	**0.00**	**MPa**

Uniaxial Compressive Strength

σ_c=	**psi**	or	**0**	**psf**	or	**0**	**MPa**

*Test Type
d = diametral
a = axial
b = block
i = irregular lump

Point Load Strength Index Test Results ASTM D-5731

Data checked by:_CRL_____ Date:_02/11/15_____

Point Load Strength Index Test Results ASTM D-5731

PROJECT:	**IRWD - Santiago Reservoir**	**LAB SAMPLE NO.:**	11743C
PROJECT NO.:	**20153742**	**SAMPLE NO.:**	B-1 @ 29'
PROJECT LOCATION:	**Santiago, CA**	**SAMPLE DESCRIP:**	Andesite
SAMPLED BY:	**KLF**	**DATE TESTED:**	2/6/2015
DATE SAMPLED:	**1/26/2015**	**REPORTED BY:**	M. Dawson

Boring No.	Depth (ft)	Test Number	Test Type*	Rock Type	Width, W (in)	Depth or Diameter, D (in)	Failure Load, P (lbs)	De^2 (in^2)	Point Load Strength Index, $I_{s(50)}$ (PSI)	Uniaxial Compressive Strength, UCS (PSI)	Valid/ Invalid
B1	29'	1	i	Andesite	1.06	1.95	0.7	2.63	236	5421	Valid
B1	29'	2	i	Andesite	1.41	1.97	0.5	3.54	133	3051	Valid
B1	29'	3	i	Andesite	1.35	1.68	0.7	2.89	242	5564	Valid
B1	29'	4	i	Andesite	1.18	1.97	1.1	2.96	353	8122	Valid
		5									
		6									
		7									
		8									
		9									
		10									

Point Load Strength Index

$I_{s(50)}$	**psi**	or	**0**	**psf**	or	**0.00**	**MPa**

Uniaxial Compressive Strength

σ_c=	**psi**	or	**0**	**psf**	or	**0**	**MPa**

*Test Type
d = diametral
a = axial
b = block
i = irregular lump

Point Load Strength Index Test Results ASTM D-5731

Data checked by:_CRL_____ Date:_02/11/15_____

Point Load Strength Index Test Results ASTM D-5731

PROJECT:	**IRWD - Santiago Reservoir**	**LAB SAMPLE NO.:**	11743D
PROJECT NO.:	**20153742**	**SAMPLE NO.:**	B-1 @34'
PROJECT LOCATION:	**Santiago, CA**	**SAMPLE DESCRIP:**	Andesite
SAMPLED BY:	**KLF**	**DATE TESTED:**	2/6/2015
DATE SAMPLED:	**1/26/2015**	**REPORTED BY:**	M. Dawson

Boring No.	Depth (ft)	Test Number	Test Type*	Rock Type	Width, W (in)	Depth or Diameter, D (in)	Failure Load, P (lbs)	De^2 (in^2)	Point Load Strength Index, $I_{s(50)}$ (PSI)	Uniaxial Compressive Strength, UCS (PSI)	Valid/ Invalid
B1	34'	1	i	Andesite	0.82	1.97	0.4	2.06	167	3837	Valid
B1	34'	2	i	Andesite	1.33	1.95	1.5	3.30	431	9909	Valid
B1	34'	3	d	Andesite	1.31	1.99	0.8	2.55	296	6797	Valid
		4									
		5									
		6									
		7									
		8									
		9									
		10									

Point Load Strength Index

$I_{s(50)}$	**psi**	or	**0**	**psf**	or	**0.00**	**MPa**

Uniaxial Compressive Strength

σ_c=	**psi**	or	**0**	**psf**	or	**0**	**MPa**

*Test Type
d = diametral
a = axial
b = block
i = irregular lump

Point Load Strength Index Test Results ASTM D-5731

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Expansion Index

AP Engineering & Testing, Inc.

EXPANSION INDEX TEST RESULTS

ASTM D 4829

Client Name: Kleinfelder
Project Name: IRWD - Santiago Hills Reservoir
Project No.: 20153742.001A

AP Job No.: 15-0463
Date: 04/27/15

Boring No.	Sample No.	Depth (ft)	Soil Description	Molded Dry Density (pcf)	Molded Moisture Content (%)	Init. Degree Saturation (%)	Measured Expansion Index	Corrected Expansion Index
B-5 & B-6 (Tvs-comp)	1	30-50	Claystone	83.4	19.7	52.3	137	140

ASTM EXPANSION CLASSIFICATION

Expansion Index	Classification
0-20	V. Low
21-50	Low
51-90	Medium
91-130	High
>130	V. High

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Corrosion

AP Engineering & Testing, Inc.

CORROSION TEST RESULTS

Client Name: Kleinfelder
Project Name: IRWD - Santiago Reservoir C+
Project No.: 20153742

AP Job No.: 15-0208
Date 02/09/15

Boring No.	Sample No.	Depth (feet)	Soil Type	Minimum Resistivity (ohm-cm)	pH	Sulfate Content (ppm)	Chloride Content (ppm)
B-1	S-4	10-11.5	SM	1964	NR	NR	NR
B-2	S-6	20-21.5	SM	4437	7.6	36	90

NOTES: Resistivity Test and pH: California Test Method 643
Sulfate Content : California Test Method 417
Chloride Content : California Test Method 422
ND = Not Detectable
NA = Not Sufficient Sample
NR = Not Requested

2607 Pomona Boulevard, Pomona, CA 91768
Tel. (909) 869-6316 Fax. (909)869-6318

APPENDIX C
FIELD EXPLORATION AND GEOLOGIC MAP AND INTERPRETIVE GEOLOGIC SECTIONS

SANTIAGO CANYON ROAD

LEGEND

- GEOLOGIC CONTACT, DOTTED WHERE BURIED
- FAULT, DOTTED WHERE BURIED
- 1 (0+00) INTERPRETIVE GEOLOGIC SECTION LOCATION
- SLIDE DIRECTION
- 80 BEDDING ATTITUDE
- 12 FAULT ATTITUDE
- B-1 BOREHOLE
- TP-1 TEST PIT
- af ENGINEERED FILL
- Qls LANDSLIDE
- Tps PUENTE FORMATION-SOQUEL MEMBER, (CONCEALED / BURIED)
- Tplv PUENTE FORMATION-LA VIDA MEMBER (CONCEALED / BURIED)
- Tema EL MODENO VOLCANICS-ANDESITE FLOW/FLOW BRECCIA
- Tt TOPANGA FORMATION, (CONCEALED / BURIED)
- Tvs VAQUEROS / SESPE FORMATION

0 30 60 90
SCALE IN FEET

EXISTING 6.0 MG
SANTIAGO HILLS
ZONE 5 RESERVOIR

HWL=730'

ALTERNATIVE 1

ALTERNATIVE 2

ALTERNATIVE 3

MAP IS A COMPILATION OF GEOLOGIC MAPPING BY SCHOELLHAMER, VEDDER, YERKES, AND KINNEY, 1981, TAN, 1995, STONEY-MILLER CONSULTANTS, INC. 1993 AND RECENT FIELD MAPPING BY KLEINFELDER.

2015 ILP NORTH CONVERSION RESERVOIR PROJECT

CODE 6198

NO.	DATE	REVISIONS	APPROVED

DESIGN: A. GARCIA
DRAWN: C. JUMANAN
CHECK: L. ROBINSON

KLEINFELDER Bright people. Right Solutions.
Simon Wong Engineering
550 West C Street Suite : 1200 San Diego, CA 92101 ● Tel. (619) 831-4600 ● Kleinfelder.com

IRVINE RANCH WATER DISTRICT

LAURA ROBINSON, P.E.	KLEINFELDER PROJECT ENGINEER R.C.E. 81565	DATE
DAN SMITH, P.E.	KLEINFELDER PROJECT MANAGER R.C.E. XXXXX	DATE
JACOB MOEDER, P.E.	IRWD PRINCIPAL ENGINEER R.C.E. XXXXX	DATE

IRVINE RANCH WATER DISTRICT

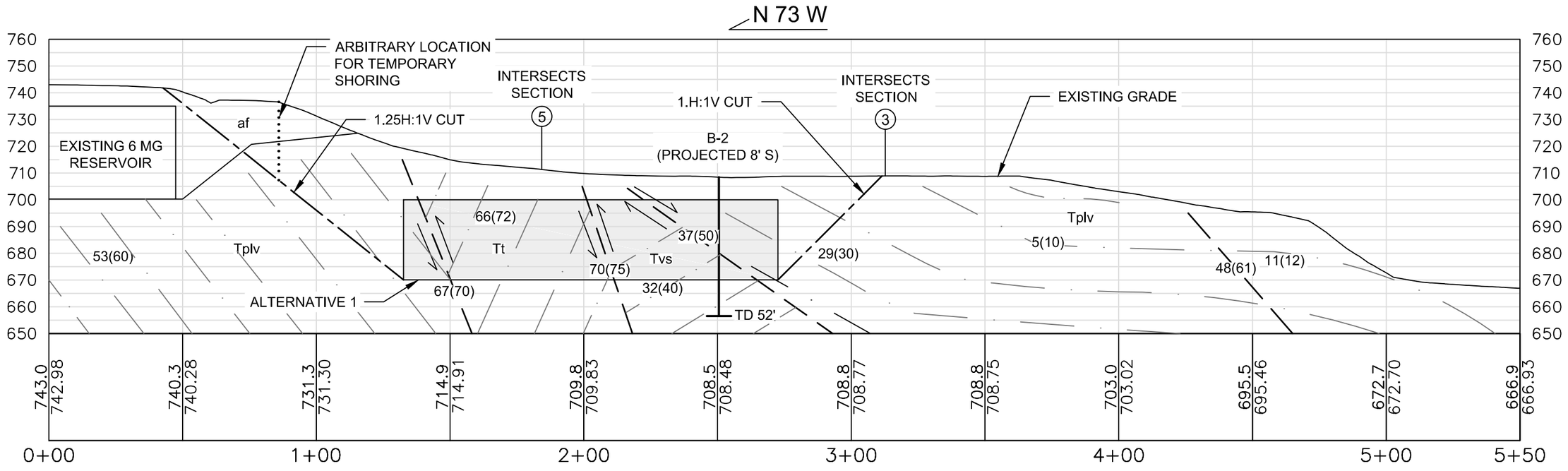
ENGINEERING DESIGN SERVICES
ILP NORTH CONVERSION RESERVOIR

PROJECT NUMBER 30496 (5407)

FIELD EXPLORATION AND GEOLOGIC MAP

APPENDIX C
FIGURE
C-1

MAY 2015



INTERPRETIVE GEOLOGIC SECTION 1

0 40 80

SCALE: 1" = 40' SCALE IN FEET

LEGEND

FAULT, ARROWS INDICATE RELATIVE MOVEMENT

67(70) — APPARENT DIP (TRUE DIP) OF BEDDING

BEDDING

B-2 (PROJECTED 10' S) / TD 52' — BORING LOCATION WITH DISTANCE AND DIRECTION PROJECTED AND TOTAL DEPTH (TD) INDICATED BENEATH BOTTOM OF BORING

af	ENGINEERED FILL
Qls	LANDSLIDE DEBRIS
Tps	PUENTE FORMATION - SOQUEL MEMBER
Tplv	PUENTE FORMATION - LA VIDA MEMBER
Tema	EL MODENO VOLCANICS - ANDESITE FLOWS FLOW BRECCIAS
Tt	TOPANGA FORMATION
Tvs	VAQUEROS/ SESPE FORMATION

INTERSECTS SECTION 5 — INDICATES POINTS OF INTERSECTING GEOLOGIC SECTIONS

LANDSLIDE RUPTURE SURFACE, ARROWS POINT IN DIRECTION OF MOVEMENT

GEOLOGIC CONTACT

PROJECTED GROSS TEMPORARY CUT FOR CONSTRUCTION

ARBITRARY LOCATION FOR TEMPORARY SHORING

KLEINFELDER Bright People. Right Solutions.

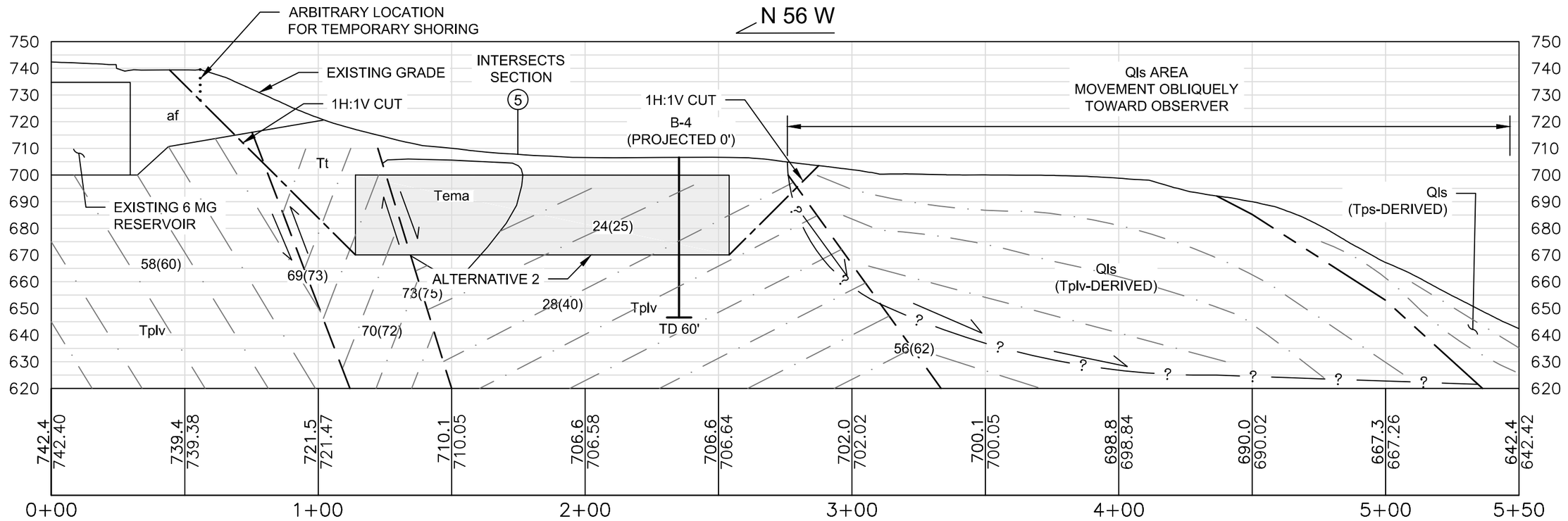
PROJECT NO.	20153742
DRAWN BY	JAT
CHECKED BY	RRS
DATE:	04-13-2015
REVISED:	—

INTERPRETIVE GEOLOGIC SECTION

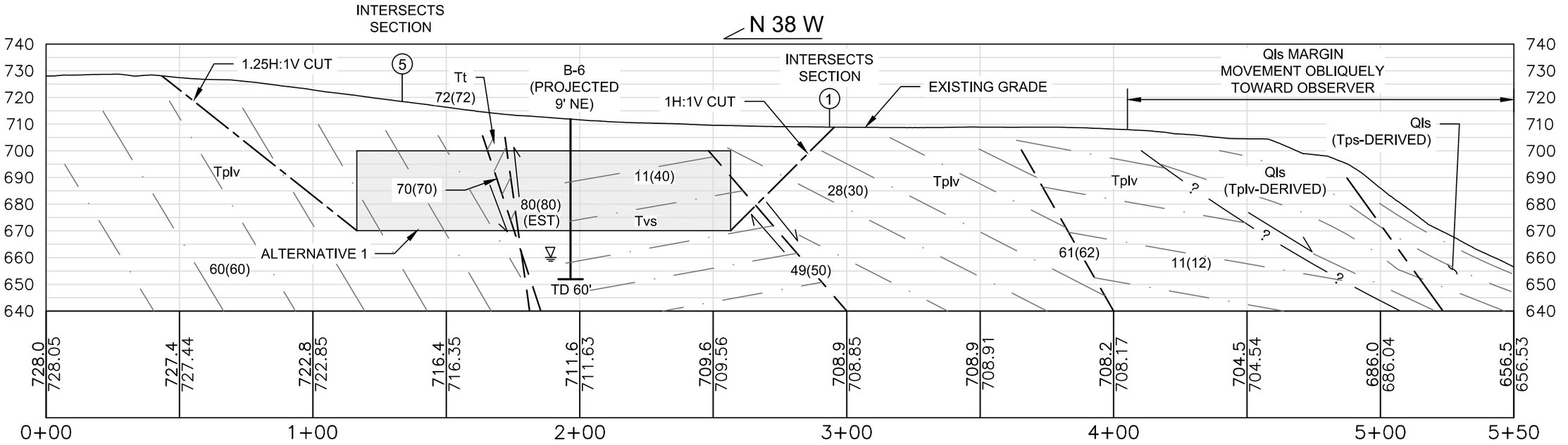
IRVINE RANCH WATER DISTRICT
ILP NORTH CONVERSION RESERVOIR
ZONE C+

FIGURE C-2

PAGE: XX of XX



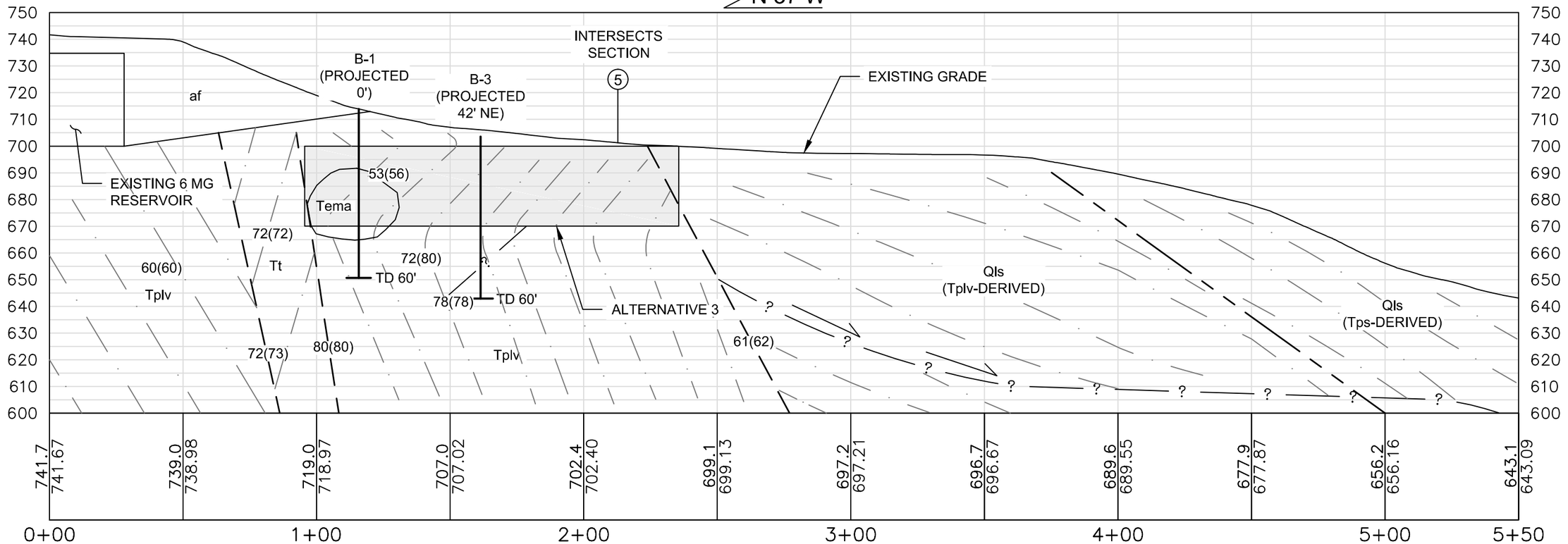
INTERPRETIVE GEOLOGIC SECTION 2



INTERPRETIVE GEOLOGIC SECTION 3

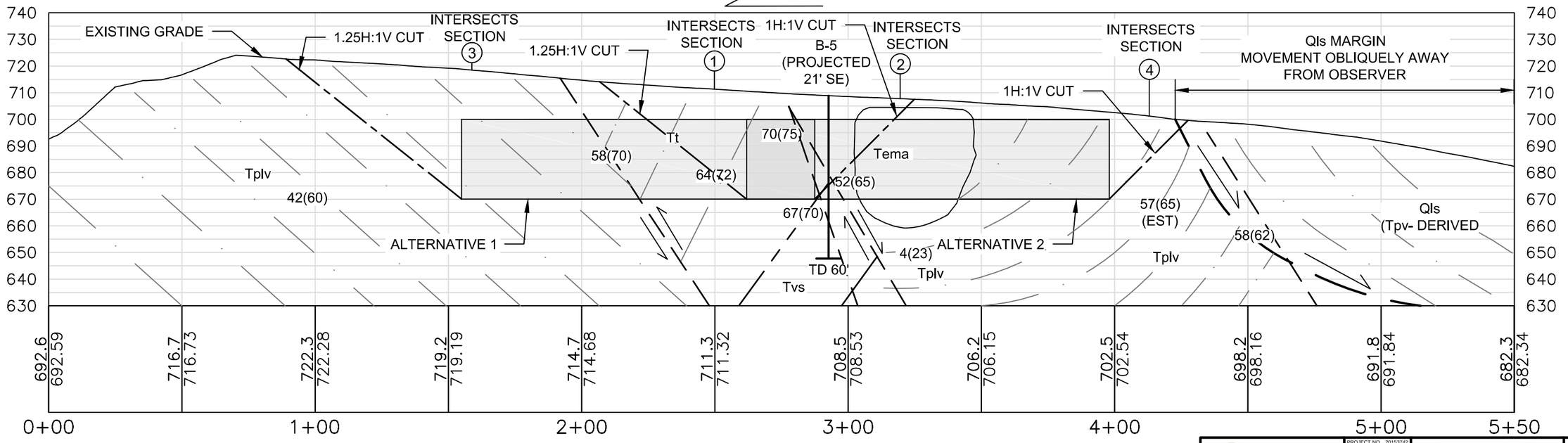
KLEINFELDER Bright People. Right Solutions.	PROJECT NO. 20153742	INTERPRETIVE GEOLOGIC SECTION	FIGURE
	DRAWN BY JAT		C-3
	CHECKED BY RRS	IRVINE RANCH WATER DISTRICT	
	DATE: 04-13-2015	ILP NORTH CONVERSION RESERVOIR	
	REVISED: —	ZONE C+	PAGE: XX of XX

N 37 W



INTERPRETIVE GEOLOGIC SECTION 4

N 14 E



INTERPRETIVE GEOLOGIC SECTION 5

KLEINFELDER Bright People. Right Solutions.	PROJECT NO. 20153742	INTERPRETIVE GEOLOGIC SECTION	FIGURE C-4
	DRAWN BY JAT		
	CHECKED BY RRS	IRVINE RANCH WATER DISTRICT	
	DATE: 04-13-2015	ILP NORTH CONVERSION RESERVOIR	
	REVISED: —	ZONE C+	PAGE: XX of XX

APPENDIX D
GEOTECHNICAL ENGINEERING ANALYSES

KLEINFELDER
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Slope Stability Calculations

PROJECT IRWD Santiago Reservoir C+ PROJECT NO. 20153742.001A

SUBJECT Temporarty Slope Stability Calc BY S.Kuo DATE 5-12-15

REVIEWED BY L. Perko/A. Williams DATE 5-12-15

PURPOSE

Estimate the cut slope angle required to meet the temporary slope stability factors of safety (FS) for the construction of the proposed reservoir. Two options for reservoir siting were analyzed. These are referred to as Option 1 and 2 in this calculation. However, in the report text, these are referred to as Alternatives. Alternative 1 is equivalent to Option 1 and similarly, Alternative 2 is equivalent to Option 2.

GIVENS

1. Boring Logs
2. Geologic Sections (Section 1, 2, 3, and 5)
3. Geomechanical properties are established from previous calculations titled "Generalized Strength Parameters," prepared by Kleinfelder, dated 2-16-15

ASSUMPTIONS

1. Temporary construction slopes requires a minimum FS of 1.25. For temporary cuts in granular units (e.g., artificial fill, colluvium and alluvium) should not exceed OSHA requirements for Type C soil.
2. No additional loadings are considered for the temporary slope cut. A vertical distributed load of 250 psf is applied for the existing access road when shoring system is installed to keep the access road open.
3. All proposed cuts are within the Right of Way of the project.
4. The existing access road can be removed to provide temporary excavation for the proposed reservoir installation; however, a shoring system is required if the access road is to remain in place.
5. No groundwater.

LOCATIONS

The 4 cross sections are analyzed for stability. The locations of the proposed reservoir and cross sections are presented in the report. Two options (1 & 2) of the proposed reservoir are considered.

Static Analysis

Static FS values were estimated using the software program SLIDEv6.0 (Rocscience, 2014). The temporary cut slope is considered under static loading condition using generalized limit equilibrium methods. The FS values were established using Janbu Corrected (force equilibrium), and Spencer's method (force and moment equilibrium).

RESULTS of Analysis

The graphic output files from SLIDE are included as Plates 1-1 thru 5-4. The text output files are included as Attachment 1. Table 1, Temporary Cut Slope Stability Analysis Summary, summarizes the sections analyzed, the options of the reservoir, cut slope angle and the slope direction relative to the new reservoir, corresponding factor of safety, and comments regarding the cut slope.

Table 1 Temporary Cut Slope Stability Analysis Summary

Section	Tank Option	Figure No.	Slope Direction from the proposed reservoir	Cut Slope Angle	FS	Comments
1	1	1-1	West	1.25H:1V	1.29	Remove existing access road and fill, expose the existing tank, and add a bench
1	1	1-2	East	1H:1V	1.31	
1	1	1-3	West	1H:1V	>1.25	With shoring to achieve the required FS
2	2	2-1	West	1H:1V	1.28	Remove existing access road and fill, expose the existing tank, and add a bench
2	2	2-2	East	1H:1V	1.33	
2	2	2-3	West	1H:1V	>1.25	With shoring to achieve the required FS
3	1	3-1	West	1.25H:1V	1.32	
3	1	3-2	East	1H:1V	1.39	
5	1	5-1	North	1.25H:1V	1.26	
5	1	5-2	South	1H:1V	2.36	Andesite adjacent to the reservoir resulted in higher FS.
5	2	5-3	North	1H:1V	1.37	
5	2	5-4	South	1H:1V	1.27	

Based on the analyses, the temporary stability of the proposed 1H:1V and 1.25H:1V slope cuts will satisfy the temporary slope stability requirement. In Sections 1 and 2, the existing access road and fill located adjacent to the existing reservoir could be removed as a part of the construction excavation to satisfy the temporary slope stability requirement, as shown in Figures 1-1 and 2-1. However, because access is required to the top of the existing reservoir, the existing access road will remain in place; therefore, a shoring system will be required for the temporary excavation for construction at this location. We recommend that the shoring be designed as a cantilevered soldier pile wall with lagging constructed top-down to a height sufficient to protect the access roadway while enabling the slopes below the wall to be constructed (as depicted in Figure 1-3 and 2-3). Detailed design of the shoring system shall be performed by an experienced licensed Civil Engineer in the State of California. Lateral earth pressures and shoring design recommendations are provided in the report (Section 5.5.4). Kleinfelder should be retained to review the shoring system design and plans prior to construction.

In Section 5 for reservoir Option-1, as shown on Figure 5-2, the resulting FS is higher due to the location of the Andesite; however, the boundary of the Andesite is estimated based on limited field data. We recommend the cut into the Andesite to be monitored to determine the actual slope needed to provide a stable cut slope during construction.

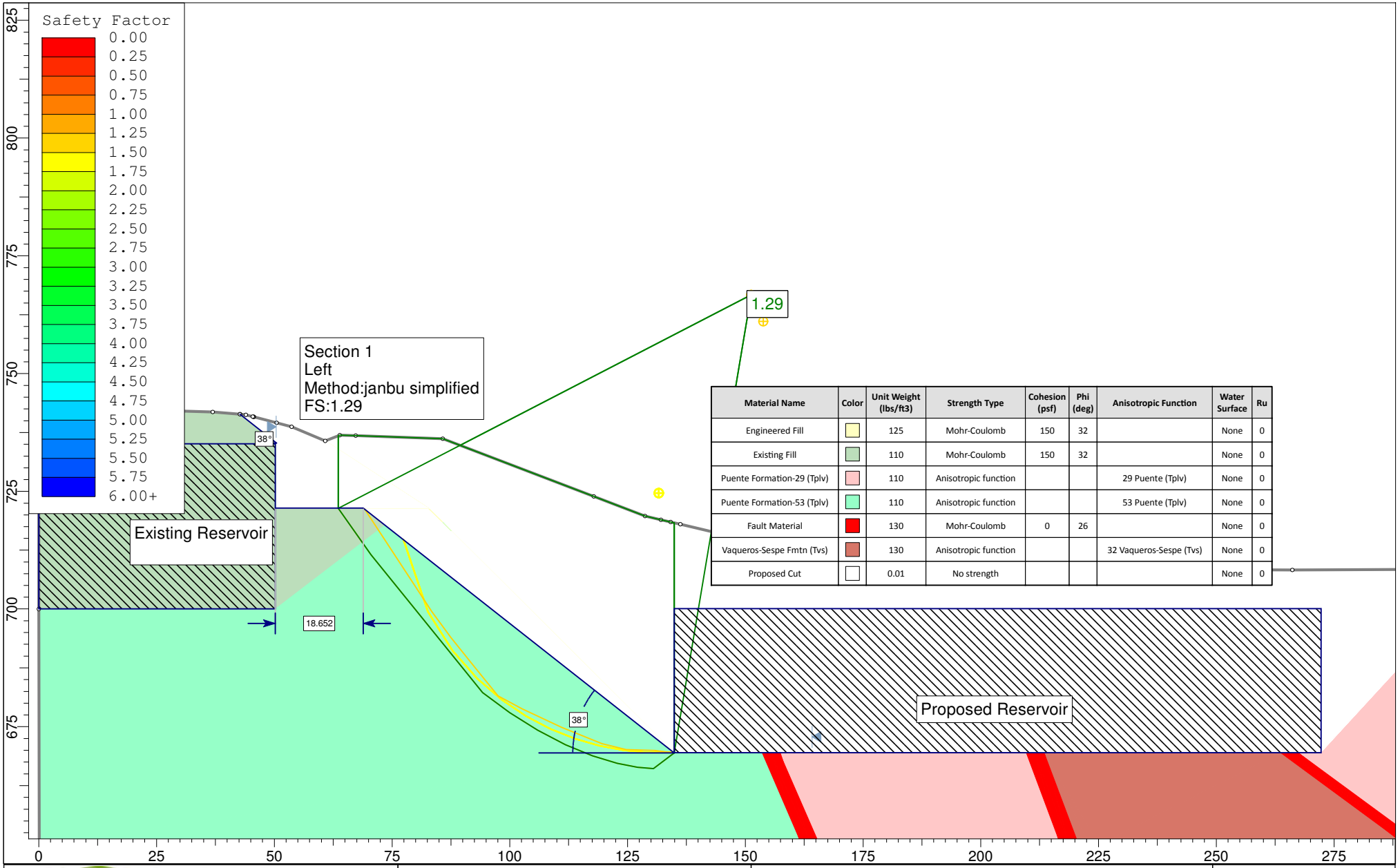
ATTACHMENTS

1. Figures
2. SLIDE Text Output

REFERENCES

California Department of Transportation (Caltrans), 2011, Trenching and Shoring Manual, Revision No. 1, August.

Rocscience, 2014, SLIDE, limit equilibrium slope stability software, version 6, Toronto, Canada.



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Anisotropic Function	Water Surface	Ru
Engineered Fill		125	Mohr-Coulomb	150	32		None	0
Existing Fill		110	Mohr-Coulomb	150	32		None	0
Puente Formation-29 (Tplv)		110	Anisotropic function			29 Puente (Tplv)	None	0
Puente Formation-53 (Tplv)		110	Anisotropic function			53 Puente (Tplv)	None	0
Fault Material		130	Mohr-Coulomb	0	26		None	0
Vaqueros-Sespe Fmtn (Tvs)		130	Anisotropic function			32 Vaqueros-Sespe (Tvs)	None	0
Proposed Cut		0.01	No strength				None	0

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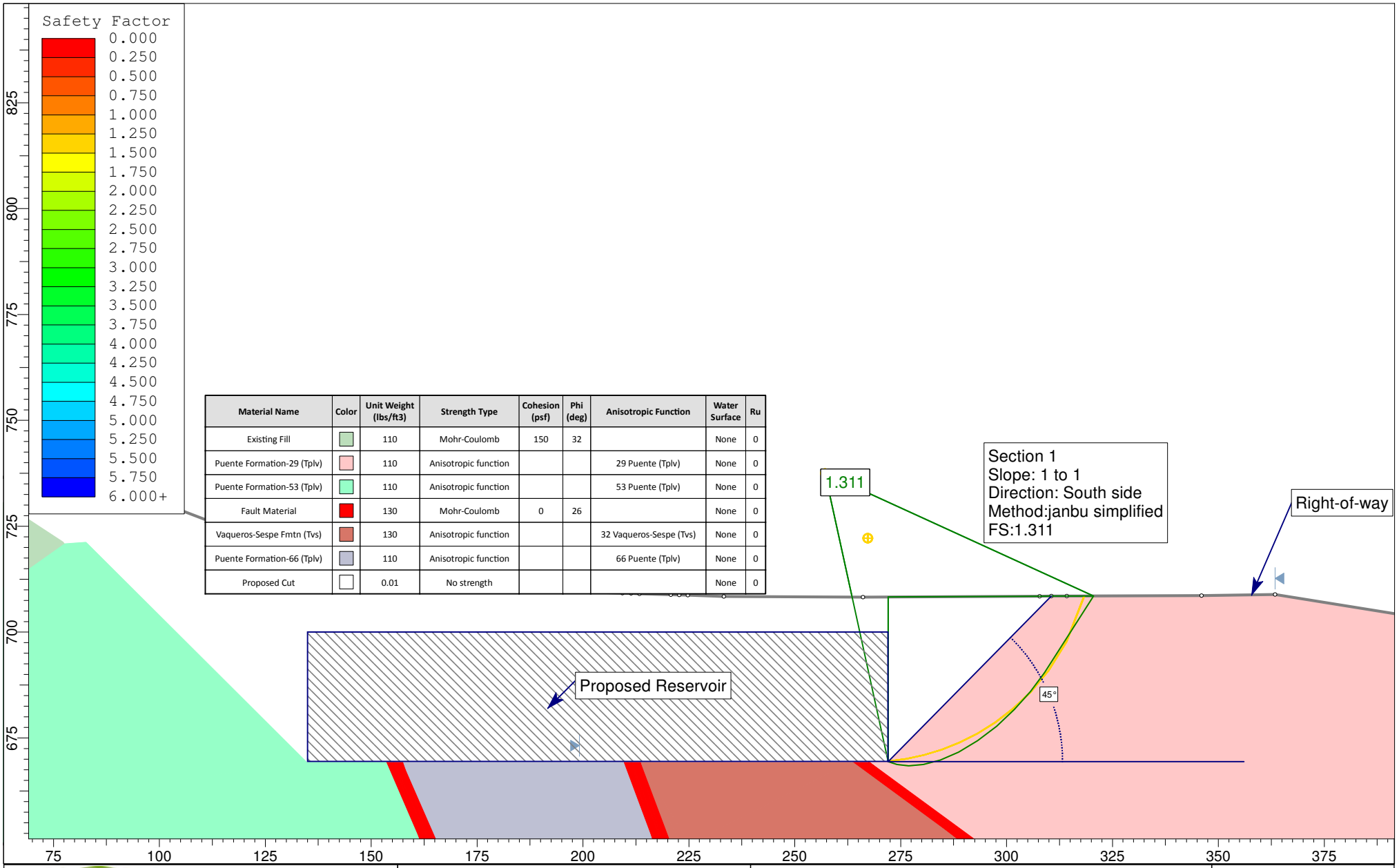
Project No.: 20153742	Section 1_LEFT_1.25to1Benched.slim
Drawn by: SK	
Date: 3/31/2015	
Checked by:	**SLIDE - An Interactive Slope Stability Program**
Date:	

FIGURE

1-1



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Anisotropic Function	Water Surface	Ru
Existing Fill		110	Mohr-Coulomb	150	32		None	0
Puente Formation-29 (Tplv)		110	Anisotropic function			29 Puente (Tplv)	None	0
Puente Formation-53 (Tplv)		110	Anisotropic function			53 Puente (Tplv)	None	0
Fault Material		130	Mohr-Coulomb	0	26		None	0
Vaqueros-Sespe Fmtn (Tvs)		130	Anisotropic function			32 Vaqueros-Sespe (Tvs)	None	0
Puente Formation-66 (Tplv)		110	Anisotropic function			66 Puente (Tplv)	None	0
Proposed Cut		0.01	No strength				None	0

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Project No.: 20153742	Section 1_Right_1to1.slim
Drawn by: SK	
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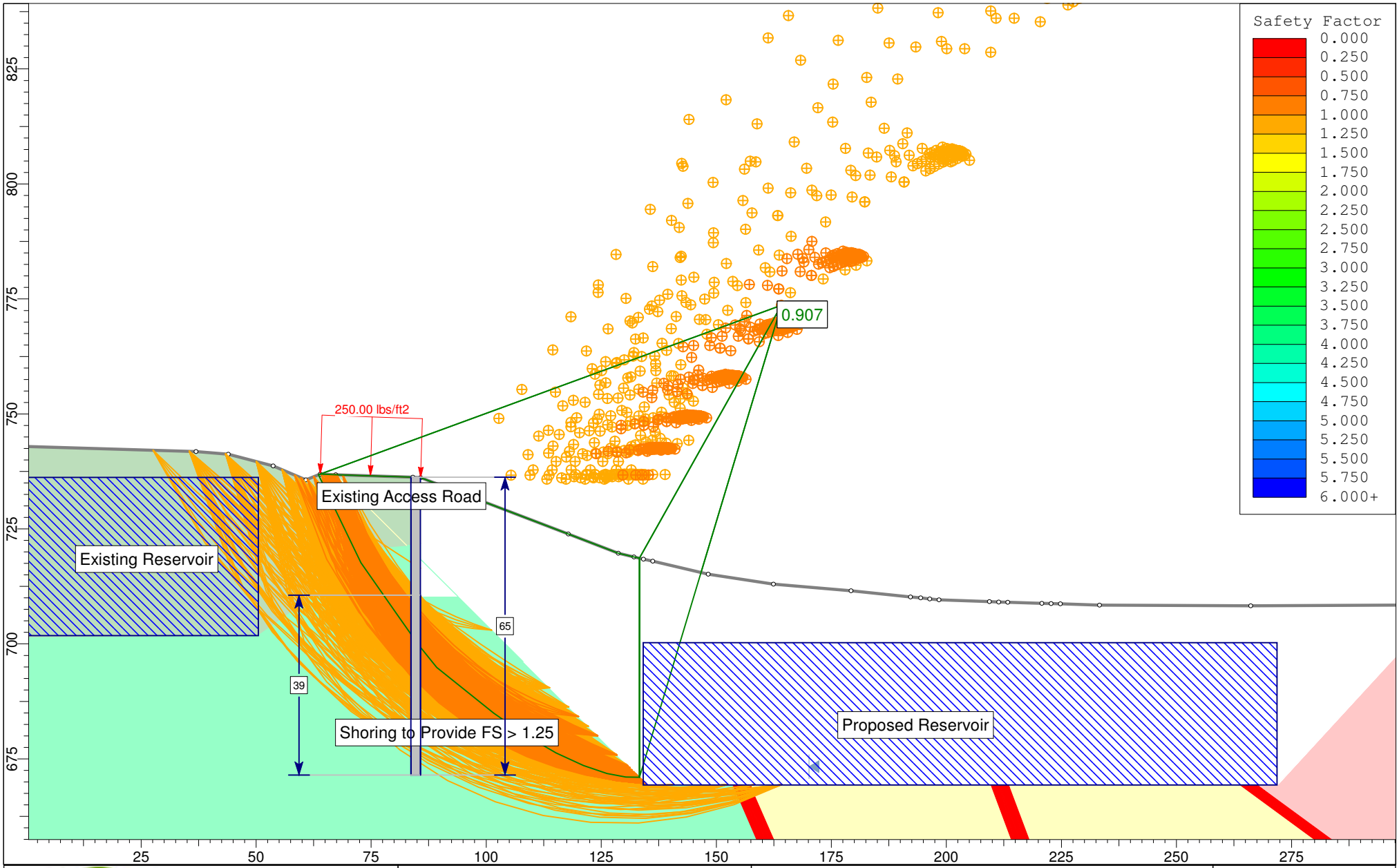
Date:	

FIGURE

1-2



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Project No.: 20153742	Section 1_Left_Shoring
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Date: 4/2/2015	
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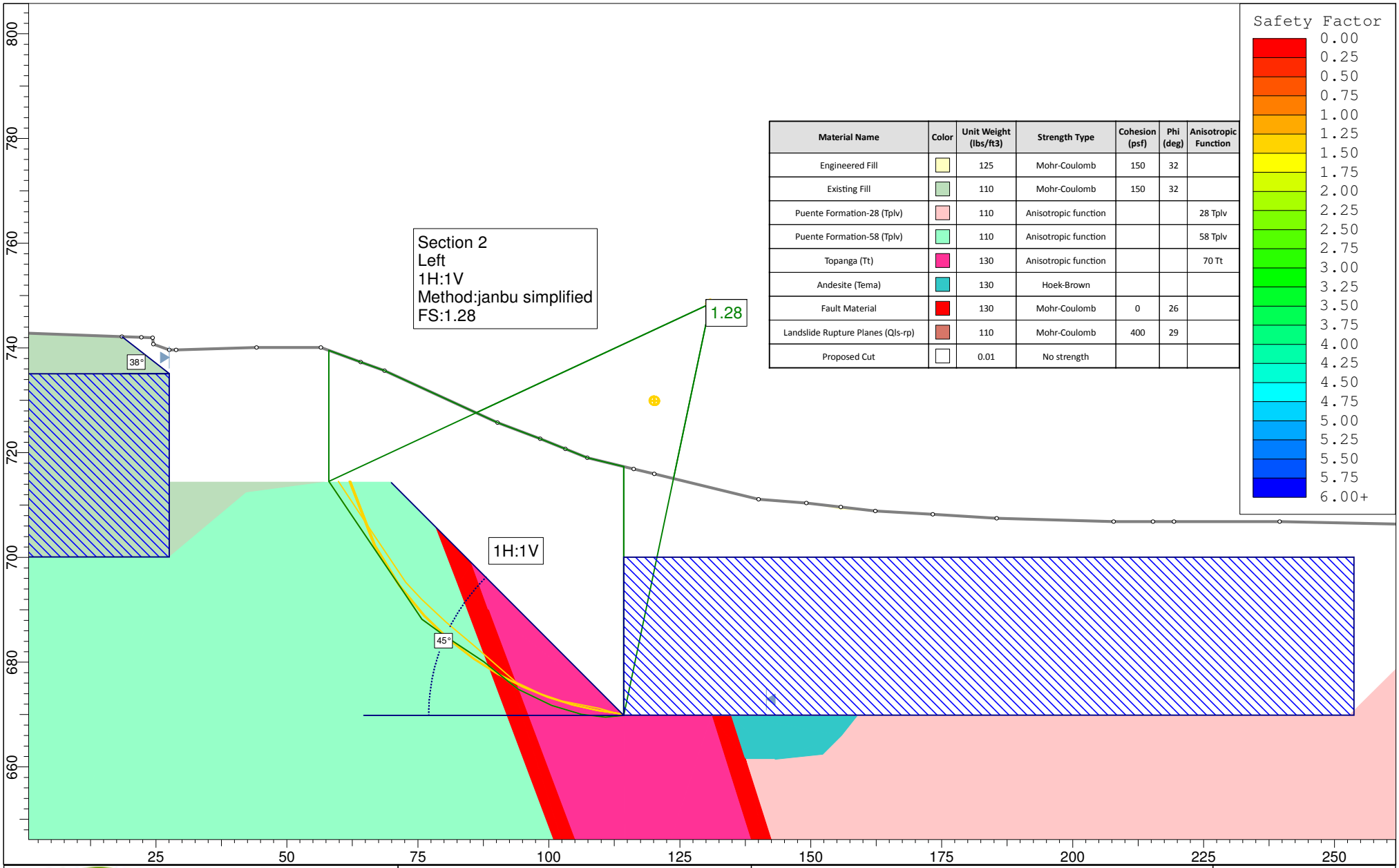
Date:	

FIGURE

1-3



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Anisotropic Function
Engineered Fill		125	Mohr-Coulomb	150	32	
Existing Fill		110	Mohr-Coulomb	150	32	
Puente Formation-28 (Tplv)		110	Anisotropic function			28 Tplv
Puente Formation-58 (Tplv)		110	Anisotropic function			58 Tplv
Topanga (Tt)		130	Anisotropic function			70 Tt
Andesite (Tema)		130	Hoek-Brown			
Fault Material		130	Mohr-Coulomb	0	26	
Landslide Rupture Planes (Qls-rp)		110	Mohr-Coulomb	400	29	
Proposed Cut		0.01	No strength			

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Project No.: 20153742	Section 2_Left_1.25to1.slim
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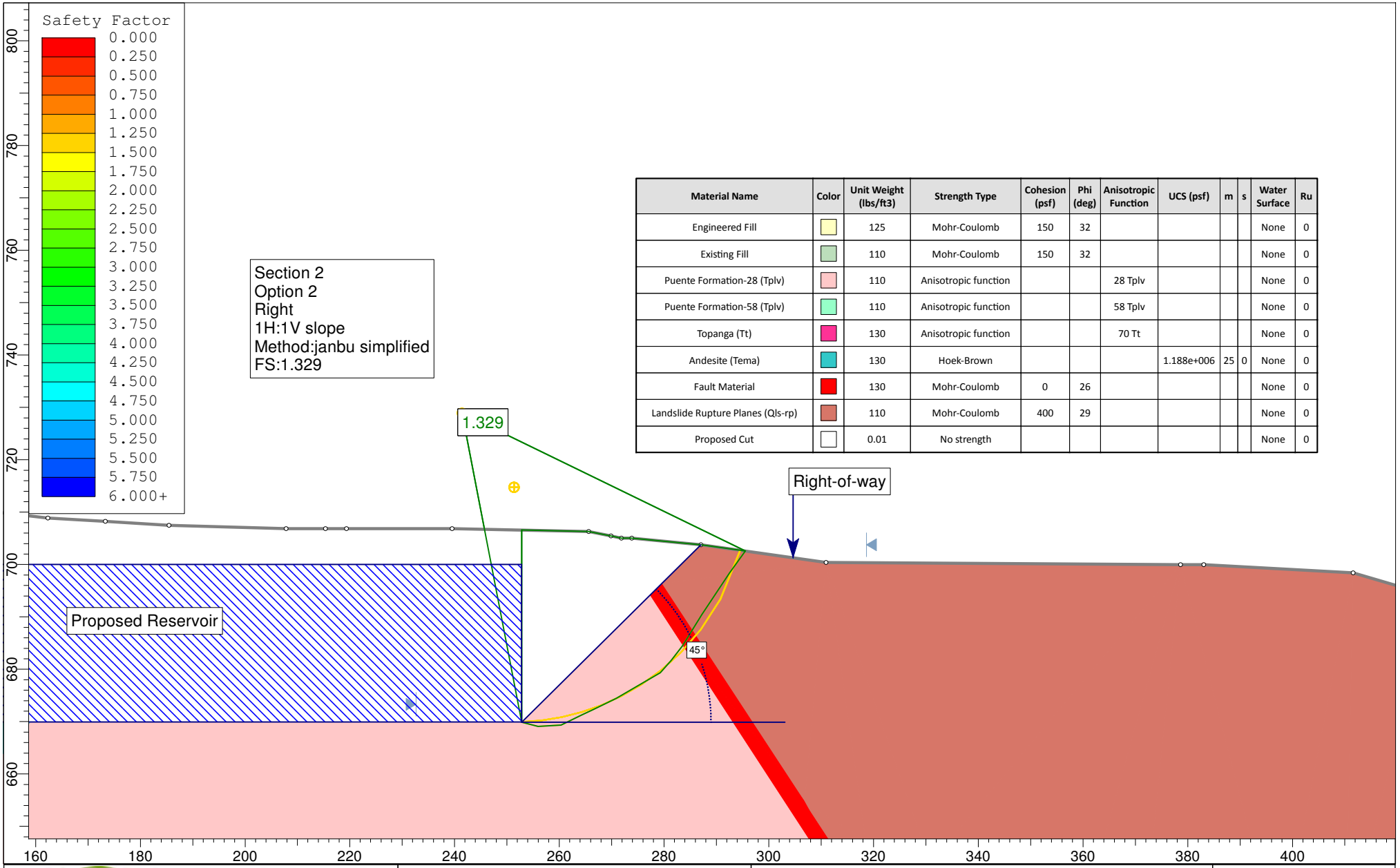
Date:	

FIGURE

2-1



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Anisotropic Function	UCS (psf)	m	s	Water Surface	Ru
Engineered Fill		125	Mohr-Coulomb	150	32					None	0
Existing Fill		110	Mohr-Coulomb	150	32					None	0
Puente Formation-28 (Tplv)		110	Anisotropic function			28 Tplv				None	0
Puente Formation-58 (Tplv)		110	Anisotropic function			58 Tplv				None	0
Topanga (Tt)		130	Anisotropic function			70 Tt				None	0
Andesite (Tema)		130	Hoek-Brown				1.188e+006	25	0	None	0
Fault Material		130	Mohr-Coulomb	0	26					None	0
Landslide Rupture Planes (Qls-rp)		110	Mohr-Coulomb	400	29					None	0
Proposed Cut		0.01	No strength							None	0

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Project No.: 20153742	
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Date: 4/1/2015	
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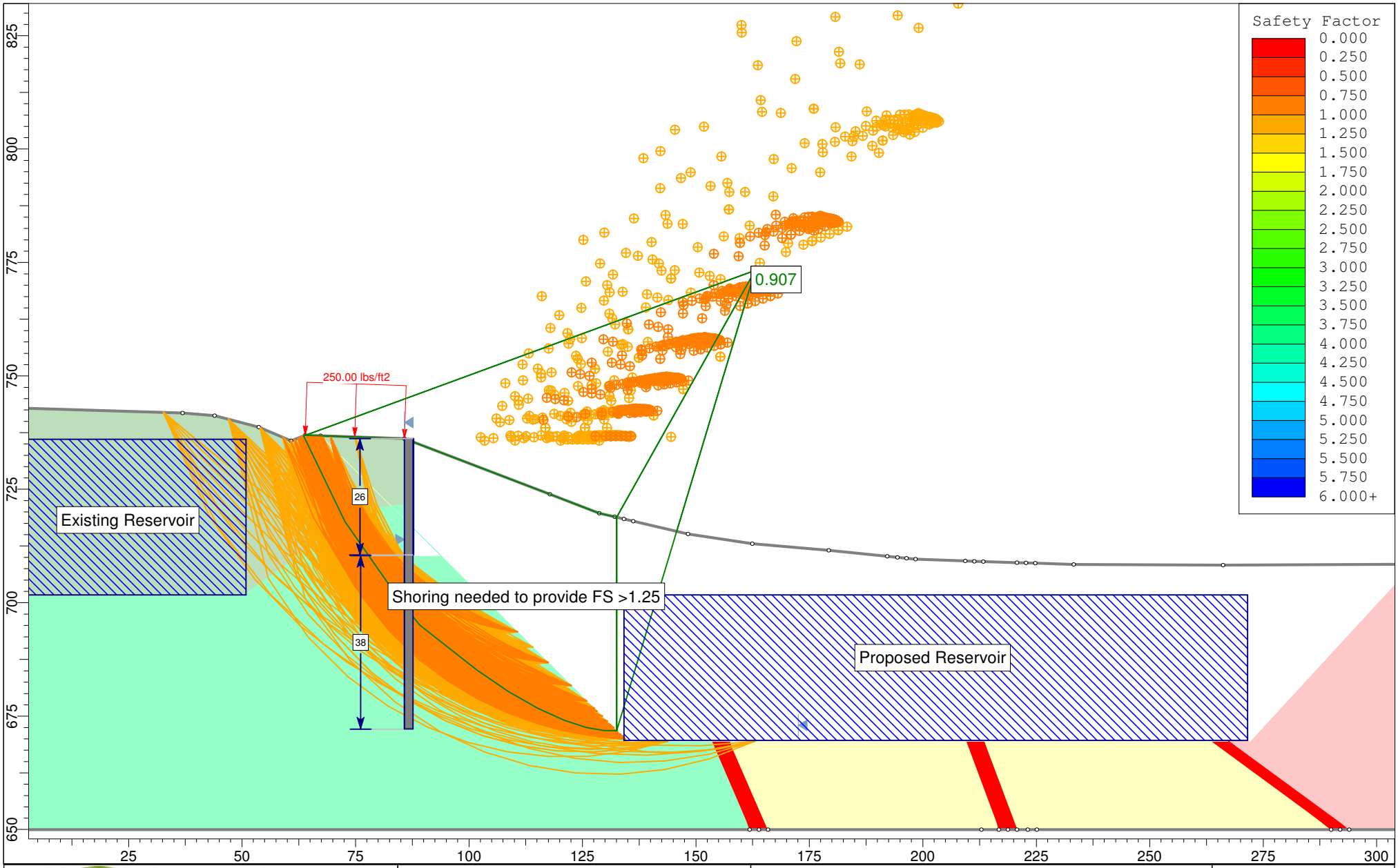
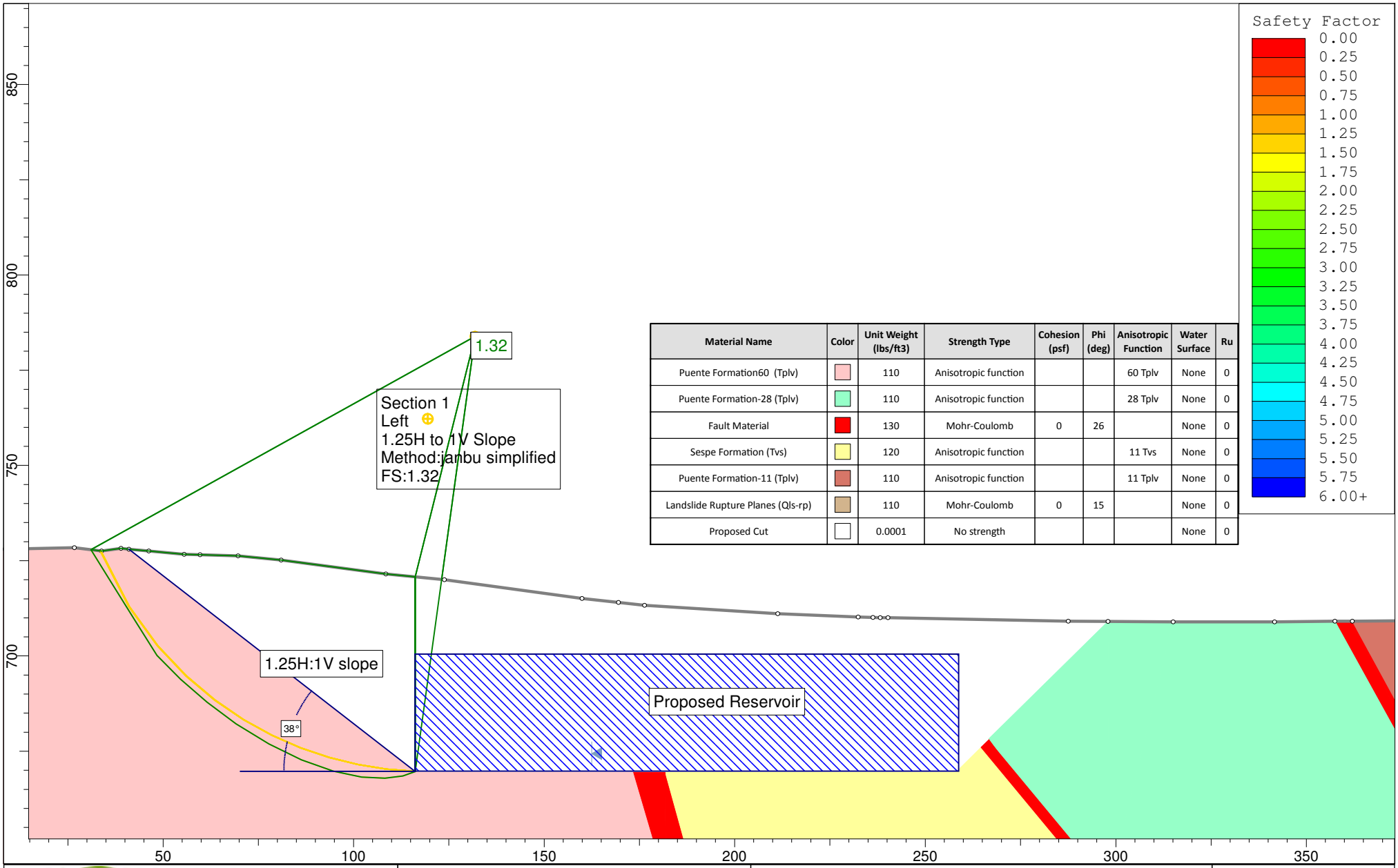
Date:	

FIGURE

2-2



KLEINFELDER Bright People. Right Solutions.	Project No.: 20153742	Section 2_Left_Shoring	**FIGURE**
	Drawn by: SK		
	Date: 4/2/2015		**2-3**
	Checked by:	**SLIDE - An Interactive Slope Stability Program**	
	Date:		



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Anisotropic Function	Water Surface	Ru
Puente Formation60 (Tplv)		110	Anisotropic function			60 Tplv	None	0
Puente Formation-28 (Tplv)		110	Anisotropic function			28 Tplv	None	0
Fault Material		130	Mohr-Coulomb	0	26		None	0
Sespe Formation (Tvs)		120	Anisotropic function			11 Tvs	None	0
Puente Formation-11 (Tplv)		110	Anisotropic function			11 Tplv	None	0
Landslide Rupture Planes (Qls-rp)		110	Mohr-Coulomb	0	15		None	0
Proposed Cut		0.0001	No strength				None	0

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Project No.: 20153742	Section 3_LEFT1.25to1.slim
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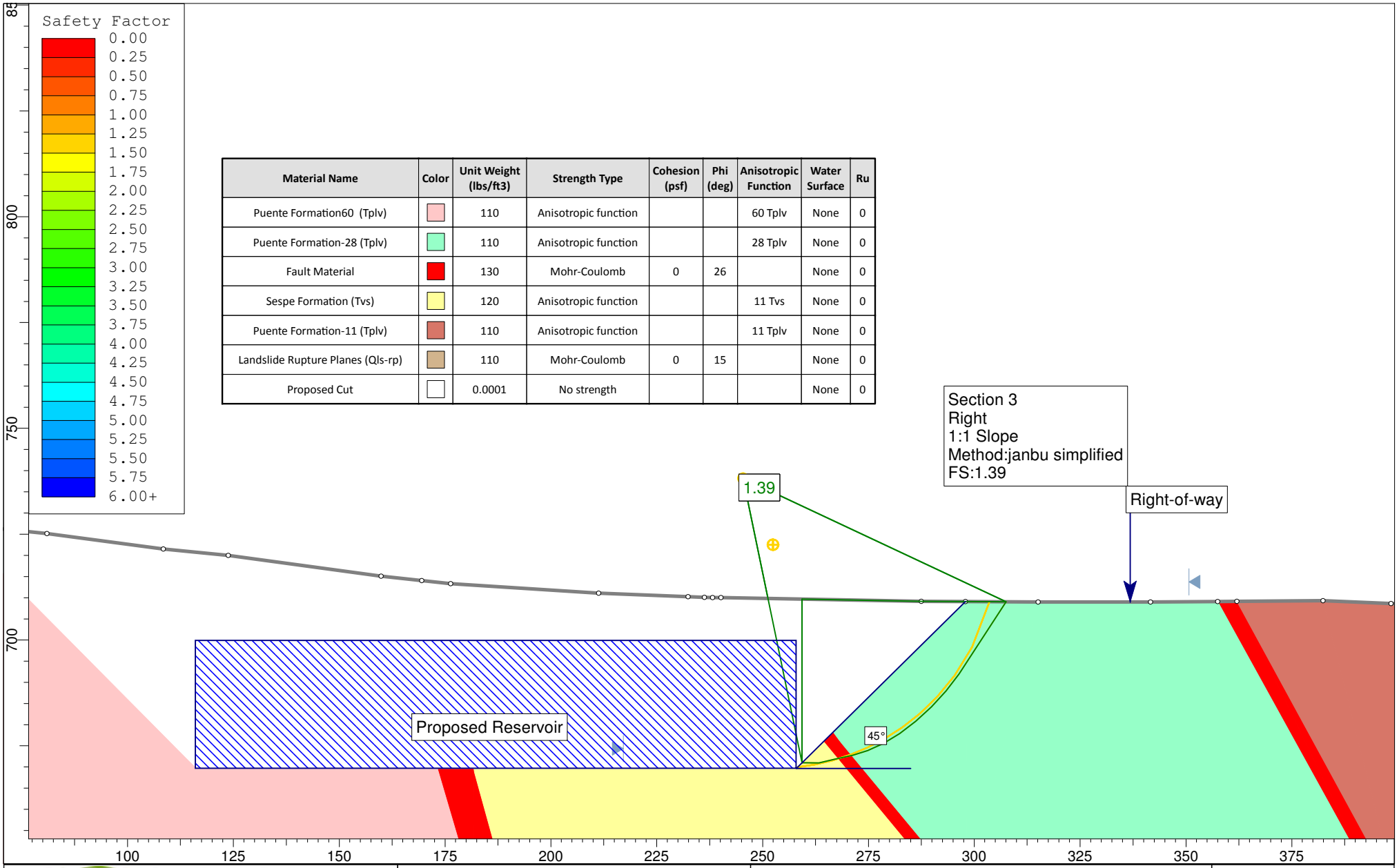
Date:	

FIGURE

3-1



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Anisotropic Function	Water Surface	Ru
Puente Formation60 (Tplv)		110	Anisotropic function			60 Tplv	None	0
Puente Formation-28 (Tplv)		110	Anisotropic function			28 Tplv	None	0
Fault Material		130	Mohr-Coulomb	0	26		None	0
Sespe Formation (Tvs)		120	Anisotropic function			11 Tvs	None	0
Puente Formation-11 (Tplv)		110	Anisotropic function			11 Tplv	None	0
Landslide Rupture Planes (Qls-rp)		110	Mohr-Coulomb	0	15		None	0
Proposed Cut		0.0001	No strength				None	0

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Project No.: 20153742	Section 3_Right.slim
Drawn by: SK	
Date: 4/1/2015	
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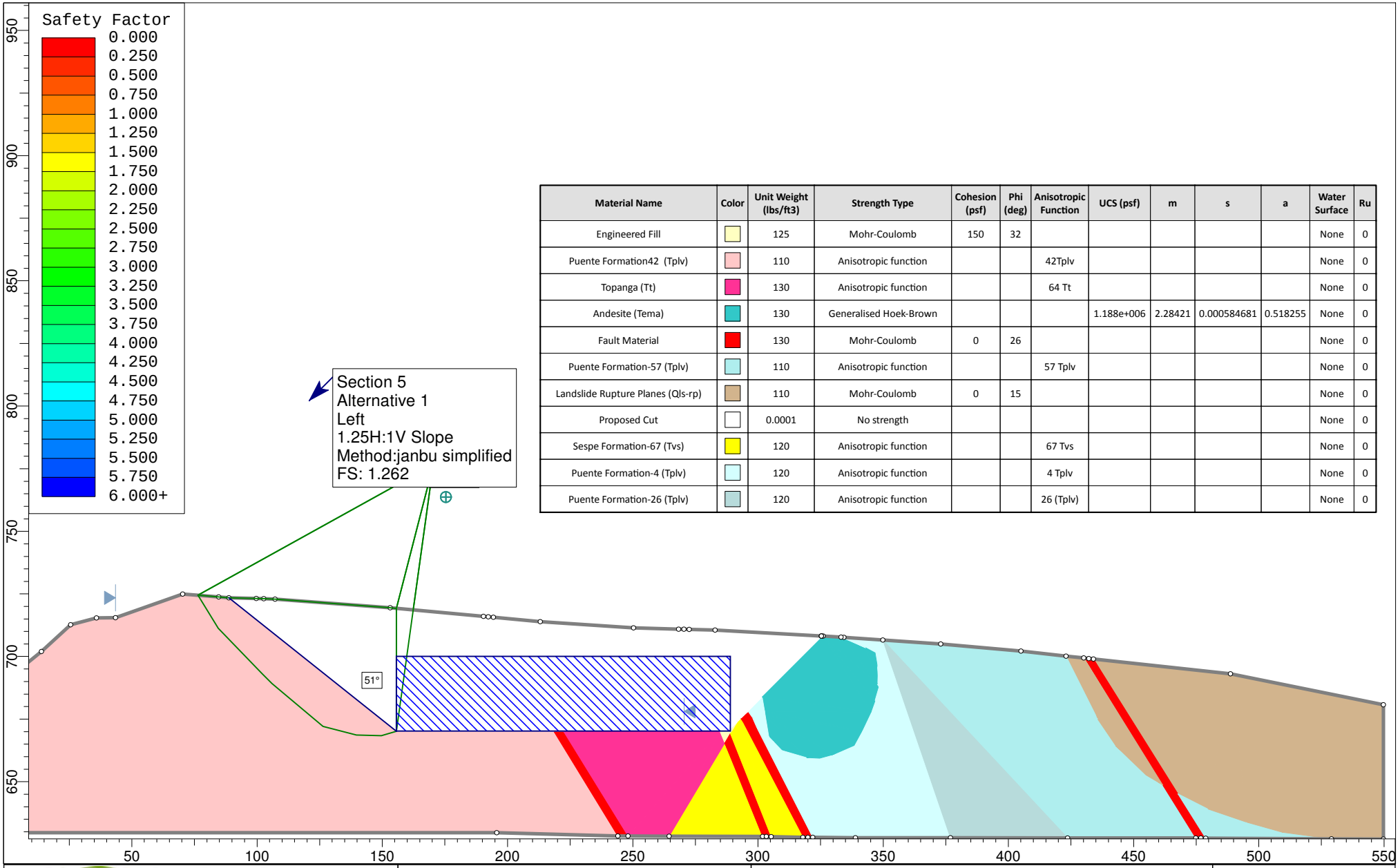
Date:	

FIGURE

3-2



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Anisotropic Function	UCS (psf)	m	s	a	Water Surface	Ru
Engineered Fill		125	Mohr-Coulomb	150	32						None	0
Puente Formation42 (Tplv)		110	Anisotropic function			42Tplv					None	0
Topanga (Tt)		130	Anisotropic function			64 Tt					None	0
Andesite (Tema)		130	Generalised Hoek-Brown				1.188e+006	2.28421	0.000584681	0.518255	None	0
Fault Material		130	Mohr-Coulomb	0	26						None	0
Puente Formation-57 (Tplv)		110	Anisotropic function			57 Tplv					None	0
Landslide Rupture Planes (Qls-rp)		110	Mohr-Coulomb	0	15						None	0
Proposed Cut		0.0001	No strength								None	0
Sespe Formation-67 (Tvs)		120	Anisotropic function			67 Tvs					None	0
Puente Formation-4 (Tplv)		120	Anisotropic function			4 Tplv					None	0
Puente Formation-26 (Tplv)		120	Anisotropic function			26 (Tplv)					None	0

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Project No.:	
Drawn by: SK	Section 5_Alternative 1_LEFT.slim
Date: 5/12/2015	
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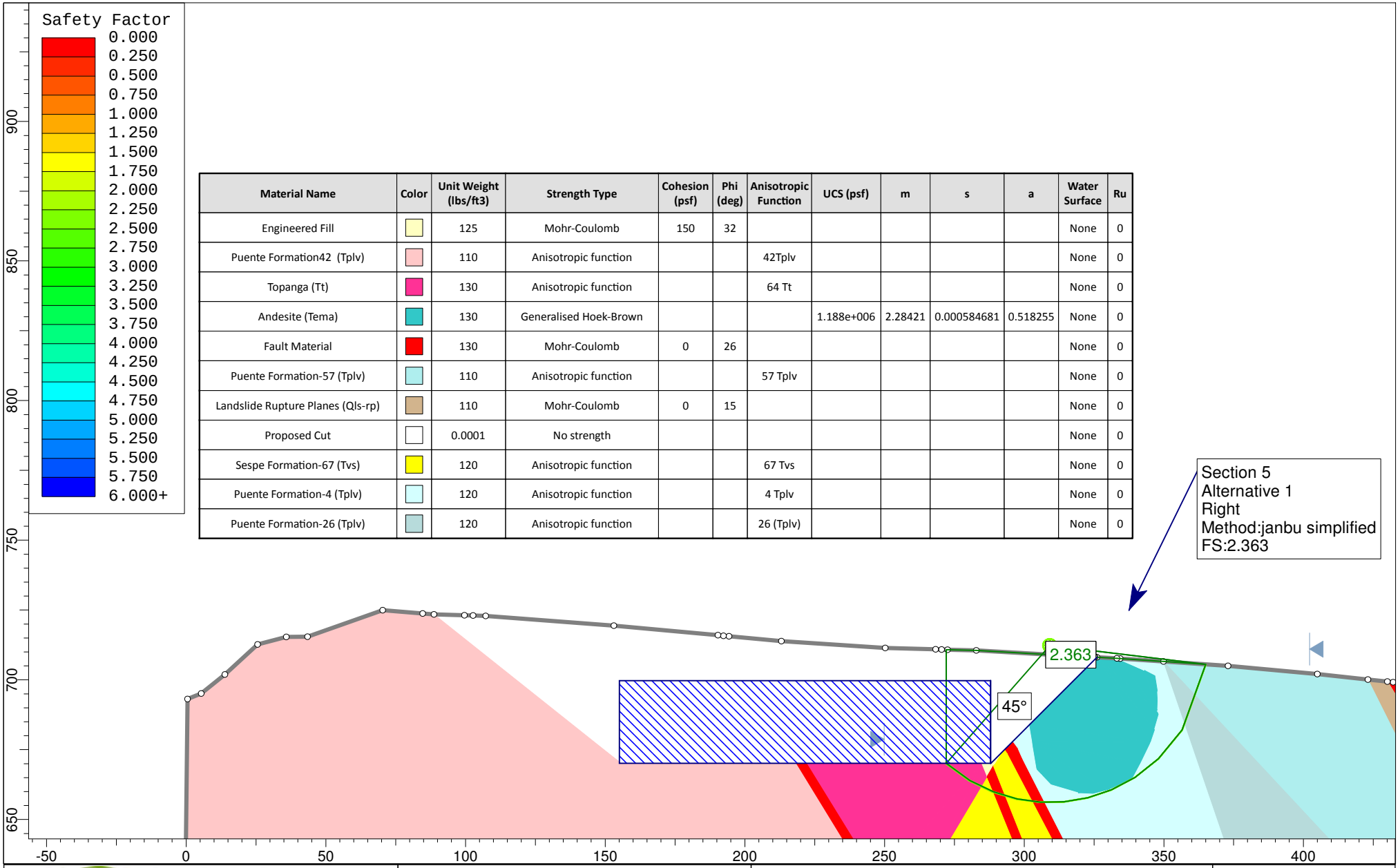
Date:	

FIGURE

5-1



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Anisotropic Function	UCS (psf)	m	s	a	Water Surface	Ru
Engineered Fill		125	Mohr-Coulomb	150	32						None	0
Puente Formation42 (Tplv)		110	Anisotropic function			42Tplv					None	0
Topanga (Tt)		130	Anisotropic function			64 Tt					None	0
Andesite (Tema)		130	Generalised Hoek-Brown				1.188e+006	2.28421	0.000584681	0.518255	None	0
Fault Material		130	Mohr-Coulomb	0	26						None	0
Puente Formation-57 (Tplv)		110	Anisotropic function			57 Tplv					None	0
Landslide Rupture Planes (Qls-rp)		110	Mohr-Coulomb	0	15						None	0
Proposed Cut		0.0001	No strength								None	0
Sespe Formation-67 (Tvs)		120	Anisotropic function			67 Tvs					None	0
Puente Formation-4 (Tplv)		120	Anisotropic function			4 Tplv					None	0
Puente Formation-26 (Tplv)		120	Anisotropic function			26 (Tplv)					None	0

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Project No.:	
Drawn by: SK	Section 5_Alternative 1_RIGHT.slim
Date: 5/12/2015	
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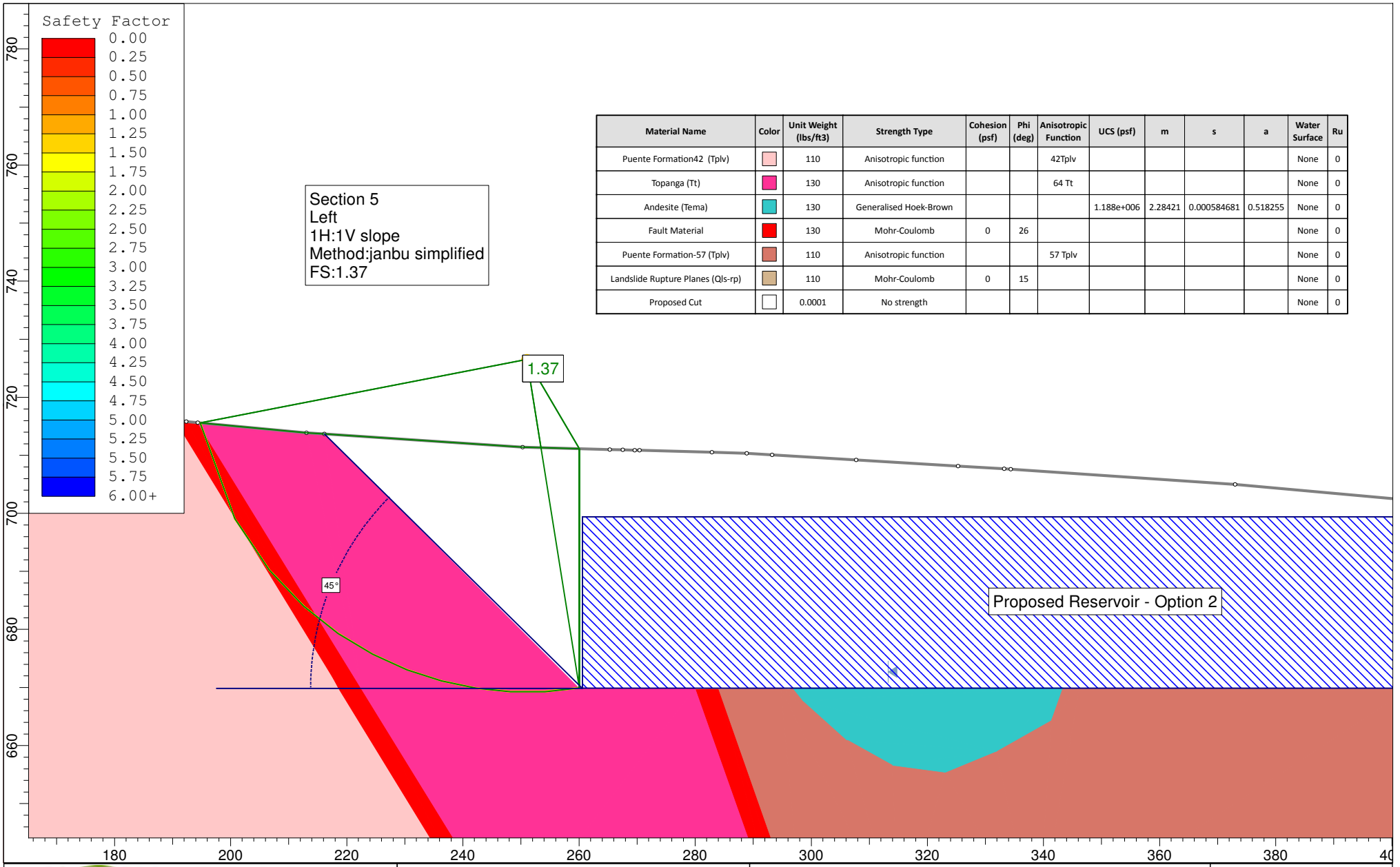
Date:	

FIGURE

5-2



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Anisotropic Function	UCS (psf)	m	s	a	Water Surface	Ru
Puente Formation42 (Tplv)		110	Anisotropic function			42Tplv					None	0
Topanga (Tt)		130	Anisotropic function			64 Tt					None	0
Andesite (Tema)		130	Generalised Hoek-Brown				1.188e+006	2.28421	0.000584681	0.518255	None	0
Fault Material		130	Mohr-Coulomb	0	26						None	0
Puente Formation-57 (Tplv)		110	Anisotropic function			57 Tplv					None	0
Landslide Rupture Planes (Qls-rp)		110	Mohr-Coulomb	0	15						None	0
Proposed Cut		0.0001	No strength								None	0

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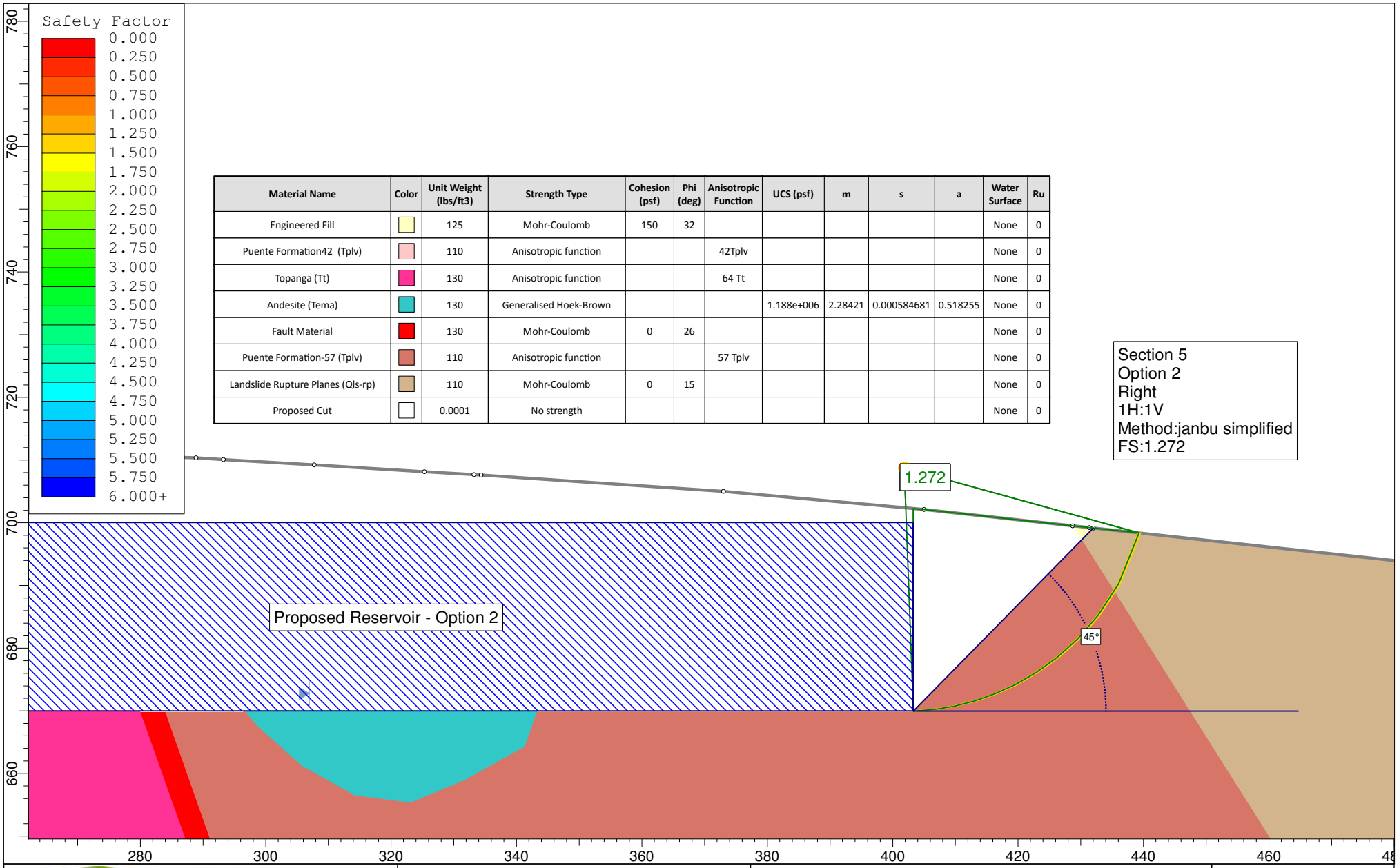
Project No.: 20153742	Section 5_LEFT_Op2.slim
Drawn by: SK	
Date: 4/1/2015	
Checked by:	**SLIDE - An Interactive Slope Stability Program**
Date:	

FIGURE

5-3



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Anisotropic Function	UCS (psf)	m	s	a	Water Surface	Ru
Engineered Fill		125	Mohr-Coulomb	150	32						None	0
Puente Formation42 (Tplv)		110	Anisotropic function			42Tplv					None	0
Topanga (Tt)		130	Anisotropic function			64 Tt					None	0
Andesite (Tema)		130	Generalised Hoek-Brown				1.188e+006	2.28421	0.000584681	0.518255	None	0
Fault Material		130	Mohr-Coulomb	0	26						None	0
Puente Formation-57 (Tplv)		110	Anisotropic function			57 Tplv					None	0
Landslide Rupture Planes (Qls-rp)		110	Mohr-Coulomb	0	15						None	0
Proposed Cut		0.0001	No strength								None	0

Section 5
Option 2
Right
1H:1V
Method:janbu simplified
FS:1.272

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Project No.: 20153742	Section 5_RIGHT_Op2.slim
Drawn by: SK	
Date: 4/1/2015	
Checked by:	SLIDE - An Interactive Slope Stability Program
Date:	

FIGURE
5-4

Slide Analysis Information

SLIDE - An Interactive Slope Stability Program

Project Summary

File Name: Section 1_LEFT_1.25to1Benched
Slide Modeler Version: 6.033
Project Title: SLIDE - An Interactive Slope Stability Program
Date Created: 2/18/2015, 4:13:13 PM

General Settings

Units of Measurement: Imperial Units
Time Units: days
Permeability Units: feet/second
Failure Direction: Left to Right
Data Output: Standard
Maximum Material Properties: 20
Maximum Support Properties: 20

Analysis Options

Analysis Methods Used

Janbu simplified
Spencer

Number of slices: 25
Tolerance: 0.005
Maximum number of iterations: 50
Check malpha < 0.2: Yes
Initial trial value of FS: 1
Steffensen Iteration: Yes

Groundwater Analysis

Groundwater Method: Water Surfaces
Pore Fluid Unit Weight: 62.4 lbs/ft3
Advanced Groundwater Method: None

Random Numbers

Pseudo-random Seed: 10116
Random Number Generation Method: Park and Miller v.3

Surface Options

Search Method: Auto Refine Search
Divisions along slope: 10
Circles per division: 10
Number of iterations: 10
Divisions to use in next iteration: 50%
Number of vertices per surface: 12
Minimum Elevation: Not Defined
Minimum Depth: Not Defined

Material Properties

Property	Engineered Fill	Existing Fill	Puente Formation-29 (Tplv)	Puente Formation-53 (Tplv)	Fault Material	Vaqueros-Sespe Fmtn (Tvs)	Proposed Cut
Color							
Strength Type	Mohr-Coulomb	Mohr-Coulomb	Anisotropic function	Anisotropic function	Mohr-Coulomb	Anisotropic function	No strength
Unit Weight [lbs/ft3]	125	110	110	110	130	130	0.01
Cohesion [psf]	150	150			0		
Friction Angle [deg]	32	32			26		
Water Surface	None	None	None	None	None	None	None
Ru Value	0	0	0	0	0	0	0

Anisotropic Functions

Name: 53 Puente (Tplv)

Angle From	Angle To	c	phi
-90	-55	300	32
-55	-51	300	27
-51	90	300	32

Name: 32 Vaqueros-Sespe (Tvs)

Angle From	Angle To	c	phi
-90	30	550	36
30	34	750	30
34	90	100	30

Name: 29 Puente (Tplv)

Angle From	Angle To	c	phi
-90	-31	300	32
-31	-27	300	27

-27	90	300	32

Global Minimums

Method: janbu simplified

FS: 1.287890
Axis Location: 151.206, 766.691
Left Slip Surface Endpoint: 63.589, 721.388
Right Slip Surface Endpoint: 134.879, 669.416
Left Slope Intercept: 63.589 736.774
Right Slope Intercept: 134.879 718.273
Resisting Horizontal Force=61086.2 lb
Driving Horizontal Force=47431.2 lb
Total Slice Area=3229.4 ft2

Method: spencer

FS: 1.526100
Axis Location: 153.801, 761.043
Left Slip Surface Endpoint: 69.146, 721.205
Right Slip Surface Endpoint: 134.879, 669.416
Left Slope Intercept: 69.146 736.723
Right Slope Intercept: 134.879 718.273
Resisting Moment=5.97169e+006 lb-ft
Driving Moment=3.91304e+006 lb-ft
Resisting Horizontal Force=49867.7 lb
Driving Horizontal Force=32676.6 lb
Total Slice Area=2895.22 ft2

Global Minimum Coordinates

Method: janbu simplified

X	Y
63.5894	721.388
70.4921	711.53
88.2568	689.585
94.2287	682.21
99.9978	677.954
105.895	674.248
111.82	671.158
117.539	668.79
122.8	667.193
127.112	666.363
130.465	666.081
134.879	669.416
134.88	718.273

Method: spencer

X	Y
69.1461	721.205
83.3982	699.457
87.4331	693.983
92.4258	687.785
95.2313	684.312
97.4988	681.508
102.543	678.8
110.94	674.866
119.555	671.37
124.69	670.144
130.821	669.919
134.879	669.416
134.88	718.273

Valid / Invalid Surfaces

Method: janbu simplified

Number of Valid Surfaces: 1561
Number of Invalid Surfaces: 2941

Error Codes:

Error Code -105 reported for 1561 surfaces
Error Code -106 reported for 796 surfaces
Error Code -107 reported for 496 surfaces
Error Code -108 reported for 65 surfaces
Error Code -109 reported for 14 surfaces
Error Code -1000 reported for 9 surfaces

Method: spencer

Number of Valid Surfaces: 965
Number of Invalid Surfaces: 3537

Error Codes:

Error Code -105 reported for 1561 surfaces
Error Code -106 reported for 796 surfaces
Error Code -107 reported for 496 surfaces
Error Code -108 reported for 396 surfaces
Error Code -109 reported for 14 surfaces
Error Code -111 reported for 265 surfaces
Error Code -1000 reported for 9 surfaces

Error Codes

The following errors were encountered during the computation:

-105 = More than two surface / slope intersections with no valid slip surface.
-106 = Average slice width is less than 0.0001 * (maximum horizontal extent of soil region). This limitation is imposed to avoid numerical errors which may result from too many slices, or too small a slip region.
-107 = Total driving moment or total driving force is negative. This will occur if the wrong failure direction is specified, or if high external or anchor loads are applied against the failure direction.
-108 = Total driving moment or total driving force < 0.1. This is to limit the calculation of extremely high safety factors if the driving force is very small (0.1 is an arbitrary number).
-109 = Soiltype for slice base not located. This error should occur very rarely, if at all. It may occur if a very low number of slices is combined with certain soil geometries, such that the midpoint of a slice base is actually outside the soil region,even though the slip surface is wholly within the soil region.
-111 = safety factor equation did not converge
-1000 = No valid slip surfaces are generated at a grid center. Unable to draw a surface.

Slice Data

Global Minimum Query (janbu simplified) - Safety Factor: 1.28789

Slice Number	Width [ft]	Weight [lbs]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	2.53712	506.611	Existing Fill	150	32	126.026	162.307	19.6957	0	19.6957
2	2.53712	1518.31	Existing Fill	150	32	240.309	309.492	255.241	0	255.241
3	1.82837	1614.32	Puente Formation-53 (Tplv)	300	27	372.041	479.148	351.599	0	351.599
4	2.96078	3028.25	Puente Formation-53 (Tplv)	300	27	428.276	551.572	493.739	0	493.739
5	2.96078	3463.81	Puente Formation-53 (Tplv)	300	27	467.371	601.922	592.554	0	592.554
6	2.96078	3899.36	Puente Formation-53 (Tplv)	300	27	506.465	652.271	691.372	0	691.372
7	2.96078	4334.92	Puente Formation-53 (Tplv)	300	27	545.559	702.62	790.187	0	790.187
8	2.96078	4756.1	Puente Formation-53 (Tplv)	300	27	583.363	751.308	885.74	0	885.74
9	2.96078	5185.05	Puente Formation-53 (Tplv)	300	27	621.864	800.892	983.055	0	983.055
10	2.98596	5665.02	Puente Formation-53 (Tplv)	300	27	660.728	850.945	1081.29	0	1081.29
11	2.98596	6103.46	Puente Formation-53 (Tplv)	300	27	699.753	901.205	1179.93	0	1179.93
12	2.88455	6084.86	Puente Formation-53 (Tplv)	300	32	925.221	1191.58	1426.83	0	1426.83
13	2.88455	6038.76	Puente Formation-53 (Tplv)	300	32	919.511	1184.23	1415.06	0	1415.06
14	2.94857	6072.83	Puente Formation-53 (Tplv)	300	32	944.317	1216.18	1466.19	0	1466.19
15	2.94857	5920.01	Puente Formation-53 (Tplv)	300	32	925.046	1191.36	1426.47	0	1426.47
			Puente							

			Formation-53 (Tplv)							
17	2.96257	5485.11	Puente Formation-53 (Tplv)	300	32	902.827	1162.74	1380.68	0	1380.68
18	2.85954	5001.84	Puente Formation-53 (Tplv)	300	32	900.668	1159.96	1376.23	0	1376.23
19	2.85954	4665.35	Puente Formation-53 (Tplv)	300	32	853.126	1098.73	1278.24	0	1278.24
20	2.6306	3952.66	Puente Formation-53 (Tplv)	300	32	838.441	1079.82	1247.97	0	1247.97
21	2.6306	3583.83	Puente Formation-53 (Tplv)	300	32	779.15	1003.46	1125.77	0	1125.77
22	2.15572	2633.48	Puente Formation-53 (Tplv)	300	32	755.154	972.555	1076.31	0	1076.31
23	2.15572	2328.94	Puente Formation-53 (Tplv)	300	32	692.465	891.819	947.107	0	947.107
24	3.35315	2950.32	Puente Formation-53 (Tplv)	300	32	633.987	816.506	826.584	0	826.584
25	4.41407	2.46673	Puente Formation-53 (Tplv)	300	32	368.167	474.158	278.712	0	278.712

Global Minimum Query (spencer) - Safety Factor: 1.5261

Slice Number	Width [ft]	Weight [lbs]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	2.92019	350.944	Existing Fill	150	32	81.4652	124.324	-41.0902	0	-41.0902
2	2.83297	1005.89	Puente Formation-53 (Tplv)	300	32	196.475	299.84	-0.255695	0	-0.255695
3	2.83297	1661.22	Puente Formation-53 (Tplv)	300	32	254.634	388.597	141.784	0	141.784
4	2.83297	2316.56	Puente Formation-53 (Tplv)	300	32	312.793	477.353	283.823	0	283.823
5	2.83297	2968.26	Puente Formation-53 (Tplv)	300	32	370.605	565.58	425.018	0	425.018
6	2.01747	2466.6	Puente Formation-53 (Tplv)	300	27	403.518	615.809	619.809	0	619.809
7	2.01747	2720.91	Puente Formation-53 (Tplv)	300	27	440.374	672.054	730.197	0	730.197
8	2.49632	3678.78	Puente Formation-53 (Tplv)	300	27	482.862	736.895	857.454	0	857.454
9	2.49632	3989.6	Puente Formation-53 (Tplv)	300	27	512.786	782.562	947.082	0	947.082
10	2.80556	4853.31	Puente Formation-53 (Tplv)	300	27	544.802	831.422	1042.97	0	1042.97
11	2.26747	4206.74	Puente Formation-53 (Tplv)	300	27	575.07	877.614	1133.63	0	1133.63
12	2.52206	4732.26	Puente Formation-53 (Tplv)	300	32	757.117	1155.44	1368.98	0	1368.98
13	2.52206	4556.4	Puente Formation-53 (Tplv)	300	32	731.451	1116.27	1306.3	0	1306.3
			Puente							

			Formation-53 (Tplv)							
15	2.7989	4545.81	Puente Formation-53 (Tplv)	300	32	678.182	1034.97	1176.2	0	1176.2
16	2.7989	4270.38	Puente Formation-53 (Tplv)	300	32	641.934	979.655	1087.67	0	1087.67
17	2.87189	4066.99	Puente Formation-53 (Tplv)	300	32	612.867	935.297	1016.69	0	1016.69
18	2.87189	3720.07	Puente Formation-53 (Tplv)	300	32	568.096	866.971	907.344	0	907.344
19	2.87189	3373.15	Puente Formation-53 (Tplv)	300	32	523.324	798.645	797.998	0	797.998
20	2.5674	2661.23	Puente Formation-53 (Tplv)	300	32	497.517	759.26	734.971	0	734.971
21	2.5674	2262.8	Puente Formation-53 (Tplv)	300	32	438.299	668.888	590.345	0	590.345
22	3.06531	2075.47	Puente Formation-53 (Tplv)	300	32	386.032	589.124	462.695	0	462.695
23	3.06531	1298.84	Puente Formation-53 (Tplv)	300	32	273.256	417.016	187.264	0	187.264
24	2.02913	452.308	Puente Formation-53 (Tplv)	300	32	180.452	275.388	-39.3877	0	-39.3877
25	2.02913	151.43	Puente Formation-53 (Tplv)	300	32	1513.6	2309.9	3216.51	0	3216.51

Interslice Data

Global Minimum Query (janbu simplified) - Safety Factor: 1.28789

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	63.5894	721.388	1.18375	0	0
2	66.1266	717.764	-913.234	0	0
3	68.6637	714.141	13.5416	0	0
4	70.4921	711.53	9.55466	0	0
5	73.4528	707.872	-254.648	0	0
6	76.4136	704.215	-780.575	0	0
7	79.3744	700.557	-1568.23	0	0
8	82.3352	696.9	-2617.6	0	0
9	85.296	693.242	-3936.81	0	0
10	88.2568	689.585	-4442.64	0	0
11	91.2427	685.898	-4742.81	0	0
12	94.2287	682.21	-5005.49	0	0
13	97.1132	680.082	-7275.17	0	0
14	99.9978	677.954	-9749.14	0	0
15	102.946	676.101	-12915.2	0	0
16	105.895	674.248	-16302.6	0	0
17	108.857	672.703	-20361.3	0	0
18	111.82	671.158	-24633.9	0	0

19	114.68	669.974	-29376.7	0	0
20	117.539	668.79	-34292	0	0
21	120.17	667.991	-39340.4	0	0
22	122.8	667.193	-44493.2	0	0
23	124.956	666.778	-49075.9	0	0
24	127.112	666.363	-53686.3	0	0
25	130.465	666.081	-61999.9	0	0
26	134.879	669.416	11.9349	0	0

Global Minimum Query (spencer) - Safety Factor: 1.5261

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	69.1461	721.205	1.20412	0	0
2	72.0663	716.749	-1079.29	107.928	-5.71054
3	74.8993	712.426	-2652.02	265.202	-5.71059
4	77.7323	708.103	-4240.02	424.002	-5.71059
5	80.5652	703.78	-5843.29	584.329	-5.71059
6	83.3982	699.457	-7464.51	746.45	-5.71059
7	85.4157	696.72	-8580.43	858.043	-5.71059
8	87.4331	693.983	-9003.58	900.357	-5.71059
9	89.9294	690.884	-9424.09	942.408	-5.71059
10	92.4258	687.785	-9788.14	978.813	-5.71059
11	95.2313	684.312	-10137.8	1013.78	-5.71059
12	97.4988	681.508	-10372.8	1037.28	-5.71059
13	100.021	680.154	-12918.1	1291.81	-5.71059
14	102.543	678.8	-15633.1	1563.31	-5.71059
15	105.342	677.489	-19077.8	1907.78	-5.71059
16	108.141	676.177	-22721.4	2272.14	-5.71059
17	110.94	674.866	-26563.9	2656.38	-5.71057
18	113.812	673.7	-30893.4	3089.33	-5.71057
19	116.683	672.535	-35415.7	3541.57	-5.71059
20	119.555	671.37	-40130.9	4013.08	-5.71058
21	122.123	670.757	-44825.1	4482.51	-5.71059
22	124.69	670.144	-49611	4961.09	-5.71058
23	127.755	670.031	-55747.5	5574.75	-5.71059
24	130.821	669.919	-62687.7	6268.77	-5.71059
25	132.85	669.667	-67556.6	6755.65	-5.71058
26	134.879	669.416	11.9349	0	0

List Of Coordinates

External Boundary

X	Y
0.063	649.948

161.839	649.948
163.881	649.948
165.899	649.948
212.896	649.948
216.753	649.948
218.75	649.936
220.756	649.946
223.112	649.948
225.122	649.948
289.928	649.948
291.932	649.948
293.929	649.948
465.626	649.948
467.626	649.948
469.627	649.948
550.243	649.948
550.243	666.594
518.094	668.639
503.205	670.847
495.188	675.51
488.071	680.091
481.036	685
471.219	692.199
456.658	695.144
443.651	695.634
425.471	698.735
423.475	699.076
421.47	699.418
405.284	702.179
363.4	708.887
346.054	708.596
314.232	708.514
307.986	708.482
307.831	708.481
266.131	708.269
233.245	708.432
224.764	708.697
222.755	708.76
220.741	708.823
213.351	709.054
211.349	709.117
209.343	709.179
198.395	709.58
196.386	709.786
194.385	709.991
192.178	710.217

179.254	711.541
162.402	713.013
148.249	715.14
136.188	717.966
134.165	718.44
132.1	718.924
128.698	719.721
117.829	723.882
85.75	736.164
67.2926	736.786
63.908	736.9
60.8	735.673
53.683	738.7
50.488	739.532
45.6576	740.791
45.5814	740.81
45.4087	740.855
43.948	741.236
42.7384	741.335
42.6913	741.338
36.913	741.809
-0.02	742.908
-0.02	699.977

Material Boundary

X	Y
-0.02	699.977
50.186	699.977
73.4529	717.812
77.646	721.026
82.7253	721.387
82.7399	721.388
85.75	721.602
117.829	723.882

Material Boundary

X	Y
134.165	718.44
155.435	669.416
163.881	649.948

Material Boundary

X	Y

132.1	718.924
153.445	669.416
161.839	649.948

Material Boundary

X	Y
136.188	717.966
157.395	669.416
165.899	649.948

Material Boundary

X	Y
423.475	699.076
467.626	649.948

Material Boundary

X	Y
425.471	698.735
469.627	649.948

Material Boundary

X	Y
421.47	699.418
465.626	649.948

Material Boundary

X	Y
211.349	709.117
265.418	669.416
291.932	649.948

Material Boundary

X	Y
213.351	709.054
267.389	669.416
293.929	649.948

Material Boundary

X	Y
209.343	709.179

263.442	669.416
289.928	649.948

Material Boundary

X	Y
194.385	709.991
209.5	669.416
216.753	649.948

Material Boundary

X	Y
196.386	709.786
211.471	669.416
218.75	649.936

Material Boundary

X	Y
198.395	709.58
213.455	669.416
220.756	649.946

Material Boundary

X	Y
82.7399	721.388
85.75	718.388
86.3064	717.833
93.7954	710.368
134.879	669.416
153.445	669.416
155.435	669.416
157.395	669.416
209.5	669.416
211.471	669.416
213.455	669.416
263.442	669.416
265.418	669.416
267.389	669.416
272.029	669.416
307.986	708.482

Material Boundary

X	Y
67.2926	736.786
82.6949	721.417
82.7253	721.387
85.75	718.369
85.75	718.373
85.75	718.388
85.75	721.602
85.75	736.164

Material Boundary

X	Y
85.75	718.369
87.7116	716.418
93.7954	710.368

Material Boundary

X	Y
67.2926	736.786
82.7399	721.388
82.6949	721.417

Material Boundary

X	Y
50.3768	737.556
50.473	737.492

Material Boundary

X	Y
60.8	735.673
82.6788	721.417
82.7253	721.387
74.721	721.387

Material Boundary

X	Y
68.9147	721.387
74.7208	721.387
82.7253	721.387
85.75	718.373
87.7116	716.418

134.879	669.416
73.4529	717.812
68.9147	721.387

Material Boundary

X	Y
50.488	739.532
50.488	721.388
68.9147	721.387

Material Boundary

X	Y
60.8	735.673
82.6949	721.417
82.6788	721.417
68.9147	721.387

Material Boundary

X	Y
42.6913	741.338
50.481	735.195
50.488	739.532

Slide Analysis Information

IRWD - ILP North Conversion Reservoir Zone C+

Project Summary

File Name: Section 1_Right_1to1
Slide Modeler Version: 6.033
Project Title: IRWD - ILP North Conversion Reservoir Zone C+
Company: KLF
Date Created: 2/18/2015, 4:13:13 PM

General Settings

Units of Measurement: Imperial Units
Time Units: days
Permeability Units: feet/second
Failure Direction: Right to Left
Data Output: Standard
Maximum Material Properties: 20
Maximum Support Properties: 20

Analysis Options

Analysis Methods Used

Janbu simplified
Spencer

Number of slices: 25
Tolerance: 0.005
Maximum number of iterations: 50
Check malpha < 0.2: Yes
Initial trial value of FS: 1
Steffensen Iteration: Yes

Groundwater Analysis

Groundwater Method: Water Surfaces
Pore Fluid Unit Weight: 62.4 lbs/ft3
Advanced Groundwater Method: None

Random Numbers

Pseudo-random Seed: 10116
Random Number Generation Method: Park and Miller v.3

Surface Options

Search Method: Auto Refine Search
Divisions along slope: 10
Circles per division: 10
Number of iterations: 10
Divisions to use in next iteration: 50%
Number of vertices per surface: 12
Minimum Elevation: Not Defined
Minimum Depth: Not Defined

Material Properties

Property	Existing Fill	Puente Formation-29 (Tplv)	Puente Formation-53 (Tplv)	Fault Material	Vaqueros-Sespe Fmtn (Tvs)	Puente Formation-66 (Tplv)	Proposed Cut
Color							
Strength Type	Mohr-Coulomb	Anisotropic function	Anisotropic function	Mohr-Coulomb	Anisotropic function	Anisotropic function	No strength
Unit Weight [lbs/ft3]	110	110	110	130	130	110	0.01
Cohesion [psf]	150			0			
Friction Angle [deg]	32			26			
Water Surface	None	None	None	None	None	None	None
Ru Value	0	0	0	0	0	0	0

Anisotropic Functions

Name: 53 Puente (Tplv)

Angle From	Angle To	c	phi
-90	-55	300	32
-55	-51	300	27
-51	90	300	32

Name: 32 Vaqueros-Sespe (Tvs)

Angle From	Angle To	c	phi
-90	30	550	36
30	34	750	30
34	90	100	30

Name: 29 Puente (Tplv)

Angle From	Angle To	c	phi
-90	-31	300	32
-31	-27	300	27

-27	90	300	32

Name: 66 Puente (Tplv)

Angle From	Angle To	c	phi
-90	64	300	32
64	68	300	27
68	90	300	32

Global Minimums

Method: janbu simplified

FS: 1.310910
Axis Location: 257.167, 737.478
Left Slip Surface Endpoint: 272.029, 669.416
Right Slip Surface Endpoint: 320.534, 708.530
Left Slope Intercept: 272.029 708.299
Right Slope Intercept: 320.534 708.530
Resisting Horizontal Force=40290.3 lb
Driving Horizontal Force=30734.7 lb
Total Slice Area=1338.89 ft2

Method: spencer

FS: 1.478410
Axis Location: 241.295, 752.850
Left Slip Surface Endpoint: 272.034, 669.421
Right Slip Surface Endpoint: 318.370, 708.525
Left Slope Intercept: 272.034 708.299
Right Slope Intercept: 318.370 708.525
Resisting Moment=3.38904e+006 lb-ft
Driving Moment=2.29235e+006 lb-ft
Resisting Horizontal Force=28929.8 lb
Driving Horizontal Force=19568.2 lb
Total Slice Area=1115.57 ft2

Global Minimum Coordinates

Method: janbu simplified

X	Y
272.029	669.416
274.08	668.718
276.824	668.405
280.222	668.687
284.164	669.715
288.466	671.559
292.952	674.209
297.439	677.611

301.721	681.594
305.552	685.879
308.955	690.381
320.534	708.53

Method: spencer

X	Y
272.034	669.421
276.247	671.097
280.459	673.029
284.671	675.237
288.884	677.746
293.096	680.587
297.308	683.801
301.52	687.443
305.733	691.588
309.945	696.349
314.157	701.896
318.37	708.525

Valid / Invalid Surfaces

Method: janbu simplified

Number of Valid Surfaces: 1768
Number of Invalid Surfaces: 2734

Error Codes:

Error Code -105 reported for 552 surfaces
Error Code -106 reported for 1291 surfaces
Error Code -107 reported for 114 surfaces
Error Code -108 reported for 725 surfaces
Error Code -1000 reported for 52 surfaces

Method: spencer

Number of Valid Surfaces: 649
Number of Invalid Surfaces: 3853

Error Codes:

Error Code -105 reported for 552 surfaces
Error Code -106 reported for 1291 surfaces
Error Code -107 reported for 114 surfaces
Error Code -108 reported for 857 surfaces
Error Code -111 reported for 987 surfaces
Error Code -1000 reported for 52 surfaces

Error Codes

The following errors were encountered during the computation:

-105 = More than two surface / slope intersections with no valid slip surface.
-106 = Average slice width is less than 0.0001 * (maximum horizontal extent of soil region). This limitation is imposed to avoid numerical errors which may result from too many slices, or too small a slip region.
-107 = Total driving moment or total driving force is negative. This will occur if the wrong failure direction is specified, or if high external or anchor loads are applied against the failure direction.
-108 = Total driving moment or total driving force < 0.1. This is to limit the calculation of extremely high safety factors if the driving force is very small (0.1 is an arbitrary number).
-111 = safety factor equation did not converge
-1000 = No valid slip surfaces are generated at a grid center. Unable to draw a surface.

Slice Data

Global Minimum Query (janbu simplified) - Safety Factor: 1.31091

Slice Number	Width [ft]	Weight [lbs]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	2.05148	314.086	Puente Formation-29 (Tplv)	300	32	360.289	472.307	275.748	0	275.748
2	2.74333	1305.41	Puente Formation-29 (Tplv)	300	32	481.82	631.623	530.709	0	530.709
3	1.69924	1245.23	Puente Formation-29 (Tplv)	300	32	556.2	729.128	686.751	0	686.751
4	1.69924	1540.69	Puente Formation-29 (Tplv)	300	32	635.932	833.65	854.018	0	854.018
5	1.97097	2119.13	Puente Formation-29 (Tplv)	300	32	659.365	864.368	903.177	0	903.177
6	1.97097	2440.56	Puente Formation-29 (Tplv)	300	32	728.505	955.005	1048.22	0	1048.22
7	2.15103	2987.67	Puente Formation-29 (Tplv)	300	32	739.794	969.804	1071.91	0	1071.91
8	2.15103	3285.16	Puente Formation-29 (Tplv)	300	32	794.537	1041.57	1186.75	0	1186.75
9	2.24265	3696.94	Puente Formation-29 (Tplv)	300	32	791.645	1037.78	1180.69	0	1180.69
10	2.24265	3930.5	Puente Formation-29 (Tplv)	300	32	830.377	1088.55	1261.94	0	1261.94
11	1.49594	2731.09	Puente Formation-29 (Tplv)	300	32	807.363	1058.38	1213.66	0	1213.66
12	1.49594	2793.87	Puente Formation-29 (Tplv)	300	32	822.056	1077.64	1244.49	0	1244.49
13	1.49594	2856.65	Puente Formation-29 (Tplv)	300	32	836.751	1096.91	1275.32	0	1275.32
14	2.14061	4153.44	Puente Formation-29 (Tplv)	300	32	799.25	1047.74	1196.64	0	1196.64
15	2.14061	4195.08	Puente Formation-29 (Tplv)	300	32	805.673	1056.17	1210.12	0	1210.12

16	1.91591	3752.15	Puente Formation-29 (Tplv)	300	32	758.259	994.009	1110.65	0	1110.65
17	1.91591	3709.76	Puente Formation-29 (Tplv)	300	32	751.378	984.989	1096.21	0	1096.21
18	1.7012	3225.79	Puente Formation-29 (Tplv)	300	32	694.566	910.513	977.025	0	977.025
19	1.7012	3127	Puente Formation-29 (Tplv)	300	32	677.592	888.262	941.417	0	941.417
20	1.92991	3373.38	Puente Formation-29 (Tplv)	300	32	607.884	796.881	795.176	0	795.176
21	1.92991	2883.63	Puente Formation-29 (Tplv)	300	32	538.648	706.119	649.926	0	649.926
22	1.92991	2243.54	Puente Formation-29 (Tplv)	300	32	448.157	587.494	460.085	0	460.085
23	1.92991	1602.72	Puente Formation-29 (Tplv)	300	32	357.565	468.736	270.034	0	270.034
24	1.92991	961.634	Puente Formation-29 (Tplv)	300	32	266.934	349.926	79.8989	0	79.8989
25	1.92991	320.545	Puente Formation-29 (Tplv)	300	32	176.303	231.117	-110.236	0	-110.236

Global Minimum Query (spencer) - Safety Factor: 1.47841

Slice Number	Width [ft]	Weight [lbs]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	2.10615	150.951	Puente Formation-29 (Tplv)	300	32	914.841	1352.51	1684.37	0	1684.37
2	2.10615	451.215	Puente Formation-29 (Tplv)	300	32	162.758	240.623	-95.0235	0	-95.0235
3	2.10615	736.593	Puente Formation-29 (Tplv)	300	32	211.887	313.256	21.2144	0	21.2144
4	2.10615	1007.08	Puente Formation-29 (Tplv)	300	32	262.238	387.696	140.343	0	140.343
5	2.10615	1261.57	Puente Formation-29 (Tplv)	300	32	303.386	448.529	237.696	0	237.696
6	2.10615	1500.07	Puente Formation-29 (Tplv)	300	32	347.556	513.831	342.202	0	342.202
7	2.10615	1721.15	Puente Formation-29 (Tplv)	300	32	380.426	562.425	419.965	0	419.965
8	2.10615	1924.82	Puente Formation-29 (Tplv)	300	32	418.111	618.139	509.128	0	509.128
9	2.10615	2109.27	Puente Formation-29 (Tplv)	300	32	442.277	653.867	566.307	0	566.307
10	2.10615	2274.5	Puente Formation-29 (Tplv)	300	32	473.076	699.401	639.177	0	639.177
11	2.10615	2418.13	Puente Formation-29 (Tplv)	300	32	487.959	721.404	674.388	0	674.388
12	2.10615	2540.16	Puente Formation-29 (Tplv)	300	32	511.347	755.981	729.723	0	729.723
			Puente							

			Formation-29 (Tplv)							
14	2.10615	2709.91	Puente Formation-29 (Tplv)	300	32	531.436	785.681	777.251	0	777.251
15	1.4041	1833.9	Puente Formation-29 (Tplv)	300	32	524.065	774.783	759.809	0	759.809
16	1.4041	1840.16	Puente Formation-29 (Tplv)	300	32	528.215	780.918	769.631	0	769.631
17	1.4041	1846.43	Puente Formation-29 (Tplv)	300	32	532.365	787.054	779.448	0	779.448
18	1.4041	1836.87	Puente Formation-29 (Tplv)	300	32	513.061	758.514	733.774	0	733.774
19	1.4041	1811.48	Puente Formation-29 (Tplv)	300	32	510.297	754.428	727.238	0	727.238
20	1.4041	1786.09	Puente Formation-29 (Tplv)	300	32	507.534	750.343	720.701	0	720.701
21	2.10615	2469.43	Puente Formation-29 (Tplv)	300	32	457.694	676.66	602.781	0	602.781
22	2.10615	1853.21	Puente Formation-29 (Tplv)	300	32	373.601	552.335	403.82	0	403.82
23	1.4041	851.779	Puente Formation-29 (Tplv)	300	32	275.765	407.693	172.344	0	172.344
24	1.4041	511.068	Puente Formation-29 (Tplv)	300	32	209.611	309.891	15.8283	0	15.8283
25	1.4041	170.356	Puente Formation-29 (Tplv)	300	32	143.437	212.059	-140.736	0	-140.736

Interslice Data

Global Minimum Query (janbu simplified) - Safety Factor: 1.31091

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	272.029	669.416	7.55945	0	0
2	274.08	668.718	-41347.6	0	0
3	276.824	668.405	-33745.7	0	0
4	278.523	668.546	-29349.4	0	0
5	280.222	668.687	-25024.2	0	0
6	282.193	669.201	-20515.4	0	0
7	284.164	669.715	-16191.2	0	0
8	286.315	670.637	-12128.8	0	0
9	288.466	671.559	-8347.88	0	0
10	290.709	672.884	-5148.86	0	0
11	292.952	674.209	-2289.57	0	0
12	294.448	675.343	-854.81	0	0
13	295.943	676.477	425.079	0	0
14	297.439	677.611	1550.1	0	0
15	299.58	679.603	2518.85	0	0
16	301.721	681.594	3183.97	0	0

17	303.637	683.736	3220.15	0	0
18	305.552	685.879	3041.32	0	0
19	307.254	688.13	2476.22	0	0
20	308.955	690.381	1778.9	0	0
21	310.885	693.406	632.74	0	0
22	312.815	696.431	-293.645	0	0
23	314.745	699.456	-820.432	0	0
24	316.674	702.481	-947.173	0	0
25	318.604	705.505	-673.696	0	0
26	320.534	708.53	0	0	0

Global Minimum Query (spencer) - Safety Factor: 1.47841

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	272.034	669.421	7.55735	0	0
2	274.141	670.259	-41625.2	4162.52	-5.71059
3	276.247	671.097	-36474.3	3647.43	-5.71059
4	278.353	672.063	-31601.4	3160.14	-5.71059
5	280.459	673.029	-27018.7	2701.87	-5.71059
6	282.565	674.133	-22757.7	2275.77	-5.71059
7	284.671	675.237	-18800.3	1880.03	-5.71059
8	286.777	676.492	-15203.9	1520.39	-5.71059
9	288.884	677.746	-11921.4	1192.14	-5.71059
10	290.99	679.167	-9034.93	903.493	-5.71059
11	293.096	680.587	-6468.43	646.843	-5.71059
12	295.202	682.194	-4327.61	432.761	-5.71059
13	297.308	683.801	-2507.74	250.774	-5.71059
14	299.414	685.622	-1135.83	113.583	-5.71059
15	301.52	687.443	-78.8365	7.88365	-5.71059
16	302.925	688.824	352.731	-35.2731	-5.71059
17	304.329	690.206	651.544	-65.1544	-5.71059
18	305.733	691.588	817.602	-81.7602	-5.71059
19	307.137	693.175	744.283	-74.4283	-5.71059
20	308.541	694.762	552.449	-55.2449	-5.71059
21	309.945	696.349	242.101	-24.2101	-5.71059
22	312.051	699.122	-452.602	45.2602	-5.71059
23	314.157	701.896	-786.151	78.6151	-5.71059
24	315.561	704.106	-779.925	77.9925	-5.71059
25	316.966	706.315	-520.712	52.0712	-5.71059
26	318.37	708.525	0	0	0

List Of Coordinates

External Boundary

X	Y
0.063	649.948
161.839	649.948
163.881	649.948
165.899	649.948
212.896	649.948
216.753	649.948
218.75	649.936
220.756	649.946
223.112	649.948
225.122	649.948
289.928	649.948
291.932	649.948
293.929	649.948
465.626	649.948
467.626	649.948
469.627	649.948
550.243	649.948
550.243	666.594
518.094	668.639
503.205	670.847
495.188	675.51
488.071	680.091
481.036	685
471.219	692.199
456.658	695.144
443.651	695.634
425.471	698.735
423.475	699.076
421.47	699.418
405.284	702.179
363.4	708.887
346.054	708.596
314.232	708.514
310.601	708.496
307.831	708.481
266.131	708.269
233.245	708.432
224.764	708.697
222.755	708.76
220.741	708.823
213.351	709.054
211.349	709.117
209.343	709.179
198.395	709.58
196.386	709.786

194.385	709.991
192.178	710.217
179.254	711.541
162.402	713.013
148.249	715.14
136.188	717.966
134.165	718.44
132.1	718.924
128.698	719.721
117.829	723.882
85.75	736.164
67.2926	736.786
63.908	736.9
60.8	735.673
53.683	738.7
43.948	741.236
36.913	741.809
-0.02	742.908
0.0169534	701.52

Material Boundary

X	Y
0.0169534	701.52
50.488	701.855
77.646	721.026
82.7399	721.388
117.829	723.882

Material Boundary

X	Y
134.165	718.44
155.435	669.416
163.881	649.948

Material Boundary

X	Y
132.1	718.924
153.445	669.416
161.839	649.948

Material Boundary

X	Y

136.188	717.966
157.395	669.416
165.899	649.948

Material Boundary

X	Y
423.475	699.076
467.626	649.948

Material Boundary

X	Y
425.471	698.735
469.627	649.948

Material Boundary

X	Y
421.47	699.418
465.626	649.948

Material Boundary

X	Y
211.349	709.117
265.418	669.416
291.932	649.948

Material Boundary

X	Y
213.351	709.054
267.389	669.416
293.929	649.948

Material Boundary

X	Y
209.343	709.179
263.442	669.416
289.928	649.948

Material Boundary

X	Y
194.385	709.991

209.5	669.416
216.753	649.948

Material Boundary

X	Y
196.386	709.786
211.471	669.416
218.75	649.936

Material Boundary

X	Y
198.395	709.58
213.455	669.416
220.756	649.946

Material Boundary

X	Y
67.2926	736.786
82.7399	721.388
134.879	669.416
153.445	669.416
155.435	669.416
157.395	669.416
209.5	669.416
211.471	669.416
213.455	669.416
263.442	669.416
265.418	669.416
267.389	669.416
272.029	669.416
310.601	708.496

Slide Analysis Information

IRWD - ILP NOrth Convsersion Reservoir Zone C+

Project Summary

File Name: Section 2_Left_1.25to1
Slide Modeler Version: 6.033
Project Title: IRWD - ILP NOrth Convsersion Reservoir Zone C+
Date Created: 2/18/2015, 4:13:13 PM

General Settings

Units of Measurement: Imperial Units
Time Units: days
Permeability Units: feet/second
Failure Direction: Left to Right
Data Output: Standard
Maximum Material Properties: 20
Maximum Support Properties: 20

Analysis Options

Analysis Methods Used

Janbu simplified
Spencer

Number of slices: 25
Tolerance: 0.005
Maximum number of iterations: 50
Check malpha < 0.2: Yes
Initial trial value of FS: 1
Steffensen Iteration: Yes

Groundwater Analysis

Groundwater Method: Water Surfaces
Pore Fluid Unit Weight: 62.4 lbs/ft3
Advanced Groundwater Method: None

Random Numbers

Pseudo-random Seed: 10116
Random Number Generation Method: Park and Miller v.3

Surface Options

Search Method: Auto Refine Search
Divisions along slope: 10

Circles per division: 10
Number of iterations: 10
Divisions to use in next iteration: 50%
Number of vertices per surface: 12
Minimum Elevation: Not Defined
Minimum Depth: Not Defined

Material Properties

Property	Engineered Fill	Existing Fill	Puente Formation-28 (Tplv)	Puente Formation-58 (Tplv)	Topanga (Tt)	Andesite (Tema)	Fault Material	Landslide Rupture Planes (Qls-rp)
Color								
Strength Type	Mohr-Coulomb	Mohr-Coulomb	Anisotropic function	Anisotropic function	Anisotropic function	Hoek-Brown	Mohr-Coulomb	Mohr-Coulomb
Unit Weight [lbs/ft3]	125	110	110	110	130	130	130	110
Cohesion [psf]	150	150					0	400
Friction Angle [deg]	32	32					26	29
Unconfined Compressive Strength (intact) [psf]						1.188e+006		
nm						25		
ns						0		
Water Surface	None	None	None	None	None	None	None	None
Ru Value	0	0	0	0	0	0	0	0

Anisotropic Functions

Name: 58 Tplv

Angle From	Angle To	c	phi
-90	-60	300	32
-60	-56	300	27
-56	90	300	32

Name: 28 Tplv

Angle From	Angle To	c	phi
-90	26	300	32
26	30	300	27
30	90	300	32

Name: 70 Tt

Angle From	Angle To	c	phi
-90	68	550	35
68	72	300	26
72	90	550	35

Property	Proposed Cut
Color	
Strength Type	No strength
Unit Weight [lbs/ft3]	0.01
Water Surface	None

Ru Value	0

Global Minimums

Method: janbu simplified

FS: 1.282740
Axis Location: 130.808, 748.444
Left Slip Surface Endpoint: 58.008, 714.501
Right Slip Surface Endpoint: 114.282, 669.839
Left Slope Intercept: 58.008 739.533
Right Slope Intercept: 114.282 717.341
Resisting Horizontal Force=54339.6 lb
Driving Horizontal Force=42362 lb
Total Slice Area=2465.74 ft2

Method: spencer

FS: 1.371280
Axis Location: 131.706, 746.647
Left Slip Surface Endpoint: 59.805, 714.501
Right Slip Surface Endpoint: 114.282, 669.839
Left Slope Intercept: 59.805 738.876
Right Slope Intercept: 114.282 717.341
Resisting Moment=4.89478e+006 lb-ft
Driving Moment=3.56951e+006 lb-ft
Resisting Horizontal Force=49170.3 lb
Driving Horizontal Force=35857.3 lb
Total Slice Area=2311.4 ft2

Global Minimum Coordinates

Method: janbu simplified

X	Y
58.0082	714.501
63.328	706.615
71.5312	694.453
75.7506	688.197
79.9389	685.12
87.6089	680.025
92.4433	676.166
94.167	674.791
100.56	671.731
106.191	670.02
110.812	669.487
114.282	669.839
114.283	717.341

Method: spencer

X	Y
59.8051	714.501
66.4923	704.451

72.7082	695.236
75.727	691.958
80.3079	687.69
85.2883	683.475
93.0335	676.776
93.76	676.148
98.5331	673.899
102.524	672.544
109.555	671.155
114.282	669.839
114.283	717.341

Valid / Invalid Surfaces

Method: janbu simplified

Number of Valid Surfaces: 1649
Number of Invalid Surfaces: 2853

Error Codes:

Error Code -105 reported for 497 surfaces
Error Code -106 reported for 1360 surfaces
Error Code -107 reported for 742 surfaces
Error Code -108 reported for 193 surfaces
Error Code -1000 reported for 61 surfaces

Method: spencer

Number of Valid Surfaces: 983
Number of Invalid Surfaces: 3519

Error Codes:

Error Code -105 reported for 497 surfaces
Error Code -106 reported for 1360 surfaces
Error Code -107 reported for 742 surfaces
Error Code -108 reported for 275 surfaces
Error Code -111 reported for 584 surfaces
Error Code -1000 reported for 61 surfaces

Error Codes

The following errors were encountered during the computation:

-105 = More than two surface / slope intersections with no valid slip surface.
-106 = Average slice width is less than 0.0001 * (maximum horizontal extent of soil region). This limitation is imposed to avoid numerical errors which may result from too many slices, or too small a slip region.
-107 = Total driving moment or total driving force is negative. This will occur if the wrong failure direction is specified, or if high external or anchor loads are applied against the failure direction.
-108 = Total driving moment or total driving force < 0.1. This is to limit the calculation of extremely high safety factors if the driving force is very small (0.1 is an arbitrary number).
-111 = safety factor equation did not converge
-1000 = No valid slip surfaces are generated at a grid center. Unable to draw a surface.

Slice Data

Global Minimum Query (janbu simplified) - Safety Factor: 1.28274

Slice Number	Width [ft]	Weight [lbs]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	2.65988	577.551	Puente Formation-58 (Tplv)	300	27	201.476	258.441	-81.5647	0	-81.5647
2	2.65988	1731.32	Puente Formation-58 (Tplv)	300	27	309.915	397.541	191.435	0	191.435
3	2.05079	2122.58	Puente Formation-58 (Tplv)	300	27	405.94	520.715	433.177	0	433.177
4	2.05079	2808.44	Puente Formation-58 (Tplv)	300	27	489.547	627.962	643.661	0	643.661
5	2.05079	3494.31	Puente Formation-58 (Tplv)	300	27	573.156	735.21	854.147	0	854.147
6	2.05079	4001.21	Puente Formation-58 (Tplv)	300	27	634.948	814.473	1009.71	0	1009.71
7	2.1097	4351.47	Puente Formation-58 (Tplv)	300	27	662.832	850.241	1079.91	0	1079.91
8	2.1097	4586.54	Puente Formation-58 (Tplv)	300	27	690.688	885.973	1150.04	0	1150.04
9	2.09415	4604.83	Puente Formation-58 (Tplv)	300	32	961.075	1232.81	1492.81	0	1492.81
10	2.09415	4511.95	Puente Formation-58 (Tplv)	300	32	945.165	1212.4	1460.15	0	1460.15
11	2.55668	5492.22	Puente Formation-58 (Tplv)	300	32	967.313	1240.81	1505.61	0	1505.61
12	2.55668	5462.11	Puente Formation-58 (Tplv)	300	32	962.979	1235.25	1496.71	0	1496.71
13	2.55668	5436.27	Puente Formation-58 (Tplv)	300	32	959.258	1230.48	1489.08	0	1489.08
14	0.828154	1760.42	Puente Formation-58 (Tplv)	300	32	914.008	1172.43	1396.19	0	1396.19
15	2.0031	4213.7	Fault Material	0	26	613.617	787.111	1613.82	0	1613.82
16	2.0031	4107.16	Fault Material	0	26	598.102	767.21	1573.01	0	1573.01
17	1.72377	3449.11	Fault Material	0	26	583.672	748.699	1535.06	0	1535.06
18	2.13109	4060.73	Topanga (Tt)	550	35	1164.63	1493.91	1348.05	0	1348.05
19	2.13109	3751.48	Topanga (Tt)	550	35	1101.82	1413.35	1232.99	0	1232.99
20	2.13109	3442.24	Topanga (Tt)	550	35	1039.02	1332.79	1117.94	0	1117.94
21	2.81536	3983.36	Topanga (Tt)	550	35	1030.21	1321.49	1101.8	0	1101.8
22	2.81536	3263.57	Topanga (Tt)	550	35	910.507	1167.94	882.517	0	882.517
23	2.31035	2074.99	Topanga (Tt)	550	35	864.683	1109.16	798.567	0	798.567
24	2.31035	1459.31	Topanga (Tt)	550	35	727.817	933.6	547.837	0	547.837
25	3.47029	865.613	Topanga (Tt)	550	35	597.993	767.069	310.007	0	310.007

Global Minimum Query (spencer) - Safety Factor: 1.37128

Slice Number	Width [ft]	Weight [lbs]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	2.22907	411.241	Puente Formation-58 (Tplv)	300	27	0	0	-697.021	0	-697.021
2	2.22907	1232.64	Puente Formation-58 (Tplv)	300	27	284.368	389.949	176.534	0	176.534

3	2.22907	2054.03	Puente Formation-58 (Tplv)	300	27	378.626	519.202	430.209	0	430.209
4	2.07198	2641.08	Puente Formation-58 (Tplv)	300	27	471.072	645.971	679.006	0	679.006
5	2.07198	3295.86	Puente Formation-58 (Tplv)	300	27	540.516	741.199	865.903	0	865.903
6	2.07198	3597.46	Puente Formation-58 (Tplv)	300	27	558.545	765.921	914.423	0	914.423
7	3.01881	5448.42	Puente Formation-58 (Tplv)	300	32	685.732	940.331	1024.74	0	1024.74
8	2.29046	4145.21	Puente Formation-58 (Tplv)	300	32	715.542	981.209	1090.16	0	1090.16
9	2.29046	4160.63	Puente Formation-58 (Tplv)	300	32	716.378	982.355	1092	0	1092
10	2.4902	4636.17	Puente Formation-58 (Tplv)	300	32	747.731	1025.35	1160.8	0	1160.8
11	2.4902	4732.57	Puente Formation-58 (Tplv)	300	32	759.283	1041.19	1186.15	0	1186.15
12	2.37774	4617.65	Puente Formation-58 (Tplv)	300	32	767.765	1052.82	1204.77	0	1204.77
13	2.68371	5205.28	Fault Material	0	26	518.864	711.508	1458.81	0	1458.81
14	2.68371	5076.52	Fault Material	0	26	499.306	684.689	1403.82	0	1403.82
15	0.550609	1025.62	Fault Material	0	26	490.01	671.941	1377.68	0	1377.68
16	0.17593	326.562	Topanga (Tt)	550	35	886.559	1215.72	950.744	0	950.744
17	2.38655	4229.46	Topanga (Tt)	550	35	978.704	1342.08	1131.2	0	1131.2
18	2.38655	3836.05	Topanga (Tt)	550	35	908.862	1246.3	994.424	0	994.424
19	1.99527	2871.16	Topanga (Tt)	550	35	882.491	1210.14	942.781	0	942.781
20	1.99527	2528.18	Topanga (Tt)	550	35	806.851	1106.42	794.649	0	794.649
21	2.34371	2480.85	Topanga (Tt)	550	35	757.241	1038.39	697.493	0	697.493
22	2.34371	1906.08	Topanga (Tt)	550	35	644.272	883.477	476.256	0	476.256
23	2.34371	1331.31	Topanga (Tt)	550	35	512.542	702.839	218.277	0	218.277
24	2.36361	789.87	Topanga (Tt)	550	35	387.814	531.801	-25.9909	0	-25.9909
25	2.36361	264.039	Topanga (Tt)	550	35	1591.47	2182.35	2331.23	0	2331.23

Interslice Data

Global Minimum Query (janbu simplified) - Safety Factor: 1.28274

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	58.0082	714.501	3.13291	0	0
2	60.6681	710.558	-18914	0	0
3	63.328	706.615	-17552.7	0	0
4	65.3788	703.574	-16005.4	0	0
5	67.4296	700.534	-14024.7	0	0
6	69.4804	697.493	-11509.8	0	0
7	71.5312	694.453	-10883	0	0
8	73.6409	691.325	-10488.8	0	0
9	75.7506	688.197	-10015.7	0	0
10	77.8447	686.659	-11467	0	0
11	79.9389	685.12	-13015.8	0	0
12	82.4955	683.422	-15258.1	0	0

13	85.0522	681.723	-17624.4	0	0
14	87.6089	680.025	-20114.3	0	0
15	88.437	679.364	-20805.4	0	0
16	90.4401	677.765	-21621	0	0
17	92.4433	676.166	-22844.3	0	0
18	94.167	674.791	-24002.6	0	0
19	96.2981	673.771	-28008.7	0	0
20	98.4292	672.751	-32104.8	0	0
21	100.56	671.731	-36164.9	0	0
22	103.376	670.875	-42223.3	0	0
23	106.191	670.02	-48309.4	0	0
24	108.501	669.754	-54237.1	0	0
25	110.812	669.487	-60597	0	0
26	114.282	669.839	11.2822	0	0

Global Minimum Query (spencer) - Safety Factor: 1.37128

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	59.8051	714.501	2.97059	0	0
2	62.0341	711.151	-19649.5	1964.95	-5.71059
3	64.2632	707.801	-18514.4	1851.44	-5.71059
4	66.4923	704.451	-16781.1	1678.11	-5.71059
5	68.5642	701.38	-14652.5	1465.25	-5.71059
6	70.6362	698.308	-13066	1306.6	-5.71059
7	72.7082	695.236	-12936.3	1293.63	-5.71059
8	75.727	691.958	-14005.8	1400.58	-5.71059
9	78.0175	689.824	-15219.8	1521.98	-5.71059
10	80.3079	687.69	-16528.1	1652.81	-5.71059
11	82.7981	685.583	-18224.8	1822.48	-5.71059
12	85.2883	683.475	-20010.8	2001.08	-5.71059
13	87.6661	681.418	-21751.9	2175.19	-5.71059
14	90.3498	679.097	-22610.9	2261.09	-5.71059
15	93.0335	676.776	-24112	2411.2	-5.71059
16	93.5841	676.3	-24448.9	2444.89	-5.71059
17	93.76	676.148	-24692.9	2469.29	-5.71059
18	96.1466	675.024	-28987.4	2898.74	-5.71059
19	98.5331	673.899	-33397.2	3339.72	-5.71059
20	100.528	673.221	-37316.5	3731.65	-5.71059
21	102.524	672.544	-41274.3	4127.43	-5.71059
22	104.867	672.081	-46230.3	4623.03	-5.71059
23	107.211	671.618	-51146.7	5114.67	-5.71059
24	109.555	671.155	-56971.3	5697.13	-5.71059
25	111.918	670.497	-62932.6	6293.26	-5.71059
26	114.282	669.839	11.2822	0	0

List Of Coordinates

External Boundary

X	Y

0.148	620.155
110.657	620.155
114.682	620.155
146.723	620.155
150.73	620.155
215.05	620.155
219.056	620.155
325.409	620.155
327.379	620.155
329.405	620.155
512.545	620.155
550.037	620.155
550.037	642.055
500.919	666.952
470.016	684.148
458.45	688.493
446.187	690.764
426.384	694.034
411.577	698.395
383.053	699.939
378.603	699.967
310.927	700.393
287.047	703.766
273.851	705.026
271.866	705.026
269.872	705.431
265.598	706.298
239.527	706.843
219.358	706.843
215.351	706.843
207.824	706.843
185.477	707.479
173.305	708.205
162.313	708.841
155.752	709.61
149.141	710.385
140.057	711.112
120.108	715.933
116.184	716.881
107.355	719.015
103.151	720.714
98.362	722.649
90.186	725.737
68.657	735.639
64.0699	737.316
56.485	740.09
44.2038	740.09
28.839	739.644
27.53	739.644
24.477	740.722
24.349	741.953

22.2157	742.03
18.4877	742.164
0.148	742.823
0.148	700.048

Material Boundary

X	Y
0.148	700.048
27.664	700.351
42.158	712.489
57.3231	714.501

Material Boundary

X	Y
137.543	661.401
150.73	620.155

Material Boundary

X	Y
116.184	716.881
131.037	669.839
146.723	620.155

Material Boundary

X	Y
215.05	620.155
215.222	669.839
215.351	706.843

Material Boundary

X	Y
78.3022	717.363
103.151	720.714

Material Boundary

X	Y
78.3022	717.363
74.2787	716.82
78.436	705.773
82.7258	694.583
110.657	620.155

Material Boundary

X	Y

78.3022	717.363
85.1634	699.029
88.3799	690.149
114.682	620.155

Material Boundary

X	Y
120.108	715.933
134.845	669.839
137.543	661.401
143.088	661.401
152.295	662.413
155.88	665.999
158.903	669.839
165.357	678.036
173.305	693.66
173.305	708.205

Material Boundary

X	Y
378.603	699.967
411.577	698.395

Material Boundary

X	Y
273.851	705.026
275.908	701.884
279.544	696.329
306.832	654.64
329.405	620.155

Material Boundary

X	Y
269.872	705.431
277.269	694.074
325.409	620.155

Material Boundary

X	Y
306.832	654.64
318.485	647.313
330.809	642.832
359.936	632.936
371.699	631.443
397.465	626.401
410.161	626.215

503.144	622.48
510.888	622.096
550.037	620.155

Material Boundary

X	Y
114.282	669.839
131.037	669.839
134.845	669.839
158.903	669.839
215.222	669.839
252.818	669.839
277.269	694.074
279.544	696.329
287.047	703.766

Material Boundary

X	Y
149.141	710.385
155.752	709.007
162.313	708.841

Material Boundary

X	Y
44.2038	740.09
68.2299	716.005

Material Boundary

X	Y
27.53	735.127
27.53	714.501
57.3231	714.501
27.53	739.644

Material Boundary

X	Y
18.4877	742.164
27.53	735.127
27.53	739.644

Material Boundary

X	Y
57.3231	714.501
69.7295	714.501
68.2299	716.005

57.3231	714.501

Material Boundary

X	Y
68.2299	716.005
74.2787	716.82

Material Boundary

X	Y
57.3231	714.501
82.7258	694.583
88.3799	690.149
114.282	669.839
85.1634	699.029
78.436	705.773
69.7295	714.501

Slide Analysis Information

IRWD - ILP NOrth Convsersion Reservoir Zone C+

Project Summary

File Name: Section 2_Left_1to1
Slide Modeler Version: 6.033
Project Title: IRWD - ILP NOrth Convsersion Reservoir Zone C+
Date Created: 2/18/2015, 4:13:13 PM

General Settings

Units of Measurement: Imperial Units
Time Units: days
Permeability Units: feet/second
Failure Direction: Right to Left
Data Output: Standard
Maximum Material Properties: 20
Maximum Support Properties: 20

Analysis Options

Analysis Methods Used

Janbu simplified
Spencer

Number of slices: 25
Tolerance: 0.005
Maximum number of iterations: 50
Check malpha < 0.2: Yes
Initial trial value of FS: 1
Steffensen Iteration: Yes

Groundwater Analysis

Groundwater Method: Water Surfaces
Pore Fluid Unit Weight: 62.4 lbs/ft3
Advanced Groundwater Method: None

Random Numbers

Pseudo-random Seed: 10116
Random Number Generation Method: Park and Miller v.3

Surface Options

Search Method: Auto Refine Search
Divisions along slope: 10

Circles per division: 10
Number of iterations: 10
Divisions to use in next iteration: 50%
Number of vertices per surface: 12
Minimum Elevation: Not Defined
Minimum Depth: Not Defined

Material Properties

Property	Engineered Fill	Existing Fill	Puente Formation-28 (Tplv)	Puente Formation-58 (Tplv)	Topanga (Tt)	Andesite (Tema)	Fault Material	Landslide Rupture Planes (Qls-rp)
Color								
Strength Type	Mohr-Coulomb	Mohr-Coulomb	Anisotropic function	Anisotropic function	Anisotropic function	Hoek-Brown	Mohr-Coulomb	Mohr-Coulomb
Unit Weight [lbs/ft3]	125	110	110	110	130	130	130	110
Cohesion [psf]	150	150					0	400
Friction Angle [deg]	32	32					26	29
Unconfined Compressive Strength (intact) [psf]						1.188e+006		
nm						25		
ns						0		
Water Surface	None	None	None	None	None	None	None	None
Ru Value	0	0	0	0	0	0	0	0

Anisotropic Functions

Name: 58 Tplv

Angle From	Angle To	c	phi
-90	-60	300	32
-60	-56	300	27
-56	90	300	32

Name: 28 Tplv

Angle From	Angle To	c	phi
-90	26	300	32
26	30	300	27
30	90	300	32

Name: 70 Tt

Angle From	Angle To	c	phi
-90	68	550	35
68	72	300	26
72	90	550	35

Property	Proposed Cut
Color	
Strength Type	No strength
Unit Weight [lbs/ft3]	0.01
Water Surface	None

Ru Value	0

Global Minimums

Method: janbu simplified

FS: 1.328530
Axis Location: 241.436, 728.903
Left Slip Surface Endpoint: 252.818, 669.839
Right Slip Surface Endpoint: 295.516, 702.570
Left Slope Intercept: 252.818 706.565
Right Slope Intercept: 295.516 702.570
Resisting Horizontal Force=30953.3 lb
Driving Horizontal Force=23298.9 lb
Total Slice Area=1086.17 ft2

Method: spencer

FS: 1.489490
Axis Location: 240.238, 729.263
Left Slip Surface Endpoint: 252.893, 669.914
Right Slip Surface Endpoint: 294.785, 702.673
Left Slope Intercept: 252.893 706.564
Right Slope Intercept: 294.785 702.673
Resisting Moment=2.2281e+006 lb-ft
Driving Moment=1.49588e+006 lb-ft
Resisting Horizontal Force=28496.1 lb
Driving Horizontal Force=19131.5 lb
Total Slice Area=1001.91 ft2

Global Minimum Coordinates

Method: janbu simplified

X	Y
252.818	669.839
255.933	669.072
260.333	669.291
264.399	671.274
266.353	672.227
270.87	674.437
279.296	679.302
281.327	681.643
283.515	684.429
287.218	690.412
292.473	698.34
295.516	702.57

Method: spencer

X	Y
252.893	669.914
256.702	670.855
260.51	672.066

264.319	673.562
268.127	675.368
271.935	677.516
275.744	680.051
279.552	683.037
283.36	686.567
287.169	690.793
290.977	695.976
294.785	702.673

Valid / Invalid Surfaces

Method: janbu simplified

Number of Valid Surfaces: 1778
Number of Invalid Surfaces: 2724

Error Codes:

Error Code -105 reported for 659 surfaces
Error Code -106 reported for 1210 surfaces
Error Code -107 reported for 451 surfaces
Error Code -108 reported for 311 surfaces
Error Code -123 reported for 21 surfaces
Error Code -1000 reported for 72 surfaces

Method: spencer

Number of Valid Surfaces: 761
Number of Invalid Surfaces: 3741

Error Codes:

Error Code -105 reported for 659 surfaces
Error Code -106 reported for 1210 surfaces
Error Code -107 reported for 451 surfaces
Error Code -108 reported for 483 surfaces
Error Code -111 reported for 845 surfaces
Error Code -123 reported for 21 surfaces
Error Code -1000 reported for 72 surfaces

Error Codes

The following errors were encountered during the computation:

-105 = More than two surface / slope intersections with no valid slip surface.
-106 = Average slice width is less than 0.0001 * (maximum horizontal extent of soil region). This limitation is imposed to avoid numerical errors which may result from too many slices, or too small a slip region.
-107 = Total driving moment or total driving force is negative. This will occur if the wrong failure direction is specified, or if high external or anchor loads are applied against the failure direction.
-108 = Total driving moment or total driving force < 0.1. This is to limit the calculation of extremely high safety factors if the driving force is very small (0.1 is an arbitrary number).
-111 = safety factor equation did not converge
-123 = Surface radius equal or less than the internal cutoff of 0.01.
-1000 = No valid slip surfaces are generated at a grid center. Unable to draw a surface.

Slice Data

Global Minimum Query (janbu simplified) - Safety Factor: 1.32853

Slice Number	Width [ft]	Weight [lbs]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	1.55739	165.646	Puente Formation-28 (Tplv)	300	32	311.992	414.491	183.224	0	183.224
2	1.55739	495.794	Puente Formation-28 (Tplv)	300	32	424.768	564.317	422.996	0	422.996
3	1.46658	733.685	Puente Formation-28 (Tplv)	300	32	450.563	598.586	477.838	0	477.838
4	1.46658	956.388	Puente Formation-28 (Tplv)	300	32	520.352	691.303	626.216	0	626.216
5	1.46658	1179.09	Puente Formation-28 (Tplv)	300	32	590.14	784.019	774.594	0	774.594
6	2.03334	1903.6	Puente Formation-28 (Tplv)	300	27	492.702	654.57	695.884	0	695.884
7	2.03334	2132.51	Puente Formation-28 (Tplv)	300	27	529.076	702.894	790.725	0	790.725
8	1.95383	2264.79	Puente Formation-28 (Tplv)	300	27	564.738	750.272	883.708	0	883.708
9	1.50567	1889.31	Puente Formation-28 (Tplv)	300	27	595.363	790.957	963.559	0	963.559
10	1.50567	2014.47	Puente Formation-28 (Tplv)	300	27	622.206	826.619	1033.55	0	1033.55
11	1.50567	2139.62	Puente Formation-28 (Tplv)	300	27	649.049	862.281	1103.54	0	1103.54
12	1.68527	2529.5	Puente Formation-28 (Tplv)	300	27	656.172	871.744	1122.11	0	1122.11
13	1.68527	2658.75	Puente Formation-28 (Tplv)	300	27	680.254	903.738	1184.9	0	1184.9
14	1.68527	2788	Puente Formation-28 (Tplv)	300	27	704.336	935.731	1247.69	0	1247.69
15	1.68527	2920.22	Puente Formation-28 (Tplv)	300	27	728.97	968.458	1311.92	0	1311.92
16	1.68527	3147.43	Puente Formation-28 (Tplv)	300	27	771.304	1024.7	1422.31	0	1422.31
17	2.03041	3943.67	Puente Formation-28 (Tplv)	300	32	738.673	981.349	1090.39	0	1090.39
18	2.18783	4137.87	Puente Formation-28 (Tplv)	300	32	697.603	926.786	1003.07	0	1003.07
19	1.85596	3222.9	Fault Material	0	26	400.17	531.638	1090.02	0	1090.02
20	1.84757	2863.72	Landslide Rupture Planes (Qls-rp)	400	29	566.166	752.168	635.329	0	635.329
21	1.75163	2289.9	Landslide Rupture Planes (Qls-rp)	400	29	519.519	690.196	523.528	0	523.528
22	1.75163	1733.06	Landslide Rupture Planes (Qls-rp)	400	29	438.118	582.053	328.434	0	328.434
23	1.75163	1176.21	Landslide Rupture Planes (Qls-rp)	400	29	356.717	473.909	133.336	0	133.336
24	1.52163	584.931	Landslide Rupture Planes (Qls-rp)	400	29	292.092	388.053	-21.5526	0	-21.5526
25	1.52163	194.977	Landslide Rupture Planes (Qls-rp)	400	29	224.413	298.139	-183.762	0	-183.762

Global Minimum Query (spencer) - Safety Factor: 1.48949

Slice Number	Width [ft]	Weight [lbs]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	1.90419	149.027	Puente Formation-28 (Tplv)	300	32	943.679	1405.6	1769.33	0	1769.33
2	1.90419	445.687	Puente Formation-28 (Tplv)	300	32	183.093	272.715	-43.6651	0	-43.6651
3	1.90419	728.288	Puente Formation-28 (Tplv)	300	32	237.158	353.245	85.2093	0	85.2093
4	1.90419	996.833	Puente Formation-28 (Tplv)	300	32	293.374	436.977	219.209	0	219.209
5	1.90419	1250.4	Puente Formation-28 (Tplv)	300	32	338.285	503.872	326.264	0	326.264
6	1.90419	1489	Puente Formation-28 (Tplv)	300	32	387.694	577.467	444.04	0	444.04
7	1.90419	1711.38	Puente Formation-28 (Tplv)	300	32	420.201	625.885	521.526	0	521.526
8	1.90419	1917.53	Puente Formation-28 (Tplv)	300	32	457.459	681.381	610.336	0	610.336
9	1.90419	2105.76	Puente Formation-28 (Tplv)	300	27	442.811	659.563	705.683	0	705.683
10	1.90419	2276.07	Puente Formation-28 (Tplv)	300	27	474.119	706.196	797.202	0	797.202

11	1.90419	2426.13	Puente Formation-28 (Tplv)	300	32	544.408	810.891	817.595	0	817.595
12	1.90419	2555.92	Puente Formation-28 (Tplv)	300	32	568.66	847.013	875.401	0	875.401
13	1.26946	1765.57	Puente Formation-28 (Tplv)	300	32	569.743	848.626	877.988	0	877.988
14	1.26946	1828.26	Puente Formation-28 (Tplv)	300	32	588.812	877.029	923.442	0	923.442
15	1.26946	1944.75	Puente Formation-28 (Tplv)	300	32	621.642	925.93	1001.7	0	1001.7
16	1.52907	2421.41	Puente Formation-28 (Tplv)	300	32	617.688	920.04	992.27	0	992.27
17	1.52907	2438.23	Puente Formation-28 (Tplv)	300	32	624.667	930.435	1008.91	0	1008.91
18	0.750239	1188.61	Fault Material	0	26	409.368	609.75	1250.17	0	1250.17
19	1.49068	2265.12	Fault Material	0	26	381.719	568.566	1165.73	0	1165.73
20	2.31769	3372.23	Landslide Rupture Planes (Qls-rp)	400	29	580.67	864.902	838.706	0	838.706
21	1.90419	2414.2	Landslide Rupture Planes (Qls-rp)	400	29	500.15	744.968	622.338	0	622.338
22	1.90419	1814.98	Landslide Rupture Planes (Qls-rp)	400	29	416.945	621.035	398.757	0	398.757
23	1.26946	841.868	Landslide Rupture Planes (Qls-rp)	400	29	308.985	460.23	108.658	0	108.658
24	1.26946	505.121	Landslide Rupture Planes (Qls-rp)	400	29	243.867	363.238	-66.3208	0	-66.3208
25	1.26946	168.374	Landslide Rupture Planes (Qls-rp)	400	29	178.724	266.207	-241.369	0	-241.369

Interslice Data

Global Minimum Query (janbu simplified) - Safety Factor: 1.32853

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	252.818	669.839	6.74405	0	0
2	254.375	669.455	-37985.3	0	0
3	255.933	669.072	-33781.9	0	0
4	257.399	669.145	-30115.1	0	0
5	258.866	669.218	-26494.4	0	0
6	260.333	669.291	-22919.5	0	0
7	262.366	670.282	-19000.5	0	0
8	264.399	671.274	-15365.8	0	0
9	266.353	672.227	-11944.2	0	0
10	267.859	672.964	-9290.26	0	0
11	269.364	673.7	-6849.17	0	0
12	270.87	674.437	-4620.93	0	0
13	272.555	675.41	-2671.95	0	0
14	274.241	676.383	-1104.63	0	0
15	275.926	677.356	354.011	0	0
16	277.611	678.329	1582.4	0	0
17	279.296	679.302	2565.48	0	0
18	281.327	681.643	2519.66	0	0
19	283.515	684.429	1997.47	0	0
20	285.371	687.427	-171.918	0	0
21	287.218	690.412	-918.643	0	0
22	288.97	693.055	-1392.12	0	0
23	290.721	695.697	-1492.61	0	0

24	292.473	698.34	-1220.13	0	0
25	293.995	700.455	-730.099	0	0
26	295.516	702.57	0	0	0

Global Minimum Query (spencer) - Safety Factor: 1.48949

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	252.893	669.914	6.71606	0	0
2	254.798	670.385	-36648.4	3664.84	-5.71059
3	256.702	670.855	-32219.9	3221.99	-5.71059
4	258.606	671.461	-27992.4	2799.24	-5.71059
5	260.51	672.066	-23970.8	2397.08	-5.71059
6	262.414	672.814	-20207.1	2020.71	-5.71059
7	264.319	673.562	-16669.2	1666.92	-5.71059
8	266.223	674.465	-13276	1327.6	-5.71059
9	268.127	675.368	-9848.48	984.848	-5.71059
10	270.031	676.442	-6978.27	697.827	-5.71059
11	271.935	677.516	-4483.66	448.366	-5.71059
12	273.839	678.783	-2683.24	268.324	-5.71059
13	275.744	680.051	-992.717	99.2717	-5.71059
14	277.013	681.046	-146.14	14.614	-5.71059
15	278.283	682.041	560.64	-56.064	-5.71059
16	279.552	683.037	1112.42	-111.242	-5.71059
17	281.081	684.454	1407.53	-140.753	-5.71059
18	282.61	685.872	1517.45	-151.745	-5.71059
19	283.36	686.567	1179.24	-117.924	-5.71059
20	284.851	688.221	142.676	-14.2676	-5.71059
21	287.169	690.793	-492.084	49.2084	-5.71059
22	289.073	693.384	-1153.83	115.383	-5.71059
23	290.977	695.976	-1394.34	139.434	-5.71059
24	292.247	698.209	-1245.1	124.51	-5.71059
25	293.516	700.441	-787.846	78.7846	-5.71059
26	294.785	702.673	0	0	0

List Of Coordinates

External Boundary

X	Y
0.148	620.155
110.657	620.155
114.682	620.155
146.723	620.155
150.73	620.155
215.05	620.155
219.056	620.155
325.409	620.155
327.379	620.155
329.405	620.155
512.545	620.155

550.037	620.155
550.037	642.055
500.919	666.952
470.016	684.148
458.45	688.493
446.187	690.764
426.384	694.034
411.577	698.395
383.053	699.939
378.603	699.967
310.927	700.393
287.047	703.766
273.851	705.026
271.866	705.026
269.872	705.431
265.598	706.298
239.527	706.843
219.358	706.843
215.351	706.843
207.824	706.843
185.477	707.479
173.305	708.205
162.313	708.841
155.752	709.61
149.141	710.385
140.057	711.112
120.108	715.933
116.184	716.881
107.355	719.015
103.151	720.714
98.362	722.649
90.186	725.737
68.657	735.639
64.0699	737.316
56.485	740.09
44.2038	740.09
28.839	739.644
27.53	739.644
24.477	740.722
24.349	741.953
0.148	742.823
0.148	700.548

Material Boundary

X	Y
0.148	700.548
27.664	700.351
42.158	712.489
68.2299	716.005
74.2787	716.82

Material Boundary

X	Y
137.543	661.401
150.73	620.155

Material Boundary

X	Y
116.184	716.881
131.037	669.839
146.723	620.155

Material Boundary

X	Y
215.05	620.155
215.222	669.839
215.351	706.843

Material Boundary

X	Y
78.3022	717.363
103.151	720.714

Material Boundary

X	Y
78.3022	717.363
74.2787	716.82
78.436	705.773
110.657	620.155

Material Boundary

X	Y
78.3022	717.363
85.1634	699.029
114.682	620.155

Material Boundary

X	Y
120.108	715.933
134.845	669.839
137.543	661.401
143.088	661.401
152.295	662.413
155.88	665.999

158.903	669.839
165.357	678.036
173.305	693.66
173.305	708.205

Material Boundary

X	Y
378.603	699.967
411.577	698.395

Material Boundary

X	Y
273.851	705.026
275.908	701.884
279.544	696.329
306.832	654.64
329.405	620.155

Material Boundary

X	Y
269.872	705.431
277.269	694.074
325.409	620.155

Material Boundary

X	Y
306.832	654.64
318.485	647.313
330.809	642.832
359.936	632.936
371.699	631.443
397.465	626.401
410.161	626.215
503.144	622.48
510.888	622.096
550.037	620.155

Material Boundary

X	Y
44.2038	740.09
68.2299	716.005
78.436	705.773
85.1634	699.029
114.282	669.839
131.037	669.839
134.845	669.839

158.903	669.839
215.222	669.839
252.818	669.839
277.269	694.074
279.544	696.329
287.047	703.766

Material Boundary

X	Y
149.141	710.385
155.752	709.007
162.313	708.841

Slide Analysis Information

IRWD- ILP North Conversion Reservoir Zone C+

Project Summary

File Name: Section 3_LEFT1.25to1
Slide Modeler Version: 6.033
Project Title: IRWD- ILP North Conversion Reservoir Zone C+
Date Created: 2/18/2015, 4:13:13 PM

General Settings

Units of Measurement: Imperial Units
Time Units: days
Permeability Units: feet/second
Failure Direction: Left to Right
Data Output: Standard
Maximum Material Properties: 20
Maximum Support Properties: 20

Analysis Options

Analysis Methods Used

Janbu simplified
Spencer

Number of slices: 25
Tolerance: 0.005
Maximum number of iterations: 50
Check malpha < 0.2: Yes
Initial trial value of FS: 1
Steffensen Iteration: Yes

Groundwater Analysis

Groundwater Method: Water Surfaces
Pore Fluid Unit Weight: 62.4 lbs/ft3
Advanced Groundwater Method: None

Random Numbers

Pseudo-random Seed: 10116
Random Number Generation Method: Park and Miller v.3

Surface Options

Search Method: Auto Refine Search
Divisions along slope: 10
Circles per division: 10
Number of iterations: 10
Divisions to use in next iteration: 50%
Number of vertices per surface: 12
Minimum Elevation: Not Defined
Minimum Depth: Not Defined

Material Properties

Property	Puente Formation60 (Tplv)	Puente Formation-28 (Tplv)	Fault Material	Sespe Formation (Tvs)	Puente Formation-11 (Tplv)	Landslide Rupture Planes (Qls-rp)	Proposed Cut
Color							
Strength Type	Anisotropic function	Anisotropic function	Mohr-Coulomb	Anisotropic function	Anisotropic function	Mohr-Coulomb	No strength
Unit Weight [lbs/ft3]	110	110	130	120	110	110	0.0001
Cohesion [psf]			0			0	
Friction Angle [deg]			26			15	
Water Surface	None	None	None	None	None	None	None
Ru Value	0	0	0	0	0	0	0

Anisotropic Functions

Name: 28 Tplv

Angle From	Angle To	c	phi
-90	-30	300	32
-30	-26	300	27
-26	90	300	32

Name: 60 Tplv

Angle From	Angle To	c	phi
-90	-62	300	32
-62	-58	300	27
-58	90	300	32

Name: 11 Tplv

Angle From	Angle To	c	phi
-90	-13	300	32
-13	-9	300	27

-9	90	300	32

Name: 11 Tvs

Angle From	Angle To	c	phi
-90	9	550	36
9	13	750	30
13	90	550	36

Global Minimums

Method: janbu simplified

FS: 1.317750
Axis Location: 131.851, 783.885
Left Slip Surface Endpoint: 31.059, 727.871
Right Slip Surface Endpoint: 116.187, 669.643
Left Slope Intercept: 31.059 727.871
Right Slope Intercept: 116.187 720.737
Resisting Horizontal Force=95383.7 lb
Driving Horizontal Force=72383.7 lb
Total Slice Area=3406.92 ft2

Method: spencer

FS: 1.512460
Axis Location: 135.501, 776.991
Left Slip Surface Endpoint: 38.035, 728.072
Right Slip Surface Endpoint: 116.156, 669.667
Left Slope Intercept: 38.035 728.072
Right Slope Intercept: 116.156 720.740
Resisting Moment=7.77653e+006 lb-ft
Driving Moment=5.14163e+006 lb-ft
Resisting Horizontal Force=57435.8 lb
Driving Horizontal Force=37975 lb
Total Slice Area=2694.99 ft2

Global Minimum Coordinates

Method: janbu simplified

X	Y
31.0593	727.871
37.0606	718.266
42.9204	708.889
48.4234	700.082
54.6185	693.837
61.5576	687.8
69.1553	682.152
77.7679	676.85

86.3054	672.71
94.6692	669.755
102.086	668.194
108.217	667.867
112.932	668.479
116.187	669.643
116.188	720.737

Method: spencer

X	Y
38.0348	728.072
43.8456	717.534
49.228	710.404
58.3078	701.628
66.682	694.378
72.3657	690.114
80.001	685.06
86.8571	680.954
94.4632	677.391
100.811	674.603
107.164	672.877
116.156	669.667
116.157	720.74

Valid / Invalid Surfaces

Method: janbu simplified

Number of Valid Surfaces: 2177
Number of Invalid Surfaces: 2325

Error Codes:

Error Code -105 reported for 480 surfaces
Error Code -106 reported for 1333 surfaces
Error Code -107 reported for 222 surfaces
Error Code -108 reported for 254 surfaces
Error Code -1000 reported for 36 surfaces

Method: spencer

Number of Valid Surfaces: 870
Number of Invalid Surfaces: 3632

Error Codes:

Error Code -105 reported for 480 surfaces
Error Code -106 reported for 1333 surfaces

Error Code -107 reported for 222 surfaces
Error Code -108 reported for 633 surfaces
Error Code -111 reported for 928 surfaces
Error Code -1000 reported for 36 surfaces

Error Codes

The following errors were encountered during the computation:

-105 = More than two surface / slope intersections with no valid slip surface.
-106 = Average slice width is less than 0.0001 * (maximum horizontal extent of soil region). This limitation is imposed to avoid numerical errors which may result from too many slices, or too small a slip region.
-107 = Total driving moment or total driving force is negative. This will occur if the wrong failure direction is specified, or if high external or anchor loads are applied against the failure direction.
-108 = Total driving moment or total driving force < 0.1. This is to limit the calculation of extremely high safety factors if the driving force is very small (0.1 is an arbitrary number).
-111 = safety factor equation did not converge
-1000 = No valid slip surfaces are generated at a grid center. Unable to draw a surface.

Slice Data

Global Minimum Query (janbu simplified) - Safety Factor: 1.31775

Slice Number	Width [ft]	Weight [lbs]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	3.00067	733.441	Puente Formation60 (Tplv)	300	27	199.02	262.258	-74.0724	0	-74.0724
2	3.00067	2338.01	Puente Formation60 (Tplv)	300	27	326.746	430.57	256.258	0	256.258
3	2.92991	3923.83	Puente Formation60 (Tplv)	300	27	460.524	606.855	602.237	0	602.237
4	2.92991	5260.4	Puente Formation60 (Tplv)	300	27	569.487	750.441	884.041	0	884.041
5	2.75146	5687.24	Puente Formation60 (Tplv)	300	27	634.356	835.922	1051.81	0	1051.81
6	2.75146	6373.16	Puente Formation60 (Tplv)	300	27	693.902	914.389	1205.81	0	1205.81
7	3.09757	7683.02	Puente Formation60 (Tplv)	300	32	949.818	1251.62	1522.91	0	1522.91
8	3.09757	7927.2	Puente Formation60 (Tplv)	300	32	975.109	1284.95	1576.25	0	1576.25
9	3.46957	9077.77	Puente Formation60 (Tplv)	300	32	1039.5	1369.8	1712.04	0	1712.04
10	3.46957	9201.35	Puente Formation60 (Tplv)	300	32	1051.46	1385.56	1737.25	0	1737.25
11	3.79884	10115.9	Puente Formation60 (Tplv)	300	32	1101.9	1452.03	1843.63	0	1843.63
12	3.79884	10063.3	Puente Formation60 (Tplv)	300	32	1097.04	1445.63	1833.39	0	1833.39
			Puente							

			Formation60 (Tplv)							
14	2.87087	7366.1	Puente Formation60 (Tplv)	300	32	1118	1473.25	1877.59	0	1877.59
15	2.87087	7220.06	Puente Formation60 (Tplv)	300	32	1099.33	1448.64	1838.21	0	1838.21
16	4.26873	10334.6	Puente Formation60 (Tplv)	300	32	1118.49	1473.89	1878.61	0	1878.61
17	4.26873	9749.89	Puente Formation60 (Tplv)	300	32	1065.67	1404.29	1767.24	0	1767.24
18	4.18189	8857.87	Puente Formation60 (Tplv)	300	32	1055.3	1390.62	1745.36	0	1745.36
19	4.18189	8043.35	Puente Formation60 (Tplv)	300	32	976.192	1286.38	1578.53	0	1578.53
20	3.7084	6343.31	Puente Formation60 (Tplv)	300	32	944.483	1244.59	1511.66	0	1511.66
21	3.7084	5486.92	Puente Formation60 (Tplv)	300	32	844.917	1113.39	1301.7	0	1301.7
22	3.06534	3807.63	Puente Formation60 (Tplv)	300	32	796.584	1049.7	1199.77	0	1199.77
23	3.06534	3059.88	Puente Formation60 (Tplv)	300	32	683.757	901.021	961.835	0	961.835
24	4.71496	3023.21	Puente Formation60 (Tplv)	300	32	566.575	746.604	714.717	0	714.717
25	3.25538	661.078	Puente Formation60 (Tplv)	300	32	390.087	514.037	342.53	0	342.53

Global Minimum Query (spencer) - Safety Factor: 1.51246

Slice Number	Width [ft]	Weight [lbs]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	2.90541	855.366	Puente Formation60 (Tplv)	300	27	178.751	270.353	-58.1852	0	-58.1852
2	2.90541	2168.94	Puente Formation60 (Tplv)	300	27	281.922	426.396	248.067	0	248.067
3	2.69121	2673.57	Puente Formation60 (Tplv)	300	32	396.592	599.83	479.83	0	479.83
4	2.69121	3110.13	Puente Formation60 (Tplv)	300	32	440.397	666.083	585.855	0	585.855
5	3.02659	3838.88	Puente Formation60 (Tplv)	300	32	514.512	778.179	765.247	0	765.247
6	3.02659	4030.23	Puente Formation60 (Tplv)	300	32	531.233	803.469	805.717	0	805.717
7	3.02659	4221.58	Puente Formation60 (Tplv)	300	32	546.596	826.704	842.902	0	842.902
8	2.79141	4019.98	Puente Formation60 (Tplv)	300	32	572.219	865.458	904.922	0	904.922
9	2.79141	4096.36	Puente Formation60 (Tplv)	300	32	577.76	873.839	918.334	0	918.334
10	2.79141	4172.74	Puente Formation60 (Tplv)	300	32	583.301	882.22	931.746	0	931.746

11	2.84184	4275.26	Puente Formation60 (Tplv)	300	32	601.538	909.802	975.887	0	975.887
12	2.84184	4251.78	Puente Formation60 (Tplv)	300	32	598.697	905.506	969.011	0	969.011
13	3.81768	5604.02	Puente Formation60 (Tplv)	300	32	601.065	909.087	974.742	0	974.742
14	3.81768	5420.05	Puente Formation60 (Tplv)	300	32	581.51	879.511	927.412	0	927.412
15	3.42806	4669.34	Puente Formation60 (Tplv)	300	32	570.494	862.849	900.745	0	900.745
16	3.42806	4439.43	Puente Formation60 (Tplv)	300	32	545.487	825.028	840.219	0	840.219
17	3.80303	4552.37	Puente Formation60 (Tplv)	300	32	529.067	800.193	800.477	0	800.477
18	3.80303	4062.1	Puente Formation60 (Tplv)	300	32	480.812	727.209	683.678	0	683.678
19	3.17394	2998.58	Puente Formation60 (Tplv)	300	32	438.648	663.437	581.622	0	581.622
20	3.17394	2624.6	Puente Formation60 (Tplv)	300	32	394.474	596.626	474.7	0	474.7
21	3.17668	2159.43	Puente Formation60 (Tplv)	300	32	358.809	542.685	388.376	0	388.376
22	3.17668	1598.86	Puente Formation60 (Tplv)	300	32	291.068	440.228	224.412	0	224.412
23	2.99734	1036.78	Puente Formation60 (Tplv)	300	32	221.577	335.126	56.2131	0	56.2131
24	2.99734	622.077	Puente Formation60 (Tplv)	300	32	167.496	253.331	-74.6867	0	-74.6867
25	2.99734	207.369	Puente Formation60 (Tplv)	300	32	1087.54	1644.86	2152.22	0	2152.22

Interslice Data

Global Minimum Query (janbu simplified) - Safety Factor: 1.31775

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	31.0593	727.871	0	0	0
2	34.0599	723.069	-952.893	0	0
3	37.0606	718.266	-702.781	0	0
4	39.9905	713.578	771.72	0	0
5	42.9204	708.889	3196.46	0	0
6	45.6719	704.485	5819.57	0	0
7	48.4234	700.082	8736.14	0	0
8	51.5209	696.96	9740.59	0	0
9	54.6185	693.837	10553.3	0	0
10	58.0881	690.819	10441.3	0	0
11	61.5576	687.8	9908.93	0	0

12	65.3565	684.976	8117.3	0	0
13	69.1553	682.152	5810.57	0	0
14	72.0262	680.384	3324.31	0	0
15	74.8971	678.617	635.902	0	0
16	77.7679	676.85	-2304.01	0	0
17	82.0367	674.78	-8070.83	0	0
18	86.3054	672.71	-14145.4	0	0
19	90.4873	671.232	-21515.9	0	0
20	94.6692	669.755	-29254.8	0	0
21	98.3776	668.974	-37266.2	0	0
22	102.086	668.194	-45428.4	0	0
23	105.151	668.03	-52940.2	0	0
24	108.217	667.867	-60388.2	0	0
25	112.932	668.479	-72902.3	0	0
26	116.187	669.643	0.130531	0	0

Global Minimum Query (spencer) - Safety Factor: 1.51246

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	38.0348	728.072	0	0	0
2	40.9402	722.803	-825.922	82.5792	-5.7097
3	43.8456	717.534	-453.386	45.3315	-5.7097
4	46.5368	713.969	-137.821	13.78	-5.70973
5	49.228	710.404	227.092	-22.7056	-5.70969
6	52.2546	707.479	50.5787	-5.05708	-5.70971
7	55.2812	704.553	-325.409	32.5358	-5.7097
8	58.3078	701.628	-1040.09	103.993	-5.70972
9	61.0992	699.211	-2151.01	215.067	-5.7097
10	63.8906	696.795	-3517.44	351.689	-5.70971
11	66.682	694.378	-5139.38	513.858	-5.70971
12	69.5238	692.246	-7334.18	733.303	-5.7097
13	72.3657	690.114	-9550.12	954.863	-5.70971
14	76.1834	687.587	-13189.7	1318.76	-5.70969
15	80.001	685.06	-17290.6	1728.79	-5.70971
16	83.4291	683.007	-21395.9	2139.25	-5.70969
17	86.8571	680.954	-25790.2	2578.62	-5.70971
18	90.6602	679.173	-31446	3144.11	-5.70971
19	94.4632	677.391	-37500.7	3749.49	-5.70972
20	97.6372	675.997	-42912.6	4290.59	-5.70971
21	100.811	674.603	-48594.1	4858.65	-5.70971
22	103.988	673.74	-54755.5	5474.69	-5.7097
23	107.164	672.877	-61104.4	6109.48	-5.7097
24	110.162	671.807	-67417.2	6740.66	-5.7097
25	113.159	670.737	-74085.2	7407.36	-5.7097
26	116.156	669.667	0.130425	0	0

List Of Coordinates

External Boundary

X	Y
-0.458	639.806
181.928	639.806
185.781	639.806
185.954	639.806
189.928	639.806
240.09	639.806
244.002	639.806
294.325	639.806
296.332	639.806
298.328	639.806
395.716	639.806
399.782	639.806
503.603	639.806
528.613	639.806
550.087	639.806
550.087	656.637
519.225	672.017
510.174	678.492
501.786	684.894
495.186	690.288
493.324	691.81
488.808	694.726
480.505	698.153
471.139	699.119
457.719	704.719
455.831	704.751
443.477	704.96
428.222	706.312
414.608	707.664
403.411	708.343
402.962	708.37
401.091	708.484
398.419	708.596
382.371	709.268
362.035	709.107
357.461	709.071
341.604	708.946
315.052	708.946
297.901	709.046
287.482	709.107
240.17	709.994

238.17	709.994
236.246	710.071
232.363	710.221
211.284	711.042
176.319	713.294
169.474	714.039
159.896	715.082
123.805	719.982
108.442	721.505
80.959	725.148
69.702	726.273
59.7233	726.553
55.53	726.671
46.259	727.532
41.0408	728.006
38.975	728.194
33.875	727.532
26.723	728.392
-0.458	727.825
-0.458	723.503

Material Boundary

X	Y
357.461	709.071
395.716	639.806

Material Boundary

X	Y
362.035	709.107
399.782	639.806

Material Boundary

X	Y
398.419	708.596
503.603	639.806

Material Boundary

X	Y
236.246	710.026
238.17	709.994

Material Boundary

X	Y
240.17	709.994
266.561	678.144
298.328	639.806

Material Boundary

X	Y
236.246	710.026
264.388	676.001
294.325	639.806

Material Boundary

X	Y
169.474	714.039
181.707	669.643
189.928	639.806

Material Boundary

X	Y
159.896	715.082
173.195	669.643
181.928	639.806

Material Boundary

X	Y
59.7233	726.553
116.187	669.643
173.195	669.643
181.707	669.643
257.94	669.643
264.388	676.001
266.561	678.144
297.901	709.046

Material Boundary

X	Y
41.0408	728.006
116.187	669.643

Slide Analysis Information

IRWD- ILP North Conversion Reservoir Zone C+

Project Summary

File Name: Section 3_Right
Slide Modeler Version: 6.033
Project Title: IRWD- ILP North Conversion Reservoir Zone C+
Date Created: 2/18/2015, 4:13:13 PM

General Settings

Units of Measurement: Imperial Units
Time Units: days
Permeability Units: feet/second
Failure Direction: Right to Left
Data Output: Standard
Maximum Material Properties: 20
Maximum Support Properties: 20

Analysis Options

Analysis Methods Used

Janbu simplified
Spencer

Number of slices: 25
Tolerance: 0.005
Maximum number of iterations: 50
Check malpha < 0.2: Yes
Initial trial value of FS: 1
Steffensen Iteration: Yes

Groundwater Analysis

Groundwater Method: Water Surfaces
Pore Fluid Unit Weight: 62.4 lbs/ft3
Advanced Groundwater Method: None

Random Numbers

Pseudo-random Seed: 10116
Random Number Generation Method: Park and Miller v.3

Surface Options

Search Method: Auto Refine Search
Divisions along slope: 10
Circles per division: 10
Number of iterations: 10
Divisions to use in next iteration: 50%
Number of vertices per surface: 12
Minimum Elevation: Not Defined
Minimum Depth: Not Defined

Material Properties

Property	Puente Formation60 (Tplv)	Puente Formation-28 (Tplv)	Fault Material	Sespe Formation (Tvs)	Puente Formation-11 (Tplv)	Landslide Rupture Planes (Qls-rp)	Proposed Cut
Color							
Strength Type	Anisotropic function	Anisotropic function	Mohr-Coulomb	Anisotropic function	Anisotropic function	Mohr-Coulomb	No strength
Unit Weight [lbs/ft3]	110	110	130	120	110	110	0.0001
Cohesion [psf]			0			0	
Friction Angle [deg]			26			15	
Water Surface	None	None	None	None	None	None	None
Ru Value	0	0	0	0	0	0	0

Anisotropic Functions

Name: 28 Tplv

Angle From	Angle To	c	phi
-90	-30	300	32
-30	-26	300	27
-26	90	300	32

Name: 60 Tplv

Angle From	Angle To	c	phi
-90	-62	300	32
-62	-58	300	27
-58	90	300	32

Name: 11 Tplv

Angle From	Angle To	c	phi
-90	-13	300	32
-13	-9	300	27

-9	90	300	32

Name: 11 Tvs

Angle From	Angle To	c	phi
-90	9	550	36
9	13	750	30
13	90	550	36

Global Minimums

Method: janbu simplified

FS: 1.390870
Axis Location: 245.396, 738.189
Left Slip Surface Endpoint: 259.300, 670.984
Right Slip Surface Endpoint: 307.502, 708.990
Left Slope Intercept: 259.300 709.636
Right Slope Intercept: 307.502 708.990
Resisting Horizontal Force=39633.6 lb
Driving Horizontal Force=28495.5 lb
Total Slice Area=1280.64 ft2

Method: spencer

FS: 1.462020
Axis Location: 251.555, 732.889
Left Slip Surface Endpoint: 264.376, 675.989
Right Slip Surface Endpoint: 304.767, 709.006
Left Slope Intercept: 264.376 709.540
Right Slope Intercept: 304.767 709.006
Resisting Moment=1.88274e+006 lb-ft
Driving Moment=1.28777e+006 lb-ft
Resisting Horizontal Force=24419.4 lb
Driving Horizontal Force=16702.5 lb
Total Slice Area=881.132 ft2

Global Minimum Coordinates

Method: janbu simplified

X	Y
259.3	670.984
263.29	670.935
266.798	671.744
271.311	672.786
274.779	673.841
278.507	675.537
282.366	677.875
286.19	680.782

289.891	684.199
293.291	687.94
296.372	691.941
307.502	708.99

Method: spencer

X	Y
264.376	675.989
268.018	677.452
271.598	678.575
276.369	680.345
279.508	681.863
282.561	683.405
285.756	685.113
289.242	687.771
292.525	691.141
296.151	695.73
299.296	700.602
302.44	705.474
304.767	709.006

Valid / Invalid Surfaces

Method: janbu simplified

Number of Valid Surfaces: 2433
Number of Invalid Surfaces: 2069

Error Codes:

Error Code -105 reported for 364 surfaces
Error Code -106 reported for 910 surfaces
Error Code -107 reported for 507 surfaces
Error Code -108 reported for 235 surfaces
Error Code -1000 reported for 53 surfaces

Method: spencer

Number of Valid Surfaces: 732
Number of Invalid Surfaces: 3770

Error Codes:

Error Code -105 reported for 364 surfaces
Error Code -106 reported for 910 surfaces
Error Code -107 reported for 507 surfaces
Error Code -108 reported for 683 surfaces
Error Code -111 reported for 1253 surfaces
Error Code -1000 reported for 53 surfaces

Error Codes

The following errors were encountered during the computation:

-105 = More than two surface / slope intersections with no valid slip surface.
-106 = Average slice width is less than 0.0001 * (maximum horizontal extent of soil region). This limitation is imposed to avoid numerical errors which may result from too many slices, or too small a slip region.
-107 = Total driving moment or total driving force is negative. This will occur if the wrong failure direction is specified, or if high external or anchor loads are applied against the failure direction.
-108 = Total driving moment or total driving force < 0.1. This is to limit the calculation of extremely high safety factors if the driving force is very small (0.1 is an arbitrary number).
-111 = safety factor equation did not converge
-1000 = No valid slip surfaces are generated at a grid center. Unable to draw a surface.

Slice Data

Global Minimum Query (janbu simplified) - Safety Factor: 1.39087

Slice Number	Width [ft]	Weight [lbs]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	1.99472	238.398	Sespe Formation (Tvs)	550	36	460.881	641.025	125.286	0	125.286
2	1.99472	715.18	Sespe Formation (Tvs)	550	36	586.559	815.828	365.881	0	365.881
3	1.75386	982.521	Sespe Formation (Tvs)	550	36	614.019	854.021	418.449	0	418.449
4	1.75386	1314.33	Sespe Formation (Tvs)	550	36	702.209	976.682	587.275	0	587.275
5	0.933034	812.206	Sespe Formation (Tvs)	550	36	758.663	1055.2	695.35	0	695.35
6	1.65987	1572.95	Fault Material	0	26	307.416	427.576	876.663	0	876.663
7	1.65987	1722.59	Fault Material	0	26	336.663	468.255	960.066	0	960.066
8	0.26073	285.159	Puente Formation-28 (Tplv)	300	32	640.608	891.002	945.8	0	945.8
9	1.73398	2027.99	Puente Formation-28 (Tplv)	300	32	652.048	906.914	971.266	0	971.266
10	1.73398	2253.53	Puente Formation-28 (Tplv)	300	32	703.46	978.421	1085.7	0	1085.7
11	1.86391	2645.08	Puente Formation-28 (Tplv)	300	32	708.419	985.319	1096.74	0	1096.74
12	1.86391	2848	Puente Formation-28 (Tplv)	300	32	749.029	1041.8	1187.13	0	1187.13
13	3.85859	6417.15	Puente Formation-28 (Tplv)	300	32	756.838	1052.66	1204.51	0	1204.51
14	1.91222	3379.89	Puente Formation-28 (Tplv)	300	32	752.731	1046.95	1195.37	0	1195.37
15	1.91222	3470.77	Puente Formation-28 (Tplv)	300	32	768.647	1069.09	1230.8	0	1230.8
			Puente							

			Formation-28 (Tplv)							
17	1.8503	3437.81	Puente Formation-28 (Tplv)	300	32	742.457	1032.66	1172.5	0	1172.5
18	1.70013	3151.5	Puente Formation-28 (Tplv)	300	32	701.644	975.896	1081.66	0	1081.66
19	1.70013	3115.17	Puente Formation-28 (Tplv)	300	32	695.22	966.961	1067.36	0	1067.36
20	1.54052	2765.48	Puente Formation-28 (Tplv)	300	32	645.59	897.932	956.893	0	956.893
21	1.54052	2683.93	Puente Formation-28 (Tplv)	300	32	630.569	877.039	923.456	0	923.456
22	2.78266	4456.21	Puente Formation-28 (Tplv)	300	32	553.949	770.471	752.91	0	752.91
23	2.78266	3274.11	Puente Formation-28 (Tplv)	300	32	440.896	613.229	501.271	0	501.271
24	2.78266	1964.47	Puente Formation-28 (Tplv)	300	32	315.645	439.021	222.48	0	222.48
25	2.78266	654.822	Puente Formation-28 (Tplv)	300	32	190.393	264.812	-56.3121	0	-56.3121

Global Minimum Query (spencer) - Safety Factor: 1.46202

Slice Number	Width [ft]	Weight [lbs]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	1.48954	84.3	Fault Material	0	26	653.717	955.747	1959.58	0	1959.58
2	1.48954	239.065	Fault Material	0	26	0	0	-37.2885	0	-37.2885
3	0.662438	140.993	Puente Formation-28 (Tplv)	300	32	176.229	257.65	-67.7748	0	-67.7748
4	1.79	537.553	Puente Formation-28 (Tplv)	300	32	217.732	318.328	29.3308	0	29.3308
5	1.79	774.453	Puente Formation-28 (Tplv)	300	32	271.319	396.674	154.711	0	154.711
6	1.5903	878.857	Puente Formation-28 (Tplv)	300	32	313.925	458.965	254.397	0	254.397
7	1.5903	1050	Puente Formation-28 (Tplv)	300	32	357.112	522.105	355.442	0	355.442
8	1.5903	1221.13	Puente Formation-28 (Tplv)	300	32	400.299	585.245	456.487	0	456.487
9	1.56964	1357.8	Puente Formation-28 (Tplv)	300	32	424.184	620.166	512.372	0	512.372
10	1.56964	1493.95	Puente Formation-28 (Tplv)	300	32	458.568	670.436	592.824	0	592.824
11	1.52662	1580.88	Puente Formation-28 (Tplv)	300	32	488.655	714.423	663.216	0	663.216
12	1.52662	1704.23	Puente Formation-28 (Tplv)	300	32	520.642	761.189	738.056	0	738.056
13	1.59738	1911.1	Puente Formation-28 (Tplv)	300	32	547.538	800.512	800.985	0	800.985
14	1.59738	2037.81	Puente Formation-28 (Tplv)	300	32	578.911	846.379	874.39	0	874.39

15	1.74293	2329.96	Puente Formation-28 (Tplv)	300	32	565.544	826.837	843.118	0	843.118
16	1.74293	2404.64	Puente Formation-28 (Tplv)	300	32	583.571	853.192	885.292	0	885.292
17	1.6416	2294.01	Puente Formation-28 (Tplv)	300	32	551.79	806.728	810.933	0	810.933
18	1.6416	2282	Puente Formation-28 (Tplv)	300	32	552.646	807.98	812.939	0	812.939
19	1.81305	2463.17	Puente Formation-28 (Tplv)	300	32	513.461	750.69	721.252	0	721.252
20	1.81305	2362.1	Puente Formation-28 (Tplv)	300	32	500.373	731.555	690.634	0	690.634
21	1.57222	1927.91	Puente Formation-28 (Tplv)	300	32	448.359	655.51	568.935	0	568.935
22	1.57222	1668.62	Puente Formation-28 (Tplv)	300	32	404.498	591.384	466.312	0	466.312
23	1.57222	1247.45	Puente Formation-28 (Tplv)	300	32	330.65	483.417	293.529	0	293.529
24	1.57222	824.561	Puente Formation-28 (Tplv)	300	32	256.483	374.984	119.999	0	119.999
25	2.32734	453.796	Puente Formation-28 (Tplv)	300	32	167.189	244.434	-88.9248	0	-88.9248

Interslice Data

Global Minimum Query (janbu simplified) - Safety Factor: 1.39087

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	259.3	670.984	0.0746955	0	0
2	261.295	670.96	-40978.8	0	0
3	263.29	670.935	-35341.6	0	0
4	265.044	671.339	-30721.5	0	0
5	266.798	671.744	-26208.9	0	0
6	267.731	671.96	-23857.9	0	0
7	269.391	672.343	-20629.4	0	0
8	271.05	672.726	-17557.8	0	0
9	271.311	672.786	-17011	0	0
10	273.045	673.314	-13597.2	0	0
11	274.779	673.841	-10344	0	0
12	276.643	674.689	-7363.82	0	0
13	278.507	675.537	-4603.48	0	0
14	282.366	677.875	-286.232	0	0
15	284.278	679.329	1155.96	0	0
16	286.19	680.782	2346.72	0	0
17	288.04	682.491	2962.72	0	0
18	289.891	684.199	3348.5	0	0
19	291.591	686.069	3265.31	0	0

20	293.291	687.94	3020.5	0	0
21	294.831	689.94	2464.13	0	0
22	296.372	691.941	1805.81	0	0
23	299.155	696.203	209.861	0	0
24	301.937	700.465	-699.866	0	0
25	304.72	704.728	-769.82	0	0
26	307.502	708.99	0	0	0

Global Minimum Query (spencer) - Safety Factor: 1.46202

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	264.376	675.989	0.0562835	0	0
2	265.866	676.588	-32255.6	3225.56	-5.71059
3	267.355	677.186	-29309.5	2930.95	-5.71059
4	268.018	677.452	-27919.4	2791.94	-5.71059
5	269.808	678.013	-24292.2	2429.22	-5.71059
6	271.598	678.575	-20841.4	2084.14	-5.71059
7	273.188	679.165	-17950	1795	-5.71059
8	274.778	679.755	-15208.9	1520.89	-5.71059
9	276.369	680.345	-12617.9	1261.79	-5.71059
10	277.938	681.104	-10302.7	1030.27	-5.71059
11	279.508	681.863	-8149.76	814.976	-5.71059
12	281.035	682.634	-6232.29	623.229	-5.71059
13	282.561	683.405	-4470.5	447.05	-5.71059
14	284.159	684.259	-2830.02	283.002	-5.71059
15	285.756	685.113	-1362.86	136.286	-5.71059
16	287.499	686.442	-274.682	27.4682	-5.71059
17	289.242	687.771	585.587	-58.5587	-5.71059
18	290.883	689.456	914.781	-91.4781	-5.71059
19	292.525	691.141	1076.56	-107.656	-5.71059
20	294.338	693.436	850.007	-85.0007	-5.71059
21	296.151	695.73	468.182	-46.8182	-5.71059
22	297.723	698.166	-119.84	11.984	-5.71059
23	299.296	700.602	-618.876	61.8876	-5.71059
24	300.868	703.038	-814.074	81.4074	-5.71059
25	302.44	705.474	-703.151	70.3151	-5.71059
26	304.767	709.006	0	0	0

List Of Coordinates

External Boundary

X	Y
-0.458	639.806
181.928	639.806

185.781	639.806
185.954	639.806
189.928	639.806
240.09	639.806
244.002	639.806
294.325	639.806
296.332	639.806
298.328	639.806
395.716	639.806
399.782	639.806
503.603	639.806
528.613	639.806
550.087	639.806
550.087	656.637
519.225	672.017
510.174	678.492
501.786	684.894
495.186	690.288
493.324	691.81
488.808	694.726
480.505	698.153
471.139	699.119
457.719	704.719
455.831	704.751
443.477	704.96
428.222	706.312
414.608	707.664
403.411	708.343
402.962	708.37
401.091	708.484
398.419	708.596
382.371	709.268
362.035	709.107
357.461	709.071
341.604	708.946
315.052	708.946
297.901	709.046
287.482	709.107
240.17	709.994
238.17	709.994
236.246	710.071
232.363	710.221
211.284	711.042
176.319	713.294
169.474	714.039
159.896	715.082

123.805	719.982
108.442	721.505
80.959	725.148
69.702	726.273
59.7233	726.553
55.53	726.671
46.259	727.532
38.975	728.194
33.875	727.532
26.723	728.392
-0.458	727.825
-0.458	723.503

Material Boundary

X	Y
357.461	709.071
395.716	639.806

Material Boundary

X	Y
362.035	709.107
399.782	639.806

Material Boundary

X	Y
398.419	708.596
503.603	639.806

Material Boundary

X	Y
236.246	710.026
238.17	709.994

Material Boundary

X	Y
240.17	709.994
266.561	678.144
298.328	639.806

Material Boundary

X	Y
236.246	710.026
264.388	676.001
294.325	639.806

Material Boundary

X	Y
169.474	714.039
181.707	669.643
189.928	639.806

Material Boundary

X	Y
159.896	715.082
173.195	669.643
181.928	639.806

Material Boundary

X	Y
59.7233	726.553
116.187	669.643
173.195	669.643
181.707	669.643
257.94	669.643
264.388	676.001
266.561	678.144
297.901	709.046

Slide Analysis Information

SLIDE - An Interactive Slope Stability Program

Project Summary

File Name: Section 5_Alternative 1_LEFT
Slide Modeler Version: 6.035
Project Title: SLIDE - An Interactive Slope Stability Program
Date Created: 2/18/2015, 4:13:13 PM

General Settings

Units of Measurement: Imperial Units
Time Units: days
Permeability Units: feet/second
Failure Direction: Left to Right
Data Output: Standard
Maximum Material Properties: 20
Maximum Support Properties: 20

Analysis Options

Analysis Methods Used

Bishop simplified
Janbu simplified
Spencer

Number of slices: 25
Tolerance: 0.005
Maximum number of iterations: 50
Check malpha < 0.2: Yes
Initial trial value of FS: 1
Steffensen Iteration: Yes

Groundwater Analysis

Groundwater Method: Water Surfaces
Pore Fluid Unit Weight: 62.4 lbs/ft3
Advanced Groundwater Method: None

Random Numbers

Pseudo-random Seed: 10116
Random Number Generation Method: Park and Miller v.3

Surface Options

Material Properties

Property	Engineered Fill	Puente Formation42 (Tplv)	Topanga (Tt)	Andesite (Tema)	Fault Material	Puente Formation-57 (Tplv)	Landslide Rupture Planes (Qls-rp)	Proposed Cut
Color								
Strength Type	Mohr-Coulomb	Anisotropic function	Anisotropic function	Generalised Hoek-Brown	Mohr-Coulomb	Anisotropic function	Mohr-Coulomb	No strength
Unit Weight [lbs/ft3]	125	110	130	130	130	110	110	0.0001
Cohesion [psf]	150				0		0	
Friction Angle [deg]	32				26		15	
Unconfined Compressive Strength (intact) [psf]				1.188e+006				
nmb				2.28421				
ns				0.000584681				
na				0.518255				
Water Surface	None	None	None	None	None	None	None	None
Ru Value	0	0	0	0	0	0	0	0

Anisotropic Functions

Name: 42Tplv

Angle From	Angle To	c	phi
-90	-46	300	32
-46	-40	300	27
-40	90	300	32

Name: 57 Tplv

Angle From	Angle To	c	phi
-90	55	300	32
55	59	300	27
59	90	300	32

Name: 64 Tt

Angle From	Angle To	c	phi
-90	62	550	35
62	66	300	26
66	90	550	35

Name: 67 Tvs

Angle From	Angle To	c	phi
-90	65	550	36
65	69	750	0
69	90	550	36

Name: 26 (Tplv)

Angle From	Angle To	c	phi
-90	24	300	32

24	28	300	27
28	90	300	32

Name: 4 Tplv

Angle From	Angle To	c	phi
-90	2	300	32
2	6	300	27
6	90	300	32

Property	Sespe Formation-67 (Tvs)	Puente Formation-4 (Tplv)	Puente Formation-26 (Tplv)
Color			
Strength Type	Anisotropic function	Anisotropic function	Anisotropic function
Unit Weight [lbs/ft3]	120	120	120
Water Surface	None	None	None
Ru Value	0	0	0

Anisotropic Functions

Name: 42Tplv

Angle From	Angle To	c	phi
-90	-46	300	32
-46	-40	300	27
-40	90	300	32

Name: 57 Tplv

Angle From	Angle To	c	phi
-90	55	300	32
55	59	300	27
59	90	300	32

Name: 64 Tt

Angle From	Angle To	c	phi
-90	62	550	35
62	66	300	26
66	90	550	35

Name: 67 Tvs

Angle From	Angle To	c	phi
-90	65	550	36
65	69	750	0
69	90	550	36

Name: 26 (Tplv)

Angle From	Angle To	c	phi
-90	24	300	32
24	28	300	27
28	90	300	32

Name: 4 Tplv

Angle From	Angle To	c	phi

-90	2	300	32
2	6	300	27
6	90	300	32

Global Minimums

Method: bishop simplified

FS: 1.333320
Axis Location: 168.058, 782.273
Left Slip Surface Endpoint: 70.847, 724.891
Right Slip Surface Endpoint: 155.637, 670.075
Left Slope Intercept: 70.847 724.891
Right Slope Intercept: 155.637 719.163
Resisting Moment=1.07128e+007 lb-ft
Driving Moment=8.03466e+006 lb-ft
Total Slice Area=2870 ft2

Method: janbu simplified

FS: 1.262360
Axis Location: 170.344, 776.565
Left Slip Surface Endpoint: 76.328, 724.437
Right Slip Surface Endpoint: 155.637, 670.075
Left Slope Intercept: 76.328 724.437
Right Slope Intercept: 155.637 719.163
Resisting Horizontal Force=77176.7 lb
Driving Horizontal Force=61136.7 lb
Total Slice Area=2887.75 ft2

Method: spencer

FS: 1.440790
Axis Location: 175.363, 763.655
Left Slip Surface Endpoint: 88.667, 723.414
Right Slip Surface Endpoint: 155.538, 670.154
Left Slope Intercept: 88.667 723.414
Right Slope Intercept: 155.538 719.172
Resisting Moment=6.0518e+006 lb-ft
Driving Moment=4.20034e+006 lb-ft
Resisting Horizontal Force=49417.5 lb
Driving Horizontal Force=34298.9 lb
Total Slice Area=2353.02 ft2

Global Minimum Coordinates

Method: bishop simplified

X	Y
70.8472	724.891
83.0074	712.299
94.2778	700.628
102.885	692.935
124.962	674.41

140.266	669.536
150.55	668.812
155.637	670.075
155.638	719.163

Method: janbu simplified

X	Y
76.3279	724.437
84.4988	711.223
101.93	693.172
105.918	689.124
126.271	672.045
139.652	668.565
149.584	668.344
155.637	670.075
155.638	719.163

Method: spencer

X	Y
88.667	723.414
93.1739	710.661
99.5144	702.187
110.642	691.727
127.269	677.776
140.176	674.296
145.71	672.804
155.538	670.154
155.539	719.172

Valid / Invalid Surfaces

Method: bishop simplified

Number of Valid Surfaces: 3
Number of Invalid Surfaces: 0

Method: janbu simplified

Number of Valid Surfaces: 3
Number of Invalid Surfaces: 0

Method: spencer

Number of Valid Surfaces: 1
Number of Invalid Surfaces: 2

Error Codes:

Error Code -108 reported for 1 surface

Error Code -111 reported for 1 surface

Error Codes

The following errors were encountered during the computation:

-108 = Total driving moment or total driving force < 0.1. This is to limit the calculation of extremely high safety factors if the driving force is very small (0.1 is an arbitrary number).
-111 = safety factor equation did not converge

Slice Data

Global Minimum Query (bishop simplified) - Safety Factor: 1.33332

Slice Number	Width [ft]	Weight [lbs]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	3.04005	484.211	Puente Formation42 (Tplv)	300	27	204.818	273.088	-52.8181	0	-52.8181
2	3.04005	1452.63	Puente Formation42 (Tplv)	300	27	292.038	389.38	175.418	0	175.418
3	3.04005	2421.05	Puente Formation42 (Tplv)	300	27	379.258	505.672	403.654	0	403.654
4	3.04005	3389.47	Puente Formation42 (Tplv)	300	27	466.477	621.963	631.889	0	631.889
5	3.75682	5526.46	Puente Formation42 (Tplv)	300	27	563.979	751.965	887.032	0	887.032
6	3.75682	6878.26	Puente Formation42 (Tplv)	300	27	662.5	883.324	1144.84	0	1144.84
7	3.75682	7399.07	Puente Formation42 (Tplv)	300	27	700.456	933.932	1244.16	0	1244.16
8	2.86899	5835.68	Puente Formation42 (Tplv)	300	27	747.118	996.148	1366.27	0	1366.27
9	2.86899	5923.3	Puente Formation42 (Tplv)	300	27	755.818	1007.75	1389.03	0	1389.03
10	2.86899	6010.92	Puente Formation42 (Tplv)	300	27	764.518	1019.35	1411.8	0	1411.8
11	3.67954	7796.64	Puente Formation42 (Tplv)	300	27	783.503	1044.66	1461.48	0	1461.48
12	3.67954	7859.28	Puente Formation42 (Tplv)	300	27	788.429	1051.23	1474.37	0	1474.37
13	3.67954	7921.92	Puente Formation42 (Tplv)	300	27	793.355	1057.8	1487.26	0	1487.26
14	3.67954	7984.55	Puente Formation42 (Tplv)	300	27	798.281	1064.36	1500.15	0	1500.15
15	3.67954	8047.19	Puente Formation42 (Tplv)	300	27	803.207	1070.93	1513.04	0	1513.04
16	3.67954	8109.83	Puente Formation42 (Tplv)	300	27	808.132	1077.5	1525.93	0	1525.93
17	3.06085	6525.69	Puente Formation42 (Tplv)	300	32	1065.18	1420.22	1792.73	0	1792.73
18	3.06085	6032.52	Puente Formation42 (Tplv)	300	32	999.475	1332.62	1652.53	0	1652.53
			Puente Formation42							

			(Tplv)							
20	3.06085	5046.18	Puente Formation42 (Tplv)	300	32	868.065	1157.41	1372.14	0	1372.14
21	3.06085	4553.01	Puente Formation42 (Tplv)	300	32	802.361	1069.8	1231.94	0	1231.94
22	3.42776	4353.07	Puente Formation42 (Tplv)	300	32	793.966	1058.61	1214.03	0	1214.03
23	3.42776	3413.96	Puente Formation42 (Tplv)	300	32	669.67	892.884	948.814	0	948.814
24	3.42776	2474.85	Puente Formation42 (Tplv)	300	32	545.373	727.157	683.595	0	683.595
25	5.08742	1488.13	Puente Formation42 (Tplv)	300	32	409.782	546.371	394.277	0	394.277

Global Minimum Query (janbu simplified) - Safety Factor: 1.26236

Slice Number	Width [ft]	Weight [lbs]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	2.72362	625.983	Puente Formation42 (Tplv)	300	32	195.176	246.382	-85.8065	0	-85.8065
2	2.72362	1877.95	Puente Formation42 (Tplv)	300	32	321.549	405.91	169.491	0	169.491
3	2.72362	3129.91	Puente Formation42 (Tplv)	300	32	447.921	565.438	424.79	0	424.79
4	2.90517	4448.46	Puente Formation42 (Tplv)	300	27	603.466	761.791	906.315	0	906.315
5	2.90517	5233.92	Puente Formation42 (Tplv)	300	27	680.426	858.943	1096.99	0	1096.99
6	2.90517	5523.56	Puente Formation42 (Tplv)	300	27	708.806	894.768	1167.3	0	1167.3
7	2.90517	5744.97	Puente Formation42 (Tplv)	300	27	730.501	922.155	1221.05	0	1221.05
8	2.90517	5966.39	Puente Formation42 (Tplv)	300	27	752.195	949.541	1274.8	0	1274.8
9	2.90517	6187.8	Puente Formation42 (Tplv)	300	27	773.889	976.927	1328.54	0	1328.54
10	3.98802	8836.99	Puente Formation42 (Tplv)	300	27	803.008	1013.68	1400.69	0	1400.69
11	3.39222	7705.7	Puente Formation42 (Tplv)	300	27	862.433	1088.7	1547.91	0	1547.91
12	3.39222	7758.93	Puente Formation42 (Tplv)	300	27	867.165	1094.67	1559.64	0	1559.64
13	3.39222	7812.17	Puente Formation42 (Tplv)	300	27	871.897	1100.65	1571.36	0	1571.36
14	3.39222	7865.41	Puente Formation42 (Tplv)	300	27	876.629	1106.62	1583.08	0	1583.08
15	3.39222	7918.65	Puente Formation42 (Tplv)	300	27	881.36	1112.59	1594.81	0	1594.81
16	3.39222	7971.89	Puente Formation42 (Tplv)	300	27	886.093	1118.57	1606.53	0	1606.53
17	3.34522	7557.21	Puente Formation42 (Tplv)	300	32	1201.25	1516.41	1946.67	0	1946.67
			Puente Formation42							

			(Tplv)							
19	3.34522	6235.28	Puente Formation42 (Tplv)	300	32	1027.96	1297.65	1596.57	0	1596.57
20	3.34522	5574.32	Puente Formation42 (Tplv)	300	32	941.308	1188.27	1421.53	0	1421.53
21	3.31064	4722.59	Puente Formation42 (Tplv)	300	32	933.471	1178.38	1405.7	0	1405.7
22	3.31064	3788.49	Puente Formation42 (Tplv)	300	32	795.33	1003.99	1126.63	0	1126.63
23	3.31064	2854.4	Puente Formation42 (Tplv)	300	32	657.19	829.61	847.552	0	847.552
24	3.0265	1636.84	Puente Formation42 (Tplv)	300	32	588.703	743.155	709.197	0	709.197
25	3.0265	545.624	Puente Formation42 (Tplv)	300	32	380.796	480.702	289.184	0	289.184

Global Minimum Query (spencer) - Safety Factor: 1.44079

Slice Number	Width [ft]	Weight [lbs]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	2.25347	577.322	Puente Formation42 (Tplv)	300	32	130.152	187.521	-180.005	0	-180.005
2	2.25347	1712.84	Puente Formation42 (Tplv)	300	32	238.283	343.315	69.3192	0	69.3192
3	3.17026	3506.46	Puente Formation42 (Tplv)	300	32	436.709	629.206	526.84	0	526.84
4	3.17026	4102.72	Puente Formation42 (Tplv)	300	32	488.064	703.198	645.251	0	645.251
5	2.782	3922.73	Puente Formation42 (Tplv)	300	27	527.059	759.382	901.587	0	901.587
6	2.782	4044.4	Puente Formation42 (Tplv)	300	27	536.344	772.759	927.841	0	927.841
7	2.782	4166.07	Puente Formation42 (Tplv)	300	27	545.932	786.574	954.954	0	954.954
8	2.782	4287.74	Puente Formation42 (Tplv)	300	27	556.397	801.651	984.545	0	984.545
9	2.77112	4349.33	Puente Formation42 (Tplv)	300	27	574.946	828.377	1037	0	1037
10	2.77112	4384.86	Puente Formation42 (Tplv)	300	27	576.035	829.946	1040.08	0	1040.08
11	2.77112	4420.39	Puente Formation42 (Tplv)	300	27	577.125	831.516	1043.16	0	1043.16
12	2.77112	4455.91	Puente Formation42 (Tplv)	300	27	578.214	833.085	1046.24	0	1046.24
13	2.77112	4491.44	Puente Formation42 (Tplv)	300	27	579.303	834.654	1049.32	0	1049.32
14	2.77112	4526.97	Puente Formation42 (Tplv)	300	27	580.393	836.224	1052.4	0	1052.4
15	2.58135	4040.21	Puente Formation42 (Tplv)	300	32	726.751	1047.1	1195.6	0	1195.6
16	2.58135	3653.65	Puente Formation42 (Tplv)	300	32	666.245	959.919	1056.09	0	1056.09
			Puente Formation42							

			(Tplv)							
18	2.58135	2880.51	Puente Formation42 (Tplv)	300	32	545.233	785.566	777.067	0	777.067
19	2.58135	2493.94	Puente Formation42 (Tplv)	300	32	484.726	698.389	637.556	0	637.556
20	2.76687	2243.95	Puente Formation42 (Tplv)	300	32	422.046	608.08	493.03	0	493.03
21	2.76687	1799.81	Puente Formation42 (Tplv)	300	32	357.191	514.637	343.49	0	343.49
22	2.45722	1226.02	Puente Formation42 (Tplv)	300	32	295.964	426.422	202.317	0	202.317
23	2.45722	875.734	Puente Formation42 (Tplv)	300	32	238.366	343.436	69.5116	0	69.5116
24	2.45722	525.445	Puente Formation42 (Tplv)	300	32	180.769	260.45	-63.2938	0	-63.2938
25	2.45722	175.156	Puente Formation42 (Tplv)	300	32	1292.43	1862.12	2499.91	0	2499.91

Interslice Data

Global Minimum Query (bishop simplified) - Safety Factor: 1.33332

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	70.8472	724.891	0	0	0
2	73.8872	721.743	-788.932	0	0
3	76.9273	718.595	-1124.52	0	0
4	79.9673	715.447	-1006.75	0	0
5	83.0074	712.299	-435.64	0	0
6	86.7642	708.409	896.406	0	0
7	90.521	704.519	2801.4	0	0
8	94.2778	700.628	4498.92	0	0
9	97.1468	698.064	5116.99	0	0
10	100.016	695.5	5463.94	0	0
11	102.885	692.935	5539.77	0	0
12	106.564	689.848	4990.56	0	0
13	110.244	686.76	4117.76	0	0
14	113.923	683.673	2854.72	0	0
15	117.603	680.585	1174.79	0	0
16	121.282	677.498	-922.023	0	0
17	124.962	674.41	-3435.72	0	0
18	128.023	673.435	-8819.13	0	0
19	131.084	672.46	-14441.6	0	0
20	134.145	671.486	-20303.1	0	0
21	137.205	670.511	-26403.6	0	0
22	140.266	669.536	-32743.2	0	0
23	143.694	669.294	-41226	0	0
24	147.122	669.053	-49727.4	0	0
25	150.55	668.812	-58247.3	0	0
26	155.637	670.075	0.12048	0	0

Global Minimum Query (janbu simplified) - Safety Factor: 1.26236

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	76.3279	724.437	0	0	0
2	79.0516	720.032	-909.534	0	0
3	81.7752	715.627	-1038.75	0	0
4	84.4988	711.223	-387.646	0	0
5	87.404	708.214	585.741	0	0
6	90.3091	705.206	1862.56	0	0
7	93.2143	702.198	2988.32	0	0
8	96.1195	699.189	3900.47	0	0
9	99.0246	696.181	4599.03	0	0
10	101.93	693.172	5083.98	0	0
11	105.918	689.124	5309.26	0	0
12	109.31	686.277	4522.08	0	0
13	112.702	683.431	3431.7	0	0
14	116.095	680.585	1985.9	0	0
15	119.487	677.738	184.668	0	0
16	122.879	674.892	-1971.98	0	0
17	126.271	672.045	-4484.06	0	0
18	129.616	671.175	-11196.4	0	0
19	132.962	670.305	-18133.7	0	0
20	136.307	669.435	-25295.9	0	0
21	139.652	668.565	-32683	0	0
22	142.963	668.491	-41445.1	0	0
23	146.273	668.418	-50125.5	0	0
24	149.584	668.344	-58724.2	0	0
25	152.611	669.209	-67359.1	0	0
26	155.637	670.075	0.12048	0	0

Global Minimum Query (spencer) - Safety Factor: 1.44079

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	88.667	723.414	0	0	0
2	90.9204	717.037	-1530.5	153.05	-5.71059
3	93.1739	710.661	-1902.69	190.269	-5.71059
4	96.3442	706.424	-1763.26	176.326	-5.71059
5	99.5144	702.187	-1656.83	165.683	-5.71059
6	102.296	699.572	-2019.55	201.955	-5.71059
7	105.078	696.957	-2625.81	262.581	-5.71059
8	107.86	694.342	-3443.73	344.373	-5.71059
9	110.642	691.727	-4381.51	438.151	-5.71059
10	113.414	689.402	-5769.46	576.946	-5.71059
11	116.185	687.077	-7402.01	740.201	-5.71059
12	118.956	684.752	-9279.15	927.915	-5.71059
13	121.727	682.426	-11400.9	1140.09	-5.71059
14	124.498	680.101	-13767.2	1376.72	-5.71059

15	127.269	677.776	-16378.2	1637.82	-5.71059
16	129.85	677.08	-20859.2	2085.92	-5.71059
17	132.432	676.384	-25497	2549.7	-5.71059
18	135.013	675.688	-30291.6	3029.16	-5.71059
19	137.595	674.992	-35242.9	3524.29	-5.71059
20	140.176	674.296	-40351	4035.09	-5.71058
21	142.943	673.55	-46000.2	4600.02	-5.71059
22	145.71	672.804	-51829.6	5182.96	-5.71059
23	148.167	672.141	-57157.5	5715.75	-5.71059
24	150.624	671.479	-62627.6	6262.75	-5.71058
25	153.081	670.816	-68239.6	6823.96	-5.71059
26	155.538	670.154	0.120139	0	0

List Of Coordinates

External Boundary

X	Y
-0.224	629.562
195.684	629.585
244.073	628.288
248.066	628.306
264.543	628.184
301.833	628.117
303.302	628.077
305.3	628.022
317.94	627.732
319.949	627.719
321.86	627.707
338.869	627.598
376.842	627.552
423.648	627.496
474.822	627.434
476.876	627.432
478.778	627.42
528.993	627.121
549.768	626.997
549.721	680.654
488.685	693.026
433.931	698.945
432.105	699.142
430.027	699.367
423.034	700.123
404.968	702.099
373.007	704.985
349.854	706.545
334.343	707.59
333.211	707.666

326.054	708.099
325.297	708.145
325.287	708.119
325.278	708.119
282.87	710.512
272.545	710.794
270.437	710.852
268.284	710.911
250.275	711.404
213.048	713.881
194.334	715.603
192.339	715.786
190.345	715.97
153.134	719.393
107.191	722.91
102.667	723.032
99.61	723.115
88.722	723.409
84.6374	723.748
70.297	724.937
43.465	715.427
35.824	715.343
25.549	712.668
13.836	701.927
5.391	695.113
0.438	693.148

Material Boundary

X	Y
190.345	715.97
218.468	670.075
218.605	669.851
244.073	628.288

Material Boundary

X	Y
194.334	715.603
222.357	670.075
222.495	669.851
248.066	628.306

Material Boundary

X	Y
301.518	684.764
301.684	683.763
302.613	678.17

302.908	676.392
304.316	667.913
306.018	666.104
309.503	662.402
319.2	659.565
324.609	659.348
330.102	660.806
338.38	664.427
341.564	670.308
345.124	677.705
346.628	682.142
348.314	687.835
347.51	689.082
347.767	695.508
346.782	701.42
342.988	703.418
334.051	707.301
333.211	707.666

Material Boundary

X	Y
301.518	684.764
301.649	691.016
304.583	699.5
307.707	702.951
312.156	705.826
321.668	707.592
325.277	708.118
325.287	708.119

Material Boundary

X	Y
423.034	700.123
435.562	675.109
443.052	664.081
454.912	652.638
460.303	649.403
461.641	648.6
466.356	645.771
467.7	645.088
479.464	639.113
495.278	633.703
509.426	629.75
528.993	627.121

Material Boundary

X	Y
433.931	698.945
467.7	645.088
478.778	627.42

Material Boundary

X	Y
430.027	699.367
461.641	648.6
474.822	627.434

Material Boundary

X	Y
268.284	710.911
284.831	670.075
286.717	665.421
301.833	628.117

Material Boundary

X	Y
272.545	710.794
278.247	696.386
288.466	670.562
288.99	669.238
305.3	628.022

Material Boundary

X	Y
272.545	710.794
295.797	677.883
297.474	675.509
321.86	627.707

Material Boundary

X	Y
268.284	710.911
278.247	696.386
292.65	675.385
292.912	675.003
293.788	673.726
317.94	627.732

Material Boundary

X	Y
264.543	628.184
286.717	665.421
288.99	669.238
291.704	673.796
292.65	675.385

Material Boundary

X	Y
349.854	706.545
423.648	627.496

Material Boundary

X	Y
349.854	706.545
376.842	627.552

Material Boundary

X	Y
102.667	723.032
155.637	670.075
218.468	670.075
222.357	670.075
284.831	670.075
287.978	670.075
288.466	670.562
291.704	673.796
292.912	675.003
295.797	677.883
301.684	683.763
326.054	708.099

Material Boundary

X	Y
88.722	723.409
155.637	670.075

Slide Analysis Information

SLIDE - An Interactive Slope Stability Program

Project Summary

File Name: Section 5_Alternative 1_RIGHT
Slide Modeler Version: 6.035
Project Title: SLIDE - An Interactive Slope Stability Program
Date Created: 2/18/2015, 4:13:13 PM

General Settings

Units of Measurement: Imperial Units
Time Units: days
Permeability Units: feet/second
Failure Direction: Right to Left
Data Output: Standard
Maximum Material Properties: 20
Maximum Support Properties: 20

Analysis Options

Analysis Methods Used

Bishop simplified
Janbu simplified
Spencer

Number of slices: 25
Tolerance: 0.005
Maximum number of iterations: 50
Check malpha < 0.2: Yes
Initial trial value of FS: 1
Steffensen Iteration: Yes

Groundwater Analysis

Groundwater Method: Water Surfaces
Pore Fluid Unit Weight: 62.4 lbs/ft3
Advanced Groundwater Method: None

Random Numbers

Pseudo-random Seed: 10116
Random Number Generation Method: Park and Miller v.3

Surface Options

Search Method: Auto Refine Search
Divisions along slope: 10
Circles per division: 10
Number of iterations: 10
Divisions to use in next iteration: 50%
Number of vertices per surface: 12
Minimum Elevation: Not Defined
Minimum Depth: Not Defined

Material Properties

Property	Engineered Fill	Puente Formation42 (Tplv)	Topanga (Tt)	Andesite (Tema)	Fault Material	Puente Formation-57 (Tplv)	Landslide Rupture Planes (Qls-rp)	Proposed Cut
Color								
Strength Type	Mohr-Coulomb	Anisotropic function	Anisotropic function	Generalised Hoek-Brown	Mohr-Coulomb	Anisotropic function	Mohr-Coulomb	No strength
Unit Weight [lbs/ft3]	125	110	130	130	130	110	110	0.0001
Cohesion [psf]	150				0		0	
Friction Angle [deg]	32				26		15	
Unconfined Compressive Strength (intact) [psf]				1.188e+006				
nmb				2.28421				
ns				0.000584681				
na				0.518255				
Water Surface	None	None	None	None	None	None	None	None
Ru Value	0	0	0	0	0	0	0	0

Anisotropic Functions

Name: 42Tplv

Angle From	Angle To	c	phi
-90	-46	300	32
-46	-40	300	27
-40	90	300	32

Name: 57 Tplv

Angle From	Angle To	c	phi
-90	55	300	32
55	59	300	27
59	90	300	32

Name: 64 Tt

Angle From	Angle To	c	phi
-90	62	550	35
62	66	300	26
66	90	550	35

Name: 67 Tvs

Angle From	Angle To	c	phi
-90	65	550	36
65	69	750	0
69	90	550	36

Name: 26 (Tplv)

Angle From	Angle To	c	phi
-90	24	300	32
24	28	300	27
28	90	300	32

Name: 4 Tplv

Angle From	Angle To	c	phi
-90	2	300	32
2	6	300	27
6	90	300	32

Property	Sespe Formation-67 (Tvs)	Puente Formation-4 (Tplv)	Puente Formation-26 (Tplv)
Color			
Strength Type	Anisotropic function	Anisotropic function	Anisotropic function
Unit Weight [lbs/ft3]	120	120	120
Water Surface	None	None	None
Ru Value	0	0	0

Anisotropic Functions

Name: 42Tplv

Angle From	Angle To	c	phi
-90	-46	300	32
-46	-40	300	27
-40	90	300	32

Name: 57 Tplv

Angle From	Angle To	c	phi
-90	55	300	32
55	59	300	27
59	90	300	32

Name: 64 Tt

Angle From	Angle To	c	phi
-90	62	550	35
62	66	300	26
66	90	550	35

Name: 67 Tvs

Angle From	Angle To	c	phi
-90	65	550	36
65	69	750	0
69	90	550	36

Name: 26 (Tplv)

Angle From	Angle To	c	phi
-90	24	300	32
24	28	300	27
28	90	300	32

Name: 4 Tplv

Angle From	Angle To	c	phi
-90	2	300	32
2	6	300	27
6	90	300	32

Global Minimums

Method: bishop simplified

FS: 2.548650
Axis Location: 290.796, 684.763
Left Slip Surface Endpoint: 290.780, 672.873
Right Slip Surface Endpoint: 302.686, 684.763
Left Slope Intercept: 290.780 710.065
Right Slope Intercept: 302.686 709.394
Resisting Moment=85310.7 lb-ft
Driving Moment=33472.9 lb-ft
Total Slice Area=407.319 ft2

Method: janbu simplified

FS: 2.362680
Axis Location: 309.187, 712.286
Left Slip Surface Endpoint: 272.114, 670.075
Right Slip Surface Endpoint: 364.959, 705.527
Left Slope Intercept: 272.114 710.806
Right Slope Intercept: 364.959 705.527
Resisting Horizontal Force=220771 lb
Driving Horizontal Force=93441.2 lb
Total Slice Area=4000.09 ft2

Method: spencer

FS: 3.195690
Axis Location: 288.560, 687.002
Left Slip Surface Endpoint: 290.780, 672.873
Right Slip Surface Endpoint: 302.686, 684.763
Left Slope Intercept: 290.780 710.065
Right Slope Intercept: 302.686 709.394
Resisting Moment=107954 lb-ft
Driving Moment=33781.2 lb-ft
Resisting Horizontal Force=4842.95 lb
Driving Horizontal Force=1515.46 lb
Total Slice Area=398.83 ft2

Global Minimum Coordinates

Method: bishop simplified

X	Y
290.78	672.873
291.863	672.921
292.945	673.069
294.027	673.321
295.109	673.683
296.192	674.168
297.274	674.793
298.356	675.587
299.439	676.598
300.521	677.923
301.603	679.806
302.686	684.763
302.687	709.394

Method: janbu simplified

X	Y
272.114	670.075
280.554	663.95
288.995	659.86
297.435	657.349
305.876	656.204
314.316	656.341
322.756	657.77
331.197	660.597
339.637	665.074
348.078	671.744
356.518	682.022
364.959	705.527

Method: spencer

X	Y
290.78	672.873
291.863	673.087
292.945	673.389
294.027	673.786
295.109	674.288
296.192	674.906
297.274	675.661
298.356	676.582
299.439	677.717
300.521	679.161
301.603	681.135
302.686	684.763
302.687	709.394

Valid / Invalid Surfaces

Method: bishop simplified

Number of Valid Surfaces: 1681
Number of Invalid Surfaces: 2819

Error Codes:

Error Code -105 reported for 698 surfaces
Error Code -106 reported for 650 surfaces
Error Code -107 reported for 1105 surfaces
Error Code -108 reported for 295 surfaces
Error Code -111 reported for 34 surfaces
Error Code -1000 reported for 37 surfaces

Method: janbu simplified

Number of Valid Surfaces: 1670
Number of Invalid Surfaces: 2830

Error Codes:

Error Code -105 reported for 698 surfaces
Error Code -106 reported for 650 surfaces
Error Code -107 reported for 1105 surfaces
Error Code -108 reported for 306 surfaces
Error Code -111 reported for 34 surfaces
Error Code -1000 reported for 37 surfaces

Method: spencer

Number of Valid Surfaces: 223
Number of Invalid Surfaces: 4277

Error Codes:

Error Code -105 reported for 698 surfaces
Error Code -106 reported for 650 surfaces
Error Code -107 reported for 1105 surfaces
Error Code -108 reported for 976 surfaces
Error Code -111 reported for 811 surfaces
Error Code -1000 reported for 37 surfaces

Error Codes

The following errors were encountered during the computation:

-105 = More than two surface / slope intersections with no valid slip surface.
-106 = Average slice width is less than 0.0001 * (maximum horizontal extent of soil region). This limitation is imposed to avoid numerical errors which may result from too many slices, or too small a slip region.
-107 = Total driving moment or total driving force is negative. This will occur if the wrong failure direction is specified, or if high external or anchor loads are applied against the failure direction.
-108 = Total driving moment or total driving force < 0.1. This is to limit the calculation of extremely high safety factors if the driving force is very small (0.1 is an arbitrary number).
-111 = safety factor equation did not converge
-1000 = No valid slip surfaces are generated at a grid center. Unable to draw a surface.

Slice Data

Global Minimum Query (bishop simplified) - Safety Factor: 2.54865

Slice Number	Width [ft]	Weight [lbs]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	0.384415	8.81614	Engineered Fill	150	32	63.7857	162.567	20.1119	0	20.1119
2	0.697907	59.1147	Sespe Formation-67 (Tvs)	550	36	236.958	603.923	74.2193	0	74.2193
3	0.541161	82.2293	Sespe Formation-67 (Tvs)	550	36	249.406	635.65	117.887	0	117.887
4	0.541161	112.537	Sespe Formation-67 (Tvs)	550	36	264.774	674.815	171.793	0	171.793
5	0.529417	141.649	Sespe Formation-67 (Tvs)	550	36	273.919	698.123	203.875	0	203.875
6	0.529417	174.407	Sespe Formation-67 (Tvs)	550	36	290.461	740.283	261.902	0	261.902
7	0.023489	8.5079	Fault Material	0	26	66.3626	169.135	346.779	0	346.779
8	0.541161	209.279	Fault Material	0	26	69.549	177.256	363.427	0	363.427
9	0.541161	234.546	Fault Material	0	26	77.9456	198.656	407.306	0	407.306
10	0.541161	257.662	Fault Material	0	26	83.9229	213.89	438.54	0	438.54
11	0.541161	276.744	Fault Material	0	26	90.1379	229.73	471.017	0	471.017
12	0.360774	191.293	Fault Material	0	26	91.3743	232.881	477.478	0	477.478
13	0.360774	195.279	Fault Material	0	26	93.2784	237.734	487.427	0	487.427
14	0.360774	199.265	Fault Material	0	26	95.1825	242.587	497.377	0	497.377
15	0.4113	230.199	Fault Material	0	26	93.9286	239.391	490.823	0	490.823
16	0.671022	383.589	Puente Formation-4 (Tplv)	300	32	218.576	557.073	411.404	0	411.404
17	0.541161	316.268	Puente Formation-4 (Tplv)	300	32	212.355	541.218	386.03	0	386.03
18	0.541161	318.527	Puente Formation-4 (Tplv)	300	32	213.188	543.341	389.427	0	389.427
19	0.360774	211.344	Puente Formation-4 (Tplv)	300	32	201.014	512.315	339.775	0	339.775
20	0.360774	207.823	Puente Formation-4 (Tplv)	300	32	199.174	507.624	332.268	0	332.268
21	0.360774	204.302	Puente Formation-4 (Tplv)	300	32	197.333	502.934	324.761	0	324.761
22	0.541161	290.777	Puente Formation-4 (Tplv)	300	32	174.843	445.614	233.031	0	233.031
23	0.541161	264.706	Puente Formation-4 (Tplv)	300	32	166.564	424.513	199.263	0	199.263
24	0.419095	161.184	Puente Formation-4 (Tplv)	300	32	99.8776	254.553	-72.7303	0	-72.7303
25	0.663227	102.379	Andesite (Tema)	2437.36	82.7151	94.9993	242.12	-280.623	0	-280.623

Global Minimum Query (janbu simplified) - Safety Factor: 2.36268

Slice Number	Width [ft]	Weight [lbs]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]

1	4.22023	840.081	Topanga (Tt)	550	35	371.79	878.421	469.033	0	469.033
2	4.22023	2520.21	Topanga (Tt)	550	35	522.128	1233.62	976.314	0	976.314
3	4.10293	3797.08	Topanga (Tt)	550	35	592.148	1399.06	1212.58	0	1212.58
4	4.33754	5082.64	Sespe Formation-67 (Tvs)	550	36	697.052	1646.91	1509.77	0	1509.77
5	4.2007	7243.32	Fault Material	0	26	379.263	896.077	1837.23	0	1837.23
6	4.23976	10129.1	Sespe Formation-67 (Tvs)	550	36	1064.95	2516.14	2706.15	0	2706.15
7	5.33244	16624.5	Sespe Formation-67 (Tvs)	550	36	1243.39	2937.74	3286.44	0	3286.44
8	3.10803	11873.5	Fault Material	0	26	811.367	1917	3930.43	0	3930.43
9	1.43502	5940.72	Fault Material	0	26	851.732	2012.37	4125.97	0	4125.97
10	3.50272	15642	Puente Formation-4 (Tplv)	300	32	1302.44	3077.25	4444.53	0	4444.53
11	3.50272	17265.3	Puente Formation-4 (Tplv)	300	32	1424.48	3365.6	4906	0	4906
12	4.22023	22770.1	Puente Formation-4 (Tplv)	300	32	1487.3	3514.02	5143.5	0	5143.5
13	4.22023	24756.6	Puente Formation-4 (Tplv)	300	32	1606.46	3795.55	5594.04	0	5594.04
14	4.22023	26470.4	Puente Formation-4 (Tplv)	300	32	1640.39	3875.71	5722.33	0	5722.33
15	4.22023	26319.7	Puente Formation-4 (Tplv)	300	32	1631.71	3855.22	5689.55	0	5689.55
16	4.22023	25174.2	Puente Formation-4 (Tplv)	300	32	1494.76	3531.64	5171.7	0	5171.7
17	4.22023	23739.4	Puente Formation-4 (Tplv)	300	32	1415.91	3345.35	4873.57	0	4873.57
18	2.81349	14807.7	Puente Formation-4 (Tplv)	300	32	1256.22	2968.05	4269.78	0	4269.78
19	2.81349	13796	Puente Formation-4 (Tplv)	300	32	1177.57	2782.23	3972.41	0	3972.41
20	2.81349	12659.3	Puente Formation-4 (Tplv)	300	32	1089.2	2573.43	3638.24	0	3638.24
21	4.22023	16282.9	Puente Formation-4 (Tplv)	300	32	867.743	2050.2	2800.9	0	2800.9
22	4.22023	13372	Puente Formation-4 (Tplv)	300	32	729.781	1724.24	2279.26	0	2279.26
23	0.878484	2343.11	Puente Formation-4 (Tplv)	300	32	479.204	1132.21	1331.81	0	1331.81
24	3.62986	6798.98	Puente Formation-26 (Tplv)	300	32	358.289	846.522	874.617	0	874.617
25	3.93212	2425.46	Puente Formation-57 (Tplv)	300	32	167.017	394.607	151.403	0	151.403

Global Minimum Query (spencer) - Safety Factor: 3.19569

Slice Number	Width [ft]	Weight [lbs]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	0.424005	9.00996	Engineered Fill	150	32	0	0	-984.346	0	-984.346
2	0.658317	48.1281	Sespe Formation-67 (Tvs)	550	36	186.307	595.38	62.4601	0	62.4601
			Sespe Formation-67							

			(Tvs)							
4	0.541161	94.2869	Sespe Formation-67 (Tvs)	550	36	204.451	653.363	142.268	0	142.268
5	0.427672	94.0103	Sespe Formation-67 (Tvs)	550	36	210.135	671.526	167.266	0	167.266
6	0.427672	112.363	Sespe Formation-67 (Tvs)	550	36	219.064	700.061	206.541	0	206.541
7	0.226979	66.6314	Fault Material	0	26	45.5999	145.723	298.776	0	298.776
8	0.541161	174.092	Fault Material	0	26	48.8955	156.255	320.37	0	320.37
9	0.541161	194.469	Fault Material	0	26	54.1924	173.182	355.076	0	355.076
10	0.541161	212.786	Fault Material	0	26	57.9972	185.341	380.006	0	380.006
11	0.541161	227.161	Fault Material	0	26	61.6577	197.039	403.99	0	403.99
12	0.541161	234.211	Fault Material	0	26	62.257	198.954	407.916	0	407.916
13	0.541161	238.608	Fault Material	0	26	63.32	202.351	414.881	0	414.881
14	0.0576723	25.655	Fault Material	0	26	62.4285	199.502	409.04	0	409.04
15	0.512325	230.162	Puente Formation-4 (Tplv)	300	32	158.938	507.915	332.735	0	332.735
16	0.512325	234.824	Puente Formation-4 (Tplv)	300	32	160.394	512.57	340.183	0	340.183
17	0.541161	249.614	Puente Formation-4 (Tplv)	300	32	155.557	497.113	315.447	0	315.447
18	0.541161	247.836	Puente Formation-4 (Tplv)	300	32	154.967	495.225	312.426	0	312.426
19	0.360774	162.015	Puente Formation-4 (Tplv)	300	32	146.635	468.6	269.817	0	269.817
20	0.360774	156.782	Puente Formation-4 (Tplv)	300	32	144.368	461.354	258.22	0	258.22
21	0.360774	151.55	Puente Formation-4 (Tplv)	300	32	142.1	454.107	246.622	0	246.622
22	0.541161	208.896	Puente Formation-4 (Tplv)	300	32	127.103	406.182	169.926	0	169.926
23	0.541161	179.888	Puente Formation-4 (Tplv)	300	32	119.417	381.621	130.621	0	130.621
24	0.332238	88.1699	Puente Formation-4 (Tplv)	300	32	90.2329	288.356	-18.6336	0	-18.6336
25	0.750084	86.0537	Andesite (Tema)	1927.43	80.3224	186.119	594.78	-227.265	0	-227.265

Interslice Data

Global Minimum Query (bishop simplified) - Safety Factor: 2.54865

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	290.78	672.873	0.0691621	0	0
2	291.165	672.89	-42196.8	0	0
3	291.863	672.921	-40360.4	0	0
4	292.404	672.995	-38960	0	0
5	292.945	673.069	-37575.5	0	0
6	293.474	673.192	-36248.7	0	0
7	294.004	673.315	-34939.7	0	0
8	294.027	673.321	-34887.8	0	0

9	294.568	673.502	-33723.2	0	0
10	295.109	673.683	-32582.3	0	0
11	295.651	673.926	-31491.1	0	0
12	296.192	674.168	-30424.7	0	0
13	296.553	674.376	-29747.9	0	0
14	296.913	674.585	-29081.6	0	0
15	297.274	674.793	-28425.7	0	0
16	297.685	675.095	-27719.4	0	0
17	298.356	675.587	-26469.7	0	0
18	298.898	676.092	-25519.8	0	0
19	299.439	676.598	-24591.6	0	0
20	299.8	677.039	-24007.3	0	0
21	300.16	677.481	-23429.3	0	0
22	300.521	677.923	-22857.8	0	0
23	301.062	678.865	-22033.9	0	0
24	301.603	679.806	-21203.1	0	0
25	302.023	681.726	-20316.7	0	0
26	302.686	684.763	0.0303344	0	0

Global Minimum Query (janbu simplified) - Safety Factor: 2.36268

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	272.114	670.075	0.0829508	0	0
2	276.334	667.013	-48461.5	0	0
3	280.554	663.95	-42974.2	0	0
4	284.657	661.962	-37718.1	0	0
5	288.995	659.86	-28397.8	0	0
6	293.195	658.61	-14313.6	0	0
7	297.435	657.349	2663.94	0	0
8	302.767	656.626	21280.7	0	0
9	305.876	656.204	30148.4	0	0
10	307.311	656.227	33213	0	0
11	310.813	656.284	41654.2	0	0
12	314.316	656.341	49644.7	0	0
13	318.536	657.055	55067	0	0
14	322.756	657.77	59433.5	0	0
15	326.977	659.183	58643.2	0	0
16	331.197	660.597	57490.2	0	0
17	335.417	662.836	52225.5	0	0
18	339.637	665.074	47295.2	0	0
19	342.451	667.298	41339.5	0	0
20	345.264	669.521	35823.6	0	0
21	348.078	671.744	30801.7	0	0
22	352.298	676.883	20072.3	0	0
23	356.518	682.022	11441	0	0
24	357.397	684.468	8604.08	0	0
25	361.027	694.577	1064.42	0	0
26	364.959	705.527	0	0	0

Global Minimum Query (spencer) - Safety Factor: 3.19569

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	290.78	672.873	0.0691621	0	0
2	291.204	672.957	-42042.9	-426.379	0.581046
3	291.863	673.087	-40350.8	-409.218	0.581046
4	292.404	673.238	-38986.2	-395.379	0.581046
5	292.945	673.389	-37643.1	-381.758	0.581046
6	293.373	673.546	-36602.9	-371.209	0.581046
7	293.8	673.703	-35577.8	-360.813	0.581046
8	294.027	673.786	-35086	-355.825	0.581046
9	294.568	674.037	-33947	-344.274	0.581046
10	295.109	674.288	-32834.2	-332.989	0.581047
11	295.651	674.597	-31768.2	-322.178	0.581047
12	296.192	674.906	-30728	-311.628	0.581045
13	296.733	675.284	-29736.8	-301.576	0.581046
14	297.274	675.661	-28767.9	-291.75	0.581046
15	297.332	675.71	-28669.3	-290.75	0.581046
16	297.844	676.146	-27720.7	-281.129	0.581044
17	298.356	676.582	-26792.7	-271.719	0.581047
18	298.898	677.15	-25857.5	-262.234	0.581046
19	299.439	677.717	-24941.2	-252.942	0.581047
20	299.8	678.199	-24356.2	-247.009	0.581047
21	300.16	678.68	-23775.5	-241.12	0.581047
22	300.521	679.161	-23199.1	-235.274	0.581046
23	301.062	680.148	-22349.3	-226.655	0.581044
24	301.603	681.135	-21485.1	-217.892	0.581048
25	301.936	682.249	-20874.5	-211.699	0.581046
26	302.686	684.763	0.0303344	0	0

List Of Coordinates

External Boundary

X	Y
-0.224	629.562
195.684	629.585
244.073	628.288
248.066	628.306
264.543	628.184
301.833	628.117
303.302	628.077
305.3	628.022
317.94	627.732
319.949	627.719
321.86	627.707
338.869	627.598
376.842	627.552

423.648	627.496
474.822	627.434
476.876	627.432
478.778	627.42
528.993	627.121
549.768	626.997
549.721	680.654
488.685	693.026
433.931	698.945
432.105	699.142
430.027	699.367
423.034	700.123
404.968	702.099
373.007	704.985
349.854	706.545
334.343	707.59
333.211	707.666
326.054	708.099
325.297	708.145
325.287	708.119
325.278	708.119
282.87	710.512
272.545	710.794
270.437	710.852
268.284	710.911
250.275	711.404
213.048	713.881
194.334	715.603
192.339	715.786
190.345	715.97
153.134	719.393
107.191	722.91
102.667	723.032
99.61	723.115
88.722	723.409
84.6374	723.748
70.297	724.937
43.465	715.427
35.824	715.343
25.549	712.668
13.836	701.927
5.391	695.113
0.438	693.148

Material Boundary

X	Y
190.345	715.97
218.468	670.075

218.605	669.851
244.073	628.288

Material Boundary

X	Y
194.334	715.603
222.357	670.075
222.495	669.851
248.066	628.306

Material Boundary

X	Y
301.518	684.764
301.684	683.763
302.613	678.17
302.908	676.392
304.316	667.913
306.018	666.104
309.503	662.402
319.2	659.565
324.609	659.348
330.102	660.806
338.38	664.427
341.564	670.308
345.124	677.705
346.628	682.142
348.314	687.835
347.51	689.082
347.767	695.508
346.782	701.42
342.988	703.418
334.051	707.301
333.211	707.666

Material Boundary

X	Y
301.518	684.764
301.649	691.016
304.583	699.5
307.707	702.951
312.156	705.826
321.668	707.592
325.277	708.118
325.287	708.119

Material Boundary

X	Y
423.034	700.123
435.562	675.109
443.052	664.081
454.912	652.638
460.303	649.403
461.641	648.6
466.356	645.771
467.7	645.088
479.464	639.113
495.278	633.703
509.426	629.75
528.993	627.121

Material Boundary

X	Y
433.931	698.945
467.7	645.088
478.778	627.42

Material Boundary

X	Y
430.027	699.367
461.641	648.6
474.822	627.434

Material Boundary

X	Y
268.284	710.911
284.831	670.075
286.717	665.421
301.833	628.117

Material Boundary

X	Y
272.545	710.794
278.247	696.386
288.466	670.562
288.99	669.238
305.3	628.022

Material Boundary

X	Y
272.545	710.794

295.797	677.883
297.474	675.509
321.86	627.707

Material Boundary

X	Y
268.284	710.911
278.247	696.386
292.65	675.385
292.912	675.003
293.788	673.726
317.94	627.732

Material Boundary

X	Y
264.543	628.184
286.717	665.421
288.99	669.238
291.704	673.796
292.65	675.385

Material Boundary

X	Y
349.854	706.545
423.648	627.496

Material Boundary

X	Y
349.854	706.545
376.842	627.552

Material Boundary

X	Y
102.667	723.032
155.637	670.075
218.468	670.075
222.357	670.075
284.831	670.075
287.978	670.075
288.466	670.562
291.704	673.796
292.912	675.003
295.797	677.883
301.684	683.763

326.054	708.099

Material Boundary

X	Y
88.722	723.409
155.637	670.075

Slide Analysis Information

SLIDE - An Interactive Slope Stability Program

Project Summary

File Name: Section 5_LEFT_Op2
Slide Modeler Version: 6.033
Project Title: SLIDE - An Interactive Slope Stability Program
Date Created: 2/18/2015, 4:13:13 PM

General Settings

Units of Measurement: Imperial Units
Time Units: days
Permeability Units: feet/second
Failure Direction: Left to Right
Data Output: Standard
Maximum Material Properties: 20
Maximum Support Properties: 20

Analysis Options

Analysis Methods Used

Janbu simplified
Spencer

Number of slices: 25
Tolerance: 0.005
Maximum number of iterations: 50
Check malpha < 0.2: Yes
Initial trial value of FS: 1
Steffensen Iteration: Yes

Groundwater Analysis

Groundwater Method: Water Surfaces
Pore Fluid Unit Weight: 62.4 lbs/ft3
Advanced Groundwater Method: None

Random Numbers

Pseudo-random Seed: 10116
Random Number Generation Method: Park and Miller v.3

Surface Options

Search Method: Auto Refine Search
Divisions along slope: 10
Circles per division: 10
Number of iterations: 10
Divisions to use in next iteration: 50%
Number of vertices per surface: 12
Minimum Elevation: Not Defined
Minimum Depth: Not Defined

Material Properties

Property	Engineered Fill	Puente Formation42 (Tplv)	Topanga (Tt)	Andesite (Tema)	Fault Material	Puente Formation-57 (Tplv)	Landslide Rupture Planes (Qls-rp)	Proposed Cut
Color								
Strength Type	Mohr-Coulomb	Anisotropic function	Anisotropic function	Generalised Hoek-Brown	Mohr-Coulomb	Anisotropic function	Mohr-Coulomb	No strength
Unit Weight [lbs/ft3]	125	110	130	130	130	110	110	0.0001
Cohesion [psf]	150				0		0	
Friction Angle [deg]	32				26		15	
Unconfined Compressive Strength (intact) [psf]				1.188e+006				
nmb				2.28421				
ns				0.000584681				
na				0.518255				
Water Surface	None	None	None	None	None	None	None	None
Ru Value	0	0	0	0	0	0	0	0

Anisotropic Functions

Name: 42Tplv

Angle From	Angle To	c	phi
-90	-46	300	32
-46	-40	300	27
-40	90	300	32

Name: 57 Tplv

Angle From	Angle To	c	phi
-90	55	300	32
55	59	300	27
59	90	300	32

Name: 64 Tt

Angle From	Angle To	c	phi
-90	62	550	35
62	66	300	26
66	90	550	35

Global Minimums

Method: janbu simplified

FS: 1.366230
Axis Location: 251.015, 726.508
Left Slip Surface Endpoint: 194.761, 715.563
Right Slip Surface Endpoint: 260.067, 669.919
Left Slope Intercept: 194.761 715.563
Right Slope Intercept: 260.067 711.136
Resisting Horizontal Force=107942 lb
Driving Horizontal Force=79007 lb
Total Slice Area=2193.71 ft2

Method: spencer

FS: 1.929140
Axis Location: 344.670, 860.409
Left Slip Surface Endpoint: 194.727, 715.567
Right Slip Surface Endpoint: 259.918, 669.937
Left Slope Intercept: 194.727 715.567
Right Slope Intercept: 259.918 711.140
Resisting Moment=1.89497e+007 lb-ft
Driving Moment=9.8229e+006 lb-ft
Resisting Horizontal Force=74160.6 lb
Driving Horizontal Force=38442.3 lb
Total Slice Area=1523.53 ft2

Global Minimum Coordinates

Method: janbu simplified

X	Y
194.761	715.563
200.698	699.077
206.635	690.25
212.572	684.006
218.509	679.311
224.446	675.731
230.382	673.043
236.319	671.116
242.256	669.873
248.193	669.269
254.13	669.285
260.067	669.919
260.068	711.136

Method: spencer

X	Y
194.727	715.567
200.653	709.672
206.58	704.225
212.506	699.179

218.433	694.498
224.359	690.151
230.286	686.114
236.212	682.366
242.139	678.889
248.065	675.666
253.992	672.686
259.918	669.937
259.919	711.14

Valid / Invalid Surfaces

Method: janbu simplified

Number of Valid Surfaces: 2106
Number of Invalid Surfaces: 2394

Error Codes:

Error Code -105 reported for 1121 surfaces
Error Code -106 reported for 876 surfaces
Error Code -108 reported for 276 surfaces
Error Code -111 reported for 43 surfaces
Error Code -1000 reported for 78 surfaces

Method: spencer

Number of Valid Surfaces: 812
Number of Invalid Surfaces: 3688

Error Codes:

Error Code -105 reported for 1121 surfaces
Error Code -106 reported for 876 surfaces
Error Code -108 reported for 1086 surfaces
Error Code -111 reported for 527 surfaces
Error Code -1000 reported for 78 surfaces

Error Codes

The following errors were encountered during the computation:

-105 = More than two surface / slope intersections with no valid slip surface.
-106 = Average slice width is less than 0.0001 * (maximum horizontal extent of soil region). This limitation is imposed to avoid numerical errors which may result from too many slices, or too small a slip region.
-108 = Total driving moment or total driving force < 0.1. This is to limit the calculation of extremely high safety factors if the driving force is very small (0.1 is an arbitrary number).
-111 = safety factor equation did not converge
-1000 = No valid slip surfaces are generated at a grid center. Unable to draw a surface.

Slice Data

Global Minimum Query (janbu simplified) - Safety Factor: 1.36623

Slice Number	Width [ft]	Weight [lbs]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	0.56846	56.3974	Topanga (Tt)	550	35	187.373	255.995	-419.882	0	-419.882
2	2.68419	1790.04	Fault Material	0	26	119.694	163.53	335.286	0	335.286
3	2.68419	4304.9	Fault Material	0	26	287.856	393.277	806.337	0	806.337
4	2.96842	6950.23	Fault Material	0	26	546.484	746.623	1530.8	0	1530.8
5	2.96842	8548.01	Fault Material	0	26	672.115	918.263	1882.71	0	1882.71
6	2.96842	9896.5	Fault Material	0	26	865.901	1183.02	2425.55	0	2425.55
7	2.96842	10995.7	Fault Material	0	26	962.078	1314.42	2694.95	0	2694.95
8	2.35771	9428.45	Fault Material	0	26	1113.84	1521.76	3120.08	0	3120.08
9	3.57912	14975.2	Topanga (Tt)	550	35	1813.52	2477.69	2753.02	0	2753.02
10	2.96842	12123.9	Topanga (Tt)	550	35	1907.69	2606.35	2936.78	0	2936.78
11	2.96842	11669.9	Topanga (Tt)	550	35	1847.79	2524.5	2819.88	0	2819.88
12	2.96842	11130	Topanga (Tt)	550	35	1887.28	2578.46	2896.94	0	2896.94
13	2.96842	10504	Topanga (Tt)	550	35	1799.52	2458.56	2725.7	0	2725.7
14	2.96842	9804.55	Topanga (Tt)	550	35	1797.16	2455.34	2721.11	0	2721.11
15	2.96842	9031.64	Topanga (Tt)	550	35	1682.71	2298.97	2497.79	0	2497.79
16	2.96842	8192.77	Topanga (Tt)	550	35	1641.39	2242.51	2417.16	0	2417.16
17	2.96842	7287.94	Topanga (Tt)	550	35	1500.27	2049.71	2141.81	0	2141.81
18	1.97894	4328.53	Topanga (Tt)	550	35	1448.28	1978.68	2040.36	0	2040.36
19	1.97894	3871.57	Topanga (Tt)	550	35	1335.78	1824.98	1820.87	0	1820.87
20	1.97894	3414.61	Topanga (Tt)	550	35	1223.29	1671.29	1601.37	0	1601.37
21	2.96842	4205.39	Topanga (Tt)	550	35	1130.13	1544.02	1419.6	0	1419.6
22	2.96842	3057.8	Topanga (Tt)	550	35	931.733	1272.96	1032.5	0	1032.5
23	1.97894	1374.42	Topanga (Tt)	550	35	802.375	1096.23	780.094	0	780.094
24	1.97894	811.261	Topanga (Tt)	550	35	648.094	885.445	479.065	0	479.065
25	1.97894	249.202	Topanga (Tt)	550	35	494.114	675.074	178.623	0	178.623

Global Minimum Query (spencer) - Safety Factor: 1.92914

Slice Number	Width [ft]	Weight [lbs]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	2.96324	515.12	Topanga (Tt)	550	35	247.049	476.591	-104.838	0	-104.838
2	2.96324	1545.36	Topanga (Tt)	550	35	343.986	663.598	162.234	0	162.234
3	2.96324	2532.58	Topanga (Tt)	550	35	445.367	859.175	441.546	0	441.546
4	2.96324	3476.79	Topanga (Tt)	550	35	535.617	1033.28	690.198	0	690.198
5	2.96324	4382.34	Topanga (Tt)	550	35	632.589	1220.35	957.364	0	957.364
6	2.96324	5249.23	Topanga (Tt)	550	35	716.647	1382.51	1188.95	0	1188.95
7	1.9755	3968.88	Topanga (Tt)	550	35	796.674	1536.9	1409.43	0	1409.43
8	1.9755	4329.6	Topanga (Tt)	550	35	849.798	1639.38	1555.8	0	1555.8
9	1.9755	4391.83	Topanga (Tt)	550	35	857.087	1653.44	1575.87	0	1575.87
10	2.96324	6356.34	Topanga (Tt)	550	35	842.168	1624.66	1534.77	0	1534.77
11	2.96324	6052.86	Topanga (Tt)	550	35	807.526	1557.83	1439.34	0	1439.34
12	2.96324	5719.56	Topanga (Tt)	550	35	779.965	1504.66	1363.4	0	1363.4
13	2.96324	5356.44	Topanga (Tt)	550	35	738.925	1425.49	1250.33	0	1250.33
14	2.96324	4965.53	Topanga (Tt)	550	35	703.732	1357.6	1153.37	0	1153.37
15	2.96324	4546.83	Topanga (Tt)	550	35	656.592	1266.66	1023.49	0	1023.49
16	2.96324	4102.06	Topanga (Tt)	550	35	614.08	1184.65	906.367	0	906.367
17	2.96324	3631.22	Topanga (Tt)	550	35	561.095	1082.43	760.39	0	760.39

18	1.9755	2148.3	Topanga (Tt)	550	35	521.291	1005.64	650.728	0	650.728
19	1.9755	1917.18	Topanga (Tt)	550	35	482.217	930.265	543.075	0	543.075
20	1.9755	1686.05	Topanga (Tt)	550	35	443.144	854.886	435.422	0	435.422
21	2.96324	2072.39	Topanga (Tt)	550	35	395.909	763.763	305.283	0	305.283
22	2.96324	1505.69	Topanga (Tt)	550	35	329.877	636.378	123.361	0	123.361
23	1.9755	679.081	Topanga (Tt)	550	35	277.994	536.29	-19.5805	0	-19.5805
24	1.9755	407.452	Topanga (Tt)	550	35	231.503	446.602	-147.667	0	-147.667
25	1.9755	135.823	Topanga (Tt)	550	35	973.175	1877.39	1895.71	0	1895.71

Interslice Data

Global Minimum Query (janbu simplified) - Safety Factor: 1.36623

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	194.761	715.563	0	0	0
2	195.33	713.985	-769.093	0	0
3	198.014	706.531	1409.62	0	0
4	200.698	699.077	6649.26	0	0
5	203.667	694.663	11787.2	0	0
6	206.635	690.25	18106.4	0	0
7	209.603	687.128	23113.6	0	0
8	212.572	684.006	28677	0	0
9	214.93	682.142	31875.7	0	0
10	218.509	679.311	33043	0	0
11	221.477	677.521	32030.6	0	0
12	224.446	675.731	30508.1	0	0
13	227.414	674.387	27236.9	0	0
14	230.382	673.043	23517.1	0	0
15	233.351	672.079	18283.7	0	0
16	236.319	671.116	12695.7	0	0
17	239.288	670.495	5847.61	0	0
18	242.256	669.873	-1232.01	0	0
19	244.235	669.672	-6591.63	0	0
20	246.214	669.471	-11985.9	0	0
21	248.193	669.269	-17414.9	0	0
22	251.161	669.277	-26246.1	0	0
23	254.13	669.285	-35158.1	0	0
24	256.109	669.496	-41292.3	0	0
25	258.088	669.708	-47289.1	0	0
26	260.067	669.919	0.0849406	0	0

Global Minimum Query (spencer) - Safety Factor: 1.92914

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	194.727	715.567	0	0	0
2	197.69	712.619	-1041.21	97.8261	-5.36743
3	200.653	709.672	-1582.67	148.699	-5.36744

4	203.617	706.949	-1700.1	159.731	-5.3674
5	206.58	704.225	-1407.78	132.267	-5.36743
6	209.543	701.702	-867.347	81.491	-5.36743
7	212.506	699.179	8.22954	-0.773201	-5.36743
8	214.482	697.619	633.293	-59.5006	-5.36743
9	216.457	696.058	1379.19	-129.581	-5.36744
10	218.433	694.498	2005.57	-188.432	-5.36743
11	221.396	692.325	2239.09	-210.373	-5.36745
12	224.359	690.151	1891.2	-177.687	-5.36745
13	227.323	688.133	772.206	-72.5521	-5.36743
14	230.286	686.114	-930.055	87.3827	-5.36743
15	233.249	684.24	-3366.81	316.327	-5.36744
16	236.212	682.366	-6383.94	599.799	-5.36743
17	239.176	680.627	-10093.9	948.369	-5.36745
18	242.139	678.889	-14377.4	1350.82	-5.36743
19	244.114	677.814	-17601.7	1653.76	-5.36744
20	246.09	676.74	-21076.4	1980.21	-5.36741
21	248.065	675.666	-24801.2	2330.18	-5.36743
22	251.029	674.176	-30952.4	2908.11	-5.36743
23	253.992	672.686	-37856.9	3556.82	-5.36743
24	255.967	671.77	-42785.4	4019.88	-5.36744
25	257.943	670.854	-47969.5	4506.94	-5.36743
26	259.918	669.937	0.0848831	0	0

List Of Coordinates

External Boundary

X	Y
-0.224	629.562
195.684	629.585
244.073	628.288
248.066	628.306
294.767	627.96
296.795	628.095
298.663	628.204
315.269	627.749
338.869	627.598
474.157	627.448
549.768	626.997
549.721	680.654
488.685	693.026
432.001	699.143
431.362	699.212
428.689	699.504
404.968	702.099
373.007	704.985
334.343	707.59

333.211	707.666
325.297	708.145
307.73	709.207
293.265	710.082
288.878	710.347
282.87	710.512
270.437	710.852
269.591	710.875
267.547	710.931
265.292	710.993
250.275	711.404
216.149	713.675
213.048	713.881
194.334	715.603
192.339	715.786
190.345	715.97
153.134	719.393
107.191	722.91
99.61	723.115
88.722	723.409
84.6374	723.748
70.297	724.937
43.465	715.427
35.824	715.343
25.549	712.668
13.836	701.927
5.391	695.113
0.438	693.148

Material Boundary

X	Y
190.345	715.97
218.605	669.851
244.073	628.288

Material Boundary

X	Y
194.334	715.603
222.495	669.851
248.066	628.306

Material Boundary

X	Y
269.591	710.875
283.994	669.919
284.018	669.851

298.663	628.204

Material Boundary

X	Y
265.292	710.993
279.929	669.919
279.954	669.851
294.767	627.96

Material Boundary

X	Y
428.689	699.504
430.123	697.233
474.157	627.448

Material Boundary

X	Y
291.506	676.493
296.586	670.206
296.626	670.157
296.818	669.919
298.584	667.734
306.1	660.969
313.916	656.61
323.086	655.407
331.804	659.015
341.425	664.427
343.352	669.919
344.431	672.995
347.722	678.959
349.004	684.186
348.314	687.835
348.807	690.399
349.695	694.739
349.201	699.374
342.988	703.418
334.051	707.301
333.211	707.666

Material Boundary

X	Y
338.869	627.598
346.164	669.919
347.722	678.959

Material Boundary

X	Y
291.506	676.493
294.711	669.919
294.744	669.851
315.269	627.749

Material Boundary

X	Y
291.506	676.493
289.533	687.243
289.928	697.106
292.689	700.557
297.719	702.924
301.862	705.489
307.73	709.207

Material Boundary

X	Y
99.61	723.115
152.982	669.851
218.605	669.851
222.495	669.851
279.954	669.851
284.018	669.851
294.744	669.851
296.317	669.851
296.386	669.919
296.626	670.157
334.051	707.301
334.343	707.59

Material Boundary

X	Y
84.6374	723.748
152.982	669.851

Material Boundary

X	Y
296.317	669.851
296.369	669.919
296.586	670.206
325.297	708.145

Material Boundary

X	Y
216.149	713.675
259.936	669.919
279.929	669.919
283.994	669.919
294.711	669.919
296.369	669.919
296.386	669.919
296.818	669.919
343.352	669.919
346.164	669.919
403.271	669.919
430.123	697.233
432.001	699.143

Slide Analysis Information

SLIDE - An Interactive Slope Stability Program

Project Summary

File Name: Section 5_RIGHT_Op2
Slide Modeler Version: 6.033
Project Title: SLIDE - An Interactive Slope Stability Program
Date Created: 2/18/2015, 4:13:13 PM

General Settings

Units of Measurement: Imperial Units
Time Units: days
Permeability Units: feet/second
Failure Direction: Right to Left
Data Output: Standard
Maximum Material Properties: 20
Maximum Support Properties: 20

Analysis Options

Analysis Methods Used

Janbu simplified
Spencer

Number of slices: 25
Tolerance: 0.005
Maximum number of iterations: 50
Check malpha < 0.2: Yes
Initial trial value of FS: 1
Steffensen Iteration: Yes

Groundwater Analysis

Groundwater Method: Water Surfaces
Pore Fluid Unit Weight: 62.4 lbs/ft3
Advanced Groundwater Method: None

Random Numbers

Pseudo-random Seed: 10116
Random Number Generation Method: Park and Miller v.3

Surface Options

Search Method: Auto Refine Search
Divisions along slope: 10
Circles per division: 10
Number of iterations: 10
Divisions to use in next iteration: 50%
Number of vertices per surface: 12
Minimum Elevation: Not Defined
Minimum Depth: Not Defined

Material Properties

Property	Engineered Fill	Puente Formation42 (Tplv)	Topanga (Tt)	Andesite (Tema)	Fault Material	Puente Formation-57 (Tplv)	Landslide Rupture Planes (Qls-rp)	Proposed Cut
Color								
Strength Type	Mohr-Coulomb	Anisotropic function	Anisotropic function	Generalised Hoek-Brown	Mohr-Coulomb	Anisotropic function	Mohr-Coulomb	No strength
Unit Weight [lbs/ft3]	125	110	130	130	130	110	110	0.0001
Cohesion [psf]	150				0		0	
Friction Angle [deg]	32				26		15	
Unconfined Compressive Strength (intact) [psf]				1.188e+006				
nmb				2.28421				
ns				0.000584681				
na				0.518255				
Water Surface	None	None	None	None	None	None	None	None
Ru Value	0	0	0	0	0	0	0	0

Anisotropic Functions

Name: 42Tplv

Angle From	Angle To	c	phi
-90	-46	300	32
-46	-40	300	27
-40	90	300	32

Name: 57 Tplv

Angle From	Angle To	c	phi
-90	55	300	32
55	59	300	27
59	90	300	32

Name: 64 Tt

Angle From	Angle To	c	phi
-90	62	550	35
62	66	300	26
66	90	550	35

Global Minimums

Method: janbu simplified

FS: 1.271940
Axis Location: 401.854, 708.744
Left Slip Surface Endpoint: 403.282, 669.930
Right Slip Surface Endpoint: 439.280, 698.358
Left Slope Intercept: 403.282 702.251
Right Slope Intercept: 439.280 698.358
Resisting Horizontal Force=24984.5 lb
Driving Horizontal Force=19642.9 lb
Total Slice Area=813.063 ft2

Method: spencer

FS: 1.905770
Axis Location: 376.214, 728.954
Left Slip Surface Endpoint: 404.005, 670.666
Right Slip Surface Endpoint: 433.416, 698.990
Left Slope Intercept: 404.005 702.186
Right Slope Intercept: 433.416 698.990
Resisting Moment=1.0845e+006 lb-ft
Driving Moment=569058 lb-ft
Resisting Horizontal Force=12315 lb
Driving Horizontal Force=6461.95 lb
Total Slice Area=553.541 ft2

Global Minimum Coordinates

Method: janbu simplified

X	Y
403.282	669.93
406.555	670.19
409.827	670.731
413.1	671.568
416.372	672.719
419.645	674.218
422.917	676.111
426.19	678.473
429.462	681.425
432.735	685.187
436.007	690.248
439.28	698.358

Method: spencer

X	Y
404.005	670.666
406.679	672.017
409.352	673.531
412.026	675.22
414.7	677.101

417.374	679.197
420.047	681.535
422.721	684.155
425.395	687.107
428.069	690.47
430.743	694.363
433.416	698.99

Valid / Invalid Surfaces

Method: janbu simplified

Number of Valid Surfaces: 1855
Number of Invalid Surfaces: 2645

Error Codes:

Error Code -105 reported for 341 surfaces
Error Code -106 reported for 1502 surfaces
Error Code -107 reported for 649 surfaces
Error Code -108 reported for 75 surfaces
Error Code -111 reported for 31 surfaces
Error Code -123 reported for 12 surfaces
Error Code -1000 reported for 35 surfaces

Method: spencer

Number of Valid Surfaces: 94
Number of Invalid Surfaces: 4406

Error Codes:

Error Code -105 reported for 341 surfaces
Error Code -106 reported for 1502 surfaces
Error Code -107 reported for 649 surfaces
Error Code -108 reported for 631 surfaces
Error Code -111 reported for 1236 surfaces
Error Code -123 reported for 12 surfaces
Error Code -1000 reported for 35 surfaces

Error Codes

The following errors were encountered during the computation:

-105 = More than two surface / slope intersections with no valid slip surface.
-106 = Average slice width is less than 0.0001 * (maximum horizontal extent of soil region). This limitation is imposed to avoid numerical errors which may result from too many slices, or too small a slip region.
-107 = Total driving moment or total driving force is negative. This will occur if the wrong failure direction is specified, or if high external or anchor loads are applied against the failure direction.
-108 = Total driving moment or total driving force < 0.1. This is to limit the calculation of extremely high safety factors if the driving force is very small (0.1 is an arbitrary number).
-111 = safety factor equation did not converge
-123 = Surface radius equal or less than the internal cutoff of 0.01.
-1000 = No valid slip surfaces are generated at a grid center. Unable to draw a surface.

Slice Data

Global Minimum Query (janbu simplified) - Safety Factor: 1.27194

Slice Number	Width [ft]	Weight [lbs]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	1.63625	138.126	Puente Formation-57 (Tplv)	300	32	266.976	339.577	63.3367	0	63.3367
2	1.63625	414.367	Puente Formation-57 (Tplv)	300	32	346.818	441.132	225.859	0	225.859
3	1.63625	677.899	Puente Formation-57 (Tplv)	300	32	406.45	516.98	347.241	0	347.241
4	1.63625	928.721	Puente Formation-57 (Tplv)	300	32	476.111	605.585	489.039	0	489.039
5	1.63625	1166.28	Puente Formation-57 (Tplv)	300	32	520.836	662.472	580.077	0	580.077
6	1.63625	1390.57	Puente Formation-57 (Tplv)	300	32	580.688	738.6	701.904	0	701.904
7	1.63625	1600.68	Puente Formation-57 (Tplv)	300	32	611.125	777.314	763.863	0	763.863
8	1.63625	1796.6	Puente Formation-57 (Tplv)	300	32	661.3	841.134	865.994	0	865.994
9	1.63625	1976.9	Puente Formation-57 (Tplv)	300	32	677.482	861.717	898.937	0	898.937
10	1.63625	2141.61	Puente Formation-57 (Tplv)	300	32	717.875	913.094	981.158	0	981.158
11	1.63625	2288.55	Puente Formation-57 (Tplv)	300	32	719.222	914.807	983.896	0	983.896
12	1.63625	2417.74	Puente Formation-57 (Tplv)	300	32	749.447	953.252	1045.42	0	1045.42
13	1.63625	2525.85	Puente Formation-57 (Tplv)	300	32	734.603	934.371	1015.21	0	1015.21
14	1.63625	2612.87	Puente Formation-57 (Tplv)	300	32	753.908	958.926	1054.5	0	1054.5
15	1.09083	1778.46	Puente Formation-57 (Tplv)	300	32	719.171	914.742	983.794	0	983.794
16	1.09083	1793.55	Puente Formation-57 (Tplv)	300	32	723.883	920.736	993.386	0	993.386
17	1.09083	1863.72	Puente Formation-57 (Tplv)	300	32	745.802	948.616	1038	0	1038
18	1.63625	3030.07	Puente Formation-57 (Tplv)	300	32	732.977	932.303	1011.89	0	1011.89
19	1.63625	2689.74	Puente Formation-57 (Tplv)	300	32	667.599	849.146	878.817	0	878.817
20	1.26252	1782.17	Puente Formation-57 (Tplv)	300	27	495.41	630.132	647.92	0	647.92
21	1.26252	1492.1	Puente Formation-57 (Tplv)	300	27	438.51	557.759	505.881	0	505.881
22	0.747451	746.671	Landslide Rupture Planes (Qls-rp)	0	15	158.856	202.055	754.077	0	754.077
23	1.09083	846.254	Landslide Rupture Planes (Qls-rp)	0	15	107.491	136.722	510.254	0	510.254
24	1.09083	507.753	Landslide Rupture Planes (Qls-rp)	0	15	64.4945	82.0331	306.152	0	306.152
25	1.09083	169.251	Landslide Rupture Planes (Qls-rp)	0	15	21.4982	27.3444	102.051	0	102.051

Global Minimum Query (spencer) - Safety Factor: 1.90577

Slice Number	Width [ft]	Weight [lbs]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	1.33688	50.2963	Puente Formation-57 (Tplv)	300	32	742.015	1414.11	1782.95	0	1782.95
2	1.33688	150.88	Puente Formation-57 (Tplv)	300	32	103.648	197.53	-163.986	0	-163.986
3	1.33688	245.519	Puente Formation-57 (Tplv)	300	32	124.574	237.41	-100.165	0	-100.165
4	1.33688	334.212	Puente Formation-57 (Tplv)	300	32	146.284	278.784	-33.9525	0	-33.9525
5	1.33688	416.457	Puente Formation-57 (Tplv)	300	32	163.649	311.877	19.0079	0	19.0079
6	1.33688	492.254	Puente Formation-57 (Tplv)	300	32	182.395	347.602	76.18	0	76.18
7	1.33688	560.973	Puente Formation-57 (Tplv)	300	32	195.98	373.493	117.614	0	117.614
8	1.33688	622.615	Puente Formation-57 (Tplv)	300	32	211.558	403.18	165.122	0	165.122
9	1.33688	676.376	Puente Formation-57 (Tplv)	300	32	221.083	421.333	194.173	0	194.173

10	1.33688	722.257	Puente Formation-57 (Tplv)	300	32	233.233	444.488	231.229	0	231.229
11	1.33688	759.212	Puente Formation-57 (Tplv)	300	32	238.336	454.213	246.793	0	246.793
12	1.33688	787.243	Puente Formation-57 (Tplv)	300	32	246.727	470.205	272.386	0	272.386
13	0.891252	535.813	Puente Formation-57 (Tplv)	300	32	246.236	469.269	270.886	0	270.886
14	0.891252	539.096	Puente Formation-57 (Tplv)	300	32	249.035	474.604	279.425	0	279.425
15	0.891252	542.379	Puente Formation-57 (Tplv)	300	32	251.835	479.939	287.963	0	287.963
16	1.33688	807.464	Puente Formation-57 (Tplv)	300	32	245.822	468.48	269.624	0	269.624
17	1.33688	790.332	Puente Formation-57 (Tplv)	300	32	245.246	467.382	267.867	0	267.867
18	0.891252	510.669	Puente Formation-57 (Tplv)	300	32	234.586	447.067	235.356	0	235.356
19	0.891252	489.652	Puente Formation-57 (Tplv)	300	32	230.474	439.231	222.817	0	222.817
20	0.891252	468.635	Puente Formation-57 (Tplv)	300	32	226.363	431.396	210.278	0	210.278
21	1.33688	691.397	Puente Formation-57 (Tplv)	300	27	205.107	390.887	178.375	0	178.375
22	1.33688	836.816	Puente Formation-57 (Tplv)	300	27	237.546	452.708	299.707	0	299.707
23	0.56936	284.506	Puente Formation-57 (Tplv)	300	32	205.958	392.509	148.046	0	148.046
24	1.0522	339.885	Landslide Rupture Planes (Qls-rp)	0	15	41.7901	79.6424	297.229	0	297.229
25	1.0522	111.959	Landslide Rupture Planes (Qls-rp)	0	15	13.7218	26.1505	97.5949	0	97.5949

Interslice Data

Global Minimum Query (janbu simplified) - Safety Factor: 1.27194

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	403.282	669.93	0.0522319	0	0
2	404.918	670.06	-28613.1	0	0
3	406.555	670.19	-24675.1	0	0
4	408.191	670.46	-20914.9	0	0
5	409.827	670.731	-17291.5	0	0
6	411.463	671.149	-13917.3	0	0
7	413.1	671.568	-10708.5	0	0
8	414.736	672.144	-7808.43	0	0
9	416.372	672.719	-5097.38	0	0
10	418.008	673.469	-2746.83	0	0
11	419.645	674.218	-604.054	0	0
12	421.281	675.165	1132.7	0	0
13	422.917	676.111	2648.49	0	0
14	424.553	677.292	3718.78	0	0
15	426.19	678.473	4562.12	0	0
16	427.281	679.457	4831.03	0	0
17	428.371	680.441	5001.38	0	0
18	429.462	681.425	5312.5	0	0
19	431.098	683.306	4604.56	0	0
20	432.735	685.187	4040.32	0	0
21	433.997	687.139	3398.78	0	0
22	435.26	689.092	2962.95	0	0
23	436.007	690.248	2209.67	0	0
24	437.098	692.951	947.167	0	0

25	438.189	695.654	189.665	0	0
26	439.28	698.358	0	0	0

Global Minimum Query (spencer) - Safety Factor: 1.90577

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	404.005	670.666	0.0496768	0	0
2	405.342	671.341	-28354.2	2835.42	-5.71059
3	406.679	672.017	-25353.1	2535.31	-5.71059
4	408.016	672.774	-22500.6	2250.06	-5.71059
5	409.352	673.531	-19810.7	1981.07	-5.71059
6	410.689	674.375	-17280.9	1728.09	-5.71059
7	412.026	675.22	-14915.8	1491.58	-5.71059
8	413.363	676.16	-12720.4	1272.04	-5.71059
9	414.7	677.101	-10690.4	1069.04	-5.71059
10	416.037	678.149	-8837.43	883.743	-5.71059
11	417.374	679.197	-7148.55	714.855	-5.71059
12	418.711	680.366	-5640.65	564.065	-5.71059
13	420.047	681.535	-4293	429.3	-5.71059
14	420.939	682.408	-3497.83	349.783	-5.71059
15	421.83	683.282	-2770.52	277.052	-5.71059
16	422.721	684.155	-2111.09	211.109	-5.71059
17	424.058	685.631	-1268.86	126.886	-5.71059
18	425.395	687.107	-566.352	56.6352	-5.71059
19	426.286	688.228	-186.327	18.6327	-5.71059
20	427.178	689.349	141.18	-14.118	-5.71059
21	428.069	690.47	416.17	-41.617	-5.71059
22	429.406	692.416	955.243	-95.5243	-5.71059
23	430.743	694.363	689.537	-68.9537	-5.71059
24	431.312	695.348	660.919	-66.0919	-5.71059
25	432.364	697.169	163.609	-16.3609	-5.71059
26	433.416	698.99	0	0	0

List Of Coordinates

External Boundary

X	Y
-0.224	629.562
195.684	629.585
244.073	628.288
248.066	628.306
294.767	627.96
296.795	628.095
298.663	628.204
315.269	627.749
338.869	627.598
474.157	627.448

549.768	626.997
549.721	680.654
488.685	693.026
432.001	699.143
431.362	699.212
428.689	699.504
404.968	702.099
373.007	704.985
334.343	707.59
333.211	707.666
325.297	708.145
307.73	709.207
293.265	710.082
288.878	710.347
282.87	710.512
270.437	710.852
269.591	710.875
267.547	710.931
265.292	710.993
250.275	711.404
216.149	713.675
213.048	713.881
194.334	715.603
192.339	715.786
190.345	715.97
153.134	719.393
107.191	722.91
99.61	723.115
88.722	723.409
84.6374	723.748
70.297	724.937
43.465	715.427
35.824	715.343
25.549	712.668
13.836	701.927
5.391	695.113
0.438	693.148

Material Boundary

X	Y
190.345	715.97
218.605	669.851
244.073	628.288

Material Boundary

X	Y
194.334	715.603

222.495	669.851
248.066	628.306

Material Boundary

X	Y
269.591	710.875
283.994	669.919
284.018	669.851
298.663	628.204

Material Boundary

X	Y
265.292	710.993
279.929	669.919
279.954	669.851
294.767	627.96

Material Boundary

X	Y
428.689	699.504
430.123	697.233
474.157	627.448

Material Boundary

X	Y
291.506	676.493
296.586	670.206
296.626	670.157
296.818	669.919
298.584	667.734
306.1	660.969
313.916	656.61
323.086	655.407
331.804	659.015
341.425	664.427
343.352	669.919
344.431	672.995
347.722	678.959
349.004	684.186
348.314	687.835
348.807	690.399
349.695	694.739
349.201	699.374
342.988	703.418
334.051	707.301

333.211	707.666

Material Boundary

X	Y
338.869	627.598
346.164	669.919
347.722	678.959

Material Boundary

X	Y
291.506	676.493
294.711	669.919
294.744	669.851
315.269	627.749

Material Boundary

X	Y
291.506	676.493
289.533	687.243
289.928	697.106
292.689	700.557
297.719	702.924
301.862	705.489
307.73	709.207

Material Boundary

X	Y
99.61	723.115
152.982	669.851
218.605	669.851
222.495	669.851
279.954	669.851
284.018	669.851
294.744	669.851
296.317	669.851
296.386	669.919
296.626	670.157
334.051	707.301
334.343	707.59

Material Boundary

X	Y
84.6374	723.748
152.982	669.851

Material Boundary

X	Y
296.317	669.851
296.369	669.919
296.586	670.206
325.297	708.145

Material Boundary

X	Y
216.149	713.675
259.936	669.919
279.929	669.919
283.994	669.919
294.711	669.919
296.369	669.919
296.386	669.919
296.818	669.919
343.352	669.919
346.164	669.919
403.271	669.919
430.123	697.233
432.001	699.143

Shear Strength Parameters

KLEINFELDER
Bright People. Right Solutions.

PROJECT IRWD Santiago Reservoir C+ PROJECT NO. 20153742.001A

SUBJECT Generalized Strength Parameters BY A.Williams DATE 2-16-15

REVIEWED BY L. Perko DATE 2-18-15

PURPOSE

Develop generalized geomechanical properties for use in slope stability, bearing capacity, and earth pressure calculations for the following geologic units (Youngest to Oldest):

1. Artificial Fill (af)
2. Landslide Rupture Plane (Qls-rp)
3. La Vida Member of the Puente Formation (Tplv)
4. El Modeno Volcanics - Andesite (Tema)
5. Topanga Group (Tt)
6. Sespe-Vaqueros Undifferentiated (Tvs)

GIVENS

1. Boring Logs and Laboratory Test Data
2. Shear test data reported in California Geological Survey (CGS) Seismic Hazard Zone Reports for the Orange (1997) and Black Star Canyon (CGS, 2000) 7.5-Minute Quadranges.
3. Laboratory Database (IRWD_lab testing.xlsx)
4. Shear Strength Database (IRWD_shear test data.xlsx)
5. Point Load Index Database (IRWD_point load data.xlsx)
6. GSI Estimate (IRWD_RMR-GSI Estimate.xlsx)
7. Joint Friction Estimate – Andesite (IRWD_Barton-Andesite.xlsx)

ASSUMPTIONS

- The rate of shearing during each direct shear test allowed for dissipation of pore pressure.
- For andesite rock mass, the joint compressive strength (JCS) is assumed as roughly $^2/_3$ the intact compressive strength, and the residual friction angle is about 20 degrees.
- Assume engineered fill placed during construction of the tank will have the following properties (validated by compaction testing conducted by Kleinfelder):
  - Total Unit Weight (γ_{tot}) = 125 pcf
  - ϕ' = 32 degrees
  - c' = 150 psf

LOCATION

The data drawn upon for developing the geomechanical properties include laboratory testing performed on the samples collected from the borings drilled on-site, and laboratory test data reported by CGS (1997 and 2000) for testing on geologic materials performed within the limits of the Orange and Black Star Canyon Quadrangles.

Groundwater

The Mohr-Coulomb (M-C) parameters developed herein are representative of drained conditions (effective stress).

PROJECT IRWD Santiago Reservoir C+ PROJECT NO. 20153742.001A

SUBJECT Generalized Strength Parameters BY A.Williams DATE 2-16-15

REVIEWED BY L. Perko DATE 2-18-15

Method

Compile available data for the specified geologic unit to compute the following:

1. Dry and Total Unit Weights (γ_{dry}, γ_{tot})
2. Drained - Mohr-Coulomb Parameters
   a. Internal friction angle (ϕ') for along and across bedding where applicable
   b. Cohesion (c') for along and across bedding where applicable
   c. Unconfined Compressive Strength (σ_{ci})
   d. For joints occurring within Andesite, the friction angle is estimated using Barton's shear strength criterion. This assumes a σ_{ci} of 8,250 psi, a residual friction angle (ϕ_r') of 20 degrees, Joint Compressive Strength (JCS) of 5,500 psi, a Joint Roughness Coefficient (JRC) of 10 and a range of working normal stress (σ_n) equivalent to 0 to 90 feet of overburden. The joint shear strength (τ_n) is plotted over the working normal stress using the following:

$$\tau_n = \sigma_n \tan\left(\phi_r + JRC \log\left(\frac{JCS}{\sigma_n}\right)\right)$$

3. Hoek-Brown Parameters for Andesite
   a. Geologic Strength Index (GSI
   b. σ_{ci}
   c. Hoek-Brown material constant (m_i)
   d. D

RESULTS of Analysis

1. Unit Weights for Analysis

   The Dry Unit Weight (γ_{dry}) and Total Unit Weight (γ_{tot}) are established for each geologic unit using the geometric mean (geomean) as computed from the database (IRWD_lab testing.xlxs).

Table 1 – Summary of Laboratory Testing Unit Weights

Geologic Unit	Number of Data Points	Dry Unit Weight (pcf)			Total Unit Weight (pcf)		
		High	Geomean	Low	High	Geomean	Low
Clayey Gravel Artificial fill (af)	4	93.6	84.9	77.0	108.8	99.8	91.6
Sandstone/Siltstone/Claystone Puente Formation (Tplv)	4	107.4	91.8	81.3	111.7	110.6	95.7
Andesite El Modeno Volcanics (Tvema)	1	--	146.3	--	--	--	--
Sandstone/Siltstone Vaqueros-Sespe Fmtn (Tvs)	4	115.0	105.8	89.2	131.1	120.3	101.8

The design values recommended are summarized in Table 2 below. For values without project test results, the unit weights are assumed from similar lithologies and our engineering judgment.

Table 2 – Design Unit Weights

Geologic Unit	Total Unit Weight (γ_{tot}) (pcf)
Artificial fill (af)	110
Andesite – El Modeno Volcanics (Tema)	145
Volcanic Sandstone/Siltstone/Claystone – Puente Formation (Tplv)	110
Sandstone – Topanga Group (Tt)	130
Sandstone/Siltstone/Claystone –Vaqueros – Sespe Formation (Tvs)	130

2. Mohr-Coulomb Materials

For slope stability evaluations, peak strength values are appropriate unless the slopes analyzed have yielded to some degree warranting the use of ultimate or even residual strengths. The peak Mohr-Coulomb envelopes for the geologic units are established from the project direct shear, and unconfined compressive strength testing. For units where project data is not available, the CGS databases and resulting parameters as described in the Seismic Hazard Zone Reports (CGS, 1997 and 2000) are utilized. The summarized shear testing data is attached (Attachment 1).

Direct shear testing data are available for the artificial fill and volcanic sandstone. The peak strength envelopes selected for design are plotted in Mohr-Coulomb space on Figure 1 and 2 for the artificial fill and volcanic sandstone, respectively.

The applicable Mohr-Coulomb design parameters for design are summarized in Table 3. For joints within andesite, we have estimated the joint friction angle using Barton's shear strength criterion. The Barton shear strength criteria assumed for the joints in andesite is included in Attachment 2.

PROJECT IRWD Santiago Reservoir C+ PROJECT NO. 20153742.001A

SUBJECT Generalized Strength Parameters BY A.Williams DATE 2-16-15

REVIEWED BY L. Perko DATE 2-18-15

Table 3 – Summary of Mohr-Coulomb Strengths

Geologic Unit	ϕ' degrees	c' psf
Artificial fill (af) – Laboratory Testing	32	150
Landslide Rupture Planes (Qls-rp)[1]	15	0
Andesite – El Modeno Volcanics (Tema)[1,3]	41[3]	500[3]
Along Joints	36	0
Volcanic Sandstone/Siltstone/Claystone – Puente Formation (Tplv)[1]	29	400
Laboratory Testing	32	300
Favorable Bedding Conditions[2]	30	750
Adverse Bedding Conditions[2]	27	300
Sandstone – Topanga Group (Tt)[1]	28	400
Favorable Bedding Conditions[2]	35	550
Adverse Bedding Conditions[2]	26	300
Sandstone/Siltstone/Claystone –Vaqueros – Sespe Formation (Tvs)[1]	38	500
Favorable Bedding Conditions[2]	36	550
Adverse Bedding Conditions[2]	30	750

Notes:

[1] Approximate mean values from Orange 7.5'-Quadrangle Seismic Hazard Zone Report (CGS, 1997)

[2] Approximate mean values from Black Star Canyon 7.5'-Quadrangle Seismic Hazard Zone Report (CGS, 2000)

[3] Hoek-Brown criterion should be applied to andesite lithology instead of the values reported above.

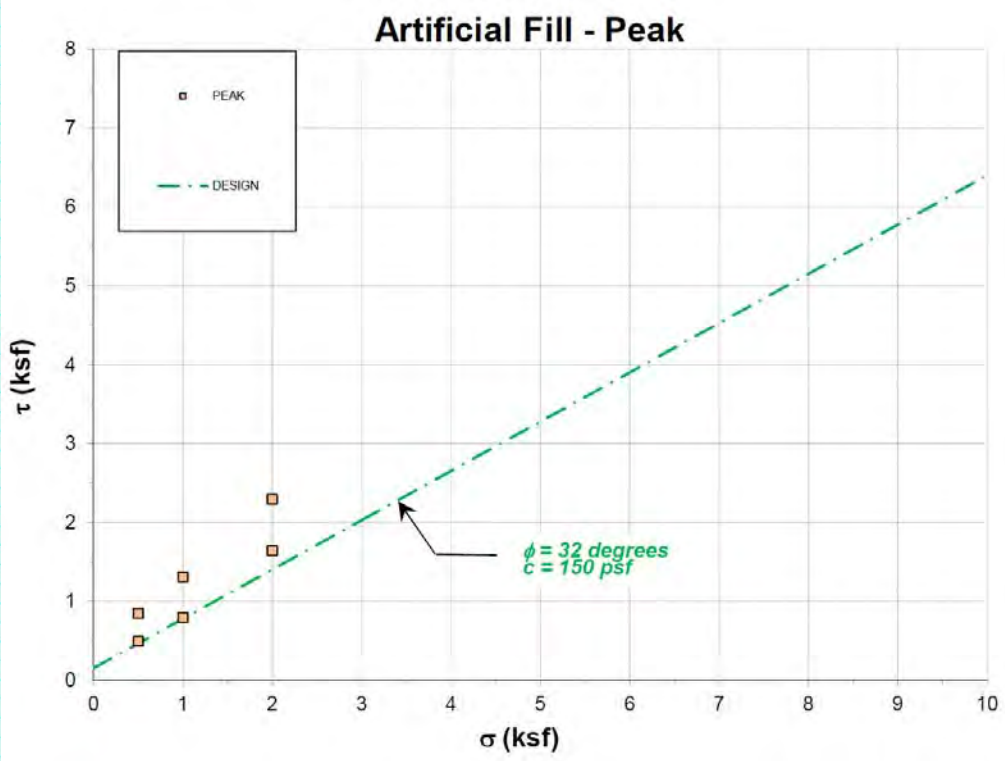


Figure 1 – Mohr-Coulomb Peak Design Envelope – Artifiical Fill.

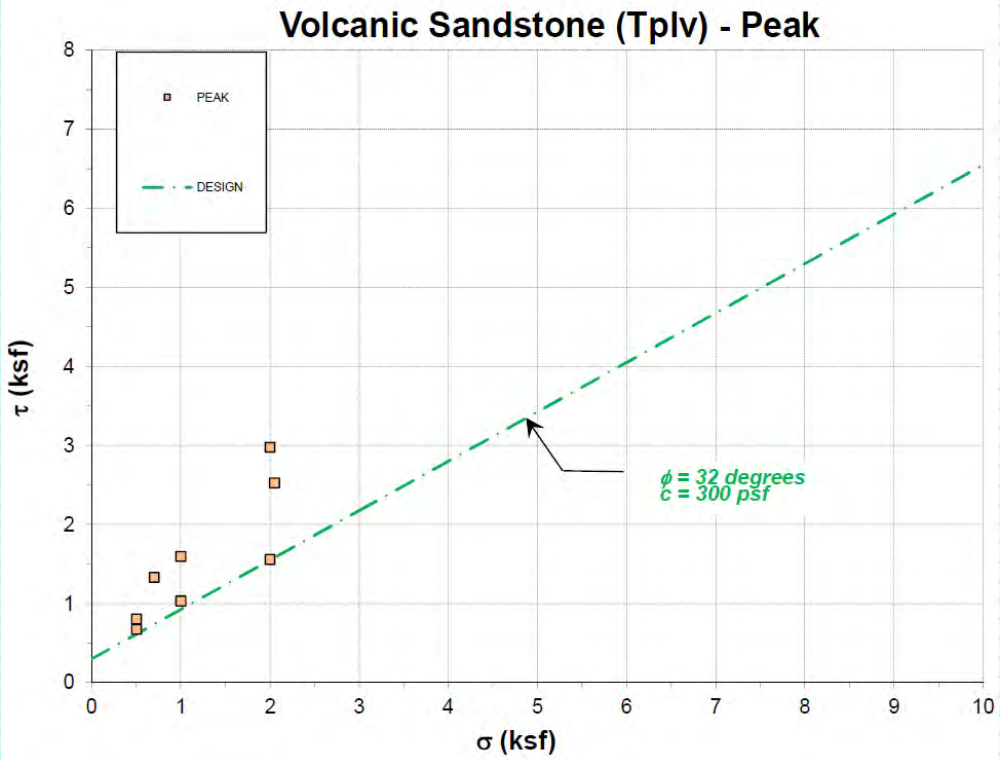


Figure 2 – Mohr-Coulomb Peak Design Envelope – Volcanic Sandstone (Tplv).

3. Hoek-Brown Material (Andesite)

The andesite lithology can be considered as a Hoek-Brown material. The Geologic Strength Index (GSI), σ_{ci}, Hoek-Brown material constant (m_i) and the disturbance factor (D) can be used to define the rock strength.

The GSI is calculated using the rock mass and discontinuity descriptions from the boring logs (e.g., RQD, rock strength, discontinuity spacing, weathering, joint roughness). The estimated GSI for the andesite ranges from 33 to 42 (Attachment 3). In the analysis, we consider a GSI of 33 to be representative of the rock mass as observed from the single boring B-2.

The intact rock strength is estimated from the point load testing completed or the field descriptors (Rock Grade). The point load testing results are summarized in Figure 3. The average point load index is about 2.3 MPa (333 psi), which we correlate to a σ_{ci} of about 8,250 psi.

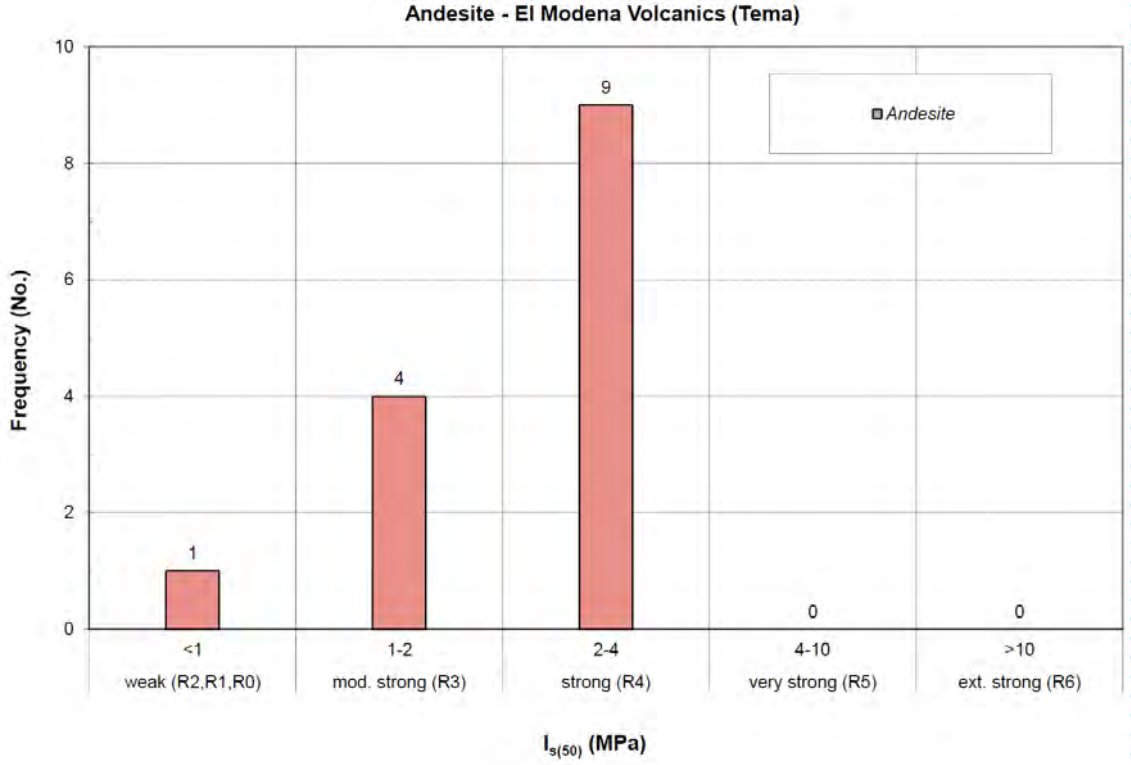


Figure 3 – Summary of Point Load Test Data for Andesite

The Hoek-Brown material constant (m_i) is estimated using the reported ranges for andesite are 25±5 (Marinos and Hoek, 2000). Therefore, we consider the use of a m_i of 25 as being appropriate in slope stability evaluations.

The disturbance factor (D) is estimated for excavations using the most recent guidance published by Dr. Hoek (2012). For small scale blasting operations in civil engineering, D ranges from 0.0 to 0.7, for good to poor blasting respectively. If mechanical excavation is used, D=0. We have assumed the rock will be rippable, however, some more resistant zones may require blasting to loosen rock in the excavation. For slope stability evaluations, we recommend the use of D=0.

SUMMARY of Results

The recommended geomechanical properties for design are summarized in Table 4. The bedding attitudes and joints where described in andesite should be considered in 2-dimensional slope stability models to simulate the anisotropic behavior of the rock medium.

Table 4 – Summary of Recommended Mohr-Coulomb Parameters

Geologic Unit / Bedding Conditions	γ_{tot} pcf	ϕ' degrees	c' psf
Artificial fill (af)			
Engineered	125	32	150
Existing Fill	110	32	150
Landslide Rupture Planes (Qls-rp)			
	NA	15	0
Andesite – El Modeno Volcanics (Tvema) *See Hoek-Brown Properties Below			
Along Joints*	145	36	0
Sandstone/Siltstone/Claystone – Puente Formation (Tplv)			
Favorable Bedding Conditions	110	32	300
Adverse Bedding Conditions		27	300
Sandstone – Topanga Group (Tt)			
Favorable Bedding Conditions	130	35	550
Adverse Bedding Conditions		26	300
Sandstone/Siltstone/Claystone –Vaqueros – Sespe Formation (Tvs)			
Favorable Bedding Conditions	130	36	550
Adverse Bedding Conditions		30	750

For andesite rock mass, the following Hoek-Brown parameters are recommended:

GSI = 33
σ_{ci} = 8,250 psi = 1,188 ksf
m_i = 25
D = 0.00

REFERENCES

California Geological Survey (CGS) formerly [California Division of Mines and Geology (CDMG)], 2000, Seismic Hazard Zone Report (SHZR) for the Black Star Canyon 7.5-Minute Quadrangle, Orange County, California, SHZR-046, Revised January 13, 2006.

California Geological Survey (CGS) formerly [California Division of Mines and Geology (CDMG)], 1997, Seismic Hazard Zone Report (SHZR) for the Orange 7.5-Minute Quadrangle, Orange County, California, SHZR-011, Revised January 17, 2006.

Hoek, E., 2012, Blast Damage Factor D, Technical Note for RocNews, February 2, 2012, Winter 2012 Issue.

Marinos, P., and Hoek, E., 2000, GSI-A geologically friendly tool for rock mass strength estimation, Proceedings GeoEng2000 Conference, Melbourne, 1422-1442.

McMillan, J.R., Perez, F.G., Wilson, R.I., and McCrink, T.P., 1997, Earthquake-Induced Landslide Zones in the Orange 7.5-Minute Quadrangle, Orange County, California, *in:* California Division of Mines and Geology (CDMG), 1997, Seismic Hazard Zone Report (SHZR) for the Orange 7.5-Minute Quadrangle, Orange County, California, SHZR-011, Revised January 17, 2006.

Wilson, R.I., McMillan, J.R., Perez, F.G., Slater, C.F., Silva, M.A.,and McCrink, T.P., 2000, Earthquake-Induced Landslide Zones in the Black Star Canyon 7.5-Minute Quadrangle, Orange County, California, *in:* California Geological Survey (CGS) formerly [California Division of Mines and Geology (CDMG)], 2000, Seismic Hazard Zone Report (SHZR) for the Black Star Canyon 7.5-Minute Quadrangle, Orange County, California, SHZR-046, Revised January 13, 2006.

ATTACHMENTS

1. CGS Shear Strength Data for Orange and Black Star Canyon 7.5'-Quadrangles
2. Barton Shear Strength Criterion for Andesite (Tvema)
3. GSI Estimates for Andesite (Tvema)

ATTACHMENTS

1. CGS Shear Strength Data for Orange and Black Star Canyon 7.5'-Quadrangles

ORANGE QUADRANGLE
SHEAR STRENGTH GROUPINGS

	Formation Name	Number Tests	Mean phi value	Group phi Mean/Median (deg.)	Group C Mean/Median (psf)	no data: Similar Lithology	Phi Values: Used in Stability Analyses
GROUP 1	Tea	2	41.3				
	Temt	2	40.5		**534/380**	Tvem, Tvema, Tvemb	**41**
				45.4/40.5			
	Tvs	1	39				
	Ts	1	38				
	Tsa/Tsi	2	37				
GROUP 2	Tpsc	12	35.3				
	Qyf	2	33.5	**34.9/36.3**	**808/765**		**35**
	Tps	1	33				
	Qch	9	32.8				
GROUP 3	Qya	2	29.5			Qof, Qvo	
		5	30.2	**30/30**	**493/300**		**30**
GROUP 4	Af	5	28				
	Tpy	1	30				
	Tplv	2	29	**28/30**	**399/300**	Tfu, Tt, Tfl	**28**
GROUP 5	Qls	1	19.3	**19.3/19.3**	**not reported**		**15**

Table 2.1. Summary of the Shear Strength Statistics for the Orange Quadrangle.

BLACK STAR CANYON QUADRANGLE
SHEAR STRENGTH GROUPS

	Formation Name* (rock types)	Number Tests	Mean/Median Phi (deg)	Mean/Median Group Phi (deg)	Mean/Median Group C (psf)	No data but Similar Lithology	Phi Values Used in Stability Analyses
GROUP 1	Klb(fbc)	2	39/39	40/39	492/550	Jbc, Jsp, KJsp	40
	Kws(fbc)	2	41/41			Kvsp, Klbc(fbc)	
						Kwsr(fbc)	
GROUP 2	Klh	15	37/36	36/36	565/400	Ktr, Kl	36
	Kwp	6	36/34			Kwps, Klhsc	
	Tsi	14	37/37			Klhs, Ts(fbc)	
	Tsa	11	35/35			Tv(fbc)	
	Tvs(fbc)	54	36/36			Qvofa	
	Tt(fbc)	35	37/38			Qvofga	
	Qyofsa	6	37/38			Qvofsa	
	Qyfsa	9	36/37			Qyfga	
GROUP 3	Kws(abc)	3	30/28	31/30	790/370	Klb(abc)	31
	Tvs(abc)	13	30/34			Klbc(abc)	
	Tps(fbc)	1	31/31			Kwsr(abc)	
	Qc	1	30/30			Ts(abc), Ts(abc)	
	af	7	31/29			Tpl(fbc), Tpy(fbc)	
						Tpsc(fbc), Qoa	
						Qofa, Qco, Qsa	
						Qycsa, Qyaa, Qyag	
						Qyfa, Qf1	
GROUP 4	Tt(abc)	4	26/27	27/24	329/285	Tpl(abc), Tps(abc)	27
	Tpy(abc)	10	28/24			Tpsc(abc), Qp	
GROUP 5	Qls	22	23/23	23/23	288/75		23

*abc = adverse bedding condition, fine-grained material strength
*fbc = favorable bedding condition, coarse-grained material strength

Table 2.1. Summary of the Shear Strength Statistics for the Black Star Canyon Quadrangle.

2. Barton Shear Strength Criterion for Andesite (Tvema)

BARTON SHEAR STRENGTH CRITERIA

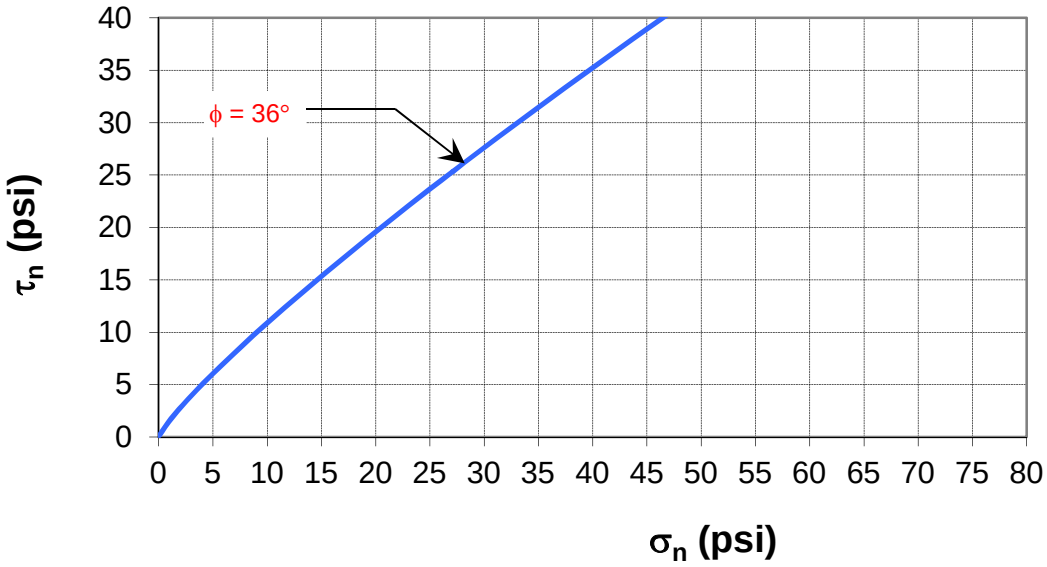
Project Name / # :	IRWD Santiago Reservoir C+/20153742	***Rock Type***	Andesite (Tvema)
Location:	Irvine, CA	***Performed By:***	ASW
Date:	2/16/2015	***Checked By:***	

INPUT DATA:

units	imperial	
φ_r =	20.0	°
****JCS =***	5500.0	**psi**
JRC =	10.0	
σ_{ci} =	8250.0	**psi**
$\sigma_{n,min}$ =	0.1	**psi**
$\sigma_{n,max}$ =	54.2	**psi**

σ_n	τ	σ_n	τ
psi	psi	psi	psi
0.1	0.2	27.1	25.3
1.1	1.7	28.2	26.2
2.2	3.0	29.3	27.1
3.3	4.3	30.4	27.9
4.4	5.4	31.4	28.7
5.5	6.5	32.5	29.6
6.5	7.6	33.6	30.4
7.6	8.6	34.7	31.2
8.7	9.7	35.8	32.1
9.8	10.7	36.9	32.9
10.9	11.7	37.9	33.7
12.0	12.7	39.0	34.5
13.0	13.6	40.1	35.3
14.1	14.6	41.2	36.1
15.2	15.5	42.3	36.9
16.3	16.5	43.3	37.7
17.4	17.4	44.4	38.5
18.5	18.3	45.5	39.3
19.5	19.2	46.6	40.1
20.6	20.1	47.7	40.9
21.7	21.0	48.8	41.7
22.8	21.9	49.8	42.5
23.9	22.7	50.9	43.2
24.9	23.6	52.0	44.0
26.0	24.5	53.1	44.8
27.1	25.3	54.2	45.6

**JCS- is assumed to be 2/3 σ_{ci}*



GOVERNING EQUATION (Barton and Choubey, 1977):

$$\tau_n = \sigma_n \tan\left(\phi_r + JRC \log\left(\frac{JCS}{\sigma_n}\right)\right)$$

3. GSI Estimates for Andesite (Tvema)

The Rock Mass Rating System

Geomechanics Classification of Rock Masses

After Z.T. Bieniawski, 1989

Project:	**IRWD Zone C**	Boring:	**B-1**	Rock Type:	**Andesite**
Date:	**02/12/15**	Depth(ft):	**20** to **22.5**	Bore Hole Surface Elevation (ft):	
Proj. No.:	**20153742**	Run:	**Not Assigned**		
		Geologist/Engineer:	**M. Garde/ A. Williams**		

Rock Mass Property Input

Rock Grade	R4
Strength of Intact Rock, Mpa	**75**
Point Load ?	N
Uniaxial Compressive ?	Y
Bieniawski Rating	8
RQD, %	**0**
Bieniawski Rating	3
Discontinuity Spacing, mm	**75**
Bieniawski Rating	6

Conditions of Discontinuitites	**Rating**
1. Very rough surfaces, not continuous, no separation, and unweathered rock walls.	**30**
2. Slightly rough surfaces, separation < 1 mm, and slightly weathered walls.	**25**
3. Slightly rough surface, separation < 1 mm, and highly weathered walls.	**20**
4. Slickenslided surfaces -or- gouge (infilling), 1-5 mm thick -or- separation 1-5 mm and continuous.	**10**
5. Soft gouge > 5 mm -or- separation > 5 mm and continuous	**0**
Bieniawski Rating?	**15**

Groundwater Conditions	**Rating**
Conditions include:	
A. Inflow per 10 m of tunnel length (L/m),	
B. Ratio of joint water pressure to σ_1,	
C. General conditions.	
1. No inflow -or- 0 ratio -or- completely dry.	**15**
2. < 10 L/min -or- < 10 ratio -or- damp.	**10**
3. 10-25 L/min inflow -or- 0.1-0.2 ratio -or- wet.	**7**
4. 22-125 L/min inflow -or- 0.2-0.5 ratio -or- dripping.	**4**
5. > 125 L/min inflow -or- > 0.5 ratio -or- flowing.	**0**
Bieniawski Rating?	**15**

Overall RMR	**47**	
Class	**III**	**Fair Rock**
GSI	**42**	

This rock exhibits an average standup time of 1 week for a 5 meter horizontal span, 200-300 kPa rock mass cohesion, and a friction angle of 25 to 35 degrees.

The Rock Mass Rating System

Geomechanics Classification of Rock Masses

After Z.T. Bieniawski, 1989

Project:	**IRWD Zone C**	Boring:	**B-1**	Rock Type:	**Andesite**
Date:	**02/12/15**	Depth(ft):	**22.5** to **25**	Bore Hole Surface Elevation (ft):	
Proj. No.:	**20153742**	Run:	**Not Assigned**		
		Geologist/Engineer:	**M. Garde/ A. Williams**		

Rock Mass Property Input

Rock Grade	R3	
Strength of Intact Rock, Mpa	**3**	Laboratory Test Result
Point Load ?	Y	
Uniaxial Compressive ?	N	
Bieniawski Rating	7	
RQD, %	**0**	
Bieniawski Rating	3	
Discontinuity Spacing, mm	**50**	
Bieniawski Rating	6	

Conditions of Discontinuitites	**Rating**
1. Very rough surfaces, not continuous, no separation, and unweathered rock walls.	**30**
2. Slightly rough surfaces, separation < 1 mm, and slightly weathered walls.	**25**
3. Slightly rough surface, separation < 1 mm, and highly weathered walls.	**20**
4. Slickenslided surfaces -or- gouge (infilling), 1-5 mm thick -or- separation 1-5 mm and continuous.	**10**
5. Soft gouge > 5 mm -or- separation > 5 mm and continuous	**0**
Bieniawski Rating?	**15**

Groundwater Conditions	**Rating**
Conditions include:	
A. Inflow per 10 m of tunnel length (L/m),	
B. Ratio of joint water pressure to σ_1,	
C. General conditions.	
1. No inflow -or- 0 ratio -or- completely dry.	**15**
2. < 10 L/min -or- < 10 ratio -or- damp.	**10**
3. 10-25 L/min inflow -or- 0.1-0.2 ratio -or- wet.	**7**
4. 22-125 L/min inflow -or- 0.2-0.5 ratio -or- dripping.	**4**
5. > 125 L/min inflow -or- > 0.5 ratio -or- flowing.	**0**
Bieniawski Rating?	**15**

Overall RMR	**46**	
Class	**III**	**Fair Rock**
GSI	**41**	

This rock exhibits an average standup time of 1 week for a 5 meter horizontal span, 200-300 kPa rock mass cohesion, and a friction angle of 25 to 35 degrees.

The Rock Mass Rating System

Geomechanics Classification of Rock Masses

After Z.T. Bieniawski, 1989

Project:	**IRWD Zone C**	Boring:	**B-1**	Rock Type:	**Andesite**
Date:	**02/12/15**	Depth(ft):	**25** to **30**	Bore Hole Surface Elevation (ft):	
Proj. No.:	**20153742**	Run:	**Not Assigned**		
		Geologist/Engineer:	**M. Garde/ A. Williams**		

Rock Mass Property Input

Rock Grade	R3	
Strength of Intact Rock, Mpa	**2**	Laboratory Test Result
Point Load ?	Y	
Uniaxial Compressive ?	N	
Bieniawski Rating	5	
RQD, %	**0**	
Bieniawski Rating	3	
Discontinuity Spacing, mm	**25**	
Bieniawski Rating	5	

Conditions of Discontinuitites	**Rating**
1. Very rough surfaces, not continuous, no separation, and unweathered rock walls.	**30**
2. Slightly rough surfaces, separation < 1 mm, and slightly weathered walls.	**25**
3. Slightly rough surface, separation < 1 mm, and highly weathered walls.	**20**
4. Slickenslided surfaces -or- gouge (infilling), 1-5 mm thick -or- separation 1-5 mm and continuous.	**10**
5. Soft gouge > 5 mm -or- separation > 5 mm and continuous	**0**
Bieniawski Rating?	**10**

Groundwater Conditions	**Rating**
Conditions include:	
A. Inflow per 10 m of tunnel length (L/m),	
B. Ratio of joint water pressure to σ_1,	
C. General conditions.	
1. No inflow -or- 0 ratio -or- completely dry.	**15**
2. < 10 L/min -or- < 10 ratio -or- damp.	**10**
3. 10-25 L/min inflow -or- 0.1-0.2 ratio -or- wet.	**7**
4. 22-125 L/min inflow -or- 0.2-0.5 ratio -or- dripping.	**4**
5. > 125 L/min inflow -or- > 0.5 ratio -or- flowing.	**0**
Bieniawski Rating?	**15**

Overall RMR	**38**	
Class	**IV**	**Poor Rock**
GSI	**33**	

This rock exhibits an average standup time of 10 hours for a 2.5 meter horizontal span, 100-200 kPa rock mass cohesion, and a friction angle between 15 and 25 degrees.

The Rock Mass Rating System

Geomechanics Classification of Rock Masses

After Z.T. Bieniawski, 1989

Project:	**IRWD Zone C**	Boring:	**B-1**	Rock Type:	**Andesite**
Date:	**02/12/15**	Depth(ft):	**30** to **35**	Bore Hole Surface Elevation (ft):	
Proj. No.:	**20153742**	Run:	**Not Assigned**		
		Geologist/Engineer:	**M. Garde/ A. Williams**		

Rock Mass Property Input

Rock Grade	R3	
Strength of Intact Rock, Mpa	**2**	Laboratory Test Result
Point Load ?	Y	
Uniaxial Compressive ?	N	
Bieniawski Rating	5	
RQD, %	**0**	
Bieniawski Rating	3	
Discontinuity Spacing, mm	**127**	
Bieniawski Rating	7	

Conditions of Discontinuitites	**Rating**
1. Very rough surfaces, not continuous, no separation, and unweathered rock walls.	**30**
2. Slightly rough surfaces, separation < 1 mm, and slightly weathered walls.	**25**
3. Slightly rough surface, separation < 1 mm, and highly weathered walls.	**20**
4. Slickenslided surfaces -or- gouge (infilling), 1-5 mm thick -or- separation 1-5 mm and continuous.	**10**
5. Soft gouge > 5 mm -or- separation > 5 mm and continuous	**0**
Bieniawski Rating?	**10**

Groundwater Conditions	**Rating**
Conditions include:	
A. Inflow per 10 m of tunnel length (L/m),	
B. Ratio of joint water pressure to σ_1,	
C. General conditions.	
1. No inflow -or- 0 ratio -or- completely dry.	**15**
2. < 10 L/min -or- < 10 ratio -or- damp.	**10**
3. 10-25 L/min inflow -or- 0.1-0.2 ratio -or- wet.	**7**
4. 22-125 L/min inflow -or- 0.2-0.5 ratio -or- dripping.	**4**
5. > 125 L/min inflow -or- > 0.5 ratio -or- flowing.	**0**
Bieniawski Rating?	**15**

Overall RMR	**40**	
Class	**IV**	**Poor Rock**
GSI	**35**	

This rock exhibits an average standup time of 10 hours for a 2.5 meter horizontal span, 100-200 kPa rock mass cohesion, and a friction angle between 15 and 25 degrees.

The Rock Mass Rating System

Geomechanics Classification of Rock Masses

After Z.T. Bieniawski, 1989

Project:	**IRWD Zone C**	Boring:	**B-1**	Rock Type:	**Andesite**
Date:	**02/12/15**	Depth(ft):	**35** to **40**	Bore Hole Surface Elevation (ft):	
Proj. No.:	**20153742**	Run:	**Not Assigned**		
		Geologist/Engineer:	**M. Garde/ A. Williams**		

Rock Mass Property Input

Rock Grade	R3
Strength of Intact Rock, Mpa	**40**
Point Load ?	N
Uniaxial Compressive ?	Y
Bieniawski Rating	5
RQD, %	**0**
Bieniawski Rating	3
Discontinuity Spacing, mm	**125**
Bieniawski Rating	7

Conditions of Discontinuitites	**Rating**
1. Very rough surfaces, not continuous, no separation, and unweathered rock walls.	**30**
2. Slightly rough surfaces, separation < 1 mm, and slightly weathered walls.	**25**
3. Slightly rough surface, separation < 1 mm, and highly weathered walls.	**20**
4. Slickenslided surfaces -or- gouge (infilling), 1-5 mm thick -or- separation 1-5 mm and continuous.	**10**
5. Soft gouge > 5 mm -or- separation > 5 mm and continuous	**0**
Bieniawski Rating?	**10**

Groundwater Conditions	**Rating**
Conditions include:	
A. Inflow per 10 m of tunnel length (L/m),	
B. Ratio of joint water pressure to σ_1,	
C. General conditions.	
1. No inflow -or- 0 ratio -or- completely dry.	**15**
2. < 10 L/min -or- < 10 ratio -or- damp.	**10**
3. 10-25 L/min inflow -or- 0.1-0.2 ratio -or- wet.	**7**
4. 22-125 L/min inflow -or- 0.2-0.5 ratio -or- dripping.	**4**
5. > 125 L/min inflow -or- > 0.5 ratio -or- flowing.	**0**
Bieniawski Rating?	**15**

Overall RMR	**40**	
Class	**IV**	**Poor Rock**
GSI	**35**	

This rock exhibits an average standup time of 10 hours for a 2.5 meter horizontal span, 100-200 kPa rock mass cohesion, and a friction angle between 15 and 25 degrees.

Appendix F

EDR Hazardous Materials Database Reports

IRWD ILP North Conversion Project
Culver Drive
Irvine, CA 92602

Inquiry Number: 4330923.2s
June 18, 2015

The EDR Radius Map™ Report with GeoCheck®

EDR® Environmental Data Resources Inc

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

TABLE OF CONTENTS

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

EXECUTIVE SUMMARY

A search of available environmental records was conducted by Environmental Data Resources, Inc (EDR). The report was designed to assist parties seeking to meet the search requirements of EPA's Standards and Practices for All Appropriate Inquiries (40 CFR Part 312), the ASTM Standard Practice for Environmental Site Assessments (E 1527-13) or custom requirements developed for the evaluation of environmental risk associated with a parcel of real estate.

TARGET PROPERTY INFORMATION

ADDRESS

CULVER DRIVE
IRVINE, CA 92602

COORDINATES

Latitude (North):	33.7402000 - 33° 44' 24.72''
Longitude (West):	117.7529000 - 117° 45' 10.44''
Universal Tranverse Mercator:	Zone 11
UTM X (Meters):	430258.0
UTM Y (Meters):	3733411.5
Elevation:	362 ft. above sea level

USGS TOPOGRAPHIC MAP ASSOCIATED WITH TARGET PROPERTY

Target Property Map:	33117-F7 TUSTIN, CA
Most Recent Revision:	1981
North Map:	33117-G7 ORANGE, CA
Most Recent Revision:	1981
Northeast Map:	33117-G6 BLACK STAR CANYON, CA
Most Recent Revision:	1988
East Map:	33117-F6 EL TORO, CA
Most Recent Revision:	1982

AERIAL PHOTOGRAPHY IN THIS REPORT

Portions of Photo from:	20120527
Source:	USDA

MAPPED SITES SUMMARY

Target Property Address:
CULVER DRIVE
IRVINE, CA 92602

Click on Map ID to see full detail.

MAP ID	SITE NAME	ADDRESS	DATABASE ACRONYMS	RELATIVE ELEVATION	DIST (ft. & mi.) DIRECTION
1	PROPOSED ORCHARD HIL	CULVER AVENUE/PORTOL	SCH, ENVIROSTOR	Lower	3641, 0.690, SW

EXECUTIVE SUMMARY

TARGET PROPERTY SEARCH RESULTS

The target property was not listed in any of the databases searched by EDR.

DATABASES WITH NO MAPPED SITES

No mapped sites were found in EDR's search of available ("reasonably ascertainable ") government records either on the target property or within the search radius around the target property for the following databases:

STANDARD ENVIRONMENTAL RECORDS

Federal NPL site list

NPL ---------- National Priority List
Proposed NPL ---------- Proposed National Priority List Sites
NPL LIENS ---------- Federal Superfund Liens

Federal Delisted NPL site list

Delisted NPL ---------- National Priority List Deletions

Federal CERCLIS list

CERCLIS ---------- Comprehensive Environmental Response, Compensation, and Liability Information System
FEDERAL FACILITY ---------- Federal Facility Site Information listing

Federal CERCLIS NFRAP site List

CERC-NFRAP ---------- CERCLIS No Further Remedial Action Planned

Federal RCRA CORRACTS facilities list

CORRACTS ---------- Corrective Action Report

Federal RCRA non-CORRACTS TSD facilities list

RCRA-TSDF ---------- RCRA - Treatment, Storage and Disposal

Federal RCRA generators list

RCRA-LQG ---------- RCRA - Large Quantity Generators
RCRA-SQG ---------- RCRA - Small Quantity Generators
RCRA-CESQG ---------- RCRA - Conditionally Exempt Small Quantity Generator

Federal institutional controls / engineering controls registries

US ENG CONTROLS ---------- Engineering Controls Sites List
US INST CONTROL ---------- Sites with Institutional Controls

LUCIS ---------- Land Use Control Information System

Federal ERNS list

ERNS ---------- Emergency Response Notification System

State- and tribal - equivalent NPL

RESPONSE ---------- State Response Sites

State and tribal landfill and/or solid waste disposal site lists

SWF/LF ---------- Solid Waste Information System

State and tribal leaking storage tank lists

LUST ---------- Geotracker's Leaking Underground Fuel Tank Report
SLIC ---------- Statewide SLIC Cases
INDIAN LUST ---------- Leaking Underground Storage Tanks on Indian Land

State and tribal registered storage tank lists

UST ---------- Active UST Facilities
AST ---------- Aboveground Petroleum Storage Tank Facilities
INDIAN UST ---------- Underground Storage Tanks on Indian Land
FEMA UST ---------- Underground Storage Tank Listing

State and tribal voluntary cleanup sites

INDIAN VCP ---------- Voluntary Cleanup Priority Listing
VCP ---------- Voluntary Cleanup Program Properties

ADDITIONAL ENVIRONMENTAL RECORDS

Local Brownfield lists

US BROWNFIELDS ---------- A Listing of Brownfields Sites

Local Lists of Landfill / Solid Waste Disposal Sites

DEBRIS REGION 9 ---------- Torres Martinez Reservation Illegal Dump Site Locations
ODI ---------- Open Dump Inventory
SWRCY ---------- Recycler Database
HAULERS ---------- Registered Waste Tire Haulers Listing
INDIAN ODI ---------- Report on the Status of Open Dumps on Indian Lands
WMUDS/SWAT ---------- Waste Management Unit Database

Local Lists of Hazardous waste / Contaminated Sites

US CDL ---------- Clandestine Drug Labs
HIST Cal-Sites ---------- Historical Calsites Database
SCH ---------- School Property Evaluation Program
Toxic Pits ---------- Toxic Pits Cleanup Act Sites
CDL ---------- Clandestine Drug Labs

US HIST CDL ..... National Clandestine Laboratory Register

Local Lists of Registered Storage Tanks

CA FID UST ..... Facility Inventory Database
HIST UST ..... Hazardous Substance Storage Container Database
SWEEPS UST ..... SWEEPS UST Listing

Local Land Records

LIENS 2 ..... CERCLA Lien Information
LIENS ..... Environmental Liens Listing
DEED ..... Deed Restriction Listing

Records of Emergency Release Reports

HMIRS ..... Hazardous Materials Information Reporting System
CHMIRS ..... California Hazardous Material Incident Report System
LDS ..... Land Disposal Sites Listing
MCS ..... Military Cleanup Sites Listing
Orange Co. Industrial Site ..... List of Industrial Site Cleanups
SPILLS 90 ..... SPILLS 90 data from FirstSearch

Other Ascertainable Records

RCRA NonGen / NLR ..... RCRA - Non Generators / No Longer Regulated
DOT OPS ..... Incident and Accident Data
DOD ..... Department of Defense Sites
FUDS ..... Formerly Used Defense Sites
CONSENT ..... Superfund (CERCLA) Consent Decrees
ROD ..... Records Of Decision
UMTRA ..... Uranium Mill Tailings Sites
US MINES ..... Mines Master Index File
TRIS ..... Toxic Chemical Release Inventory System
TSCA ..... Toxic Substances Control Act
FTTS ..... FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
HIST FTTS ..... FIFRA/TSCA Tracking System Administrative Case Listing
SSTS ..... Section 7 Tracking Systems
ICIS ..... Integrated Compliance Information System
PADS ..... PCB Activity Database System
MLTS ..... Material Licensing Tracking System
RADINFO ..... Radiation Information Database
FINDS ..... Facility Index System/Facility Registry System
RAATS ..... RCRA Administrative Action Tracking System
RMP ..... Risk Management Plans
CA BOND EXP. PLAN ..... Bond Expenditure Plan
NPDES ..... NPDES Permits Listing
UIC ..... UIC Listing
Cortese ..... "Cortese" Hazardous Waste & Substances Sites List
HIST CORTESE ..... Hazardous Waste & Substance Site List
CUPA Listings ..... CUPA Resources List
Notify 65 ..... Proposition 65 Records
DRYCLEANERS ..... Cleaner Facilities
WIP ..... Well Investigation Program Case List

EXECUTIVE SUMMARY

ENF Enforcement Action Listing
HAZNET Facility and Manifest Data
EMI Emissions Inventory Data
INDIAN RESERV Indian Reservations
SCRD DRYCLEANERS State Coalition for Remediation of Drycleaners Listing
WDS Waste Discharge System
Financial Assurance Financial Assurance Information Listing
PROC Certified Processors Database
HWT Registered Hazardous Waste Transporter Database
HWP EnviroStor Permitted Facilities Listing
MWMP Medical Waste Management Program Listing
LEAD SMELTERS Lead Smelter Sites
US AIRS Aerometric Information Retrieval System Facility Subsystem
EPA WATCH LIST EPA WATCH LIST
US FIN ASSUR Financial Assurance Information
COAL ASH EPA Coal Combustion Residues Surface Impoundments List
PCB TRANSFORMER PCB Transformer Registration Database
COAL ASH DOE Steam-Electric Plant Operation Data
2020 COR ACTION 2020 Corrective Action Program List
PRP Potentially Responsible Parties

EDR HIGH RISK HISTORICAL RECORDS

EDR Exclusive Records

EDR MGP EDR Proprietary Manufactured Gas Plants
EDR US Hist Auto Stat EDR Exclusive Historic Gas Stations
EDR US Hist Cleaners EDR Exclusive Historic Dry Cleaners

EDR RECOVERED GOVERNMENT ARCHIVES

Exclusive Recovered Govt. Archives

RGA LUST Recovered Government Archive Leaking Underground Storage Tank
RGA LF Recovered Government Archive Solid Waste Facilities List

SURROUNDING SITES: SEARCH RESULTS

Surrounding sites were identified in the following databases.

Elevations have been determined from the USGS Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be field verified. Sites with an elevation equal to or higher than the target property have been differentiated below from sites with an elevation lower than the target property.
Page numbers and map identification numbers refer to the EDR Radius Map report where detailed data on individual sites can be reviewed.

Sites listed in ***bold italics*** are in multiple databases.

Unmappable (orphan) sites are not considered in the foregoing analysis.

EXECUTIVE SUMMARY

STANDARD ENVIRONMENTAL RECORDS

State- and tribal - equivalent CERCLIS

ENVIROSTOR: The Department of Toxic Substances Control's (DTSC's) Site Mitigation and Brownfields Reuse Program's (SMBRP's) EnviroStor database identifes sites that have known contamination or sites for which there may be reasons to investigate further. The database includes the following site types: Federal Superfund sites (National Priorities List (NPL)); State Response, including Military Facilities and State Superfund; Voluntary Cleanup; and School sites. EnviroStor provides similar information to the information that was available in CalSites, and provides additional site information, including, but not limited to, identification of formerly-contaminated properties that have been released for reuse, properties where environmental deed restrictions have been recorded to prevent inappropriate land uses, and risk characterization information that is used to assess potential impacts to public health and the environment at contaminated sites.

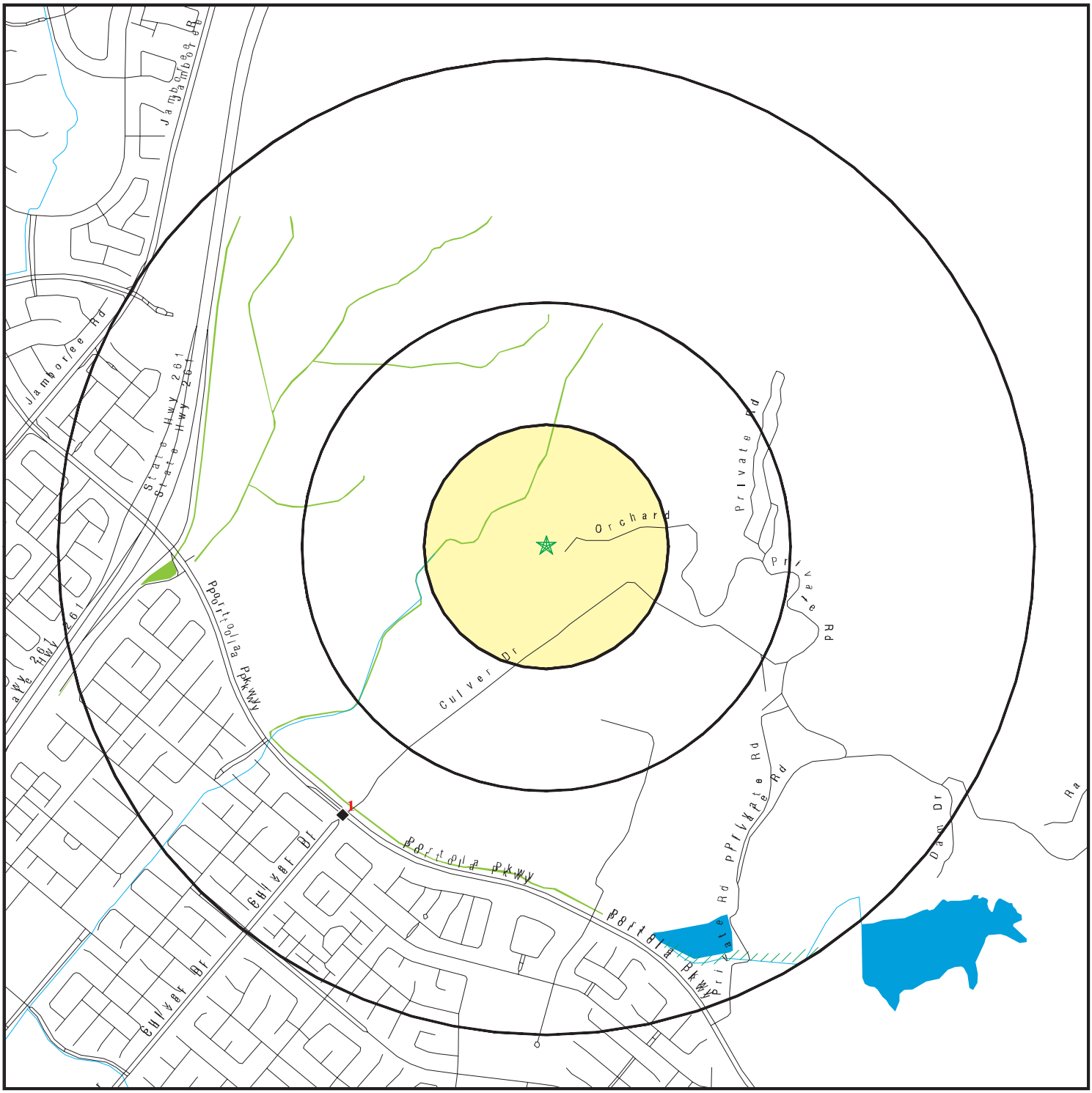
A review of the ENVIROSTOR list, as provided by EDR, and dated 05/04/2015 has revealed that there is 1 ENVIROSTOR site within approximately 1 mile of the target property.

Lower Elevation	Address	Direction / Distance	Map ID	Page
PROPOSED ORCHARD HIL	***CULVER AVENUE/PORTOL***	***SW 1/2 - 1 (0.690 mi.)***	***1***	***8***
Status: No Further Action				
Facility Id: 60000462				

EXECUTIVE SUMMARY

There were no unmapped sites in this report.

OVERVIEW MAP - 4330923.2S



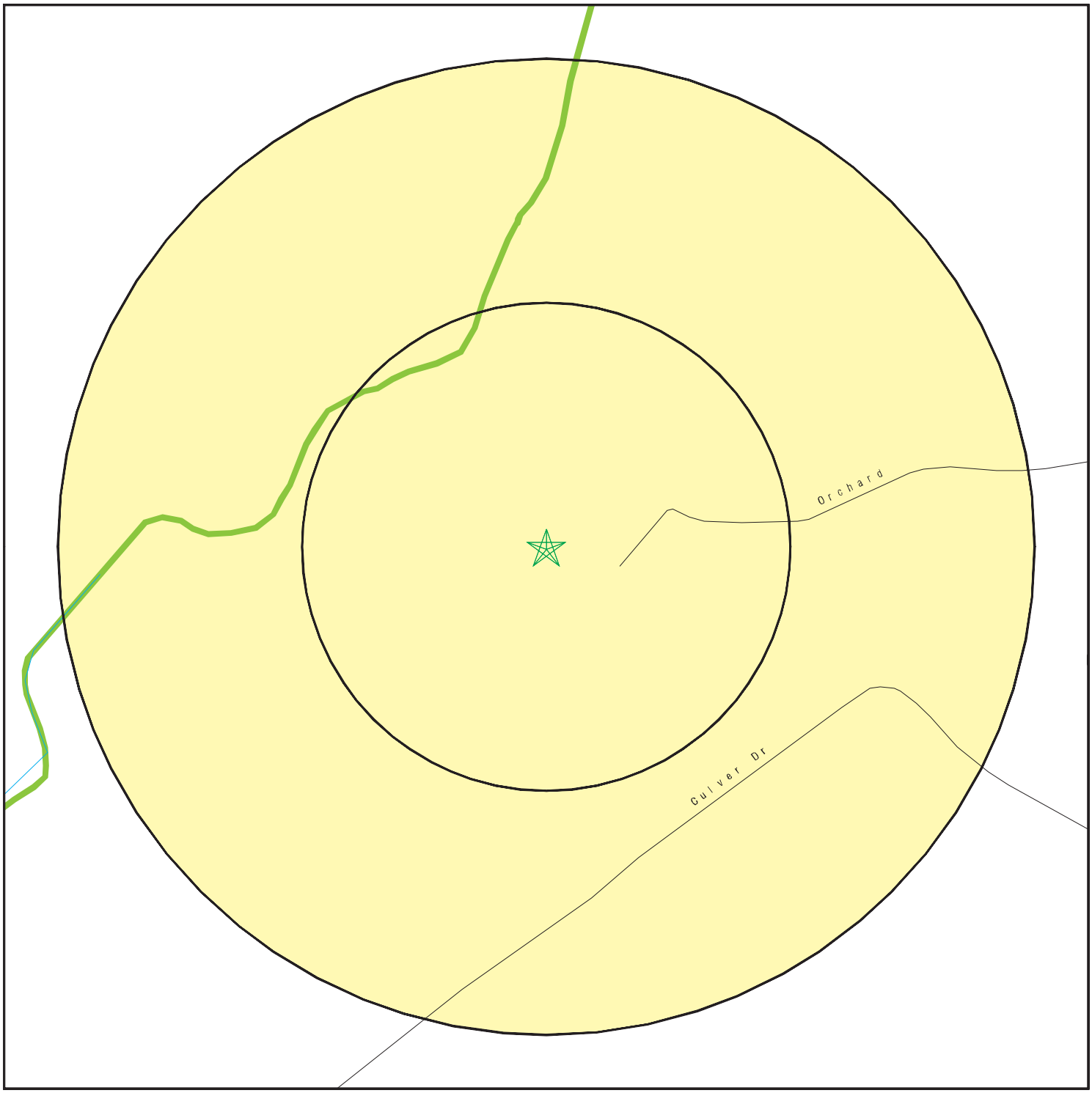
0 1/4 1/2 1 Miles

- Target Property
- Sites at elevations higher than or equal to the target property
- Sites at elevations lower than the target property
- Manufactured Gas Plants
- National Priority List Sites
- Dept. Defense Sites
- Indian Reservations BIA
- 100-year flood zone
- 500-year flood zone
- National Wetland Inventory
- Areas of Concern

This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

SITE NAME: IRWD ILP North Conversion Project	CLIENT: Bonterra Psomas
ADDRESS: Culver Drive Irvine CA 92602	CONTACT: Jeff Gershon
LAT/LONG: 33.7402 / 117.7529	INQUIRY #: 4330923.2s DATE: June 18, 2015 6:58 pm

DETAIL MAP - 4330923.2S



- Target Property
- Sites at elevations higher than or equal to the target property
- Sites at elevations lower than the target property
- Manufactured Gas Plants
- Sensitive Receptors
- National Priority List Sites
- Dept. Defense Sites

0 1/16 1/8 1/4 Miles

- Indian Reservations BIA
- 100-year flood zone
- 500-year flood zone
- National Wetland Inventory
- Areas of Concern

This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

SITE NAME: IRWD ILP North Conversion Project	CLIENT: Bonterra Psomas
ADDRESS: Culver Drive Irvine CA 92602	CONTACT: Jeff Gershon
LAT/LONG: 33.7402 / 117.7529	INQUIRY #: 4330923.2s DATE: June 18, 2015 6:59 pm

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
STANDARD ENVIRONMENTAL RECORDS								
Federal NPL site list								
NPL	1.000		0	0	0	0	NR	0
Proposed NPL	1.000		0	0	0	0	NR	0
NPL LIENS	TP		NR	NR	NR	NR	NR	0
Federal Delisted NPL site list								
Delisted NPL	1.000		0	0	0	0	NR	0
Federal CERCLIS list								
CERCLIS	0.500		0	0	0	NR	NR	0
FEDERAL FACILITY	0.500		0	0	0	NR	NR	0
Federal CERCLIS NFRAP site List								
CERC-NFRAP	0.500		0	0	0	NR	NR	0
Federal RCRA CORRACTS facilities list								
CORRACTS	1.000		0	0	0	0	NR	0
Federal RCRA non-CORRACTS TSD facilities list								
RCRA-TSDF	0.500		0	0	0	NR	NR	0
Federal RCRA generators list								
RCRA-LQG	0.250		0	0	NR	NR	NR	0
RCRA-SQG	0.250		0	0	NR	NR	NR	0
RCRA-CESQG	0.250		0	0	NR	NR	NR	0
Federal institutional controls / engineering controls registries								
US ENG CONTROLS	0.500		0	0	0	NR	NR	0
US INST CONTROL	0.500		0	0	0	NR	NR	0
LUCIS	0.500		0	0	0	NR	NR	0
Federal ERNS list								
ERNS	TP		NR	NR	NR	NR	NR	0
State- and tribal - equivalent NPL								
RESPONSE	1.000		0	0	0	0	NR	0
State- and tribal - equivalent CERCLIS								
ENVIROSTOR	1.000		0	0	0	1	NR	1
State and tribal landfill and/or solid waste disposal site lists								
SWF/LF	0.500		0	0	0	NR	NR	0
State and tribal leaking storage tank lists								
LUST	0.500		0	0	0	NR	NR	0

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
SLIC	0.500		0	0	0	NR	NR	0
INDIAN LUST	0.500		0	0	0	NR	NR	0
State and tribal registered storage tank lists								
UST	0.250		0	0	NR	NR	NR	0
AST	0.250		0	0	NR	NR	NR	0
INDIAN UST	0.250		0	0	NR	NR	NR	0
FEMA UST	0.250		0	0	NR	NR	NR	0
State and tribal voluntary cleanup sites								
INDIAN VCP	0.500		0	0	0	NR	NR	0
VCP	0.500		0	0	0	NR	NR	0
ADDITIONAL ENVIRONMENTAL RECORDS								
Local Brownfield lists								
US BROWNFIELDS	0.500		0	0	0	NR	NR	0
Local Lists of Landfill / Solid Waste Disposal Sites								
DEBRIS REGION 9	0.500		0	0	0	NR	NR	0
ODI	0.500		0	0	0	NR	NR	0
SWRCY	0.500		0	0	0	NR	NR	0
HAULERS	TP		NR	NR	NR	NR	NR	0
INDIAN ODI	0.500		0	0	0	NR	NR	0
WMUDS/SWAT	0.500		0	0	0	NR	NR	0
Local Lists of Hazardous waste / Contaminated Sites								
US CDL	TP		NR	NR	NR	NR	NR	0
HIST Cal-Sites	1.000		0	0	0	0	NR	0
SCH	0.250		0	0	NR	NR	NR	0
Toxic Pits	1.000		0	0	0	0	NR	0
CDL	TP		NR	NR	NR	NR	NR	0
US HIST CDL	TP		NR	NR	NR	NR	NR	0
Local Lists of Registered Storage Tanks								
CA FID UST	0.250		0	0	NR	NR	NR	0
HIST UST	0.250		0	0	NR	NR	NR	0
SWEEPS UST	0.250		0	0	NR	NR	NR	0
Local Land Records								
LIENS 2	TP		NR	NR	NR	NR	NR	0
LIENS	TP		NR	NR	NR	NR	NR	0
DEED	0.500		0	0	0	NR	NR	0
Records of Emergency Release Reports								
HMIRS	TP		NR	NR	NR	NR	NR	0
CHMIRS	TP		NR	NR	NR	NR	NR	0
LDS	TP		NR	NR	NR	NR	NR	0

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
MCS	TP		NR	NR	NR	NR	NR	0
Orange Co. Industrial Site	TP		NR	NR	NR	NR	NR	0
SPILLS 90	TP		NR	NR	NR	NR	NR	0
Other Ascertainable Records								
RCRA NonGen / NLR	0.250		0	0	NR	NR	NR	0
DOT OPS	TP		NR	NR	NR	NR	NR	0
DOD	1.000		0	0	0	0	NR	0
FUDS	1.000		0	0	0	0	NR	0
CONSENT	1.000		0	0	0	0	NR	0
ROD	1.000		0	0	0	0	NR	0
UMTRA	0.500		0	0	0	NR	NR	0
US MINES	0.250		0	0	NR	NR	NR	0
TRIS	TP		NR	NR	NR	NR	NR	0
TSCA	TP		NR	NR	NR	NR	NR	0
FTTS	TP		NR	NR	NR	NR	NR	0
HIST FTTS	TP		NR	NR	NR	NR	NR	0
SSTS	TP		NR	NR	NR	NR	NR	0
ICIS	TP		NR	NR	NR	NR	NR	0
PADS	TP		NR	NR	NR	NR	NR	0
MLTS	TP		NR	NR	NR	NR	NR	0
RADINFO	TP		NR	NR	NR	NR	NR	0
FINDS	TP		NR	NR	NR	NR	NR	0
RAATS	TP		NR	NR	NR	NR	NR	0
RMP	TP		NR	NR	NR	NR	NR	0
CA BOND EXP. PLAN	1.000		0	0	0	0	NR	0
NPDES	TP		NR	NR	NR	NR	NR	0
UIC	TP		NR	NR	NR	NR	NR	0
Cortese	0.500		0	0	0	NR	NR	0
HIST CORTESE	0.500		0	0	0	NR	NR	0
CUPA Listings	0.250		0	0	NR	NR	NR	0
Notify 65	1.000		0	0	0	0	NR	0
DRYCLEANERS	0.250		0	0	NR	NR	NR	0
WIP	0.250		0	0	NR	NR	NR	0
ENF	TP		NR	NR	NR	NR	NR	0
HAZNET	TP		NR	NR	NR	NR	NR	0
EMI	TP		NR	NR	NR	NR	NR	0
INDIAN RESERV	1.000		0	0	0	0	NR	0
SCRD DRYCLEANERS	0.500		0	0	0	NR	NR	0
WDS	TP		NR	NR	NR	NR	NR	0
Financial Assurance	TP		NR	NR	NR	NR	NR	0
PROC	0.500		0	0	0	NR	NR	0
HWT	0.250		0	0	NR	NR	NR	0
HWP	1.000		0	0	0	0	NR	0
MWMP	0.250		0	0	NR	NR	NR	0
LEAD SMELTERS	TP		NR	NR	NR	NR	NR	0
US AIRS	TP		NR	NR	NR	NR	NR	0
EPA WATCH LIST	TP		NR	NR	NR	NR	NR	0
US FIN ASSUR	TP		NR	NR	NR	NR	NR	0
COAL ASH EPA	0.500		0	0	0	NR	NR	0
PCB TRANSFORMER	TP		NR	NR	NR	NR	NR	0

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
COAL ASH DOE	TP		NR	NR	NR	NR	NR	0
2020 COR ACTION	0.250		0	0	NR	NR	NR	0
PRP	TP		NR	NR	NR	NR	NR	0
EDR HIGH RISK HISTORICAL RECORDS								
EDR Exclusive Records								
EDR MGP	1.000		0	0	0	0	NR	0
EDR US Hist Auto Stat	0.250		0	0	NR	NR	NR	0
EDR US Hist Cleaners	0.250		0	0	NR	NR	NR	0
EDR RECOVERED GOVERNMENT ARCHIVES								
Exclusive Recovered Govt. Archives								
RGA LUST	TP		NR	NR	NR	NR	NR	0
RGA LF	TP		NR	NR	NR	NR	NR	0
- Totals --		0	0	0	0	1	0	1

NOTES:

TP = Target Property

NR = Not Requested at this Search Distance

Sites may be listed in more than one database

1
SW
1/2-1
0.690 mi.
3641 ft.

PROPOSED ORCHARD HILLS K-8 SCHOOL SITE
CULVER AVENUE/PORTOLA PARKWAY
IRVINE, CA 92602

SCH
ENVIROSTOR

S108195939
N/A

Relative:
Lower

Actual:
230 ft.

SCH:

Facility ID:	60000462
Site Type:	School Investigation
Site Type Detail:	School
Site Mgmt. Req.:	NONE SPECIFIED
Acres:	15.19
National Priorities List:	NO
Cleanup Oversight Agencies:	SMBRP
Lead Agency:	SMBRP
Lead Agency Description:	DTSC - Site Cleanup Program
Project Manager:	Aslam Shareef
Supervisor:	Shahir Haddad
Division Branch:	Southern California Schools & Brownfields Outreach
Site Code:	404723
Assembly:	68
Senate:	37
Special Program Status:	Not reported
Status:	No Further Action
Status Date:	06/19/2007
Restricted Use:	NO
Funding:	School District
Latitude:	33.7387
Longitude:	-117.7558
APN:	NONE SPECIFIED
Past Use:	AGRICULTURAL - ROW CROPS, AGRICULTURAL - ORCHARD, AGRICULTURAL - ROW CROPS
Potential COC:	Arsenic, Chlordane, DDD, DDE, DDT
Confirmed COC:	30001-NO, 30004-NO, 30006-NO, 30007-NO, 30008-NO
Potential Description:	SOIL, SOIL
Alias Name:	Proposed Orchard HIlls Elementary School
Alias Type:	Alternate Name
Alias Name:	404723
Alias Type:	Project Code (Site Code)
Alias Name:	60000462
Alias Type:	Envirostor ID Number

Completed Info:

Completed Area Name:	PROJECT WIDE
Completed Sub Area Name:	Not reported
Completed Document Type:	Phase 1
Completed Date:	12/15/2006
Comments:	Phase I Determination was sent to the School District as the Site had Ag history until 2005.
Completed Area Name:	PROJECT WIDE
Completed Sub Area Name:	Not reported
Completed Document Type:	Preliminary Endangerment Assessment Tech Memo
Completed Date:	03/16/2007
Comments:	approved
Completed Area Name:	PROJECT WIDE
Completed Sub Area Name:	Not reported
Completed Document Type:	Preliminary Endangerment Assessment Report

PROPOSED ORCHARD HILLS K-8 SCHOOL SITE (Continued) **S108195939**

Completed Date: 06/19/2007
Comments: PEA approval letter sent to the District on June 19, 2007 and the CRU memo was processed on June 20, 2007

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Environmental Oversight Agreement
Completed Date: 02/16/2007
Comments: Signed Agreement sent (FedEx) to District.

Future Area Name: Not reported
Future Sub Area Name: Not reported
Future Document Type: Not reported
Future Due Date: Not reported
Schedule Area Name: Not reported
Schedule Sub Area Name: Not reported
Schedule Document Type: Not reported
Schedule Due Date: Not reported
Schedule Revised Date: Not reported

ENVIROSTOR:
Facility ID: 60000462
Status: No Further Action
Status Date: 06/19/2007
Site Code: 404723
Site Type: School Investigation
Site Type Detailed: School
Acres: 15.19
NPL: NO
Regulatory Agencies: SMBRP
Lead Agency: SMBRP
Program Manager: Aslam Shareef
Supervisor: Shahir Haddad
Division Branch: Southern California Schools & Brownfields Outreach
Assembly: 68
Senate: 37
Special Program: Not reported
Restricted Use: NO
Site Mgmt Req: NONE SPECIFIED
Funding: School District
Latitude: 33.7387
Longitude: -117.7558
APN: NONE SPECIFIED
Past Use: AGRICULTURAL - ROW CROPS, AGRICULTURAL - ORCHARD, AGRICULTURAL - ROW CROPS
Potential COC: Arsenic Chlordane DDD DDE DDT
Confirmed COC: 30001-NO 30004-NO 30006-NO 30007-NO 30008-NO
Potential Description: SOIL, SOIL
Alias Name: Proposed Orchard HIlls Elementary School
Alias Type: Alternate Name
Alias Name: 404723
Alias Type: Project Code (Site Code)
Alias Name: 60000462
Alias Type: Envirostor ID Number

Completed Info:
Completed Area Name: PROJECT WIDE

PROPOSED ORCHARD HILLS K-8 SCHOOL SITE (Continued) **S108195939**

Completed Sub Area Name: Not reported
Completed Document Type: Phase 1
Completed Date: 12/15/2006
Comments: Phase I Determination was sent to the School District as the Site had Ag history until 2005.

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Preliminary Endangerment Assessment Tech Memo
Completed Date: 03/16/2007
Comments: approved

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Preliminary Endangerment Assessment Report
Completed Date: 06/19/2007
Comments: PEA approval letter sent to the District on June 19, 2007 and the CRU memo was processed on June 20, 2007

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Environmental Oversight Agreement
Completed Date: 02/16/2007
Comments: Signed Agreement sent (FedEx) to District.

Future Area Name: Not reported
Future Sub Area Name: Not reported
Future Document Type: Not reported
Future Due Date: Not reported
Schedule Area Name: Not reported
Schedule Sub Area Name: Not reported
Schedule Document Type: Not reported
Schedule Due Date: Not reported
Schedule Revised Date: Not reported

Count: 0 records.

ORPHAN SUMMARY

City	EDR ID	Site Name	Site Address	Zip	Database(s)
		NO SITES FOUND			

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

To maintain currency of the following federal and state databases, EDR contacts the appropriate governmental agency on a monthly or quarterly basis, as required.

Number of Days to Update: Provides confirmation that EDR is reporting records that have been updated within 90 days from the date the government agency made the information available to the public.

STANDARD ENVIRONMENTAL RECORDS

Federal NPL site list

NPL: National Priority List

National Priorities List (Superfund). The NPL is a subset of CERCLIS and identifies over 1,200 sites for priority cleanup under the Superfund Program. NPL sites may encompass relatively large areas. As such, EDR provides polygon coverage for over 1,000 NPL site boundaries produced by EPA's Environmental Photographic Interpretation Center (EPIC) and regional EPA offices.

Date of Government Version: 12/16/2014
Date Data Arrived at EDR: 01/08/2015
Date Made Active in Reports: 02/09/2015
Number of Days to Update: 32

Source: EPA
Telephone: N/A
Last EDR Contact: 04/08/2015
Next Scheduled EDR Contact: 07/20/2015
Data Release Frequency: Quarterly

NPL Site Boundaries

Sources:

EPA's Environmental Photographic Interpretation Center (EPIC)
Telephone: 202-564-7333

EPA Region 1
Telephone 617-918-1143

EPA Region 6
Telephone: 214-655-6659

EPA Region 3
Telephone 215-814-5418

EPA Region 7
Telephone: 913-551-7247

EPA Region 4
Telephone 404-562-8033

EPA Region 8
Telephone: 303-312-6774

EPA Region 5
Telephone 312-886-6686

EPA Region 9
Telephone: 415-947-4246

EPA Region 10
Telephone 206-553-8665

Proposed NPL: Proposed National Priority List Sites

A site that has been proposed for listing on the National Priorities List through the issuance of a proposed rule in the Federal Register. EPA then accepts public comments on the site, responds to the comments, and places on the NPL those sites that continue to meet the requirements for listing.

Date of Government Version: 12/16/2014
Date Data Arrived at EDR: 01/08/2015
Date Made Active in Reports: 02/09/2015
Number of Days to Update: 32

Source: EPA
Telephone: N/A
Last EDR Contact: 04/08/2015
Next Scheduled EDR Contact: 07/20/2015
Data Release Frequency: Quarterly

NPL LIENS: Federal Superfund Liens

Federal Superfund Liens. Under the authority granted the USEPA by CERCLA of 1980, the USEPA has the authority to file liens against real property in order to recover remedial action expenditures or when the property owner received notification of potential liability. USEPA compiles a listing of filed notices of Superfund Liens.

Date of Government Version: 10/15/1991
Date Data Arrived at EDR: 02/02/1994
Date Made Active in Reports: 03/30/1994
Number of Days to Update: 56

Source: EPA
Telephone: 202-564-4267
Last EDR Contact: 08/15/2011
Next Scheduled EDR Contact: 11/28/2011
Data Release Frequency: No Update Planned

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Federal Delisted NPL site list

DELISTED NPL: National Priority List Deletions

The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) establishes the criteria that the EPA uses to delete sites from the NPL. In accordance with 40 CFR 300.425.(e), sites may be deleted from the NPL where no further response is appropriate.

Date of Government Version: 12/16/2014
Date Data Arrived at EDR: 01/08/2015
Date Made Active in Reports: 02/09/2015
Number of Days to Update: 32

Source: EPA
Telephone: N/A
Last EDR Contact: 04/08/2015
Next Scheduled EDR Contact: 07/20/2015
Data Release Frequency: Quarterly

Federal CERCLIS list

CERCLIS: Comprehensive Environmental Response, Compensation, and Liability Information System

CERCLIS contains data on potentially hazardous waste sites that have been reported to the USEPA by states, municipalities, private companies and private persons, pursuant to Section 103 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). CERCLIS contains sites which are either proposed to or on the National Priorities List (NPL) and sites which are in the screening and assessment phase for possible inclusion on the NPL.

Date of Government Version: 10/25/2013
Date Data Arrived at EDR: 11/11/2013
Date Made Active in Reports: 02/13/2014
Number of Days to Update: 94

Source: EPA
Telephone: 703-412-9810
Last EDR Contact: 05/29/2015
Next Scheduled EDR Contact: 09/07/2015
Data Release Frequency: Quarterly

FEDERAL FACILITY: Federal Facility Site Information listing

A listing of National Priority List (NPL) and Base Realignment and Closure (BRAC) sites found in the Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) Database where EPA Federal Facilities Restoration and Reuse Office is involved in cleanup activities.

Date of Government Version: 03/26/2015
Date Data Arrived at EDR: 04/08/2015
Date Made Active in Reports: 06/11/2015
Number of Days to Update: 64

Source: Environmental Protection Agency
Telephone: 703-603-8704
Last EDR Contact: 04/08/2015
Next Scheduled EDR Contact: 07/20/2015
Data Release Frequency: Varies

Federal CERCLIS NFRAP site List

CERCLIS-NFRAP: CERCLIS No Further Remedial Action Planned

Archived sites are sites that have been removed and archived from the inventory of CERCLIS sites. Archived status indicates that, to the best of EPA's knowledge, assessment at a site has been completed and that EPA has determined no further steps will be taken to list this site on the National Priorities List (NPL), unless information indicates this decision was not appropriate or other considerations require a recommendation for listing at a later time. This decision does not necessarily mean that there is no hazard associated with a given site; it only means that, based upon available information, the location is not judged to be a potential NPL site.

Date of Government Version: 10/25/2013
Date Data Arrived at EDR: 11/11/2013
Date Made Active in Reports: 02/13/2014
Number of Days to Update: 94

Source: EPA
Telephone: 703-412-9810
Last EDR Contact: 05/29/2015
Next Scheduled EDR Contact: 09/07/2015
Data Release Frequency: Quarterly

Federal RCRA CORRACTS facilities list

CORRACTS: Corrective Action Report

CORRACTS identifies hazardous waste handlers with RCRA corrective action activity.

Date of Government Version: 03/10/2015
Date Data Arrived at EDR: 03/31/2015
Date Made Active in Reports: 06/11/2015
Number of Days to Update: 72

Source: EPA
Telephone: 800-424-9346
Last EDR Contact: 03/31/2015
Next Scheduled EDR Contact: 07/13/2015
Data Release Frequency: Quarterly

Federal RCRA non-CORRACTS TSD facilities list

RCRA-TSDF: RCRA - Treatment, Storage and Disposal

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Transporters are individuals or entities that move hazardous waste from the generator offsite to a facility that can recycle, treat, store, or dispose of the waste. TSDFs treat, store, or dispose of the waste.

Date of Government Version: 03/10/2015
Date Data Arrived at EDR: 03/31/2015
Date Made Active in Reports: 06/11/2015
Number of Days to Update: 72

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 03/31/2015
Next Scheduled EDR Contact: 07/13/2015
Data Release Frequency: Quarterly

Federal RCRA generators list

RCRA-LQG: RCRA - Large Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Large quantity generators (LQGs) generate over 1,000 kilograms (kg) of hazardous waste, or over 1 kg of acutely hazardous waste per month.

Date of Government Version: 03/10/2015
Date Data Arrived at EDR: 03/31/2015
Date Made Active in Reports: 06/11/2015
Number of Days to Update: 72

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 03/31/2015
Next Scheduled EDR Contact: 07/13/2015
Data Release Frequency: Quarterly

RCRA-SQG: RCRA - Small Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Small quantity generators (SQGs) generate between 100 kg and 1,000 kg of hazardous waste per month.

Date of Government Version: 03/10/2015
Date Data Arrived at EDR: 03/31/2015
Date Made Active in Reports: 06/11/2015
Number of Days to Update: 72

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 03/31/2015
Next Scheduled EDR Contact: 07/13/2015
Data Release Frequency: Quarterly

RCRA-CESQG: RCRA - Conditionally Exempt Small Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Conditionally exempt small quantity generators (CESQGs) generate less than 100 kg of hazardous waste, or less than 1 kg of acutely hazardous waste per month.

Date of Government Version: 03/10/2015
Date Data Arrived at EDR: 03/31/2015
Date Made Active in Reports: 06/11/2015
Number of Days to Update: 72

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 03/31/2015
Next Scheduled EDR Contact: 07/13/2015
Data Release Frequency: Varies

Federal institutional controls / engineering controls registries

US ENG CONTROLS: Engineering Controls Sites List

A listing of sites with engineering controls in place. Engineering controls include various forms of caps, building foundations, liners, and treatment methods to create pathway elimination for regulated substances to enter environmental media or effect human health.

Date of Government Version: 03/16/2015
Date Data Arrived at EDR: 03/17/2015
Date Made Active in Reports: 06/02/2015
Number of Days to Update: 77

Source: Environmental Protection Agency
Telephone: 703-603-0695
Last EDR Contact: 06/01/2015
Next Scheduled EDR Contact: 09/14/2015
Data Release Frequency: Varies

US INST CONTROL: Sites with Institutional Controls

A listing of sites with institutional controls in place. Institutional controls include administrative measures, such as groundwater use restrictions, construction restrictions, property use restrictions, and post remediation care requirements intended to prevent exposure to contaminants remaining on site. Deed restrictions are generally required as part of the institutional controls.

Date of Government Version: 03/16/2015
Date Data Arrived at EDR: 03/17/2015
Date Made Active in Reports: 06/02/2015
Number of Days to Update: 77

Source: Environmental Protection Agency
Telephone: 703-603-0695
Last EDR Contact: 06/01/2015
Next Scheduled EDR Contact: 09/14/2015
Data Release Frequency: Varies

LUCIS: Land Use Control Information System

LUCIS contains records of land use control information pertaining to the former Navy Base Realignment and Closure properties.

Date of Government Version: 05/28/2015
Date Data Arrived at EDR: 05/29/2015
Date Made Active in Reports: 06/11/2015
Number of Days to Update: 13

Source: Department of the Navy
Telephone: 843-820-7326
Last EDR Contact: 05/18/2015
Next Scheduled EDR Contact: 08/31/2015
Data Release Frequency: Varies

Federal ERNS list

ERNS: Emergency Response Notification System

Emergency Response Notification System. ERNS records and stores information on reported releases of oil and hazardous substances.

Date of Government Version: 03/30/2015
Date Data Arrived at EDR: 03/31/2015
Date Made Active in Reports: 06/02/2015
Number of Days to Update: 63

Source: National Response Center, United States Coast Guard
Telephone: 202-267-2180
Last EDR Contact: 03/31/2015
Next Scheduled EDR Contact: 07/13/2015
Data Release Frequency: Annually

State- and tribal - equivalent NPL

RESPONSE: State Response Sites

Identifies confirmed release sites where DTSC is involved in remediation, either in a lead or oversight capacity. These confirmed release sites are generally high-priority and high potential risk.

Date of Government Version: 05/04/2015
Date Data Arrived at EDR: 05/05/2015
Date Made Active in Reports: 05/14/2015
Number of Days to Update: 9

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 05/05/2015
Next Scheduled EDR Contact: 08/17/2015
Data Release Frequency: Quarterly

State- and tribal - equivalent CERCLIS

ENVIROSTOR: EnviroStor Database

The Department of Toxic Substances Control's (DTSC's) Site Mitigation and Brownfields Reuse Program's (SMBRP's) EnviroStor database identifes sites that have known contamination or sites for which there may be reasons to investigate further. The database includes the following site types: Federal Superfund sites (National Priorities List (NPL)); State Response, including Military Facilities and State Superfund; Voluntary Cleanup; and School sites. EnviroStor provides similar information to the information that was available in CalSites, and provides additional site information, including, but not limited to, identification of formerly-contaminated properties that have been released for reuse, properties where environmental deed restrictions have been recorded to prevent inappropriate land uses, and risk characterization information that is used to assess potential impacts to public health and the environment at contaminated sites.

Date of Government Version: 05/04/2015
Date Data Arrived at EDR: 05/05/2015
Date Made Active in Reports: 05/14/2015
Number of Days to Update: 9

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 05/05/2015
Next Scheduled EDR Contact: 08/17/2015
Data Release Frequency: Quarterly

State and tribal landfill and/or solid waste disposal site lists

SWF/LF (SWIS): Solid Waste Information System

Active, Closed and Inactive Landfills. SWF/LF records typically contain an inve ntory of solid waste disposal facilities or landfills. These may be active or i nactive facilities or open dumps that failed to meet RCRA Section 4004 criteria for solid waste landfills or disposal sites.

Date of Government Version: 05/18/2015
Date Data Arrived at EDR: 05/20/2015
Date Made Active in Reports: 06/05/2015
Number of Days to Update: 16

Source: Department of Resources Recycling and Recovery
Telephone: 916-341-6320
Last EDR Contact: 05/20/2015
Next Scheduled EDR Contact: 08/31/2015
Data Release Frequency: Quarterly

State and tribal leaking storage tank lists

LUST REG 6V: Leaking Underground Storage Tank Case Listing

Leaking Underground Storage Tank locations. Inyo, Kern, Los Angeles, Mono, San Bernardino counties.

Date of Government Version: 06/07/2005
Date Data Arrived at EDR: 06/07/2005
Date Made Active in Reports: 06/29/2005
Number of Days to Update: 22

Source: California Regional Water Quality Control Board Victorville Branch Office (6)
Telephone: 760-241-7365
Last EDR Contact: 09/12/2011
Next Scheduled EDR Contact: 12/26/2011
Data Release Frequency: No Update Planned

LUST REG 9: Leaking Underground Storage Tank Report

Orange, Riverside, San Diego counties. For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 03/01/2001
Date Data Arrived at EDR: 04/23/2001
Date Made Active in Reports: 05/21/2001
Number of Days to Update: 28

Source: California Regional Water Quality Control Board San Diego Region (9)
Telephone: 858-637-5595
Last EDR Contact: 09/26/2011
Next Scheduled EDR Contact: 01/09/2012
Data Release Frequency: No Update Planned

LUST REG 6L: Leaking Underground Storage Tank Case Listing

For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 09/09/2003
Date Data Arrived at EDR: 09/10/2003
Date Made Active in Reports: 10/07/2003
Number of Days to Update: 27

Source: California Regional Water Quality Control Board Lahontan Region (6)
Telephone: 530-542-5572
Last EDR Contact: 09/12/2011
Next Scheduled EDR Contact: 12/26/2011
Data Release Frequency: No Update Planned

LUST: Geotracker's Leaking Underground Fuel Tank Report

Leaking Underground Storage Tank Incident Reports. LUST records contain an inventory of reported leaking underground storage tank incidents. Not all states maintain these records, and the information stored varies by state. For more information on a particular leaking underground storage tank sites, please contact the appropriate regulatory agency.

Date of Government Version: 03/13/2015
Date Data Arrived at EDR: 03/18/2015
Date Made Active in Reports: 03/24/2015
Number of Days to Update: 6

Source: State Water Resources Control Board
Telephone: see region list
Last EDR Contact: 06/17/2015
Next Scheduled EDR Contact: 09/28/2015
Data Release Frequency: Quarterly

LUST REG 1: Active Toxic Site Investigation

Del Norte, Humboldt, Lake, Mendocino, Modoc, Siskiyou, Sonoma, Trinity counties. For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 02/01/2001
Date Data Arrived at EDR: 02/28/2001
Date Made Active in Reports: 03/29/2001
Number of Days to Update: 29

Source: California Regional Water Quality Control Board North Coast (1)
Telephone: 707-570-3769
Last EDR Contact: 08/01/2011
Next Scheduled EDR Contact: 11/14/2011
Data Release Frequency: No Update Planned

LUST REG 2: Fuel Leak List

Leaking Underground Storage Tank locations. Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, Sonoma counties.

Date of Government Version: 09/30/2004
Date Data Arrived at EDR: 10/20/2004
Date Made Active in Reports: 11/19/2004
Number of Days to Update: 30

Source: California Regional Water Quality Control Board San Francisco Bay Region (2)
Telephone: 510-622-2433
Last EDR Contact: 09/19/2011
Next Scheduled EDR Contact: 01/02/2012
Data Release Frequency: Quarterly

LUST REG 5: Leaking Underground Storage Tank Database

Leaking Underground Storage Tank locations. Alameda, Alpine, Amador, Butte, Colusa, Contra Costa, Calveras, El Dorado, Fresno, Glenn, Kern, Kings, Lake, Lassen, Madera, Mariposa, Merced, Modoc, Napa, Nevada, Placer, Plumas, Sacramento, San Joaquin, Shasta, Solano, Stanislaus, Sutter, Tehama, Tulare, Tuolumne, Yolo, Yuba counties.

Date of Government Version: 07/01/2008
Date Data Arrived at EDR: 07/22/2008
Date Made Active in Reports: 07/31/2008
Number of Days to Update: 9

Source: California Regional Water Quality Control Board Central Valley Region (5)
Telephone: 916-464-4834
Last EDR Contact: 07/01/2011
Next Scheduled EDR Contact: 10/17/2011
Data Release Frequency: No Update Planned

LUST REG 4: Underground Storage Tank Leak List

Los Angeles, Ventura counties. For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 09/07/2004
Date Data Arrived at EDR: 09/07/2004
Date Made Active in Reports: 10/12/2004
Number of Days to Update: 35

Source: California Regional Water Quality Control Board Los Angeles Region (4)
Telephone: 213-576-6710
Last EDR Contact: 09/06/2011
Next Scheduled EDR Contact: 12/19/2011
Data Release Frequency: No Update Planned

LUST REG 3: Leaking Underground Storage Tank Database

Leaking Underground Storage Tank locations. Monterey, San Benito, San Luis Obispo, Santa Barbara, Santa Cruz counties.

Date of Government Version: 05/19/2003
Date Data Arrived at EDR: 05/19/2003
Date Made Active in Reports: 06/02/2003
Number of Days to Update: 14

Source: California Regional Water Quality Control Board Central Coast Region (3)
Telephone: 805-542-4786
Last EDR Contact: 07/18/2011
Next Scheduled EDR Contact: 10/31/2011
Data Release Frequency: No Update Planned

LUST REG 7: Leaking Underground Storage Tank Case Listing
Leaking Underground Storage Tank locations. Imperial, Riverside, San Diego, Santa Barbara counties.

Date of Government Version: 02/26/2004
Date Data Arrived at EDR: 02/26/2004
Date Made Active in Reports: 03/24/2004
Number of Days to Update: 27

Source: California Regional Water Quality Control Board Colorado River Basin Region (7)
Telephone: 760-776-8943
Last EDR Contact: 08/01/2011
Next Scheduled EDR Contact: 11/14/2011
Data Release Frequency: No Update Planned

LUST REG 8: Leaking Underground Storage Tanks
California Regional Water Quality Control Board Santa Ana Region (8). For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 02/14/2005
Date Data Arrived at EDR: 02/15/2005
Date Made Active in Reports: 03/28/2005
Number of Days to Update: 41

Source: California Regional Water Quality Control Board Santa Ana Region (8)
Telephone: 909-782-4496
Last EDR Contact: 08/15/2011
Next Scheduled EDR Contact: 11/28/2011
Data Release Frequency: Varies

SLIC: Statewide SLIC Cases
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 03/13/2015
Date Data Arrived at EDR: 03/18/2015
Date Made Active in Reports: 03/24/2015
Number of Days to Update: 6

Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 06/17/2015
Next Scheduled EDR Contact: 09/28/2015
Data Release Frequency: Varies

SLIC REG 1: Active Toxic Site Investigations
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 04/03/2003
Date Data Arrived at EDR: 04/07/2003
Date Made Active in Reports: 04/25/2003
Number of Days to Update: 18

Source: California Regional Water Quality Control Board, North Coast Region (1)
Telephone: 707-576-2220
Last EDR Contact: 08/01/2011
Next Scheduled EDR Contact: 11/14/2011
Data Release Frequency: No Update Planned

SLIC REG 2: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 09/30/2004
Date Data Arrived at EDR: 10/20/2004
Date Made Active in Reports: 11/19/2004
Number of Days to Update: 30

Source: Regional Water Quality Control Board San Francisco Bay Region (2)
Telephone: 510-286-0457
Last EDR Contact: 09/19/2011
Next Scheduled EDR Contact: 01/02/2012
Data Release Frequency: Quarterly

SLIC REG 3: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 05/18/2006
Date Data Arrived at EDR: 05/18/2006
Date Made Active in Reports: 06/15/2006
Number of Days to Update: 28

Source: California Regional Water Quality Control Board Central Coast Region (3)
Telephone: 805-549-3147
Last EDR Contact: 07/18/2011
Next Scheduled EDR Contact: 10/31/2011
Data Release Frequency: Semi-Annually

SLIC REG 4: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 11/17/2004
Date Data Arrived at EDR: 11/18/2004
Date Made Active in Reports: 01/04/2005
Number of Days to Update: 47

Source: Region Water Quality Control Board Los Angeles Region (4)
Telephone: 213-576-6600
Last EDR Contact: 07/01/2011
Next Scheduled EDR Contact: 10/17/2011
Data Release Frequency: Varies

SLIC REG 5: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 04/01/2005
Date Data Arrived at EDR: 04/05/2005
Date Made Active in Reports: 04/21/2005
Number of Days to Update: 16

Source: Regional Water Quality Control Board Central Valley Region (5)
Telephone: 916-464-3291
Last EDR Contact: 09/12/2011
Next Scheduled EDR Contact: 12/26/2011
Data Release Frequency: Semi-Annually

SLIC REG 6V: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 05/24/2005
Date Data Arrived at EDR: 05/25/2005
Date Made Active in Reports: 06/16/2005
Number of Days to Update: 22

Source: Regional Water Quality Control Board, Victorville Branch
Telephone: 619-241-6583
Last EDR Contact: 08/15/2011
Next Scheduled EDR Contact: 11/28/2011
Data Release Frequency: Semi-Annually

SLIC REG 6L: SLIC Sites
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 09/07/2004
Date Data Arrived at EDR: 09/07/2004
Date Made Active in Reports: 10/12/2004
Number of Days to Update: 35

Source: California Regional Water Quality Control Board, Lahontan Region
Telephone: 530-542-5574
Last EDR Contact: 08/15/2011
Next Scheduled EDR Contact: 11/28/2011
Data Release Frequency: No Update Planned

SLIC REG 7: SLIC List
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 11/24/2004
Date Data Arrived at EDR: 11/29/2004
Date Made Active in Reports: 01/04/2005
Number of Days to Update: 36

Source: California Regional Quality Control Board, Colorado River Basin Region
Telephone: 760-346-7491
Last EDR Contact: 08/01/2011
Next Scheduled EDR Contact: 11/14/2011
Data Release Frequency: No Update Planned

SLIC REG 8: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 04/03/2008
Date Data Arrived at EDR: 04/03/2008
Date Made Active in Reports: 04/14/2008
Number of Days to Update: 11

Source: California Region Water Quality Control Board Santa Ana Region (8)
Telephone: 951-782-3298
Last EDR Contact: 09/12/2011
Next Scheduled EDR Contact: 12/26/2011
Data Release Frequency: Semi-Annually

SLIC REG 9: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 09/10/2007
Date Data Arrived at EDR: 09/11/2007
Date Made Active in Reports: 09/28/2007
Number of Days to Update: 17

Source: California Regional Water Quality Control Board San Diego Region (9)
Telephone: 858-467-2980
Last EDR Contact: 08/08/2011
Next Scheduled EDR Contact: 11/21/2011
Data Release Frequency: Annually

INDIAN LUST R4: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Florida, Mississippi and North Carolina.

Date of Government Version: 09/30/2014
Date Data Arrived at EDR: 03/03/2015
Date Made Active in Reports: 03/13/2015
Number of Days to Update: 10

Source: EPA Region 4
Telephone: 404-562-8677
Last EDR Contact: 04/27/2015
Next Scheduled EDR Contact: 08/10/2015
Data Release Frequency: Semi-Annually

INDIAN LUST R5: Leaking Underground Storage Tanks on Indian Land
Leaking underground storage tanks located on Indian Land in Michigan, Minnesota and Wisconsin.

Date of Government Version: 01/30/2015
Date Data Arrived at EDR: 02/05/2015
Date Made Active in Reports: 03/09/2015
Number of Days to Update: 32

Source: EPA, Region 5
Telephone: 312-886-7439
Last EDR Contact: 04/27/2015
Next Scheduled EDR Contact: 08/10/2015
Data Release Frequency: Varies

INDIAN LUST R6: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in New Mexico and Oklahoma.

Date of Government Version: 01/23/2015
Date Data Arrived at EDR: 02/10/2015
Date Made Active in Reports: 03/13/2015
Number of Days to Update: 31

Source: EPA Region 6
Telephone: 214-665-6597
Last EDR Contact: 01/26/2015
Next Scheduled EDR Contact: 05/11/2015
Data Release Frequency: Varies

INDIAN LUST R9: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Arizona, California, New Mexico and Nevada

Date of Government Version: 01/08/2015
Date Data Arrived at EDR: 01/08/2015
Date Made Active in Reports: 02/09/2015
Number of Days to Update: 32

Source: Environmental Protection Agency
Telephone: 415-972-3372
Last EDR Contact: 01/08/2015
Next Scheduled EDR Contact: 05/11/2015
Data Release Frequency: Quarterly

INDIAN LUST R8: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Colorado, Montana, North Dakota, South Dakota, Utah and Wyoming.

Date of Government Version: 01/28/2015
Date Data Arrived at EDR: 01/30/2015
Date Made Active in Reports: 03/13/2015
Number of Days to Update: 42

Source: EPA Region 8
Telephone: 303-312-6271
Last EDR Contact: 04/27/2015
Next Scheduled EDR Contact: 08/10/2015
Data Release Frequency: Quarterly

INDIAN LUST R1: Leaking Underground Storage Tanks on Indian Land
A listing of leaking underground storage tank locations on Indian Land.

Date of Government Version: 02/01/2013
Date Data Arrived at EDR: 05/01/2013
Date Made Active in Reports: 11/01/2013
Number of Days to Update: 184

Source: EPA Region 1
Telephone: 617-918-1313
Last EDR Contact: 04/03/2015
Next Scheduled EDR Contact: 08/10/2015
Data Release Frequency: Varies

INDIAN LUST R10: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Alaska, Idaho, Oregon and Washington.

Date of Government Version: 02/03/2015
Date Data Arrived at EDR: 02/12/2015
Date Made Active in Reports: 03/13/2015
Number of Days to Update: 29
Source: EPA Region 10
Telephone: 206-553-2857
Last EDR Contact: 04/27/2015
Next Scheduled EDR Contact: 08/10/2015
Data Release Frequency: Quarterly

INDIAN LUST R7: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Iowa, Kansas, and Nebraska

Date of Government Version: 09/23/2014
Date Data Arrived at EDR: 11/25/2014
Date Made Active in Reports: 01/29/2015
Number of Days to Update: 65
Source: EPA Region 7
Telephone: 913-551-7003
Last EDR Contact: 04/27/2015
Next Scheduled EDR Contact: 08/10/2015
Data Release Frequency: Varies

State and tribal registered storage tank lists

UST: Active UST Facilities
Active UST facilities gathered from the local regulatory agencies

Date of Government Version: 03/13/2015
Date Data Arrived at EDR: 03/18/2015
Date Made Active in Reports: 03/26/2015
Number of Days to Update: 8
Source: SWRCB
Telephone: 916-341-5851
Last EDR Contact: 06/17/2015
Next Scheduled EDR Contact: 09/28/2015
Data Release Frequency: Semi-Annually

AST: Aboveground Petroleum Storage Tank Facilities
A listing of aboveground storage tank petroleum storage tank locations.

Date of Government Version: 08/01/2009
Date Data Arrived at EDR: 09/10/2009
Date Made Active in Reports: 10/01/2009
Number of Days to Update: 21
Source: California Environmental Protection Agency
Telephone: 916-327-5092
Last EDR Contact: 07/13/2015
Next Scheduled EDR Contact: 04/13/2015
Data Release Frequency: Quarterly

INDIAN UST R7: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 7 (Iowa, Kansas, Missouri, Nebraska, and 9 Tribal Nations).

Date of Government Version: 09/23/2014
Date Data Arrived at EDR: 11/25/2014
Date Made Active in Reports: 01/29/2015
Number of Days to Update: 65
Source: EPA Region 7
Telephone: 913-551-7003
Last EDR Contact: 04/27/2015
Next Scheduled EDR Contact: 08/10/2015
Data Release Frequency: Varies

INDIAN UST R10: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 10 (Alaska, Idaho, Oregon, Washington, and Tribal Nations).

Date of Government Version: 02/03/2015
Date Data Arrived at EDR: 02/12/2015
Date Made Active in Reports: 03/13/2015
Number of Days to Update: 29
Source: EPA Region 10
Telephone: 206-553-2857
Last EDR Contact: 04/27/2015
Next Scheduled EDR Contact: 08/10/2015
Data Release Frequency: Quarterly

INDIAN UST R9: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 9 (Arizona, California, Hawaii, Nevada, the Pacific Islands, and Tribal Nations).

Date of Government Version: 12/14/2014
Date Data Arrived at EDR: 02/13/2015
Date Made Active in Reports: 03/13/2015
Number of Days to Update: 28

Source: EPA Region 9
Telephone: 415-972-3368
Last EDR Contact: 01/26/2015
Next Scheduled EDR Contact: 05/11/2015
Data Release Frequency: Quarterly

INDIAN UST R8: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 8 (Colorado, Montana, North Dakota, South Dakota, Utah, Wyoming and 27 Tribal Nations).

Date of Government Version: 01/29/2015
Date Data Arrived at EDR: 01/30/2015
Date Made Active in Reports: 03/13/2015
Number of Days to Update: 42

Source: EPA Region 8
Telephone: 303-312-6137
Last EDR Contact: 04/27/2015
Next Scheduled EDR Contact: 08/10/2015
Data Release Frequency: Quarterly

INDIAN UST R1: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 1 (Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont and ten Tribal Nations).

Date of Government Version: 02/01/2013
Date Data Arrived at EDR: 05/01/2013
Date Made Active in Reports: 01/27/2014
Number of Days to Update: 271

Source: EPA, Region 1
Telephone: 617-918-1313
Last EDR Contact: 04/28/2015
Next Scheduled EDR Contact: 08/10/2015
Data Release Frequency: Varies

INDIAN UST R4: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 4 (Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee and Tribal Nations)

Date of Government Version: 09/30/2014
Date Data Arrived at EDR: 03/03/2015
Date Made Active in Reports: 03/13/2015
Number of Days to Update: 10

Source: EPA Region 4
Telephone: 404-562-9424
Last EDR Contact: 04/27/2015
Next Scheduled EDR Contact: 08/10/2015
Data Release Frequency: Semi-Annually

INDIAN UST R5: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 5 (Michigan, Minnesota and Wisconsin and Tribal Nations).

Date of Government Version: 01/30/2015
Date Data Arrived at EDR: 02/05/2015
Date Made Active in Reports: 03/13/2015
Number of Days to Update: 36

Source: EPA Region 5
Telephone: 312-886-6136
Last EDR Contact: 04/27/2015
Next Scheduled EDR Contact: 08/10/2015
Data Release Frequency: Varies

INDIAN UST R6: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 6 (Louisiana, Arkansas, Oklahoma, New Mexico, Texas and 65 Tribes).

Date of Government Version: 01/23/2015
Date Data Arrived at EDR: 02/13/2015
Date Made Active in Reports: 03/13/2015
Number of Days to Update: 28

Source: EPA Region 6
Telephone: 214-665-7591
Last EDR Contact: 01/26/2015
Next Scheduled EDR Contact: 05/11/2015
Data Release Frequency: Semi-Annually

FEMA UST: Underground Storage Tank Listing

A listing of all FEMA owned underground storage tanks.

Date of Government Version: 01/01/2010
Date Data Arrived at EDR: 02/16/2010
Date Made Active in Reports: 04/12/2010
Number of Days to Update: 55

Source: FEMA
Telephone: 202-646-5797
Last EDR Contact: 04/13/2015
Next Scheduled EDR Contact: 07/27/2015
Data Release Frequency: Varies

State and tribal voluntary cleanup sites

INDIAN VCP R1: Voluntary Cleanup Priority Listing
A listing of voluntary cleanup priority sites located on Indian Land located in Region 1.

Date of Government Version: 09/29/2014
Date Data Arrived at EDR: 10/01/2014
Date Made Active in Reports: 11/06/2014
Number of Days to Update: 36

Source: EPA, Region 1
Telephone: 617-918-1102
Last EDR Contact: 04/02/2015
Next Scheduled EDR Contact: 07/13/2015
Data Release Frequency: Varies

INDIAN VCP R7: Voluntary Cleanup Priority Lisitng
A listing of voluntary cleanup priority sites located on Indian Land located in Region 7.

Date of Government Version: 03/20/2008
Date Data Arrived at EDR: 04/22/2008
Date Made Active in Reports: 05/19/2008
Number of Days to Update: 27

Source: EPA, Region 7
Telephone: 913-551-7365
Last EDR Contact: 04/20/2009
Next Scheduled EDR Contact: 07/20/2009
Data Release Frequency: Varies

VCP: Voluntary Cleanup Program Properties
Contains low threat level properties with either confirmed or unconfirmed releases and the project proponents have request that DTSC oversee investigation and/or cleanup activities and have agreed to provide coverage for DTSC's costs.

Date of Government Version: 05/04/2015
Date Data Arrived at EDR: 05/05/2015
Date Made Active in Reports: 05/14/2015
Number of Days to Update: 9

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 05/05/2015
Next Scheduled EDR Contact: 08/17/2015
Data Release Frequency: Quarterly

ADDITIONAL ENVIRONMENTAL RECORDS

Local Brownfield lists

US BROWNFIELDS: A Listing of Brownfields Sites
Brownfields are real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant. Cleaning up and reinvesting in these properties takes development pressures off of undeveloped, open land, and both improves and protects the environment. Assessment, Cleanup and Redevelopment Exchange System (ACRES) stores information reported by EPA Brownfields grant recipients on brownfields properties assessed or cleaned up with grant funding as well as information on Targeted Brownfields Assessments performed by EPA Regions. A listing of ACRES Brownfield sites is obtained from Cleanups in My Community. Cleanups in My Community provides information on Brownfields properties for which information is reported back to EPA, as well as areas served by Brownfields grant programs.

Date of Government Version: 03/23/2015
Date Data Arrived at EDR: 03/24/2015
Date Made Active in Reports: 06/02/2015
Number of Days to Update: 70

Source: Environmental Protection Agency
Telephone: 202-566-2777
Last EDR Contact: 03/24/2015
Next Scheduled EDR Contact: 07/06/2015
Data Release Frequency: Semi-Annually

Local Lists of Landfill / Solid Waste Disposal Sites

ODI: Open Dump Inventory
An open dump is defined as a disposal facility that does not comply with one or more of the Part 257 or Part 258 Subtitle D Criteria.

Date of Government Version: 06/30/1985
Date Data Arrived at EDR: 08/09/2004
Date Made Active in Reports: 09/17/2004
Number of Days to Update: 39
Source: Environmental Protection Agency
Telephone: 800-424-9346
Last EDR Contact: 06/09/2004
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

DEBRIS REGION 9: Torres Martinez Reservation Illegal Dump Site Locations
A listing of illegal dump sites location on the Torres Martinez Indian Reservation located in eastern Riverside County and northern Imperial County, California.

Date of Government Version: 01/12/2009
Date Data Arrived at EDR: 05/07/2009
Date Made Active in Reports: 09/21/2009
Number of Days to Update: 137
Source: EPA, Region 9
Telephone: 415-947-4219
Last EDR Contact: 04/23/2015
Next Scheduled EDR Contact: 08/10/2015
Data Release Frequency: No Update Planned

SWRCY: Recycler Database
A listing of recycling facilities in California.

Date of Government Version: 03/16/2015
Date Data Arrived at EDR: 03/18/2015
Date Made Active in Reports: 03/26/2015
Number of Days to Update: 8
Source: Department of Conservation
Telephone: 916-323-3836
Last EDR Contact: 06/17/2015
Next Scheduled EDR Contact: 09/28/2015
Data Release Frequency: Quarterly

HAULERS: Registered Waste Tire Haulers Listing
A listing of registered waste tire haulers.

Date of Government Version: 05/26/2015
Date Data Arrived at EDR: 05/28/2015
Date Made Active in Reports: 06/05/2015
Number of Days to Update: 8
Source: Integrated Waste Management Board
Telephone: 916-341-6422
Last EDR Contact: 05/18/2015
Next Scheduled EDR Contact: 08/31/2015
Data Release Frequency: Varies

INDIAN ODI: Report on the Status of Open Dumps on Indian Lands
Location of open dumps on Indian land.

Date of Government Version: 12/31/1998
Date Data Arrived at EDR: 12/03/2007
Date Made Active in Reports: 01/24/2008
Number of Days to Update: 52
Source: Environmental Protection Agency
Telephone: 703-308-8245
Last EDR Contact: 05/01/2015
Next Scheduled EDR Contact: 08/17/2015
Data Release Frequency: Varies

WMUDS/SWAT: Waste Management Unit Database
Waste Management Unit Database System. WMUDS is used by the State Water Resources Control Board staff and the Regional Water Quality Control Boards for program tracking and inventory of waste management units. WMUDS is composed of the following databases: Facility Information, Scheduled Inspections Information, Waste Management Unit Information, SWAT Program Information, SWAT Report Summary Information, SWAT Report Summary Data, Chapter 15 (formerly Subchapter 15) Information, Chapter 15 Monitoring Parameters, TPCA Program Information, RCRA Program Information, Closure Information, and Interested Parties Information.

Date of Government Version: 04/01/2000
Date Data Arrived at EDR: 04/10/2000
Date Made Active in Reports: 05/10/2000
Number of Days to Update: 30
Source: State Water Resources Control Board
Telephone: 916-227-4448
Last EDR Contact: 05/06/2015
Next Scheduled EDR Contact: 08/24/2015
Data Release Frequency: No Update Planned

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Local Lists of Hazardous waste / Contaminated Sites

US CDL: Clandestine Drug Labs

A listing of clandestine drug lab locations. The U.S. Department of Justice ("the Department") provides this web site as a public service. It contains addresses of some locations where law enforcement agencies reported they found chemicals or other items that indicated the presence of either clandestine drug laboratories or dumpsites. In most cases, the source of the entries is not the Department, and the Department has not verified the entry and does not guarantee its accuracy. Members of the public must verify the accuracy of all entries by, for example, contacting local law enforcement and local health departments.

Date of Government Version: 02/25/2015
Date Data Arrived at EDR: 03/10/2015
Date Made Active in Reports: 03/25/2015
Number of Days to Update: 15

Source: Drug Enforcement Administration
Telephone: 202-307-1000
Last EDR Contact: 05/29/2015
Next Scheduled EDR Contact: 09/14/2015
Data Release Frequency: Quarterly

HIST CAL-SITES: Calsites Database

The Calsites database contains potential or confirmed hazardous substance release properties. In 1996, California EPA reevaluated and significantly reduced the number of sites in the Calsites database. No longer updated by the state agency. It has been replaced by ENVIROSTOR.

Date of Government Version: 08/08/2005
Date Data Arrived at EDR: 08/03/2006
Date Made Active in Reports: 08/24/2006
Number of Days to Update: 21

Source: Department of Toxic Substance Control
Telephone: 916-323-3400
Last EDR Contact: 02/23/2009
Next Scheduled EDR Contact: 05/25/2009
Data Release Frequency: No Update Planned

SCH: School Property Evaluation Program

This category contains proposed and existing school sites that are being evaluated by DTSC for possible hazardous materials contamination. In some cases, these properties may be listed in the CalSites category depending on the level of threat to public health and safety or the environment they pose.

Date of Government Version: 05/04/2015
Date Data Arrived at EDR: 05/05/2015
Date Made Active in Reports: 05/14/2015
Number of Days to Update: 9

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 05/05/2015
Next Scheduled EDR Contact: 08/17/2015
Data Release Frequency: Quarterly

TOXIC PITS: Toxic Pits Cleanup Act Sites

Toxic PITS Cleanup Act Sites. TOXIC PITS identifies sites suspected of containing hazardous substances where cleanup has not yet been completed.

Date of Government Version: 07/01/1995
Date Data Arrived at EDR: 08/30/1995
Date Made Active in Reports: 09/26/1995
Number of Days to Update: 27

Source: State Water Resources Control Board
Telephone: 916-227-4364
Last EDR Contact: 01/26/2009
Next Scheduled EDR Contact: 04/27/2009
Data Release Frequency: No Update Planned

CDL: Clandestine Drug Labs

A listing of drug lab locations. Listing of a location in this database does not indicate that any illegal drug lab materials were or were not present there, and does not constitute a determination that the location either requires or does not require additional cleanup work.

Date of Government Version: 12/31/2014
Date Data Arrived at EDR: 03/10/2015
Date Made Active in Reports: 03/18/2015
Number of Days to Update: 8

Source: Department of Toxic Substances Control
Telephone: 916-255-6504
Last EDR Contact: 04/13/2015
Next Scheduled EDR Contact: 07/27/2015
Data Release Frequency: Varies

US HIST CDL: National Clandestine Laboratory Register

A listing of clandestine drug lab locations. The U.S. Department of Justice ("the Department") provides this web site as a public service. It contains addresses of some locations where law enforcement agencies reported they found chemicals or other items that indicated the presence of either clandestine drug laboratories or dumpsites. In most cases, the source of the entries is not the Department, and the Department has not verified the entry and does not guarantee its accuracy. Members of the public must verify the accuracy of all entries by, for example, contacting local law enforcement and local health departments.

Date of Government Version: 02/25/2015
Date Data Arrived at EDR: 03/10/2015
Date Made Active in Reports: 03/25/2015
Number of Days to Update: 15

Source: Drug Enforcement Administration
Telephone: 202-307-1000
Last EDR Contact: 05/29/2015
Next Scheduled EDR Contact: 09/14/2015
Data Release Frequency: No Update Planned

Local Lists of Registered Storage Tanks

CA FID UST: Facility Inventory Database

The Facility Inventory Database (FID) contains a historical listing of active and inactive underground storage tank locations from the State Water Resource Control Board. Refer to local/county source for current data.

Date of Government Version: 10/31/1994
Date Data Arrived at EDR: 09/05/1995
Date Made Active in Reports: 09/29/1995
Number of Days to Update: 24

Source: California Environmental Protection Agency
Telephone: 916-341-5851
Last EDR Contact: 12/28/1998
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

UST MENDOCINO: Mendocino County UST Database

A listing of underground storage tank locations in Mendocino County.

Date of Government Version: 09/23/2009
Date Data Arrived at EDR: 09/23/2009
Date Made Active in Reports: 10/01/2009
Number of Days to Update: 8

Source: Department of Public Health
Telephone: 707-463-4466
Last EDR Contact: 06/01/2015
Next Scheduled EDR Contact: 09/14/2015
Data Release Frequency: Annually

HIST UST: Hazardous Substance Storage Container Database

The Hazardous Substance Storage Container Database is a historical listing of UST sites. Refer to local/county source for current data.

Date of Government Version: 10/15/1990
Date Data Arrived at EDR: 01/25/1991
Date Made Active in Reports: 02/12/1991
Number of Days to Update: 18

Source: State Water Resources Control Board
Telephone: 916-341-5851
Last EDR Contact: 07/26/2001
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

SWEEPS UST: SWEEPS UST Listing

Statewide Environmental Evaluation and Planning System. This underground storage tank listing was updated and maintained by a company contacted by the SWRCB in the early 1990's. The listing is no longer updated or maintained. The local agency is the contact for more information on a site on the SWEEPS list.

Date of Government Version: 06/01/1994
Date Data Arrived at EDR: 07/07/2005
Date Made Active in Reports: 08/11/2005
Number of Days to Update: 35

Source: State Water Resources Control Board
Telephone: N/A
Last EDR Contact: 06/03/2005
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

Local Land Records

LIENS 2: CERCLA Lien Information

A Federal CERCLA ('Superfund') lien can exist by operation of law at any site or property at which EPA has spent Superfund monies. These monies are spent to investigate and address releases and threatened releases of contamination. CERCLIS provides information as to the identity of these sites and properties.

Date of Government Version: 02/18/2014
Date Data Arrived at EDR: 03/18/2014
Date Made Active in Reports: 04/24/2014
Number of Days to Update: 37

Source: Environmental Protection Agency
Telephone: 202-564-6023
Last EDR Contact: 04/27/2015
Next Scheduled EDR Contact: 08/10/2015
Data Release Frequency: Varies

LIENS: Environmental Liens Listing

A listing of property locations with environmental liens for California where DTSC is a lien holder.

Date of Government Version: 03/11/2015
Date Data Arrived at EDR: 03/13/2015
Date Made Active in Reports: 03/24/2015
Number of Days to Update: 11

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 06/05/2015
Next Scheduled EDR Contact: 09/21/2015
Data Release Frequency: Varies

DEED: Deed Restriction Listing

Site Mitigation and Brownfields Reuse Program Facility Sites with Deed Restrictions & Hazardous Waste Management Program Facility Sites with Deed / Land Use Restriction. The DTSC Site Mitigation and Brownfields Reuse Program (SMBRP) list includes sites cleaned up under the program's oversight and generally does not include current or former hazardous waste facilities that required a hazardous waste facility permit. The list represents deed restrictions that are active. Some sites have multiple deed restrictions. The DTSC Hazardous Waste Management Program (HWMP) has developed a list of current or former hazardous waste facilities that have a recorded land use restriction at the local county recorder's office. The land use restrictions on this list were required by the DTSC HWMP as a result of the presence of hazardous substances that remain on site after the facility (or part of the facility) has been closed or cleaned up. The types of land use restriction include deed notice, deed restriction, or a land use restriction that binds current and future owners.

Date of Government Version: 03/09/2015
Date Data Arrived at EDR: 03/10/2015
Date Made Active in Reports: 03/18/2015
Number of Days to Update: 8

Source: DTSC and SWRCB
Telephone: 916-323-3400
Last EDR Contact: 06/09/2015
Next Scheduled EDR Contact: 09/21/2015
Data Release Frequency: Semi-Annually

Records of Emergency Release Reports

HMIRS: Hazardous Materials Information Reporting System

Hazardous Materials Incident Report System. HMIRS contains hazardous material spill incidents reported to DOT.

Date of Government Version: 03/30/2015
Date Data Arrived at EDR: 03/31/2015
Date Made Active in Reports: 06/11/2015
Number of Days to Update: 72

Source: U.S. Department of Transportation
Telephone: 202-366-4555
Last EDR Contact: 03/31/2015
Next Scheduled EDR Contact: 07/13/2015
Data Release Frequency: Annually

CHMIRS: California Hazardous Material Incident Report System

California Hazardous Material Incident Reporting System. CHMIRS contains information on reported hazardous material incidents (accidental releases or spills).

Date of Government Version: 04/14/2015
Date Data Arrived at EDR: 04/29/2015
Date Made Active in Reports: 05/21/2015
Number of Days to Update: 22

Source: Office of Emergency Services
Telephone: 916-845-8400
Last EDR Contact: 04/27/2015
Next Scheduled EDR Contact: 08/10/2015
Data Release Frequency: Varies

LDS: Land Disposal Sites Listing

The Land Disposal program regulates of waste discharge to land for treatment, storage and disposal in waste management units.

Date of Government Version: 03/13/2015
Date Data Arrived at EDR: 03/18/2015
Date Made Active in Reports: 03/24/2015
Number of Days to Update: 6

Source: State Water Qualilty Control Board
Telephone: 866-480-1028
Last EDR Contact: 06/17/2015
Next Scheduled EDR Contact: 09/28/2015
Data Release Frequency: Quarterly

MCS: Military Cleanup Sites Listing

The State Water Resources Control Board and nine Regional Water Quality Control Boards partner with the Department of Defense (DoD) through the Defense and State Memorandum of Agreement (DSMOA) to oversee the investigation and remediation of water quality issues at military facilities.

Date of Government Version: 03/13/2015
Date Data Arrived at EDR: 03/18/2015
Date Made Active in Reports: 03/24/2015
Number of Days to Update: 6

Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 06/17/2015
Next Scheduled EDR Contact: 09/28/2015
Data Release Frequency: Quarterly

SPILLS 90: SPILLS90 data from FirstSearch

Spills 90 includes those spill and release records available exclusively from FirstSearch databases. Typically, they may include chemical, oil and/or hazardous substance spills recorded after 1990. Duplicate records that are already included in EDR incident and release records are not included in Spills 90.

Date of Government Version: 06/06/2012
Date Data Arrived at EDR: 01/03/2013
Date Made Active in Reports: 02/22/2013
Number of Days to Update: 50

Source: FirstSearch
Telephone: N/A
Last EDR Contact: 01/03/2013
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

Other Ascertainable Records

RCRA NonGen / NLR: RCRA - Non Generators / No Longer Regulated

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Non-Generators do not presently generate hazardous waste.

Date of Government Version: 03/10/2015
Date Data Arrived at EDR: 03/31/2015
Date Made Active in Reports: 06/11/2015
Number of Days to Update: 72

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 03/31/2015
Next Scheduled EDR Contact: 07/13/2015
Data Release Frequency: Varies

DOT OPS: Incident and Accident Data

Department of Transporation, Office of Pipeline Safety Incident and Accident data.

Date of Government Version: 07/31/2012
Date Data Arrived at EDR: 08/07/2012
Date Made Active in Reports: 09/18/2012
Number of Days to Update: 42

Source: Department of Transporation, Office of Pipeline Safety
Telephone: 202-366-4595
Last EDR Contact: 05/05/2015
Next Scheduled EDR Contact: 08/17/2015
Data Release Frequency: Varies

DOD: Department of Defense Sites

This data set consists of federally owned or administered lands, administered by the Department of Defense, that have any area equal to or greater than 640 acres of the United States, Puerto Rico, and the U.S. Virgin Islands.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 11/10/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 62

Source: USGS
Telephone: 888-275-8747
Last EDR Contact: 04/14/2015
Next Scheduled EDR Contact: 07/27/2015
Data Release Frequency: Semi-Annually

FUDS: Formerly Used Defense Sites

The listing includes locations of Formerly Used Defense Sites properties where the US Army Corps of Engineers is actively working or will take necessary cleanup actions.

Date of Government Version: 06/06/2014
Date Data Arrived at EDR: 09/10/2014
Date Made Active in Reports: 09/18/2014
Number of Days to Update: 8

Source: U.S. Army Corps of Engineers
Telephone: 202-528-4285
Last EDR Contact: 06/12/2015
Next Scheduled EDR Contact: 09/21/2015
Data Release Frequency: Varies

CONSENT: Superfund (CERCLA) Consent Decrees

Major legal settlements that establish responsibility and standards for cleanup at NPL (Superfund) sites. Released periodically by United States District Courts after settlement by parties to litigation matters.

Date of Government Version: 12/31/2014
Date Data Arrived at EDR: 04/17/2015
Date Made Active in Reports: 06/02/2015
Number of Days to Update: 46

Source: Department of Justice, Consent Decree Library
Telephone: Varies
Last EDR Contact: 03/30/2015
Next Scheduled EDR Contact: 07/13/2015
Data Release Frequency: Varies

ROD: Records Of Decision

Record of Decision. ROD documents mandate a permanent remedy at an NPL (Superfund) site containing technical and health information to aid in the cleanup.

Date of Government Version: 11/25/2013
Date Data Arrived at EDR: 12/12/2013
Date Made Active in Reports: 02/24/2014
Number of Days to Update: 74

Source: EPA
Telephone: 703-416-0223
Last EDR Contact: 06/12/2015
Next Scheduled EDR Contact: 09/21/2015
Data Release Frequency: Annually

UMTRA: Uranium Mill Tailings Sites

Uranium ore was mined by private companies for federal government use in national defense programs. When the mills shut down, large piles of the sand-like material (mill tailings) remain after uranium has been extracted from the ore. Levels of human exposure to radioactive materials from the piles are low; however, in some cases tailings were used as construction materials before the potential health hazards of the tailings were recognized.

Date of Government Version: 09/14/2010
Date Data Arrived at EDR: 10/07/2011
Date Made Active in Reports: 03/01/2012
Number of Days to Update: 146

Source: Department of Energy
Telephone: 505-845-0011
Last EDR Contact: 05/26/2015
Next Scheduled EDR Contact: 09/07/2015
Data Release Frequency: Varies

US MINES: Mines Master Index File

Contains all mine identification numbers issued for mines active or opened since 1971. The data also includes violation information.

Date of Government Version: 12/30/2014
Date Data Arrived at EDR: 12/31/2014
Date Made Active in Reports: 01/29/2015
Number of Days to Update: 29

Source: Department of Labor, Mine Safety and Health Administration
Telephone: 303-231-5959
Last EDR Contact: 06/03/2015
Next Scheduled EDR Contact: 09/14/2015
Data Release Frequency: Semi-Annually

TRIS: Toxic Chemical Release Inventory System

Toxic Release Inventory System. TRIS identifies facilities which release toxic chemicals to the air, water and land in reportable quantities under SARA Title III Section 313.

Date of Government Version: 12/31/2013
Date Data Arrived at EDR: 02/12/2015
Date Made Active in Reports: 06/02/2015
Number of Days to Update: 110

Source: EPA
Telephone: 202-566-0250
Last EDR Contact: 01/29/2015
Next Scheduled EDR Contact: 06/08/2015
Data Release Frequency: Annually

TSCA: Toxic Substances Control Act

Toxic Substances Control Act. TSCA identifies manufacturers and importers of chemical substances included on the TSCA Chemical Substance Inventory list. It includes data on the production volume of these substances by plant site.

Date of Government Version: 12/31/2012
Date Data Arrived at EDR: 01/15/2015
Date Made Active in Reports: 01/29/2015
Number of Days to Update: 14

Source: EPA
Telephone: 202-260-5521
Last EDR Contact: 03/27/2015
Next Scheduled EDR Contact: 07/06/2015
Data Release Frequency: Every 4 Years

FTTS: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
FTTS tracks administrative cases and pesticide enforcement actions and compliance activities related to FIFRA, TSCA and EPCRA (Emergency Planning and Community Right-to-Know Act). To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 04/09/2009
Date Data Arrived at EDR: 04/16/2009
Date Made Active in Reports: 05/11/2009
Number of Days to Update: 25

Source: EPA/Office of Prevention, Pesticides and Toxic Substances
Telephone: 202-566-1667
Last EDR Contact: 05/20/2015
Next Scheduled EDR Contact: 09/07/2015
Data Release Frequency: Quarterly

FTTS INSP: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
A listing of FIFRA/TSCA Tracking System (FTTS) inspections and enforcements.

Date of Government Version: 04/09/2009
Date Data Arrived at EDR: 04/16/2009
Date Made Active in Reports: 05/11/2009
Number of Days to Update: 25

Source: EPA
Telephone: 202-566-1667
Last EDR Contact: 05/20/2015
Next Scheduled EDR Contact: 09/07/2015
Data Release Frequency: Quarterly

HIST FTTS: FIFRA/TSCA Tracking System Administrative Case Listing
A complete administrative case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

Date of Government Version: 10/19/2006
Date Data Arrived at EDR: 03/01/2007
Date Made Active in Reports: 04/10/2007
Number of Days to Update: 40

Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 12/17/2007
Next Scheduled EDR Contact: 03/17/2008
Data Release Frequency: No Update Planned

HIST FTTS INSP: FIFRA/TSCA Tracking System Inspection & Enforcement Case Listing
A complete inspection and enforcement case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

Date of Government Version: 10/19/2006
Date Data Arrived at EDR: 03/01/2007
Date Made Active in Reports: 04/10/2007
Number of Days to Update: 40

Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 12/17/2008
Next Scheduled EDR Contact: 03/17/2008
Data Release Frequency: No Update Planned

SSTS: Section 7 Tracking Systems
Section 7 of the Federal Insecticide, Fungicide and Rodenticide Act, as amended (92 Stat. 829) requires all registered pesticide-producing establishments to submit a report to the Environmental Protection Agency by March 1st each year. Each establishment must report the types and amounts of pesticides, active ingredients and devices being produced, and those having been produced and sold or distributed in the past year.

Date of Government Version: 12/31/2009
Date Data Arrived at EDR: 12/10/2010
Date Made Active in Reports: 02/25/2011
Number of Days to Update: 77

Source: EPA
Telephone: 202-564-4203
Last EDR Contact: 04/10/2015
Next Scheduled EDR Contact: 08/10/2015
Data Release Frequency: Annually

ICIS: Integrated Compliance Information System

The Integrated Compliance Information System (ICIS) supports the information needs of the national enforcement and compliance program as well as the unique needs of the National Pollutant Discharge Elimination System (NPDES) program.

Date of Government Version: 01/23/2015
Date Data Arrived at EDR: 02/06/2015
Date Made Active in Reports: 03/09/2015
Number of Days to Update: 31

Source: Environmental Protection Agency
Telephone: 202-564-5088
Last EDR Contact: 04/09/2015
Next Scheduled EDR Contact: 07/27/2015
Data Release Frequency: Quarterly

PADS: PCB Activity Database System

PCB Activity Database. PADS Identifies generators, transporters, commercial storers and/or brokers and disposers of PCB's who are required to notify the EPA of such activities.

Date of Government Version: 07/01/2014
Date Data Arrived at EDR: 10/15/2014
Date Made Active in Reports: 11/17/2014
Number of Days to Update: 33

Source: EPA
Telephone: 202-566-0500
Last EDR Contact: 04/17/2015
Next Scheduled EDR Contact: 07/27/2015
Data Release Frequency: Annually

MLTS: Material Licensing Tracking System

MLTS is maintained by the Nuclear Regulatory Commission and contains a list of approximately 8,100 sites which possess or use radioactive materials and which are subject to NRC licensing requirements. To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 03/31/2015
Date Data Arrived at EDR: 04/09/2015
Date Made Active in Reports: 06/11/2015
Number of Days to Update: 63

Source: Nuclear Regulatory Commission
Telephone: 301-415-7169
Last EDR Contact: 06/04/2015
Next Scheduled EDR Contact: 09/21/2015
Data Release Frequency: Quarterly

RADINFO: Radiation Information Database

The Radiation Information Database (RADINFO) contains information about facilities that are regulated by U.S. Environmental Protection Agency (EPA) regulations for radiation and radioactivity.

Date of Government Version: 04/07/2015
Date Data Arrived at EDR: 04/09/2015
Date Made Active in Reports: 06/11/2015
Number of Days to Update: 63

Source: Environmental Protection Agency
Telephone: 202-343-9775
Last EDR Contact: 04/09/2015
Next Scheduled EDR Contact: 07/20/2015
Data Release Frequency: Quarterly

FINDS: Facility Index System/Facility Registry System

Facility Index System. FINDS contains both facility information and 'pointers' to other sources that contain more detail. EDR includes the following FINDS databases in this report: PCS (Permit Compliance System), AIRS (Aerometric Information Retrieval System), DOCKET (Enforcement Docket used to manage and track information on civil judicial enforcement cases for all environmental statutes), FURS (Federal Underground Injection Control), C-DOCKET (Criminal Docket System used to track criminal enforcement actions for all environmental statutes), FFIS (Federal Facilities Information System), STATE (State Environmental Laws and Statutes), and PADS (PCB Activity Data System).

Date of Government Version: 01/18/2015
Date Data Arrived at EDR: 02/27/2015
Date Made Active in Reports: 03/25/2015
Number of Days to Update: 26

Source: EPA
Telephone: (415) 947-8000
Last EDR Contact: 06/10/2015
Next Scheduled EDR Contact: 09/21/2015
Data Release Frequency: Quarterly

RAATS: RCRA Administrative Action Tracking System

RCRA Administration Action Tracking System. RAATS contains records based on enforcement actions issued under RCRA pertaining to major violators and includes administrative and civil actions brought by the EPA. For administration actions after September 30, 1995, data entry in the RAATS database was discontinued. EPA will retain a copy of the database for historical records. It was necessary to terminate RAATS because a decrease in agency resources made it impossible to continue to update the information contained in the database.

Date of Government Version: 04/17/1995
Date Data Arrived at EDR: 07/03/1995
Date Made Active in Reports: 08/07/1995
Number of Days to Update: 35

Source: EPA
Telephone: 202-564-4104
Last EDR Contact: 06/02/2008
Next Scheduled EDR Contact: 09/01/2008
Data Release Frequency: No Update Planned

RMP: Risk Management Plans

When Congress passed the Clean Air Act Amendments of 1990, it required EPA to publish regulations and guidance for chemical accident prevention at facilities using extremely hazardous substances. The Risk Management Program Rule (RMP Rule) was written to implement Section 112(r) of these amendments. The rule, which built upon existing industry codes and standards, requires companies of all sizes that use certain flammable and toxic substances to develop a Risk Management Program, which includes a(n): Hazard assessment that details the potential effects of an accidental release, an accident history of the last five years, and an evaluation of worst-case and alternative accidental releases; Prevention program that includes safety precautions and maintenance, monitoring, and employee training measures; and Emergency response program that spells out emergency health care, employee training measures and procedures for informing the public and response agencies (e.g the fire department) should an accident occur.

Date of Government Version: 02/01/2015
Date Data Arrived at EDR: 02/13/2015
Date Made Active in Reports: 03/25/2015
Number of Days to Update: 40

Source: Environmental Protection Agency
Telephone: 202-564-8600
Last EDR Contact: 04/27/2015
Next Scheduled EDR Contact: 08/10/2015
Data Release Frequency: Varies

BRS: Biennial Reporting System

The Biennial Reporting System is a national system administered by the EPA that collects data on the generation and management of hazardous waste. BRS captures detailed data from two groups: Large Quantity Generators (LQG) and Treatment, Storage, and Disposal Facilities.

Date of Government Version: 12/31/2011
Date Data Arrived at EDR: 02/26/2013
Date Made Active in Reports: 04/19/2013
Number of Days to Update: 52

Source: EPA/NTIS
Telephone: 800-424-9346
Last EDR Contact: 05/29/2015
Next Scheduled EDR Contact: 09/07/2015
Data Release Frequency: Biennially

CA BOND EXP. PLAN: Bond Expenditure Plan

Department of Health Services developed a site-specific expenditure plan as the basis for an appropriation of Hazardous Substance Cleanup Bond Act funds. It is not updated.

Date of Government Version: 01/01/1989
Date Data Arrived at EDR: 07/27/1994
Date Made Active in Reports: 08/02/1994
Number of Days to Update: 6

Source: Department of Health Services
Telephone: 916-255-2118
Last EDR Contact: 05/31/1994
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

UIC: UIC Listing

A listing of wells identified as underground injection wells, in the California Oil and Gas Wells database.

Date of Government Version: 11/19/2014
Date Data Arrived at EDR: 12/15/2014
Date Made Active in Reports: 01/29/2015
Number of Days to Update: 45

Source: Deaprtment of Conservation
Telephone: 916-445-2408
Last EDR Contact: 03/20/2015
Next Scheduled EDR Contact: 06/29/2015
Data Release Frequency: Varies

NPDES: NPDES Permits Listing
A listing of NPDES permits, including stormwater.

Date of Government Version: 05/18/2015
Date Data Arrived at EDR: 05/20/2015
Date Made Active in Reports: 06/11/2015
Number of Days to Update: 22
Source: State Water Resources Control Board
Telephone: 916-445-9379
Last EDR Contact: 05/20/2015
Next Scheduled EDR Contact: 08/31/2015
Data Release Frequency: Quarterly

CORTESE: "Cortese" Hazardous Waste & Substances Sites List
The sites for the list are designated by the State Water Resource Control Board (LUST), the Integrated Waste Board (SWF/LS), and the Department of Toxic Substances Control (Cal-Sites).

Date of Government Version: 03/10/2015
Date Data Arrived at EDR: 03/31/2015
Date Made Active in Reports: 04/10/2015
Number of Days to Update: 10
Source: CAL EPA/Office of Emergency Information
Telephone: 916-323-3400
Last EDR Contact: 03/31/2015
Next Scheduled EDR Contact: 07/13/2015
Data Release Frequency: Quarterly

HIST CORTESE: Hazardous Waste & Substance Site List
The sites for the list are designated by the State Water Resource Control Board [LUST], the Integrated Waste Board [SWF/LS], and the Department of Toxic Substances Control [CALSITES]. This listing is no longer updated by the state agency.

Date of Government Version: 04/01/2001
Date Data Arrived at EDR: 01/22/2009
Date Made Active in Reports: 04/08/2009
Number of Days to Update: 76
Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 01/22/2009
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

NOTIFY 65: Proposition 65 Records
Listings of all Proposition 65 incidents reported to counties by the State Water Resources Control Board and the Regional Water Quality Control Board. This database is no longer updated by the reporting agency.

Date of Government Version: 10/21/1993
Date Data Arrived at EDR: 11/01/1993
Date Made Active in Reports: 11/19/1993
Number of Days to Update: 18
Source: State Water Resources Control Board
Telephone: 916-445-3846
Last EDR Contact: 06/17/2015
Next Scheduled EDR Contact: 10/05/2015
Data Release Frequency: No Update Planned

DRYCLEANERS: Cleaner Facilities
A list of drycleaner related facilities that have EPA ID numbers. These are facilities with certain SIC codes: power laundries, family and commercial; garment pressing and cleaner's agents; linen supply; coin-operated laundries and cleaning; drycleaning plants, except rugs; carpet and upholster cleaning; industrial launderers; laundry and garment services.

Date of Government Version: 02/18/2015
Date Data Arrived at EDR: 02/20/2015
Date Made Active in Reports: 03/12/2015
Number of Days to Update: 20
Source: Department of Toxic Substance Control
Telephone: 916-327-4498
Last EDR Contact: 06/05/2015
Next Scheduled EDR Contact: 09/21/2015
Data Release Frequency: Annually

WIP: Well Investigation Program Case List
Well Investigation Program case in the San Gabriel and San Fernando Valley area.

Date of Government Version: 07/03/2009
Date Data Arrived at EDR: 07/21/2009
Date Made Active in Reports: 08/03/2009
Number of Days to Update: 13
Source: Los Angeles Water Quality Control Board
Telephone: 213-576-6726
Last EDR Contact: 03/30/2015
Next Scheduled EDR Contact: 07/13/2015
Data Release Frequency: Varies

ENF: Enforcement Action Listing

A listing of Water Board Enforcement Actions. Formal is everything except Oral/Verbal Communication, Notice of Violation, Expedited Payment Letter, and Staff Enforcement Letter.

Date of Government Version: 04/30/2015
Date Data Arrived at EDR: 05/01/2015
Date Made Active in Reports: 05/13/2015
Number of Days to Update: 12

Source: State Water Resoruces Control Board
Telephone: 916-445-9379
Last EDR Contact: 04/27/2015
Next Scheduled EDR Contact: 08/10/2015
Data Release Frequency: Varies

HAZNET: Facility and Manifest Data

Facility and Manifest Data. The data is extracted from the copies of hazardous waste manifests received each year by the DTSC. The annual volume of manifests is typically 700,000 - 1,000,000 annually, representing approximately 350,000 - 500,000 shipments. Data are from the manifests submitted without correction, and therefore many contain some invalid values for data elements such as generator ID, TSD ID, waste category, and disposal method. This database begins with calendar year 1993.

Date of Government Version: 12/31/2013
Date Data Arrived at EDR: 10/15/2014
Date Made Active in Reports: 11/19/2014
Number of Days to Update: 35

Source: California Environmental Protection Agency
Telephone: 916-255-1136
Last EDR Contact: 04/17/2015
Next Scheduled EDR Contact: 07/27/2015
Data Release Frequency: Annually

EMI: Emissions Inventory Data

Toxics and criteria pollutant emissions data collected by the ARB and local air pollution agencies.

Date of Government Version: 12/31/2012
Date Data Arrived at EDR: 03/25/2014
Date Made Active in Reports: 04/28/2014
Number of Days to Update: 34

Source: California Air Resources Board
Telephone: 916-322-2990
Last EDR Contact: 03/27/2015
Next Scheduled EDR Contact: 07/06/2015
Data Release Frequency: Varies

INDIAN RESERV: Indian Reservations

This map layer portrays Indian administered lands of the United States that have any area equal to or greater than 640 acres.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 12/08/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 34

Source: USGS
Telephone: 202-208-3710
Last EDR Contact: 04/14/2015
Next Scheduled EDR Contact: 07/27/2015
Data Release Frequency: Semi-Annually

SCRD DRYCLEANERS: State Coalition for Remediation of Drycleaners Listing

The State Coalition for Remediation of Drycleaners was established in 1998, with support from the U.S. EPA Office of Superfund Remediation and Technology Innovation. It is comprised of representatives of states with established drycleaner remediation programs. Currently the member states are Alabama, Connecticut, Florida, Illinois, Kansas, Minnesota, Missouri, North Carolina, Oregon, South Carolina, Tennessee, Texas, and Wisconsin.

Date of Government Version: 03/07/2011
Date Data Arrived at EDR: 03/09/2011
Date Made Active in Reports: 05/02/2011
Number of Days to Update: 54

Source: Environmental Protection Agency
Telephone: 615-532-8599
Last EDR Contact: 05/21/2015
Next Scheduled EDR Contact: 08/31/2015
Data Release Frequency: Varies

LEAD SMELTER 1: Lead Smelter Sites

A listing of former lead smelter site locations.

Date of Government Version: 11/25/2014
Date Data Arrived at EDR: 11/26/2014
Date Made Active in Reports: 01/29/2015
Number of Days to Update: 64

Source: Environmental Protection Agency
Telephone: 703-603-8787
Last EDR Contact: 04/10/2015
Next Scheduled EDR Contact: 07/20/2015
Data Release Frequency: Varies

LEAD SMELTER 2: Lead Smelter Sites

A list of several hundred sites in the U.S. where secondary lead smelting was done from 1931and 1964. These sites may pose a threat to public health through ingestion or inhalation of contaminated soil or dust

Date of Government Version: 04/05/2001
Date Data Arrived at EDR: 10/27/2010
Date Made Active in Reports: 12/02/2010
Number of Days to Update: 36

Source: American Journal of Public Health
Telephone: 703-305-6451
Last EDR Contact: 12/02/2009
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

WDS: Waste Discharge System

Sites which have been issued waste discharge requirements.

Date of Government Version: 06/19/2007
Date Data Arrived at EDR: 06/20/2007
Date Made Active in Reports: 06/29/2007
Number of Days to Update: 9

Source: State Water Resources Control Board
Telephone: 916-341-5227
Last EDR Contact: 05/20/2015
Next Scheduled EDR Contact: 09/07/2015
Data Release Frequency: Quarterly

PRP: Potentially Responsible Parties

A listing of verified Potentially Responsible Parties

Date of Government Version: 10/25/2013
Date Data Arrived at EDR: 10/17/2014
Date Made Active in Reports: 10/20/2014
Number of Days to Update: 3

Source: EPA
Telephone: 202-564-6023
Last EDR Contact: 05/14/2015
Next Scheduled EDR Contact: 08/24/2015
Data Release Frequency: Quarterly

2020 COR ACTION: 2020 Corrective Action Program List

The EPA has set ambitious goals for the RCRA Corrective Action program by creating the 2020 Corrective Action Universe. This RCRA cleanup baseline includes facilities expected to need corrective action. The 2020 universe contains a wide variety of sites. Some properties are heavily contaminated while others were contaminated but have since been cleaned up. Still others have not been fully investigated yet, and may require little or no remediation. Inclusion in the 2020 Universe does not necessarily imply failure on the part of a facility to meet its RCRA obligations.

Date of Government Version: 04/22/2013
Date Data Arrived at EDR: 03/03/2015
Date Made Active in Reports: 03/09/2015
Number of Days to Update: 6

Source: Environmental Protection Agency
Telephone: 703-308-4044
Last EDR Contact: 05/14/2015
Next Scheduled EDR Contact: 08/24/2015
Data Release Frequency: Varies

EPA WATCH LIST: EPA WATCH LIST

EPA maintains a "Watch List" to facilitate dialogue between EPA, state and local environmental agencies on enforcement matters relating to facilities with alleged violations identified as either significant or high priority. Being on the Watch List does not mean that the facility has actually violated the law only that an investigation by EPA or a state or local environmental agency has led those organizations to allege that an unproven violation has in fact occurred. Being on the Watch List does not represent a higher level of concern regarding the alleged violations that were detected, but instead indicates cases requiring additional dialogue between EPA, state and local agencies - primarily because of the length of time the alleged violation has gone unaddressed or unresolved.

Date of Government Version: 08/30/2013
Date Data Arrived at EDR: 03/21/2014
Date Made Active in Reports: 06/17/2014
Number of Days to Update: 88

Source: Environmental Protection Agency
Telephone: 617-520-3000
Last EDR Contact: 05/07/2015
Next Scheduled EDR Contact: 08/24/2015
Data Release Frequency: Quarterly

PROC: Certified Processors Database

A listing of certified processors.

Date of Government Version: 03/16/2015
Date Data Arrived at EDR: 03/18/2015
Date Made Active in Reports: 03/24/2015
Number of Days to Update: 6

Source: Department of Conservation
Telephone: 916-323-3836
Last EDR Contact: 06/17/2015
Next Scheduled EDR Contact: 09/28/2015
Data Release Frequency: Quarterly

Financial Assurance 1: Financial Assurance Information Listing
Financial Assurance information

Date of Government Version: 04/30/2015
Date Data Arrived at EDR: 05/01/2015
Date Made Active in Reports: 05/13/2015
Number of Days to Update: 12

Source: Department of Toxic Substances Control
Telephone: 916-255-3628
Last EDR Contact: 04/27/2015
Next Scheduled EDR Contact: 08/10/2015
Data Release Frequency: Varies

Financial Assurance 2: Financial Assurance Information Listing
A listing of financial assurance information for solid waste facilities. Financial assurance is intended to ensure that resources are available to pay for the cost of closure, post-closure care, and corrective measures if the owner or operator of a regulated facility is unable or unwilling to pay.

Date of Government Version: 05/18/2015
Date Data Arrived at EDR: 05/22/2015
Date Made Active in Reports: 06/05/2015
Number of Days to Update: 14

Source: California Integrated Waste Management Board
Telephone: 916-341-6066
Last EDR Contact: 05/18/2015
Next Scheduled EDR Contact: 08/31/2015
Data Release Frequency: Varies

PCB TRANSFORMER: PCB Transformer Registration Database
The database of PCB transformer registrations that includes all PCB registration submittals.

Date of Government Version: 02/01/2011
Date Data Arrived at EDR: 10/19/2011
Date Made Active in Reports: 01/10/2012
Number of Days to Update: 83

Source: Environmental Protection Agency
Telephone: 202-566-0517
Last EDR Contact: 05/01/2015
Next Scheduled EDR Contact: 08/10/2015
Data Release Frequency: Varies

US FIN ASSUR: Financial Assurance Information
All owners and operators of facilities that treat, store, or dispose of hazardous waste are required to provide proof that they will have sufficient funds to pay for the clean up, closure, and post-closure care of their facilities.

Date of Government Version: 03/09/2015
Date Data Arrived at EDR: 03/10/2015
Date Made Active in Reports: 03/25/2015
Number of Days to Update: 15

Source: Environmental Protection Agency
Telephone: 202-566-1917
Last EDR Contact: 05/14/2015
Next Scheduled EDR Contact: 08/31/2015
Data Release Frequency: Quarterly

COAL ASH EPA: Coal Combustion Residues Surface Impoundments List
A listing of coal combustion residues surface impoundments with high hazard potential ratings.

Date of Government Version: 07/01/2014
Date Data Arrived at EDR: 09/10/2014
Date Made Active in Reports: 10/20/2014
Number of Days to Update: 40

Source: Environmental Protection Agency
Telephone: N/A
Last EDR Contact: 06/12/2015
Next Scheduled EDR Contact: 09/21/2015
Data Release Frequency: Varies

MWMP: Medical Waste Management Program Listing
The Medical Waste Management Program (MWMP) ensures the proper handling and disposal of medical waste by permitting and inspecting medical waste Offsite Treatment Facilities (PDF) and Transfer Stations (PDF) throughout the state. MWMP also oversees all Medical Waste Transporters.

Date of Government Version: 01/16/2015
Date Data Arrived at EDR: 03/10/2015
Date Made Active in Reports: 03/18/2015
Number of Days to Update: 8

Source: Department of Public Health
Telephone: 916-558-1784
Last EDR Contact: 06/09/2015
Next Scheduled EDR Contact: 09/21/2015
Data Release Frequency: Varies

US AIRS MINOR: Air Facility System Data
A listing of minor source facilities.

Date of Government Version: 10/16/2014
Date Data Arrived at EDR: 10/31/2014
Date Made Active in Reports: 11/17/2014
Number of Days to Update: 17

Source: EPA
Telephone: 202-564-2496
Last EDR Contact: 03/30/2015
Next Scheduled EDR Contact: 07/13/2015
Data Release Frequency: Annually

US AIRS (AFS): Aerometric Information Retrieval System Facility Subsystem (AFS)
The database is a sub-system of Aerometric Information Retrieval System (AIRS). AFS contains compliance data on air pollution point sources regulated by the U.S. EPA and/or state and local air regulatory agencies. This information comes from source reports by various stationary sources of air pollution, such as electric power plants, steel mills, factories, and universities, and provides information about the air pollutants they produce. Action, air program, air program pollutant, and general level plant data. It is used to track emissions and compliance data from industrial plants.

Date of Government Version: 10/16/2014
Date Data Arrived at EDR: 10/31/2014
Date Made Active in Reports: 11/17/2014
Number of Days to Update: 17

Source: EPA
Telephone: 202-564-2496
Last EDR Contact: 03/30/2015
Next Scheduled EDR Contact: 07/13/2015
Data Release Frequency: Annually

HWP: EnviroStor Permitted Facilities Listing
Detailed information on permitted hazardous waste facilities and corrective action ("cleanups") tracked in EnviroStor.

Date of Government Version: 05/26/2015
Date Data Arrived at EDR: 05/28/2015
Date Made Active in Reports: 06/05/2015
Number of Days to Update: 8

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 05/28/2015
Next Scheduled EDR Contact: 09/07/2015
Data Release Frequency: Quarterly

HWT: Registered Hazardous Waste Transporter Database
A listing of hazardous waste transporters. In California, unless specifically exempted, it is unlawful for any person to transport hazardous wastes unless the person holds a valid registration issued by DTSC. A hazardous waste transporter registration is valid for one year and is assigned a unique registration number.

Date of Government Version: 04/13/2015
Date Data Arrived at EDR: 04/15/2015
Date Made Active in Reports: 04/23/2015
Number of Days to Update: 8

Source: Department of Toxic Substances Control
Telephone: 916-440-7145
Last EDR Contact: 04/15/2015
Next Scheduled EDR Contact: 07/27/2015
Data Release Frequency: Quarterly

COAL ASH DOE: Steam-Electric Plant Operation Data
A listing of power plants that store ash in surface ponds.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 08/07/2009
Date Made Active in Reports: 10/22/2009
Number of Days to Update: 76

Source: Department of Energy
Telephone: 202-586-8719
Last EDR Contact: 04/15/2015
Next Scheduled EDR Contact: 07/27/2015
Data Release Frequency: Varies

FEDLAND: Federal and Indian Lands
Federally and Indian administrated lands of the United States. Lands included are administrated by: Army Corps of Engineers, Bureau of Reclamation, National Wild and Scenic River, National Wildlife Refuge, Public Domain Land, Wilderness, Wilderness Study Area, Wildlife Management Area, Bureau of Indian Affairs, Bureau of Land Management, Department of Justice, Forest Service, Fish and Wildlife Service, National Park Service.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 02/06/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 339

Source: U.S. Geological Survey
Telephone: 888-275-8747
Last EDR Contact: 04/14/2015
Next Scheduled EDR Contact: 07/27/2015
Data Release Frequency: N/A

EDR HIGH RISK HISTORICAL RECORDS

EDR Exclusive Records

EDR MGP: EDR Proprietary Manufactured Gas Plants

The EDR Proprietary Manufactured Gas Plant Database includes records of coal gas plants (manufactured gas plants) compiled by EDR's researchers. Manufactured gas sites were used in the United States from the 1800's to 1950's to produce a gas that could be distributed and used as fuel. These plants used whale oil, rosin, coal, or a mixture of coal, oil, and water that also produced a significant amount of waste. Many of the byproducts of the gas production, such as coal tar (oily waste containing volatile and non-volatile chemicals), sludges, oils and other compounds are potentially hazardous to human health and the environment. The byproduct from this process was frequently disposed of directly at the plant site and can remain or spread slowly, serving as a continuous source of soil and groundwater contamination.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

EDR US Hist Auto Stat: EDR Exclusive Historic Gas Stations

EDR has searched selected national collections of business directories and has collected listings of potential gas station/filling station/service station sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include gas station/filling station/service station establishments. The categories reviewed included, but were not limited to gas, gas station, gasoline station, filling station, auto, automobile repair, auto service station, service station, etc. This database falls within a category of information EDR classifies as "High Risk Historical Records", or HRHR. EDR's HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

EDR US Hist Cleaners: EDR Exclusive Historic Dry Cleaners

EDR has searched selected national collections of business directories and has collected listings of potential dry cleaner sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include dry cleaning establishments. The categories reviewed included, but were not limited to dry cleaners, cleaners, laundry, laundromat, cleaning/laundry, wash & dry etc. This database falls within a category of information EDR classifies as "High Risk Historical Records", or HRHR. EDR's HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

EDR RECOVERED GOVERNMENT ARCHIVES

Exclusive Recovered Govt. Archives

RGA LUST: Recovered Government Archive Leaking Underground Storage Tank

The EDR Recovered Government Archive Leaking Underground Storage Tank database provides a list of LUST incidents derived from historical databases and includes many records that no longer appear in current government lists. Compiled from Records formerly available from the State Water Resources Control Board in California.

Date of Government Version: N/A
Date Data Arrived at EDR: 07/01/2013
Date Made Active in Reports: 12/30/2013
Number of Days to Update: 182

Source: State Water Resources Control Board
Telephone: N/A
Last EDR Contact: 06/01/2012
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

RGA LF: Recovered Government Archive Solid Waste Facilities List

The EDR Recovered Government Archive Landfill database provides a list of landfills derived from historical databases and includes many records that no longer appear in current government lists. Compiled from Records formerly available from the Department of Resources Recycling and Recovery in California.

Date of Government Version: N/A
Date Data Arrived at EDR: 07/01/2013
Date Made Active in Reports: 01/13/2014
Number of Days to Update: 196

Source: Department of Resources Recycling and Recovery
Telephone: N/A
Last EDR Contact: 06/01/2012
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

COUNTY RECORDS

ALAMEDA COUNTY:

Contaminated Sites

A listing of contaminated sites overseen by the Toxic Release Program (oil and groundwater contamination from chemical releases and spills) and the Leaking Underground Storage Tank Program (soil and ground water contamination from leaking petroleum USTs).

Date of Government Version: 01/21/2015
Date Data Arrived at EDR: 01/28/2015
Date Made Active in Reports: 02/26/2015
Number of Days to Update: 29

Source: Alameda County Environmental Health Services
Telephone: 510-567-6700
Last EDR Contact: 05/21/2015
Next Scheduled EDR Contact: 07/13/2015
Data Release Frequency: Semi-Annually

Underground Tanks

Underground storage tank sites located in Alameda county.

Date of Government Version: 01/21/2015
Date Data Arrived at EDR: 01/28/2015
Date Made Active in Reports: 02/26/2015
Number of Days to Update: 29

Source: Alameda County Environmental Health Services
Telephone: 510-567-6700
Last EDR Contact: 05/21/2015
Next Scheduled EDR Contact: 07/13/2015
Data Release Frequency: Semi-Annually

AMADOR COUNTY:

CUPA Facility List

Cupa Facility List

Date of Government Version: 03/09/2015
Date Data Arrived at EDR: 03/24/2015
Date Made Active in Reports: 03/31/2015
Number of Days to Update: 7

Source: Amador County Environmental Health
Telephone: 209-223-6439
Last EDR Contact: 06/05/2015
Next Scheduled EDR Contact: 09/21/2015
Data Release Frequency: Varies

BUTTE COUNTY:

CUPA Facility Listing
Cupa facility list.

Date of Government Version: 11/20/2014
Date Data Arrived at EDR: 11/24/2014
Date Made Active in Reports: 01/07/2015
Number of Days to Update: 44

Source: Public Health Department
Telephone: 530-538-7149
Last EDR Contact: 04/14/2015
Next Scheduled EDR Contact: 04/27/2015
Data Release Frequency: No Update Planned

CALVERAS COUNTY:

CUPA Facility Listing
Cupa Facility Listing

Date of Government Version: 04/17/2015
Date Data Arrived at EDR: 04/21/2015
Date Made Active in Reports: 05/07/2015
Number of Days to Update: 16

Source: Calveras County Environmental Health
Telephone: 209-754-6399
Last EDR Contact: 03/30/2015
Next Scheduled EDR Contact: 07/13/2015
Data Release Frequency: Quarterly

COLUSA COUNTY:

CUPA Facility List
Cupa facility list.

Date of Government Version: 06/11/2014
Date Data Arrived at EDR: 06/13/2014
Date Made Active in Reports: 07/07/2014
Number of Days to Update: 24

Source: Health & Human Services
Telephone: 530-458-0396
Last EDR Contact: 06/12/2015
Next Scheduled EDR Contact: 08/24/2015
Data Release Frequency: Varies

CONTRA COSTA COUNTY:

Site List
List includes sites from the underground tank, hazardous waste generator and business plan/2185 programs.

Date of Government Version: 05/26/2015
Date Data Arrived at EDR: 05/29/2015
Date Made Active in Reports: 06/11/2015
Number of Days to Update: 13

Source: Contra Costa Health Services Department
Telephone: 925-646-2286
Last EDR Contact: 05/04/2015
Next Scheduled EDR Contact: 08/17/2015
Data Release Frequency: Semi-Annually

DEL NORTE COUNTY:

CUPA Facility List
Cupa Facility list

Date of Government Version: 05/19/2015
Date Data Arrived at EDR: 05/22/2015
Date Made Active in Reports: 06/05/2015
Number of Days to Update: 14

Source: Del Norte County Environmental Health Division
Telephone: 707-465-0426
Last EDR Contact: 05/18/2015
Next Scheduled EDR Contact: 08/17/2015
Data Release Frequency: Varies

EL DORADO COUNTY:

CUPA Facility List
CUPA facility list.

Date of Government Version: 05/26/2015
Date Data Arrived at EDR: 05/29/2015
Date Made Active in Reports: 06/05/2015
Number of Days to Update: 7

Source: El Dorado County Environmental Management Department
Telephone: 530-621-6623
Last EDR Contact: 05/04/2015
Next Scheduled EDR Contact: 08/17/2015
Data Release Frequency: Varies

FRESNO COUNTY:

CUPA Resources List
Certified Unified Program Agency. CUPA's are responsible for implementing a unified hazardous materials and hazardous waste management regulatory program. The agency provides oversight of businesses that deal with hazardous materials, operate underground storage tanks or aboveground storage tanks.

Date of Government Version: 03/31/2015
Date Data Arrived at EDR: 04/15/2015
Date Made Active in Reports: 04/23/2015
Number of Days to Update: 8

Source: Dept. of Community Health
Telephone: 559-445-3271
Last EDR Contact: 04/06/2015
Next Scheduled EDR Contact: 07/20/2015
Data Release Frequency: Semi-Annually

HUMBOLDT COUNTY:

CUPA Facility List
CUPA facility list.

Date of Government Version: 03/11/2015
Date Data Arrived at EDR: 03/13/2015
Date Made Active in Reports: 03/24/2015
Number of Days to Update: 11

Source: Humboldt County Environmental Health
Telephone: N/A
Last EDR Contact: 05/26/2015
Next Scheduled EDR Contact: 09/07/2015
Data Release Frequency: Varies

IMPERIAL COUNTY:

CUPA Facility List
Cupa facility list.

Date of Government Version: 04/27/2015
Date Data Arrived at EDR: 04/28/2015
Date Made Active in Reports: 05/13/2015
Number of Days to Update: 15

Source: San Diego Border Field Office
Telephone: 760-339-2777
Last EDR Contact: 04/27/2015
Next Scheduled EDR Contact: 08/10/2015
Data Release Frequency: Varies

INYO COUNTY:

CUPA Facility List
Cupa facility list.

Date of Government Version: 09/10/2013
Date Data Arrived at EDR: 09/11/2013
Date Made Active in Reports: 10/14/2013
Number of Days to Update: 33

Source: Inyo County Environmental Health Services
Telephone: 760-878-0238
Last EDR Contact: 05/21/2015
Next Scheduled EDR Contact: 09/07/2015
Data Release Frequency: Varies

KERN COUNTY:

Underground Storage Tank Sites & Tank Listing
Kern County Sites and Tanks Listing.

Date of Government Version: 07/22/2014
Date Data Arrived at EDR: 11/12/2014
Date Made Active in Reports: 12/19/2014
Number of Days to Update: 37

Source: Kern County Environment Health Services Department
Telephone: 661-862-8700
Last EDR Contact: 06/12/2015
Next Scheduled EDR Contact: 08/24/2015
Data Release Frequency: Quarterly

KINGS COUNTY:

CUPA Facility List
A listing of sites included in the county's Certified Unified Program Agency database. California's Secretary for Environmental Protection established the unified hazardous materials and hazardous waste regulatory program as required by chapter 6.11 of the California Health and Safety Code. The Unified Program consolidates the administration, permits, inspections, and enforcement activities.

Date of Government Version: 05/26/2015
Date Data Arrived at EDR: 05/28/2015
Date Made Active in Reports: 06/15/2015
Number of Days to Update: 18

Source: Kings County Department of Public Health
Telephone: 559-584-1411
Last EDR Contact: 05/21/2015
Next Scheduled EDR Contact: 09/07/2015
Data Release Frequency: Varies

LAKE COUNTY:

CUPA Facility List
Cupa facility list

Date of Government Version: 05/05/2015
Date Data Arrived at EDR: 05/07/2015
Date Made Active in Reports: 05/20/2015
Number of Days to Update: 13

Source: Lake County Environmental Health
Telephone: 707-263-1164
Last EDR Contact: 04/16/2015
Next Scheduled EDR Contact: 08/03/2015
Data Release Frequency: Varies

LOS ANGELES COUNTY:

San Gabriel Valley Areas of Concern
San Gabriel Valley areas where VOC contamination is at or above the MCL as designated by region 9 EPA office.

Date of Government Version: 03/30/2009
Date Data Arrived at EDR: 03/31/2009
Date Made Active in Reports: 10/23/2009
Number of Days to Update: 206

Source: EPA Region 9
Telephone: 415-972-3178
Last EDR Contact: 06/17/2015
Next Scheduled EDR Contact: 10/05/2015
Data Release Frequency: No Update Planned

HMS: Street Number List
Industrial Waste and Underground Storage Tank Sites.

Date of Government Version: 11/24/2014
Date Data Arrived at EDR: 01/30/2015
Date Made Active in Reports: 03/04/2015
Number of Days to Update: 33

Source: Department of Public Works
Telephone: 626-458-3517
Last EDR Contact: 04/13/2015
Next Scheduled EDR Contact: 07/27/2015
Data Release Frequency: Semi-Annually

List of Solid Waste Facilities
Solid Waste Facilities in Los Angeles County.

Date of Government Version: 04/20/2015
Date Data Arrived at EDR: 04/20/2015
Date Made Active in Reports: 05/07/2015
Number of Days to Update: 17

Source: La County Department of Public Works
Telephone: 818-458-5185
Last EDR Contact: 04/20/2015
Next Scheduled EDR Contact: 08/03/2015
Data Release Frequency: Varies

City of Los Angeles Landfills

Landfills owned and maintained by the City of Los Angeles.

Date of Government Version: 03/05/2009
Date Data Arrived at EDR: 03/10/2009
Date Made Active in Reports: 04/08/2009
Number of Days to Update: 29

Source: Engineering & Construction Division
Telephone: 213-473-7869
Last EDR Contact: 04/15/2015
Next Scheduled EDR Contact: 08/03/2015
Data Release Frequency: Varies

Site Mitigation List

Industrial sites that have had some sort of spill or complaint.

Date of Government Version: 01/15/2015
Date Data Arrived at EDR: 01/29/2015
Date Made Active in Reports: 03/10/2015
Number of Days to Update: 40

Source: Community Health Services
Telephone: 323-890-7806
Last EDR Contact: 04/16/2015
Next Scheduled EDR Contact: 08/03/2015
Data Release Frequency: Annually

City of El Segundo Underground Storage Tank

Underground storage tank sites located in El Segundo city.

Date of Government Version: 03/30/2015
Date Data Arrived at EDR: 04/02/2015
Date Made Active in Reports: 04/13/2015
Number of Days to Update: 11

Source: City of El Segundo Fire Department
Telephone: 310-524-2236
Last EDR Contact: 03/06/2015
Next Scheduled EDR Contact: 08/03/2015
Data Release Frequency: Semi-Annually

City of Long Beach Underground Storage Tank

Underground storage tank sites located in the city of Long Beach.

Date of Government Version: 03/03/2015
Date Data Arrived at EDR: 05/26/2015
Date Made Active in Reports: 06/11/2015
Number of Days to Update: 16

Source: City of Long Beach Fire Department
Telephone: 562-570-2563
Last EDR Contact: 04/27/2015
Next Scheduled EDR Contact: 08/10/2015
Data Release Frequency: Annually

City of Torrance Underground Storage Tank

Underground storage tank sites located in the city of Torrance.

Date of Government Version: 04/14/2015
Date Data Arrived at EDR: 04/23/2015
Date Made Active in Reports: 05/11/2015
Number of Days to Update: 18

Source: City of Torrance Fire Department
Telephone: 310-618-2973
Last EDR Contact: 04/13/2015
Next Scheduled EDR Contact: 07/27/2015
Data Release Frequency: Semi-Annually

MADERA COUNTY:

CUPA Facility List

A listing of sites included in the county's Certified Unified Program Agency database. California's Secretary for Environmental Protection established the unified hazardous materials and hazardous waste regulatory program as required by chapter 6.11 of the California Health and Safety Code. The Unified Program consolidates the administration, permits, inspections, and enforcement activities.

Date of Government Version: 05/28/2015
Date Data Arrived at EDR: 05/29/2015
Date Made Active in Reports: 06/15/2015
Number of Days to Update: 17

Source: Madera County Environmental Health
Telephone: 559-675-7823
Last EDR Contact: 05/22/2015
Next Scheduled EDR Contact: 09/07/2015
Data Release Frequency: Varies

MARIN COUNTY:

Underground Storage Tank Sites
Currently permitted USTs in Marin County.

Date of Government Version: 10/08/2014
Date Data Arrived at EDR: 10/22/2014
Date Made Active in Reports: 12/15/2014
Number of Days to Update: 54

Source: Public Works Department Waste Management
Telephone: 415-499-6647
Last EDR Contact: 05/05/2015
Next Scheduled EDR Contact: 07/20/2015
Data Release Frequency: Semi-Annually

MERCED COUNTY:

CUPA Facility List
CUPA facility list.

Date of Government Version: 05/22/2015
Date Data Arrived at EDR: 05/26/2015
Date Made Active in Reports: 06/05/2015
Number of Days to Update: 10

Source: Merced County Environmental Health
Telephone: 209-381-1094
Last EDR Contact: 05/22/2015
Next Scheduled EDR Contact: 09/07/2015
Data Release Frequency: Varies

MONO COUNTY:

CUPA Facility List
CUPA Facility List

Date of Government Version: 02/27/2015
Date Data Arrived at EDR: 03/06/2015
Date Made Active in Reports: 03/10/2015
Number of Days to Update: 4

Source: Mono County Health Department
Telephone: 760-932-5580
Last EDR Contact: 06/01/2015
Next Scheduled EDR Contact: 09/14/2015
Data Release Frequency: Varies

MONTEREY COUNTY:

CUPA Facility Listing
CUPA Program listing from the Environmental Health Division.

Date of Government Version: 03/19/2015
Date Data Arrived at EDR: 03/20/2015
Date Made Active in Reports: 03/31/2015
Number of Days to Update: 11

Source: Monterey County Health Department
Telephone: 831-796-1297
Last EDR Contact: 05/26/2015
Next Scheduled EDR Contact: 09/07/2015
Data Release Frequency: Varies

NAPA COUNTY:

Sites With Reported Contamination
A listing of leaking underground storage tank sites located in Napa county.

Date of Government Version: 12/05/2011
Date Data Arrived at EDR: 12/06/2011
Date Made Active in Reports: 02/07/2012
Number of Days to Update: 63

Source: Napa County Department of Environmental Management
Telephone: 707-253-4269
Last EDR Contact: 06/01/2015
Next Scheduled EDR Contact: 09/14/2015
Data Release Frequency: No Update Planned

Closed and Operating Underground Storage Tank Sites
Underground storage tank sites located in Napa county.

Date of Government Version: 01/15/2008
Date Data Arrived at EDR: 01/16/2008
Date Made Active in Reports: 02/08/2008
Number of Days to Update: 23

Source: Napa County Department of Environmental Management
Telephone: 707-253-4269
Last EDR Contact: 06/01/2015
Next Scheduled EDR Contact: 09/14/2015
Data Release Frequency: No Update Planned

NEVADA COUNTY:

CUPA Facility List
CUPA facility list.

Date of Government Version: 02/12/2015
Date Data Arrived at EDR: 02/13/2015
Date Made Active in Reports: 03/03/2015
Number of Days to Update: 18

Source: Community Development Agency
Telephone: 530-265-1467
Last EDR Contact: 05/04/2015
Next Scheduled EDR Contact: 08/17/2015
Data Release Frequency: Varies

ORANGE COUNTY:

List of Industrial Site Cleanups
Petroleum and non-petroleum spills.

Date of Government Version: 05/01/2015
Date Data Arrived at EDR: 05/12/2015
Date Made Active in Reports: 06/05/2015
Number of Days to Update: 24

Source: Health Care Agency
Telephone: 714-834-3446
Last EDR Contact: 05/06/2015
Next Scheduled EDR Contact: 08/24/2015
Data Release Frequency: Annually

List of Underground Storage Tank Cleanups
Orange County Underground Storage Tank Cleanups (LUST).

Date of Government Version: 05/01/2015
Date Data Arrived at EDR: 05/12/2015
Date Made Active in Reports: 06/08/2015
Number of Days to Update: 27

Source: Health Care Agency
Telephone: 714-834-3446
Last EDR Contact: 05/06/2015
Next Scheduled EDR Contact: 08/24/2015
Data Release Frequency: Quarterly

List of Underground Storage Tank Facilities
Orange County Underground Storage Tank Facilities (UST).

Date of Government Version: 05/01/2015
Date Data Arrived at EDR: 05/12/2015
Date Made Active in Reports: 06/11/2015
Number of Days to Update: 30

Source: Health Care Agency
Telephone: 714-834-3446
Last EDR Contact: 05/12/2015
Next Scheduled EDR Contact: 08/24/2015
Data Release Frequency: Quarterly

PLACER COUNTY:

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Master List of Facilities
List includes aboveground tanks, underground tanks and cleanup sites.

Date of Government Version: 03/10/2015
Date Data Arrived at EDR: 03/12/2015
Date Made Active in Reports: 03/18/2015
Number of Days to Update: 6
Source: Placer County Health and Human Services
Telephone: 530-745-2363
Last EDR Contact: 06/21/2015
Next Scheduled EDR Contact: 09/21/2015
Data Release Frequency: Semi-Annually

RIVERSIDE COUNTY:

Listing of Underground Tank Cleanup Sites
Riverside County Underground Storage Tank Cleanup Sites (LUST).

Date of Government Version: 04/28/2015
Date Data Arrived at EDR: 04/30/2015
Date Made Active in Reports: 05/13/2015
Number of Days to Update: 13
Source: Department of Environmental Health
Telephone: 951-358-5055
Last EDR Contact: 03/23/2015
Next Scheduled EDR Contact: 07/06/2015
Data Release Frequency: Quarterly

Underground Storage Tank Tank List
Underground storage tank sites located in Riverside county.

Date of Government Version: 04/28/2015
Date Data Arrived at EDR: 04/30/2015
Date Made Active in Reports: 05/13/2015
Number of Days to Update: 13
Source: Department of Environmental Health
Telephone: 951-358-5055
Last EDR Contact: 03/23/2015
Next Scheduled EDR Contact: 07/06/2015
Data Release Frequency: Quarterly

SACRAMENTO COUNTY:

Toxic Site Clean-Up List
List of sites where unauthorized releases of potentially hazardous materials have occurred.

Date of Government Version: 02/02/2015
Date Data Arrived at EDR: 04/08/2015
Date Made Active in Reports: 04/16/2015
Number of Days to Update: 8
Source: Sacramento County Environmental Management
Telephone: 916-875-8406
Last EDR Contact: 04/08/2015
Next Scheduled EDR Contact: 07/20/2015
Data Release Frequency: Quarterly

Master Hazardous Materials Facility List
Any business that has hazardous materials on site - hazardous material storage sites, underground storage tanks, waste generators.

Date of Government Version: 02/02/2015
Date Data Arrived at EDR: 04/08/2015
Date Made Active in Reports: 04/16/2015
Number of Days to Update: 8
Source: Sacramento County Environmental Management
Telephone: 916-875-8406
Last EDR Contact: 04/08/2015
Next Scheduled EDR Contact: 07/20/2015
Data Release Frequency: Quarterly

SAN BERNARDINO COUNTY:

Hazardous Material Permits
This listing includes underground storage tanks, medical waste handlers/generators, hazardous materials handlers, hazardous waste generators, and waste oil generators/handlers.

Date of Government Version: 03/02/2015
Date Data Arrived at EDR: 03/03/2015
Date Made Active in Reports: 03/10/2015
Number of Days to Update: 7

Source: San Bernardino County Fire Department Hazardous Materials Division
Telephone: 909-387-3041
Last EDR Contact: 05/12/2015
Next Scheduled EDR Contact: 08/24/2015
Data Release Frequency: Quarterly

SAN DIEGO COUNTY:

Hazardous Materials Management Division Database

The database includes: HE58 - This report contains the business name, site address, business phone number, establishment 'H' permit number, type of permit, and the business status. HE17 - In addition to providing the same information provided in the HE58 listing, HE17 provides inspection dates, violations received by the establishment, hazardous waste generated, the quantity, method of storage, treatment/disposal of waste and the hauler, and information on underground storage tanks. Unauthorized Release List - Includes a summary of environmental contamination cases in San Diego County (underground tank cases, non-tank cases, groundwater contamination, and soil contamination are included.)

Date of Government Version: 09/23/2013
Date Data Arrived at EDR: 09/24/2013
Date Made Active in Reports: 10/17/2013
Number of Days to Update: 23

Source: Hazardous Materials Management Division
Telephone: 619-338-2268
Last EDR Contact: 06/05/2015
Next Scheduled EDR Contact: 09/21/2015
Data Release Frequency: Quarterly

Solid Waste Facilities

San Diego County Solid Waste Facilities.

Date of Government Version: 10/31/2014
Date Data Arrived at EDR: 11/21/2014
Date Made Active in Reports: 12/29/2014
Number of Days to Update: 38

Source: Department of Health Services
Telephone: 619-338-2209
Last EDR Contact: 04/27/2015
Next Scheduled EDR Contact: 08/10/2015
Data Release Frequency: Varies

Environmental Case Listing

The listing contains all underground tank release cases and projects pertaining to properties contaminated with hazardous substances that are actively under review by the Site Assessment and Mitigation Program.

Date of Government Version: 03/23/2010
Date Data Arrived at EDR: 06/15/2010
Date Made Active in Reports: 07/09/2010
Number of Days to Update: 24

Source: San Diego County Department of Environmental Health
Telephone: 619-338-2371
Last EDR Contact: 06/03/2015
Next Scheduled EDR Contact: 09/21/2015
Data Release Frequency: No Update Planned

SAN FRANCISCO COUNTY:

Local Oversite Facilities

A listing of leaking underground storage tank sites located in San Francisco county.

Date of Government Version: 09/19/2008
Date Data Arrived at EDR: 09/19/2008
Date Made Active in Reports: 09/29/2008
Number of Days to Update: 10

Source: Department Of Public Health San Francisco County
Telephone: 415-252-3920
Last EDR Contact: 05/06/2015
Next Scheduled EDR Contact: 08/24/2015
Data Release Frequency: Quarterly

Underground Storage Tank Information

Underground storage tank sites located in San Francisco county.

Date of Government Version: 11/29/2010
Date Data Arrived at EDR: 03/10/2011
Date Made Active in Reports: 03/15/2011
Number of Days to Update: 5

Source: Department of Public Health
Telephone: 415-252-3920
Last EDR Contact: 05/06/2015
Next Scheduled EDR Contact: 08/24/2015
Data Release Frequency: Quarterly

SAN JOAQUIN COUNTY:

San Joaquin Co. UST
A listing of underground storage tank locations in San Joaquin county.

Date of Government Version: 03/24/2015
Date Data Arrived at EDR: 03/25/2015
Date Made Active in Reports: 03/31/2015
Number of Days to Update: 6
Source: Environmental Health Department
Telephone: N/A
Last EDR Contact: 06/17/2015
Next Scheduled EDR Contact: 10/05/2015
Data Release Frequency: Semi-Annually

SAN LUIS OBISPO COUNTY:

CUPA Facility List
Cupa Facility List.

Date of Government Version: 05/22/2015
Date Data Arrived at EDR: 05/26/2015
Date Made Active in Reports: 06/10/2015
Number of Days to Update: 15
Source: San Luis Obispo County Public Health Department
Telephone: 805-781-5596
Last EDR Contact: 05/20/2015
Next Scheduled EDR Contact: 09/07/2015
Data Release Frequency: Varies

SAN MATEO COUNTY:

Business Inventory
List includes Hazardous Materials Business Plan, hazardous waste generators, and underground storage tanks.

Date of Government Version: 04/13/2015
Date Data Arrived at EDR: 04/15/2015
Date Made Active in Reports: 04/23/2015
Number of Days to Update: 8
Source: San Mateo County Environmental Health Services Division
Telephone: 650-363-1921
Last EDR Contact: 06/15/2015
Next Scheduled EDR Contact: 09/28/2015
Data Release Frequency: Annually

Fuel Leak List
A listing of leaking underground storage tank sites located in San Mateo county.

Date of Government Version: 03/16/2015
Date Data Arrived at EDR: 03/17/2015
Date Made Active in Reports: 03/24/2015
Number of Days to Update: 7
Source: San Mateo County Environmental Health Services Division
Telephone: 650-363-1921
Last EDR Contact: 06/10/2015
Next Scheduled EDR Contact: 06/29/2015
Data Release Frequency: Semi-Annually

SANTA BARBARA COUNTY:

CUPA Facility Listing
CUPA Program Listing from the Environmental Health Services division.

Date of Government Version: 09/08/2011
Date Data Arrived at EDR: 09/09/2011
Date Made Active in Reports: 10/07/2011
Number of Days to Update: 28
Source: Santa Barbara County Public Health Department
Telephone: 805-686-8167
Last EDR Contact: 05/22/2015
Next Scheduled EDR Contact: 09/07/2015
Data Release Frequency: Varies

SANTA CLARA COUNTY:

Cupa Facility List
Cupa facility list

Date of Government Version: 02/23/2015
Date Data Arrived at EDR: 02/25/2015
Date Made Active in Reports: 03/03/2015
Number of Days to Update: 6

Source: Department of Environmental Health
Telephone: 408-918-1973
Last EDR Contact: 06/05/2015
Next Scheduled EDR Contact: 09/07/2015
Data Release Frequency: Varies

HIST LUST - Fuel Leak Site Activity Report
A listing of open and closed leaking underground storage tanks. This listing is no longer updated by the county. Leaking underground storage tanks are now handled by the Department of Environmental Health.

Date of Government Version: 03/29/2005
Date Data Arrived at EDR: 03/30/2005
Date Made Active in Reports: 04/21/2005
Number of Days to Update: 22

Source: Santa Clara Valley Water District
Telephone: 408-265-2600
Last EDR Contact: 03/23/2009
Next Scheduled EDR Contact: 06/22/2009
Data Release Frequency: No Update Planned

LOP Listing
A listing of leaking underground storage tanks located in Santa Clara county.

Date of Government Version: 03/03/2014
Date Data Arrived at EDR: 03/05/2014
Date Made Active in Reports: 03/18/2014
Number of Days to Update: 13

Source: Department of Environmental Health
Telephone: 408-918-3417
Last EDR Contact: 06/01/2015
Next Scheduled EDR Contact: 09/14/2015
Data Release Frequency: Annually

Hazardous Material Facilities
Hazardous material facilities, including underground storage tank sites.

Date of Government Version: 05/07/2015
Date Data Arrived at EDR: 05/12/2015
Date Made Active in Reports: 06/08/2015
Number of Days to Update: 27

Source: City of San Jose Fire Department
Telephone: 408-535-7694
Last EDR Contact: 05/07/2015
Next Scheduled EDR Contact: 08/24/2015
Data Release Frequency: Annually

SANTA CRUZ COUNTY:

CUPA Facility List
CUPA facility listing.

Date of Government Version: 05/22/2015
Date Data Arrived at EDR: 05/26/2015
Date Made Active in Reports: 06/08/2015
Number of Days to Update: 13

Source: Santa Cruz County Environmental Health
Telephone: 831-464-2761
Last EDR Contact: 05/22/2015
Next Scheduled EDR Contact: 09/07/2015
Data Release Frequency: Varies

SHASTA COUNTY:

CUPA Facility List
Cupa Facility List.

Date of Government Version: 03/11/2015
Date Data Arrived at EDR: 03/13/2015
Date Made Active in Reports: 03/24/2015
Number of Days to Update: 11

Source: Shasta County Department of Resource Management
Telephone: 530-225-5789
Last EDR Contact: 05/26/2015
Next Scheduled EDR Contact: 09/07/2015
Data Release Frequency: Varies

SOLANO COUNTY:

Leaking Underground Storage Tanks
A listing of leaking underground storage tank sites located in Solano county.

Date of Government Version: 03/13/2015
Date Data Arrived at EDR: 03/19/2015
Date Made Active in Reports: 03/24/2015
Number of Days to Update: 5

Source: Solano County Department of Environmental Management
Telephone: 707-784-6770
Last EDR Contact: 06/10/2015
Next Scheduled EDR Contact: 09/28/2015
Data Release Frequency: Quarterly

Underground Storage Tanks
Underground storage tank sites located in Solano county.

Date of Government Version: 03/13/2015
Date Data Arrived at EDR: 03/20/2015
Date Made Active in Reports: 03/31/2015
Number of Days to Update: 11

Source: Solano County Department of Environmental Management
Telephone: 707-784-6770
Last EDR Contact: 06/10/2015
Next Scheduled EDR Contact: 09/28/2015
Data Release Frequency: Quarterly

SONOMA COUNTY:

Cupa Facility List
Cupa Facility list

Date of Government Version: 03/31/2015
Date Data Arrived at EDR: 04/02/2015
Date Made Active in Reports: 04/10/2015
Number of Days to Update: 8

Source: County of Sonoma Fire & Emergency Services Department
Telephone: 707-565-1174
Last EDR Contact: 03/30/2015
Next Scheduled EDR Contact: 07/13/2015
Data Release Frequency: Varies

Leaking Underground Storage Tank Sites
A listing of leaking underground storage tank sites located in Sonoma county.

Date of Government Version: 04/01/2015
Date Data Arrived at EDR: 04/02/2015
Date Made Active in Reports: 04/13/2015
Number of Days to Update: 11

Source: Department of Health Services
Telephone: 707-565-6565
Last EDR Contact: 03/30/2015
Next Scheduled EDR Contact: 07/13/2015
Data Release Frequency: Quarterly

SUTTER COUNTY:

Underground Storage Tanks
Underground storage tank sites located in Sutter county.

Date of Government Version: 03/09/2015
Date Data Arrived at EDR: 03/10/2015
Date Made Active in Reports: 03/18/2015
Number of Days to Update: 8

Source: Sutter County Department of Agriculture
Telephone: 530-822-7500
Last EDR Contact: 06/05/2015
Next Scheduled EDR Contact: 09/21/2015
Data Release Frequency: Semi-Annually

TUOLUMNE COUNTY:

CUPA Facility List
Cupa facility list

Date of Government Version: 05/05/2015
Date Data Arrived at EDR: 05/07/2015
Date Made Active in Reports: 05/13/2015
Number of Days to Update: 6

Source: Divison of Environmental Health
Telephone: 209-533-5633
Last EDR Contact: 04/27/2015
Next Scheduled EDR Contact: 08/10/2015
Data Release Frequency: Varies

VENTURA COUNTY:

Business Plan, Hazardous Waste Producers, and Operating Underground Tanks

The BWT list indicates by site address whether the Environmental Health Division has Business Plan (B), Waste Producer (W), and/or Underground Tank (T) information.

Date of Government Version: 04/27/2015
Date Data Arrived at EDR: 05/22/2015
Date Made Active in Reports: 06/05/2015
Number of Days to Update: 14

Source: Ventura County Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 05/18/2015
Next Scheduled EDR Contact: 08/31/2015
Data Release Frequency: Quarterly

Inventory of Illegal Abandoned and Inactive Sites

Ventura County Inventory of Closed, Illegal Abandoned, and Inactive Sites.

Date of Government Version: 12/01/2011
Date Data Arrived at EDR: 12/01/2011
Date Made Active in Reports: 01/19/2012
Number of Days to Update: 49

Source: Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 04/02/2015
Next Scheduled EDR Contact: 07/20/2015
Data Release Frequency: Annually

Listing of Underground Tank Cleanup Sites

Ventura County Underground Storage Tank Cleanup Sites (LUST).

Date of Government Version: 05/29/2008
Date Data Arrived at EDR: 06/24/2008
Date Made Active in Reports: 07/31/2008
Number of Days to Update: 37

Source: Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 05/18/2015
Next Scheduled EDR Contact: 08/31/2015
Data Release Frequency: Quarterly

Medical Waste Program List

To protect public health and safety and the environment from potential exposure to disease causing agents, the Environmental Health Division Medical Waste Program regulates the generation, handling, storage, treatment and disposal of medical waste throughout the County.

Date of Government Version: 04/27/2015
Date Data Arrived at EDR: 04/29/2015
Date Made Active in Reports: 05/13/2015
Number of Days to Update: 14

Source: Ventura County Resource Management Agency
Telephone: 805-654-2813
Last EDR Contact: 04/27/2015
Next Scheduled EDR Contact: 08/10/2015
Data Release Frequency: Quarterly

Underground Tank Closed Sites List

Ventura County Operating Underground Storage Tank Sites (UST)/Underground Tank Closed Sites List.

Date of Government Version: 02/27/2015
Date Data Arrived at EDR: 03/18/2015
Date Made Active in Reports: 03/26/2015
Number of Days to Update: 8

Source: Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 06/17/2015
Next Scheduled EDR Contact: 09/28/2015
Data Release Frequency: Quarterly

YOLO COUNTY:

Underground Storage Tank Comprehensive Facility Report

Underground storage tank sites located in Yolo county.

Date of Government Version: 03/26/2015
Date Data Arrived at EDR: 04/01/2015
Date Made Active in Reports: 04/13/2015
Number of Days to Update: 12

Source: Yolo County Department of Health
Telephone: 530-666-8646
Last EDR Contact: 06/17/2015
Next Scheduled EDR Contact: 10/05/2015
Data Release Frequency: Annually

YUBA COUNTY:

CUPA Facility List
CUPA facility listing for Yuba County.

Date of Government Version: 05/18/2015
Date Data Arrived at EDR: 05/19/2015
Date Made Active in Reports: 06/05/2015
Number of Days to Update: 17

Source: Yuba County Environmental Health Department
Telephone: 530-749-7523
Last EDR Contact: 05/18/2015
Next Scheduled EDR Contact: 08/17/2015
Data Release Frequency: Varies

OTHER DATABASE(S)

Depending on the geographic area covered by this report, the data provided in these specialty databases may or may not be complete. For example, the existence of wetlands information data in a specific report does not mean that all wetlands in the area covered by the report are included. Moreover, the absence of any reported wetlands information does not necessarily mean that wetlands do not exist in the area covered by the report.

CT MANIFEST: Hazardous Waste Manifest Data
Facility and manifest data. Manifest is a document that lists and tracks hazardous waste from the generator through transporters to a tsd facility.

Date of Government Version: 07/30/2013
Date Data Arrived at EDR: 08/19/2013
Date Made Active in Reports: 10/03/2013
Number of Days to Update: 45

Source: Department of Energy & Environmental Protection
Telephone: 860-424-3375
Last EDR Contact: 05/18/2015
Next Scheduled EDR Contact: 08/31/2015
Data Release Frequency: No Update Planned

NJ MANIFEST: Manifest Information
Hazardous waste manifest information.

Date of Government Version: 12/31/2012
Date Data Arrived at EDR: 04/29/2015
Date Made Active in Reports: 05/29/2015
Number of Days to Update: 30

Source: Department of Environmental Protection
Telephone: N/A
Last EDR Contact: 04/14/2015
Next Scheduled EDR Contact: 07/27/2015
Data Release Frequency: Annually

NY MANIFEST: Facility and Manifest Data
Manifest is a document that lists and tracks hazardous waste from the generator through transporters to a TSD facility.

Date of Government Version: 05/01/2015
Date Data Arrived at EDR: 05/06/2015
Date Made Active in Reports: 05/20/2015
Number of Days to Update: 14

Source: Department of Environmental Conservation
Telephone: 518-402-8651
Last EDR Contact: 05/06/2015
Next Scheduled EDR Contact: 08/17/2015
Data Release Frequency: Annually

PA MANIFEST: Manifest Information
Hazardous waste manifest information.

Date of Government Version: 12/31/2013
Date Data Arrived at EDR: 07/21/2014
Date Made Active in Reports: 08/25/2014
Number of Days to Update: 35

Source: Department of Environmental Protection
Telephone: 717-783-8990
Last EDR Contact: 04/16/2015
Next Scheduled EDR Contact: 08/03/2015
Data Release Frequency: Annually

RI MANIFEST: Manifest information
Hazardous waste manifest information

Date of Government Version: 12/31/2013
Date Data Arrived at EDR: 07/15/2014
Date Made Active in Reports: 08/13/2014
Number of Days to Update: 29

Source: Department of Environmental Management
Telephone: 401-222-2797
Last EDR Contact: 05/26/2015
Next Scheduled EDR Contact: 09/07/2015
Data Release Frequency: Annually

WI MANIFEST: Manifest Information
Hazardous waste manifest information.

Date of Government Version: 12/31/2014
Date Data Arrived at EDR: 03/19/2015
Date Made Active in Reports: 04/07/2015
Number of Days to Update: 19

Source: Department of Natural Resources
Telephone: N/A
Last EDR Contact: 06/11/2015
Next Scheduled EDR Contact: 09/28/2015
Data Release Frequency: Annually

Oil/Gas Pipelines
Source: PennWell Corporation
Telephone: 281-546-1505
Petroleum Bundle (Crude Oil, Refined Products, Petrochemicals, Gas Liquids (LPG/NGL), and Specialty Gases (Miscellaneous)) N = Natural Gas Bundle (Natural Gas, Gas Liquids (LPG/NGL), and Specialty Gases (Miscellaneous)). This map includes information copyrighted by PennWell Corporation. This information is provided on a best effort basis and PennWell Corporation does not guarantee its accuracy nor warrant its fitness for any particular purpose. Such information has been reprinted with the permission of PennWell.

Electric Power Transmission Line Data
Source: PennWell Corporation
Telephone: 800-823-6277
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Sensitive Receptors: There are individuals deemed sensitive receptors due to their fragile immune systems and special sensitivity to environmental discharges. These sensitive receptors typically include the elderly, the sick, and children. While the location of all sensitive receptors cannot be determined, EDR indicates those buildings and facilities - schools, daycares, hospitals, medical centers, and nursing homes - where individuals who are sensitive receptors are likely to be located.

AHA Hospitals:
Source: American Hospital Association, Inc.
Telephone: 312-280-5991
The database includes a listing of hospitals based on the American Hospital Association's annual survey of hospitals.

Medical Centers: Provider of Services Listing
Source: Centers for Medicare & Medicaid Services
Telephone: 410-786-3000
A listing of hospitals with Medicare provider number, produced by Centers of Medicare & Medicaid Services, a federal agency within the U.S. Department of Health and Human Services.

Nursing Homes
Source: National Institutes of Health
Telephone: 301-594-6248
Information on Medicare and Medicaid certified nursing homes in the United States.

Public Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics' primary database on elementary and secondary public education in the United States. It is a comprehensive, annual, national statistical database of all public elementary and secondary schools and school districts, which contains data that are comparable across all states.

Private Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics' primary database on private school locations in the United States.

Daycare Centers: Licensed Facilities
Source: Department of Social Services
Telephone: 916-657-4041

Flood Zone Data: This data, available in select counties across the country, was obtained by EDR in 2003 & 2011 from the Federal Emergency Management Agency (FEMA). Data depicts 100-year and 500-year flood zones as defined by FEMA.

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002, 2005 and 2010 from the U.S. Fish and Wildlife Service.

Scanned Digital USGS 7.5' Topographic Map (DRG)
Source: United States Geologic Survey
A digital raster graphic (DRG) is a scanned image of a U.S. Geological Survey topographic map. The map images are made by scanning published paper maps on high-resolution scanners. The raster image is georeferenced and fit to the Universal Transverse Mercator (UTM) projection.

STREET AND ADDRESS INFORMATION

GEOCHECK ®- PHYSICAL SETTING SOURCE ADDENDUM

TARGET PROPERTY ADDRESS

IRWD ILP NORTH CONVERSION PROJECT
CULVER DRIVE
IRVINE, CA 92602

TARGET PROPERTY COORDINATES

Latitude (North):	33.7402 - 33° 44' 24.72''
Longitude (West):	117.7529 - 117° 45' 10.44''
Universal Tranverse Mercator:	Zone 11
UTM X (Meters):	430258.0
UTM Y (Meters):	3733411.5
Elevation:	362 ft. above sea level

USGS TOPOGRAPHIC MAP

Target Property Map:	33117-F7 TUSTIN, CA
Most Recent Revision:	1981
North Map:	33117-G7 ORANGE, CA
Most Recent Revision:	1981
Northeast Map:	33117-G6 BLACK STAR CANYON, CA
Most Recent Revision:	1988
East Map:	33117-F6 EL TORO, CA
Most Recent Revision:	1982

EDR's GeoCheck Physical Setting Source Addendum is provided to assist the environmental professional in forming an opinion about the impact of potential contaminant migration.

Assessment of the impact of contaminant migration generally has two principal investigative components:

1. Groundwater flow direction, and
2. Groundwater flow velocity.

Groundwater flow direction may be impacted by surface topography, hydrology, hydrogeology, characteristics of the soil, and nearby wells. Groundwater flow velocity is generally impacted by the nature of the geologic strata.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

GROUNDWATER FLOW DIRECTION INFORMATION

Groundwater flow direction for a particular site is best determined by a qualified environmental professional using site-specific well data. If such data is not reasonably ascertainable, it may be necessary to rely on other sources of information, such as surface topographic information, hydrologic information, hydrogeologic data collected on nearby properties, and regional groundwater flow information (from deep aquifers).

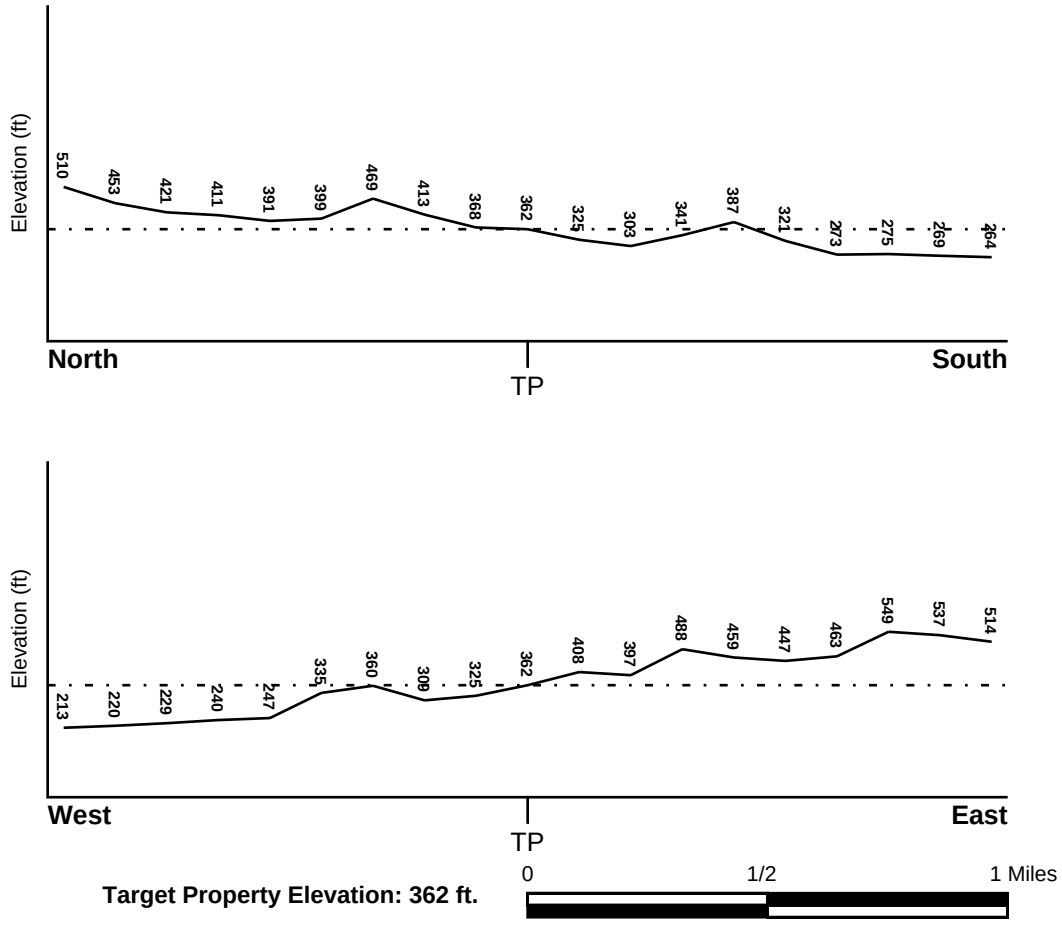
TOPOGRAPHIC INFORMATION

Surface topography may be indicative of the direction of surficial groundwater flow. This information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

TARGET PROPERTY TOPOGRAPHY

General Topographic Gradient: General SSW

SURROUNDING TOPOGRAPHY: ELEVATION PROFILES



Source: Topography has been determined from the USGS 7.5' Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be field verified.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

HYDROLOGIC INFORMATION

Surface water can act as a hydrologic barrier to groundwater flow. Such hydrologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

Refer to the Physical Setting Source Map following this summary for hydrologic information (major waterways and bodies of water).

FEMA FLOOD ZONE

Target Property County	FEMA Flood Electronic Data
ORANGE, CA	YES - refer to the Overview Map and Detail Map

Flood Plain Panel at Target Property: 06059C - FEMA DFIRM Flood data

Additional Panels in search area: Not Reported

NATIONAL WETLAND INVENTORY

NWI Quad at Target Property	NWI Electronic Data Coverage
TUSTIN	YES - refer to the Overview Map and Detail Map

HYDROGEOLOGIC INFORMATION

Hydrogeologic information obtained by installation of wells on a specific site can often be an indicator of groundwater flow direction in the immediate area. Such hydrogeologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

Site-Specific Hydrogeological Data*:

Search Radius:	1.25 miles
Status:	Not found

AQUIFLOW®

Search Radius: 1.000 Mile.

EDR has developed the AQUIFLOW Information System to provide data on the general direction of groundwater flow at specific points. EDR has reviewed reports submitted by environmental professionals to regulatory authorities at select sites and has extracted the date of the report, groundwater flow direction as determined hydrogeologically, and the depth to water table.

MAP ID	LOCATION FROM TP	GENERAL DIRECTION GROUNDWATER FLOW
Not Reported		

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

GROUNDWATER FLOW VELOCITY INFORMATION

Groundwater flow velocity information for a particular site is best determined by a qualified environmental professional using site specific geologic and soil strata data. If such data are not reasonably ascertainable, it may be necessary to rely on other sources of information, including geologic age identification, rock stratigraphic unit and soil characteristics data collected on nearby properties and regional soil information. In general, contaminant plumes move more quickly through sandy-gravelly types of soils than silty-clayey types of soils.

GEOLOGIC INFORMATION IN GENERAL AREA OF TARGET PROPERTY

Geologic information can be used by the environmental professional in forming an opinion about the relative speed at which contaminant migration may be occurring.

ROCK STRATIGRAPHIC UNIT

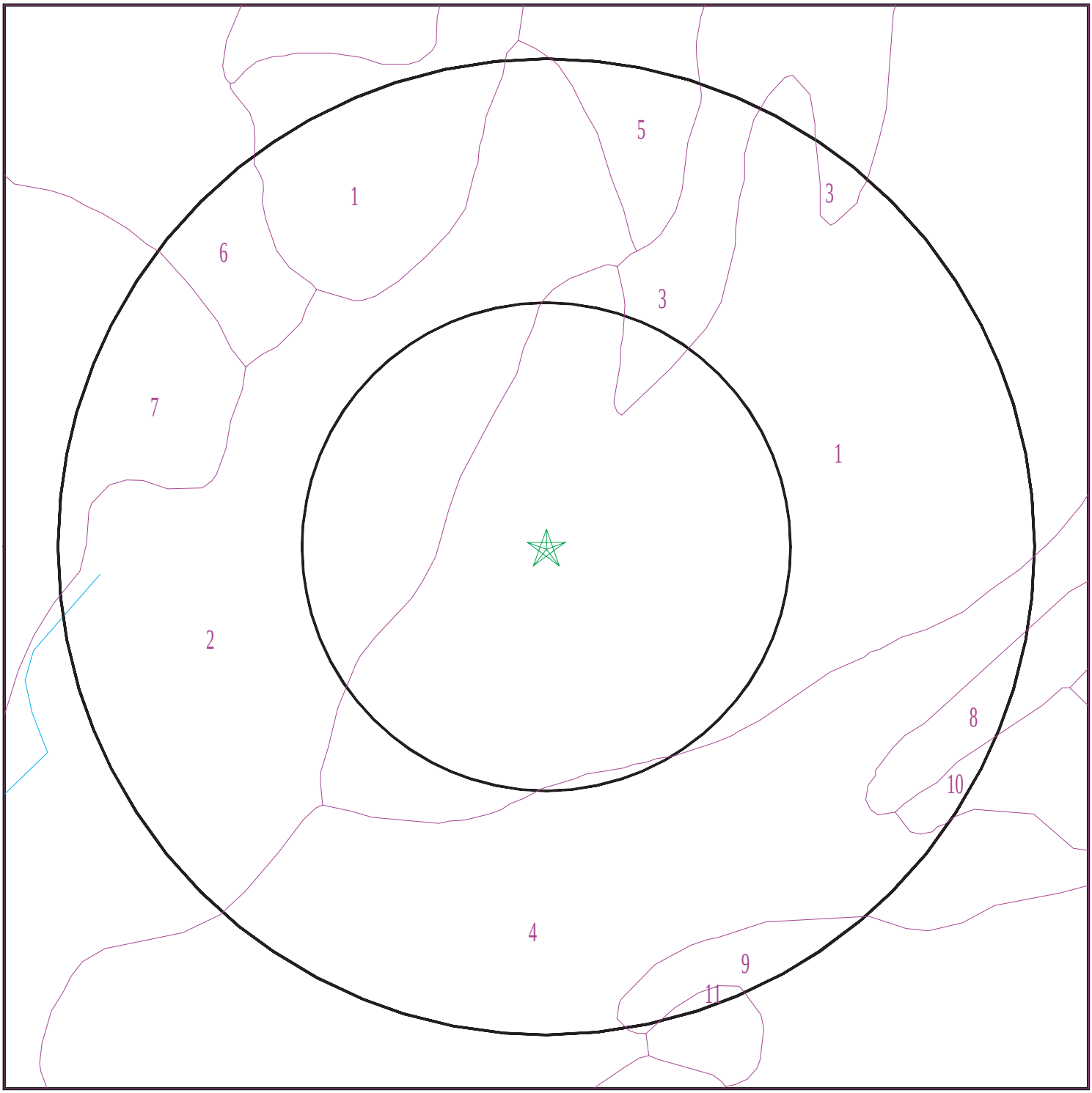
Era:	Cenozoic
System:	Tertiary
Series:	Eocene
Code:	Te *(decoded above as Era, System & Series)*

GEOLOGIC AGE IDENTIFICATION

Category: Stratifed Sequence

Geologic Age and Rock Stratigraphic Unit Source: P.G. Schruben, R.E. Arndt and W.J. Bawiec, Geology of the Conterminous U.S. at 1:2,500,000 Scale - a digital representation of the 1974 P.B. King and H.M. Beikman Map, USGS Digital Data Series DDS - 11 (1994).

SSURGO SOIL MAP - 4330923.2s



Target Property
SSURGO Soil
Water

0 1/16 1/8 1/4 Miles

N

SITE NAME:	IRWD ILP North Conversion Project	CLIENT:	Bonterra Psomas
ADDRESS:	Culver Drive Irvine CA 92602	CONTACT:	Jeff Gershon
LAT/LONG:	33.7402 / 117.7529	INQUIRY #:	4330923.2s
		DATE:	June 18, 2015 6:59 pm

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

DOMINANT SOIL COMPOSITION IN GENERAL AREA OF TARGET PROPERTY

The U.S. Department of Agriculture's (USDA) Soil Conservation Service (SCS) leads the National Cooperative Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map in a soil survey is a representation of soil patterns in a landscape. The following information is based on Soil Conservation Service SSURGO data.

Soil Map ID: 1

Soil Component Name: ANAHEIM

Soil Surface Texture: loam

Hydrologic Group: Class C - Slow infiltration rates. Soils with layers impeding downward movement of water, or soils with moderately fine or fine textures.

Soil Drainage Class: Well drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: Low

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	25 inches	loam	Not reported	Not reported	Max: 14 Min: 4	Max: 7.8 Min: 6.1
2	25 inches	29 inches	weathered bedrock	Not reported	Not reported	Max: Min:	Max: Min:

Soil Map ID: 2

Soil Component Name: SORRENTO

Soil Surface Texture: clay loam

Hydrologic Group: Class B - Moderate infiltration rates. Deep and moderately deep, moderately well and well drained soils with moderately coarse textures.

Soil Drainage Class: Well drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: High

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	11 inches	clay loam	Not reported	Not reported	Max: 4 Min: 1.4	Max: 8.4 Min: 6.1
2	11 inches	61 inches	silty clay loam	Not reported	Not reported	Max: 4 Min: 1.4	Max: 8.4 Min: 7.9
3	61 inches	72 inches	stratified loamy fine sand to silt loam	Not reported	Not reported	Max: 14 Min: 4	Max: 8.4 Min: 7.9

Soil Map ID: 3

Soil Component Name: ANAHEIM

Soil Surface Texture: loam

Hydrologic Group: Class C - Slow infiltration rates. Soils with layers impeding downward movement of water, or soils with moderately fine or fine textures.

Soil Drainage Class: Well drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: Low

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	25 inches	loam	Not reported	Not reported	Max: 14 Min: 4	Max: 7.8 Min: 6.1

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
2	25 inches	29 inches	weathered bedrock	Not reported	Not reported	Max: Min:	Max: Min:

Soil Map ID: 4

Soil Component Name: SORRENTO

Soil Surface Texture: loam

Hydrologic Group: Class B - Moderate infiltration rates. Deep and moderately deep, moderately well and well drained soils with moderately coarse textures.

Soil Drainage Class: Well drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: High

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	11 inches	loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Lean Clay. FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), silt.	Max: 14 Min: 4	Max: 8.4 Min: 6.1
2	11 inches	61 inches	silty clay loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Lean Clay	Max: 14.11 Min: 1	Max: 8.4 Min: 7.9

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
3	61 inches	72 inches	stratified loamy fine sand to silt loam	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 14 Min: 4	Max: 8.4 Min: 7.9

Soil Map ID: 5

Soil Component Name: CAPISTRANO

Soil Surface Texture: sandy loam

Hydrologic Group: Class B - Moderate infiltration rates. Deep and moderately deep, moderately well and well drained soils with moderately coarse textures.

Soil Drainage Class: Well drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: Low

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	27 inches	sandy loam	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 42 Min: 14	Max: 7.3 Min: 5.6
2	27 inches	64 inches	fine sandy loam	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 42 Min: 14	Max: 7.3 Min: 5.6

Soil Map ID: 6

Soil Component Name: CALLEGUAS

Soil Surface Texture: clay loam

Hydrologic Group: Class D - Very slow infiltration rates. Soils are clayey, have a high water table, or are shallow to an impervious layer.

Soil Drainage Class: Well drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: High

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	14 inches	clay loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Lean Clay	Max: 14 Min: 4	Max: 8.4 Min: 7.9
2	14 inches	18 inches	weathered bedrock	Not reported	Not reported	Max: 1.4 Min: 0	Max: Min:

Soil Map ID: 7

Soil Component Name: SOPER

Soil Surface Texture: cobbly loam

Hydrologic Group: Class C - Slow infiltration rates. Soils with layers impeding downward movement of water, or soils with moderately fine or fine textures.

Soil Drainage Class: Well drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: Moderate

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	9 inches	cobbly loam	Not reported	Not reported	Max: 14 Min: 4	Max: 7.3 Min: 6.1
2	9 inches	29 inches	cobbly clay loam	Not reported	Not reported	Max: 4 Min: 1.4	Max: 7.8 Min: 6.1
3	29 inches	33 inches	weathered bedrock	Not reported	Not reported	Max: Min:	Max: Min:

Soil Map ID: 8

Soil Component Name: ALO

Soil Surface Texture: clay

Hydrologic Group: Class D - Very slow infiltration rates. Soils are clayey, have a high water table, or are shallow to an impervious layer.

Soil Drainage Class: Well drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: High

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	14 inches	clay	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit 50% or more), Fat Clay.	Max: 1.4 Min: 0.42	Max: 8.4 Min: 6.1
2	14 inches	22 inches	clay	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit 50% or more), Fat Clay.	Max: 1.4 Min: 0.42	Max: 8.4 Min: 6.1

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
3	22 inches	25 inches	weathered bedrock	Not reported	Not reported	Max: 1.4 Min: 0	Max: Min:

Soil Map ID: 9

Soil Component Name: SAN EMIGDIO

Soil Surface Texture: fine sandy loam

Hydrologic Group: Class B - Moderate infiltration rates. Deep and moderately deep, moderately well and well drained soils with moderately coarse textures.

Soil Drainage Class: Well drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: High

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	7 inches	fine sandy loam	Not reported	Not reported	Max: 42 Min: 14	Max: 8.4 Min: 7.9
2	7 inches	61 inches	stratified gravelly loamy coarse sand to very fine sandy loam	Not reported	Not reported	Max: 42 Min: 14	Max: 8.4 Min: 7.9

Soil Map ID: 10

Soil Component Name: ALO

Soil Surface Texture: clay

Hydrologic Group: Class D - Very slow infiltration rates. Soils are clayey, have a high water table, or are shallow to an impervious layer.

Soil Drainage Class: Well drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: High

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	25 inches	clay	Not reported	Not reported	Max: 1.4 Min: 0.42	Max: 8.4 Min: 6.1
2	25 inches	29 inches	weathered bedrock	Not reported	Not reported	Max: Min:	Max: Min:

Soil Map ID: 11

Soil Component Name: CIENEBA

Soil Surface Texture: sandy loam

Hydrologic Group: Class C - Slow infiltration rates. Soils with layers impeding downward movement of water, or soils with moderately fine or fine textures.

Soil Drainage Class: Somewhat excessively drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: Low

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	16 inches	sandy loam	Not reported	Not reported	Max: 42 Min: 14	Max: 7.3 Min: 5.6
2	16 inches	20 inches	weathered bedrock	Not reported	Not reported	Max: Min:	Max: Min:

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

LOCAL / REGIONAL WATER AGENCY RECORDS

EDR Local/Regional Water Agency records provide water well information to assist the environmental professional in assessing sources that may impact ground water flow direction, and in forming an opinion about the impact of contaminant migration on nearby drinking water wells.

WELL SEARCH DISTANCE INFORMATION

DATABASE	SEARCH DISTANCE (miles)
Federal USGS	1.000
Federal FRDS PWS	Nearest PWS within 1 mile
State Database	1.000

FEDERAL USGS WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
1	USGS40000137735	1/2 - 1 Mile West

FEDERAL FRDS PUBLIC WATER SUPPLY SYSTEM INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
No PWS System Found		

Note: PWS System location is not always the same as well location.

STATE DATABASE WELL INFORMATION

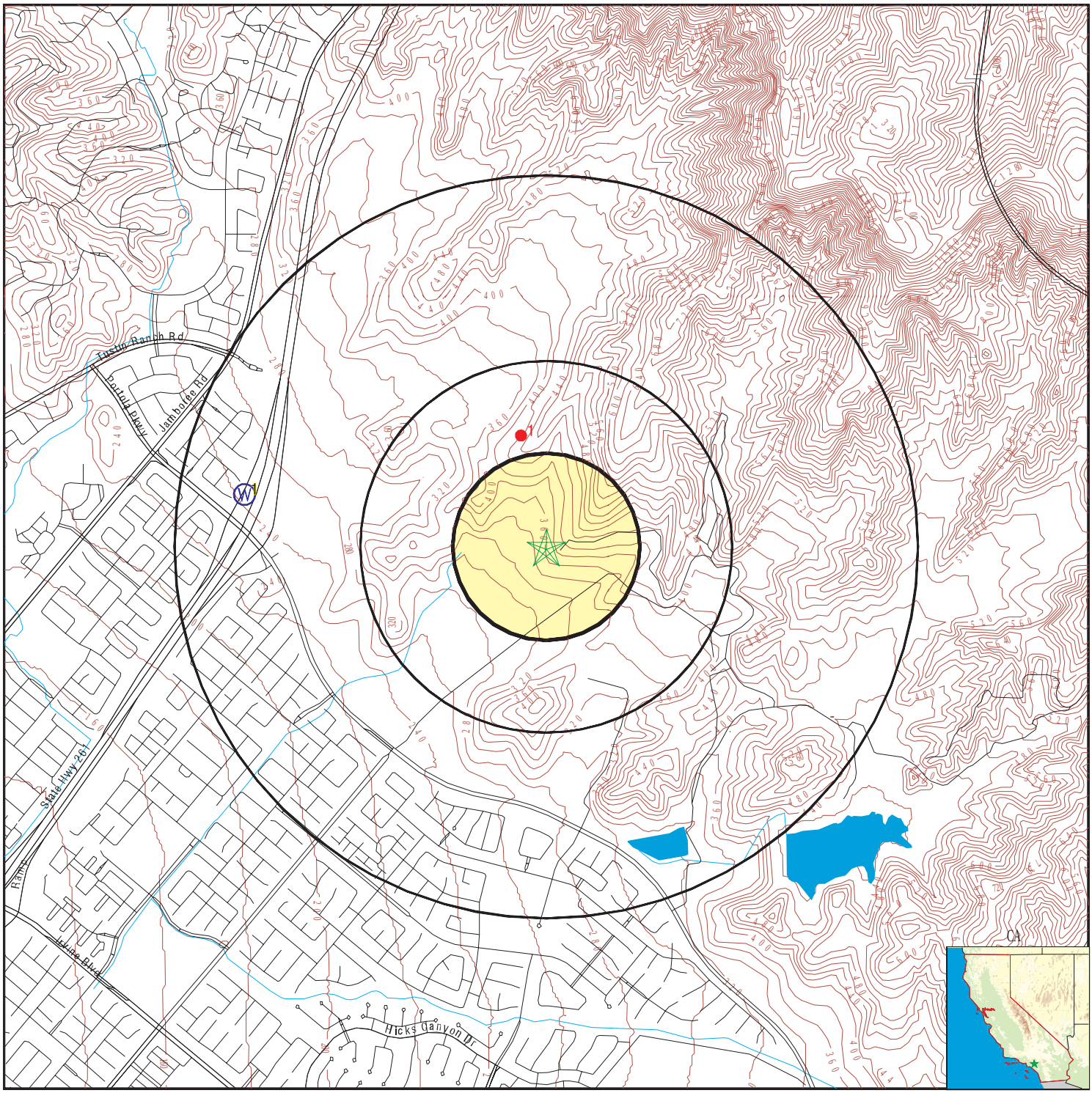
MAP ID	WELL ID	LOCATION FROM TP
No Wells Found		

OTHER STATE DATABASE INFORMATION

STATE OIL/GAS WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
1	CAOG11000218018	1/4 - 1/2 Mile NNW

PHYSICAL SETTING SOURCE MAP - 4330923.2s



- County Boundary
- Major Roads
- Contour Lines
- Earthquake Fault Lines
- Earthquake epicenter, Richter 5 or greater
- Water Wells
- Public Water Supply Wells
- Cluster of Multiple Icons
- Groundwater Flow Direction
- GI Indeterminate Groundwater Flow at Location
- GV Groundwater Flow Varies at Location
- HD Closest Hydrogeological Data
- Oil, gas or related wells

SITE NAME: IRWD ILP North Conversion Project	CLIENT: Bonterra Psomas
ADDRESS: Culver Drive Irvine CA 92602	CONTACT: Jeff Gershon INQUIRY #: 4330923.2s
LAT/LONG: 33.7402 / 117.7529	DATE: June 18, 2015 6:59 pm

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID
Direction
Distance
Elevation

	Database	EDR ID Number
1 **West** **1/2 - 1 Mile** **Lower**	**FED USGS**	**USGS40000137735**

Org. Identifier:	USGS-CA		
Formal name:	USGS California Water Science Center		
Monloc Identifier:	USGS-334432117455801		
Monloc name:	005S009W15A001S		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	18070204	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	33.7422406
Longitude:	-117.7669976	Sourcemap scale:	Not Reported
Horiz Acc measure:	Unknown	Horiz Acc measure units:	Unknown
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	Not Reported
Vert measure units:	Not Reported	Vertacc measure val:	Not Reported
Vert accmeasure units:	Not Reported		
Vertcollection method:	Not Reported		
Vert coord refsys:	Not Reported	Countrycode:	US
Aquifername:	California Coastal Basin aquifers		
Formation type:	Not Reported		
Aquifer type:	Not Reported		
Construction date:	Not Reported	Welldepth:	Not Reported
Welldepth units:	Not Reported	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 0

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID
Direction
Distance

Database EDR ID Number

1
NNW **OIL_GAS** **CAOG11000218018**
1/4 - 1/2 Mile

District nun:	1	Api number:	05901242
Blm well:	N	Redrill can:	Not Reported
Dryhole:	Y	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Orange	Fieldname:	Any Field
Area name:	Any Area	Section:	18
Township:	05S	Range:	08W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Irvine Ranch (nct-2)	Wellnumber:	1
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	30-DEC-99
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	30-DEC-99	Completion:	30-DEC-99
Directiona:	Unknown	Gissymbol:	PDH
Site id:	CAOG11000218018		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS
RADON

AREA RADON INFORMATION

State Database: CA Radon

Radon Test Results

Zipcode	Num Tests	> 4 pCi/L
92602	5	1

Federal EPA Radon Zone for ORANGE County: 3

Note: Zone 1 indoor average level > 4 pCi/L.
: Zone 2 indoor average level >= 2 pCi/L and <= 4 pCi/L.
: Zone 3 indoor average level < 2 pCi/L.

Federal Area Radon Information for ORANGE COUNTY, CA

Number of sites tested: 30

Area	Average Activity	% <4 pCi/L	% 4-20 pCi/L	% >20 pCi/L
Living Area - 1st Floor	0.763 pCi/L	100%	0%	0%
Living Area - 2nd Floor	Not Reported	Not Reported	Not Reported	Not Reported
Basement	Not Reported	Not Reported	Not Reported	Not Reported

PHYSICAL SETTING SOURCE RECORDS SEARCHED

TOPOGRAPHIC INFORMATION

USGS 7.5' Digital Elevation Model (DEM)
Source: United States Geologic Survey
EDR acquired the USGS 7.5' Digital Elevation Model in 2002 and updated it in 2006. The 7.5 minute DEM corresponds to the USGS 1:24,000- and 1:25,000-scale topographic quadrangle maps. The DEM provides elevation data with consistent elevation units and projection.

Scanned Digital USGS 7.5' Topographic Map (DRG)
Source: United States Geologic Survey
A digital raster graphic (DRG) is a scanned image of a U.S. Geological Survey topographic map. The map images are made by scanning published paper maps on high-resolution scanners. The raster image is georeferenced and fit to the Universal Transverse Mercator (UTM) projection.

HYDROLOGIC INFORMATION

Flood Zone Data: This data, available in select counties across the country, was obtained by EDR in 2003 & 2011 from the Federal Emergency Management Agency (FEMA). Data depicts 100-year and 500-year flood zones as defined by FEMA.

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002, 2005 and 2010 from the U.S. Fish and Wildlife Service.

HYDROGEOLOGIC INFORMATION

AQUIFLOW^{R} Information System
Source: EDR proprietary database of groundwater flow information
EDR has developed the AQUIFLOW Information System (AIS) to provide data on the general direction of groundwater flow at specific points. EDR has reviewed reports submitted to regulatory authorities at select sites and has extracted the date of the report, hydrogeologically determined groundwater flow direction and depth to water table information.

GEOLOGIC INFORMATION

Geologic Age and Rock Stratigraphic Unit
Source: P.G. Schruben, R.E. Arndt and W.J. Bawiec, Geology of the Conterminous U.S. at 1:2,500,000 Scale - A digital representation of the 1974 P.B. King and H.M. Beikman Map, USGS Digital Data Series DDS - 11 (1994).

STATSGO: State Soil Geographic Database
Source: Department of Agriculture, Natural Resources Conservation Services
The U.S. Department of Agriculture's (USDA) Natural Resources Conservation Service (NRCS) leads the national Conservation Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map in a soil survey is a representation of soil patterns in a landscape. Soil maps for STATSGO are compiled by generalizing more detailed (SSURGO) soil survey maps.

SSURGO: Soil Survey Geographic Database
Source: Department of Agriculture, Natural Resources Conservation Services (NRCS)
Telephone: 800-672-5559
SSURGO is the most detailed level of mapping done by the Natural Resources Conservation Services, mapping scales generally range from 1:12,000 to 1:63,360. Field mapping methods using national standards are used to construct the soil maps in the Soil Survey Geographic (SSURGO) database. SSURGO digitizing duplicates the original soil survey maps. This level of mapping is designed for use by landowners, townships and county natural resource planning and management.

PHYSICAL SETTING SOURCE RECORDS SEARCHED

LOCAL / REGIONAL WATER AGENCY RECORDS

FEDERAL WATER WELLS

PWS: Public Water Systems
Source: EPA/Office of Drinking Water
Telephone: 202-564-3750
Public Water System data from the Federal Reporting Data System. A PWS is any water system which provides water to at least 25 people for at least 60 days annually. PWSs provide water from wells, rivers and other sources.

PWS ENF: Public Water Systems Violation and Enforcement Data
Source: EPA/Office of Drinking Water
Telephone: 202-564-3750
Violation and Enforcement data for Public Water Systems from the Safe Drinking Water Information System (SDWIS) after August 1995. Prior to August 1995, the data came from the Federal Reporting Data System (FRDS).

USGS Water Wells: USGS National Water Inventory System (NWIS)
This database contains descriptive information on sites where the USGS collects or has collected data on surface water and/or groundwater. The groundwater data includes information on wells, springs, and other sources of groundwater.

STATE RECORDS

Water Well Database
Source: Department of Water Resources
Telephone: 916-651-9648

California Drinking Water Quality Database
Source: Department of Public Health
Telephone: 916-324-2319
The database includes all drinking water compliance and special studies monitoring for the state of California since 1984. It consists of over 3,200,000 individual analyses along with well and water system information.

OTHER STATE DATABASE INFORMATION

California Oil and Gas Well Locations
Source: Department of Conservation
Telephone: 916-323-1779
Oil and Gas well locations in the state.

RADON

State Database: CA Radon
Source: Department of Health Services
Telephone: 916-324-2208
Radon Database for California

Area Radon Information
Source: USGS
Telephone: 703-356-4020
The National Radon Database has been developed by the U.S. Environmental Protection Agency (USEPA) and is a compilation of the EPA/State Residential Radon Survey and the National Residential Radon Survey. The study covers the years 1986 - 1992. Where necessary data has been supplemented by information collected at private sources such as universities and research institutions.

EPA Radon Zones
Source: EPA
Telephone: 703-356-4020
Sections 307 & 309 of IRAA directed EPA to list and identify areas of U.S. with the potential for elevated indoor radon levels.

PHYSICAL SETTING SOURCE RECORDS SEARCHED

OTHER

Airport Landing Facilities: Private and public use landing facilities
Source: Federal Aviation Administration, 800-457-6656

Epicenters: World earthquake epicenters, Richter 5 or greater
Source: Department of Commerce, National Oceanic and Atmospheric Administration

California Earthquake Fault Lines: The fault lines displayed on EDR's Topographic map are digitized quaternary fault lines, prepared in 1975 by the United State Geological Survey. Additional information (also from 1975) regarding activity at specific fault lines comes from California's Preliminary Fault Activity Map prepared by the California Division of Mines and Geology.

STREET AND ADDRESS INFORMATION

IRWD ILP North Conversion Project
Jamboree Road
Orange, CA 92869

Inquiry Number: 4330930.2s
June 18, 2015

The EDR Radius Map™ Report with GeoCheck®

EDR® Environmental Data Resources Inc

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

TABLE OF CONTENTS

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

EXECUTIVE SUMMARY

A search of available environmental records was conducted by Environmental Data Resources, Inc (EDR). The report was designed to assist parties seeking to meet the search requirements of EPA's Standards and Practices for All Appropriate Inquiries (40 CFR Part 312), the ASTM Standard Practice for Environmental Site Assessments (E 1527-13) or custom requirements developed for the evaluation of environmental risk associated with a parcel of real estate.

TARGET PROPERTY INFORMATION

ADDRESS

JAMBOREE ROAD
ORANGE, CA 92869

COORDINATES

Latitude (North):	33.7955000 - 33° 47' 43.80''
Longitude (West):	117.7609000 - 117° 45' 39.24''
Universal Tranverse Mercator:	Zone 11
UTM X (Meters):	429562.2
UTM Y (Meters):	3739548.2
Elevation:	628 ft. above sea level

USGS TOPOGRAPHIC MAP ASSOCIATED WITH TARGET PROPERTY

Target Property Map:	33117-G7 ORANGE, CA
Most Recent Revision:	1981
East Map:	33117-G6 BLACK STAR CANYON, CA
Most Recent Revision:	1988

AERIAL PHOTOGRAPHY IN THIS REPORT

Portions of Photo from:	20120527
Source:	USDA

MAPPED SITES SUMMARY

Target Property Address:
JAMBOREE ROAD
ORANGE, CA 92869

Click on Map ID to see full detail.

MAP ID	SITE NAME	ADDRESS	DATABASE ACRONYMS	RELATIVE ELEVATION	DIST (ft. & mi.) DIRECTION
1	IRVINE REGIONAL PARK	21501 CHAPMAN	HIST CORTESE, LUST	Lower	184, 0.035, North
A2	SANTIAGO HILLS CLEAN	8500 E CHAPMAN AVE	DRYCLEANERS	Lower	1186, 0.225, SSW
A3		8500 E CHAPMAN AVE	EDR US Hist Cleaners	Lower	1186, 0.225, SSW
4	CHEVRON #9-3098	1409 CHAPMAN	HIST CORTESE, LUST	Higher	1918, 0.363, SSE
B5	IRVINE PARK- ARMY CA		FUDS	Lower	4583, 0.868, East
B6	IRVINE PARK - ARMY C	LOCATED ON APPROX. 2	ENVIROSTOR	Lower	4587, 0.869, East

EXECUTIVE SUMMARY

TARGET PROPERTY SEARCH RESULTS

The target property was not listed in any of the databases searched by EDR.

DATABASES WITH NO MAPPED SITES

No mapped sites were found in EDR's search of available ("reasonably ascertainable ") government records either on the target property or within the search radius around the target property for the following databases:

STANDARD ENVIRONMENTAL RECORDS

Federal NPL site list

NPL ---------- National Priority List
Proposed NPL ---------- Proposed National Priority List Sites
NPL LIENS ---------- Federal Superfund Liens

Federal Delisted NPL site list

Delisted NPL ---------- National Priority List Deletions

Federal CERCLIS list

CERCLIS ---------- Comprehensive Environmental Response, Compensation, and Liability Information System
FEDERAL FACILITY ---------- Federal Facility Site Information listing

Federal CERCLIS NFRAP site List

CERC-NFRAP ---------- CERCLIS No Further Remedial Action Planned

Federal RCRA CORRACTS facilities list

CORRACTS ---------- Corrective Action Report

Federal RCRA non-CORRACTS TSD facilities list

RCRA-TSDF ---------- RCRA - Treatment, Storage and Disposal

Federal RCRA generators list

RCRA-LQG ---------- RCRA - Large Quantity Generators
RCRA-SQG ---------- RCRA - Small Quantity Generators
RCRA-CESQG ---------- RCRA - Conditionally Exempt Small Quantity Generator

Federal institutional controls / engineering controls registries

US ENG CONTROLS ---------- Engineering Controls Sites List
US INST CONTROL ---------- Sites with Institutional Controls

LUCIS ---------- Land Use Control Information System

Federal ERNS list

ERNS ---------- Emergency Response Notification System

State- and tribal - equivalent NPL

RESPONSE ---------- State Response Sites

State and tribal landfill and/or solid waste disposal site lists

SWF/LF ---------- Solid Waste Information System

State and tribal leaking storage tank lists

SLIC ---------- Statewide SLIC Cases
INDIAN LUST ---------- Leaking Underground Storage Tanks on Indian Land

State and tribal registered storage tank lists

UST ---------- Active UST Facilities
AST ---------- Aboveground Petroleum Storage Tank Facilities
INDIAN UST ---------- Underground Storage Tanks on Indian Land
FEMA UST ---------- Underground Storage Tank Listing

State and tribal voluntary cleanup sites

INDIAN VCP ---------- Voluntary Cleanup Priority Listing
VCP ---------- Voluntary Cleanup Program Properties

ADDITIONAL ENVIRONMENTAL RECORDS

Local Brownfield lists

US BROWNFIELDS ---------- A Listing of Brownfields Sites

Local Lists of Landfill / Solid Waste Disposal Sites

DEBRIS REGION 9 ---------- Torres Martinez Reservation Illegal Dump Site Locations
ODI ---------- Open Dump Inventory
SWRCY ---------- Recycler Database
HAULERS ---------- Registered Waste Tire Haulers Listing
INDIAN ODI ---------- Report on the Status of Open Dumps on Indian Lands
WMUDS/SWAT ---------- Waste Management Unit Database

Local Lists of Hazardous waste / Contaminated Sites

US CDL ---------- Clandestine Drug Labs
HIST Cal-Sites ---------- Historical Calsites Database
SCH ---------- School Property Evaluation Program
Toxic Pits ---------- Toxic Pits Cleanup Act Sites
CDL ---------- Clandestine Drug Labs
US HIST CDL ---------- National Clandestine Laboratory Register

EXECUTIVE SUMMARY

Local Lists of Registered Storage Tanks

CA FID UST	Facility Inventory Database
HIST UST	Hazardous Substance Storage Container Database
SWEEPS UST	SWEEPS UST Listing

Local Land Records

LIENS 2	CERCLA Lien Information
LIENS	Environmental Liens Listing
DEED	Deed Restriction Listing

Records of Emergency Release Reports

HMIRS	Hazardous Materials Information Reporting System
CHMIRS	California Hazardous Material Incident Report System
LDS	Land Disposal Sites Listing
MCS	Military Cleanup Sites Listing
Orange Co. Industrial Site	List of Industrial Site Cleanups
SPILLS 90	SPILLS 90 data from FirstSearch

Other Ascertainable Records

RCRA NonGen / NLR	RCRA - Non Generators / No Longer Regulated
DOT OPS	Incident and Accident Data
DOD	Department of Defense Sites
CONSENT	Superfund (CERCLA) Consent Decrees
ROD	Records Of Decision
UMTRA	Uranium Mill Tailings Sites
US MINES	Mines Master Index File
TRIS	Toxic Chemical Release Inventory System
TSCA	Toxic Substances Control Act
FTTS	FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
HIST FTTS	FIFRA/TSCA Tracking System Administrative Case Listing
SSTS	Section 7 Tracking Systems
ICIS	Integrated Compliance Information System
PADS	PCB Activity Database System
MLTS	Material Licensing Tracking System
RADINFO	Radiation Information Database
FINDS	Facility Index System/Facility Registry System
RAATS	RCRA Administrative Action Tracking System
RMP	Risk Management Plans
CA BOND EXP. PLAN	Bond Expenditure Plan
NPDES	NPDES Permits Listing
UIC	UIC Listing
Cortese	"Cortese" Hazardous Waste & Substances Sites List
CUPA Listings	CUPA Resources List
Notify 65	Proposition 65 Records
WIP	Well Investigation Program Case List
ENF	Enforcement Action Listing
HAZNET	Facility and Manifest Data
EMI	Emissions Inventory Data
INDIAN RESERV	Indian Reservations

SCRD DRYCLEANERS State Coalition for Remediation of Drycleaners Listing
WDS Waste Discharge System
Financial Assurance Financial Assurance Information Listing
PROC Certified Processors Database
HWT Registered Hazardous Waste Transporter Database
HWP EnviroStor Permitted Facilities Listing
MWMP Medical Waste Management Program Listing
LEAD SMELTERS Lead Smelter Sites
US AIRS Aerometric Information Retrieval System Facility Subsystem
EPA WATCH LIST EPA WATCH LIST
US FIN ASSUR Financial Assurance Information
COAL ASH EPA Coal Combustion Residues Surface Impoundments List
PCB TRANSFORMER PCB Transformer Registration Database
COAL ASH DOE Steam-Electric Plant Operation Data
2020 COR ACTION 2020 Corrective Action Program List
PRP Potentially Responsible Parties

EDR HIGH RISK HISTORICAL RECORDS

EDR Exclusive Records

EDR MGP EDR Proprietary Manufactured Gas Plants
EDR US Hist Auto Stat EDR Exclusive Historic Gas Stations

EDR RECOVERED GOVERNMENT ARCHIVES

Exclusive Recovered Govt. Archives

RGA LUST Recovered Government Archive Leaking Underground Storage Tank
RGA LF Recovered Government Archive Solid Waste Facilities List

SURROUNDING SITES: SEARCH RESULTS

Surrounding sites were identified in the following databases.

Elevations have been determined from the USGS Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be field verified. Sites with an elevation equal to or higher than the target property have been differentiated below from sites with an elevation lower than the target property.
Page numbers and map identification numbers refer to the EDR Radius Map report where detailed data on individual sites can be reviewed.

Sites listed in ***bold italics*** are in multiple databases.

Unmappable (orphan) sites are not considered in the foregoing analysis.

STANDARD ENVIRONMENTAL RECORDS

State- and tribal - equivalent CERCLIS

ENVIROSTOR: The Department of Toxic Substances Control's (DTSC's) Site Mitigation and Brownfields Reuse Program's (SMBRP's) EnviroStor database identifes sites that have known contamination or sites for which

there may be reasons to investigate further. The database includes the following site types: Federal Superfund sites (National Priorities List (NPL)); State Response, including Military Facilities and State Superfund; Voluntary Cleanup; and School sites. EnviroStor provides similar information to the information that was available in CalSites, and provides additional site information, including, but not limited to, identification of formerly-contaminated properties that have been released for reuse, properties where environmental deed restrictions have been recorded to prevent inappropriate land uses, and risk characterization information that is used to assess potential impacts to public health and the environment at contaminated sites.

A review of the ENVIROSTOR list, as provided by EDR, and dated 05/04/2015 has revealed that there is 1 ENVIROSTOR site within approximately 1 mile of the target property.

Lower Elevation	Address	Direction / Distance	Map ID	Page
IRVINE PARK - ARMY C Status: Inactive - Action Required Facility Id: 80000831	LOCATED ON APPROX. 2	E 1/2 - 1 (0.869 mi.)	B6	14

State and tribal leaking storage tank lists

LUST: The Leaking Underground Storage Tank Incident Reports contain an inventory of reported leaking underground storage tank incidents. The data come from the State Water Resources Control Board Leaking Underground Storage Tank Information System.

A review of the LUST list, as provided by EDR, and dated 03/13/2015 has revealed that there are 2 LUST sites within approximately 0.5 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
CHEVRON #9-3098 Facility Status: Case Closed Global ID: T0605901236	***1409 CHAPMAN***	***SSE 1/4 - 1/2 (0.363 mi.)***	***4***	***12***

Lower Elevation	Address	Direction / Distance	Map ID	Page
IRVINE REGIONAL PARK Status: Completed - Case Closed Facility Status: Case Closed Global Id: T0605900800 Current Status: 9 Global ID: T0605900800 Facility Id: 89UT113	***21501 CHAPMAN***	***N 0 - 1/8 (0.035 mi.)***	***1***	***8***

ADDITIONAL ENVIRONMENTAL RECORDS

Other Ascertainable Records

FUDS: The Listing includes locations of Formerly Used Defense Sites Properties where the US Army Corps Of Engineers is actively working or will take necessary cleanup actions.

A review of the FUDS list, as provided by EDR, and dated 06/06/2014 has revealed that there is 1 FUDS

site within approximately 1 mile of the target property.

Lower Elevation	Address	Direction / Distance	Map ID	Page
IRVINE PARK- ARMY CA		E 1/2 - 1 (0.868 mi.)	B5	13

HIST CORTESE: The sites for the list are designated by the State Water Resource Control Board [LUST], the Integrated Waste Board [SWF/LS], and the Department of Toxic Substances Control [CALSITES]. This listing is no longer updated by the state agency.

A review of the HIST CORTESE list, as provided by EDR, and dated 04/01/2001 has revealed that there are 2 HIST CORTESE sites within approximately 0.5 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
CHEVRON #9-3098 Reg Id: 083001628T	***1409 CHAPMAN***	***SSE 1/4 - 1/2 (0.363 mi.)***	***4***	***12***

Lower Elevation	Address	Direction / Distance	Map ID	Page
IRVINE REGIONAL PARK Reg Id: 083001012T Reg Id: 083001592T	***21501 CHAPMAN***	***N 0 - 1/8 (0.035 mi.)***	***1***	***8***

DRYCLEANERS: A list of drycleaner related facilities that have EPA ID numbers. These are facilities with certain SIC codes: power laundries, family and commercial; garment pressing and cleaners' agents; linen supply; coin-operated laundries and cleaning; drycleaning plants except rugs; carpet and upholster cleaning; industrial launderers; laundry and garment services.

A review of the DRYCLEANERS list, as provided by EDR, and dated 02/18/2015 has revealed that there is 1 DRYCLEANERS site within approximately 0.25 miles of the target property.

Lower Elevation	Address	Direction / Distance	Map ID	Page
SANTIAGO HILLS CLEAN EPA Id: CAL000217113	8500 E CHAPMAN AVE	SSW 1/8 - 1/4 (0.225 mi.)	A2	10

EDR HIGH RISK HISTORICAL RECORDS

EDR Exclusive Records

EDR US Hist Cleaners: EDR has searched selected national collections of business directories and has collected listings of potential dry cleaner sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include dry cleaning establishments. The categories reviewed included, but were not limited to dry cleaners, cleaners, laundry, laundromat, cleaning/laundry, wash & dry etc. This database falls within a category of information EDR classifies as "High Risk Historical Records", or HRHR. EDR's HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

A review of the EDR US Hist Cleaners list, as provided by EDR, has revealed that there is 1 EDR US

EXECUTIVE SUMMARY

Hist Cleaners site within approximately 0.25 miles of the target property.

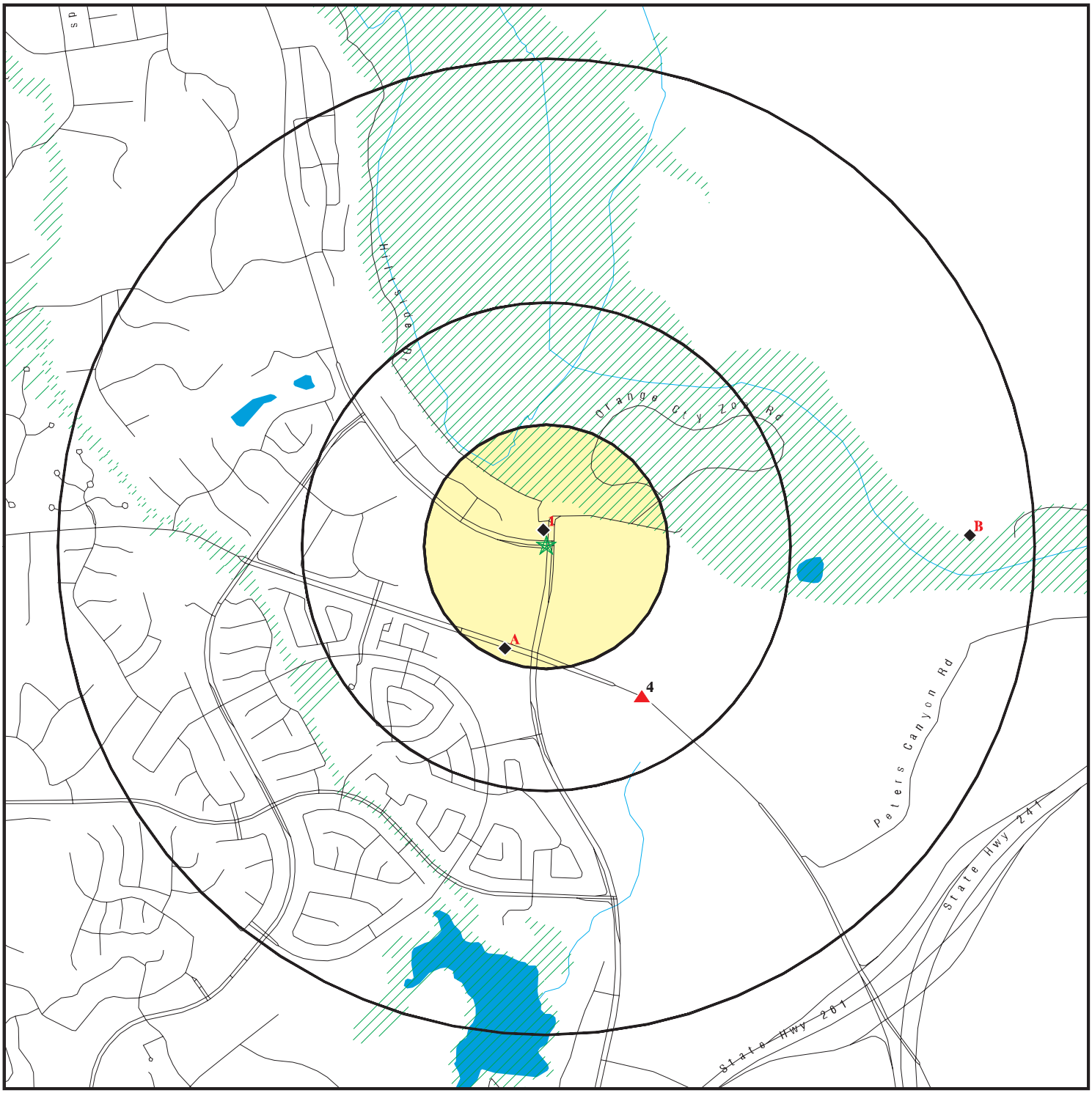
Lower Elevation	Address	Direction / Distance	Map ID	Page
Not reported	8500 E CHAPMAN AVE	SSW 1/8 - 1/4 (0.225 mi.)	A3	11

EXECUTIVE SUMMARY

Due to poor or inadequate address information, the following sites were not mapped. Count: 1 records.

Site Name	Database(s)
ORANGE CITY DUMP #9	SWF/LF

OVERVIEW MAP - 4330930.2S

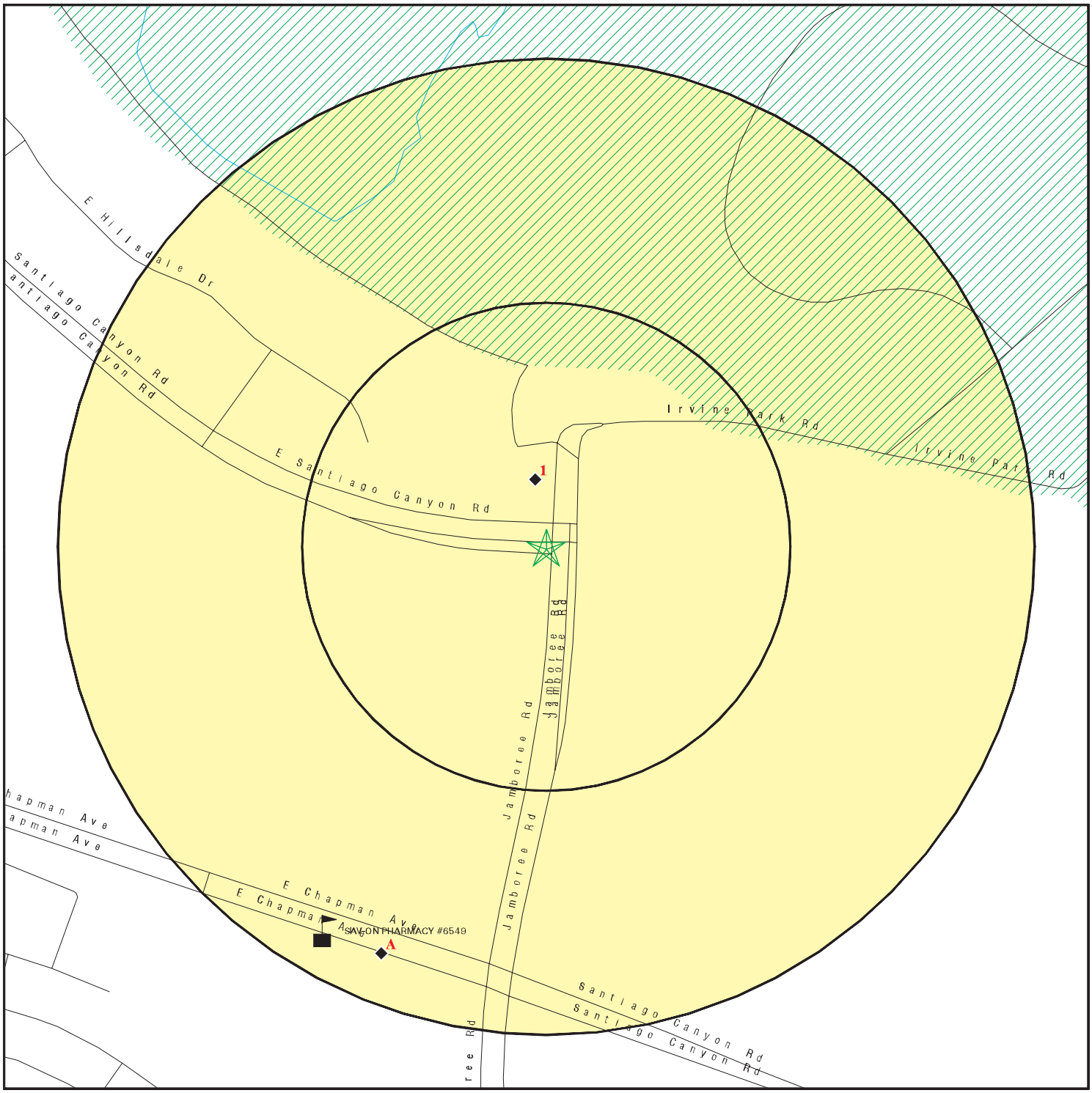


- Target Property
- Sites at elevations higher than or equal to the target property
- Sites at elevations lower than the target property
- Manufactured Gas Plants
- National Priority List Sites
- Dept. Defense Sites
- Indian Reservations BIA
- 100-year flood zone
- 500-year flood zone
- Areas of Concern

This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

SITE NAME: IRWD ILP North Conversion Project	CLIENT: Bonterra Psomas
ADDRESS: Jamboree Road Orange CA 92869	CONTACT: Jeff Gershon INQUIRY #: 4330930.2s
LAT/LONG: 33.7955 / 117.7609	DATE: June 18, 2015 6:59 pm

DETAIL MAP - 4330930.2S



0 1/16 1/8 1/4 Miles

- Target Property
- Sites at elevations higher than or equal to the target property
- Sites at elevations lower than the target property
- Manufactured Gas Plants
- Sensitive Receptors
- National Priority List Sites
- Dept. Defense Sites
- Indian Reservations BIA
- 100-year flood zone
- 500-year flood zone
- Areas of Concern

This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

SITE NAME: IRWD ILP North Conversion Project	CLIENT: Bonterra Psomas
ADDRESS: Jamboree Road Orange CA 92869	CONTACT: Jeff Gershon INQUIRY #: 4330930.2s
LAT/LONG: 33.7955 / 117.7609	DATE: June 18, 2015 7:00 pm

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
STANDARD ENVIRONMENTAL RECORDS								
Federal NPL site list								
NPL	1.000		0	0	0	0	NR	0
Proposed NPL	1.000		0	0	0	0	NR	0
NPL LIENS	TP		NR	NR	NR	NR	NR	0
Federal Delisted NPL site list								
Delisted NPL	1.000		0	0	0	0	NR	0
Federal CERCLIS list								
CERCLIS	0.500		0	0	0	NR	NR	0
FEDERAL FACILITY	0.500		0	0	0	NR	NR	0
Federal CERCLIS NFRAP site List								
CERC-NFRAP	0.500		0	0	0	NR	NR	0
Federal RCRA CORRACTS facilities list								
CORRACTS	1.000		0	0	0	0	NR	0
Federal RCRA non-CORRACTS TSD facilities list								
RCRA-TSDF	0.500		0	0	0	NR	NR	0
Federal RCRA generators list								
RCRA-LQG	0.250		0	0	NR	NR	NR	0
RCRA-SQG	0.250		0	0	NR	NR	NR	0
RCRA-CESQG	0.250		0	0	NR	NR	NR	0
Federal institutional controls / engineering controls registries								
US ENG CONTROLS	0.500		0	0	0	NR	NR	0
US INST CONTROL	0.500		0	0	0	NR	NR	0
LUCIS	0.500		0	0	0	NR	NR	0
Federal ERNS list								
ERNS	TP		NR	NR	NR	NR	NR	0
State- and tribal - equivalent NPL								
RESPONSE	1.000		0	0	0	0	NR	0
State- and tribal - equivalent CERCLIS								
ENVIROSTOR	1.000		0	0	0	1	NR	1
State and tribal landfill and/or solid waste disposal site lists								
SWF/LF	0.500		0	0	0	NR	NR	0
State and tribal leaking storage tank lists								
LUST	0.500		1	0	1	NR	NR	2

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
SLIC	0.500		0	0	0	NR	NR	0
INDIAN LUST	0.500		0	0	0	NR	NR	0
State and tribal registered storage tank lists								
UST	0.250		0	0	NR	NR	NR	0
AST	0.250		0	0	NR	NR	NR	0
INDIAN UST	0.250		0	0	NR	NR	NR	0
FEMA UST	0.250		0	0	NR	NR	NR	0
State and tribal voluntary cleanup sites								
INDIAN VCP	0.500		0	0	0	NR	NR	0
VCP	0.500		0	0	0	NR	NR	0
ADDITIONAL ENVIRONMENTAL RECORDS								
Local Brownfield lists								
US BROWNFIELDS	0.500		0	0	0	NR	NR	0
Local Lists of Landfill / Solid Waste Disposal Sites								
DEBRIS REGION 9	0.500		0	0	0	NR	NR	0
ODI	0.500		0	0	0	NR	NR	0
SWRCY	0.500		0	0	0	NR	NR	0
HAULERS	TP		NR	NR	NR	NR	NR	0
INDIAN ODI	0.500		0	0	0	NR	NR	0
WMUDS/SWAT	0.500		0	0	0	NR	NR	0
Local Lists of Hazardous waste / Contaminated Sites								
US CDL	TP		NR	NR	NR	NR	NR	0
HIST Cal-Sites	1.000		0	0	0	0	NR	0
SCH	0.250		0	0	NR	NR	NR	0
Toxic Pits	1.000		0	0	0	0	NR	0
CDL	TP		NR	NR	NR	NR	NR	0
US HIST CDL	TP		NR	NR	NR	NR	NR	0
Local Lists of Registered Storage Tanks								
CA FID UST	0.250		0	0	NR	NR	NR	0
HIST UST	0.250		0	0	NR	NR	NR	0
SWEEPS UST	0.250		0	0	NR	NR	NR	0
Local Land Records								
LIENS 2	TP		NR	NR	NR	NR	NR	0
LIENS	TP		NR	NR	NR	NR	NR	0
DEED	0.500		0	0	0	NR	NR	0
Records of Emergency Release Reports								
HMIRS	TP		NR	NR	NR	NR	NR	0
CHMIRS	TP		NR	NR	NR	NR	NR	0
LDS	TP		NR	NR	NR	NR	NR	0

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
MCS	TP		NR	NR	NR	NR	NR	0
Orange Co. Industrial Site	TP		NR	NR	NR	NR	NR	0
SPILLS 90	TP		NR	NR	NR	NR	NR	0
Other Ascertainable Records								
RCRA NonGen / NLR	0.250		0	0	NR	NR	NR	0
DOT OPS	TP		NR	NR	NR	NR	NR	0
DOD	1.000		0	0	0	0	NR	0
FUDS	1.000		0	0	0	1	NR	1
CONSENT	1.000		0	0	0	0	NR	0
ROD	1.000		0	0	0	0	NR	0
UMTRA	0.500		0	0	0	NR	NR	0
US MINES	0.250		0	0	NR	NR	NR	0
TRIS	TP		NR	NR	NR	NR	NR	0
TSCA	TP		NR	NR	NR	NR	NR	0
FTTS	TP		NR	NR	NR	NR	NR	0
HIST FTTS	TP		NR	NR	NR	NR	NR	0
SSTS	TP		NR	NR	NR	NR	NR	0
ICIS	TP		NR	NR	NR	NR	NR	0
PADS	TP		NR	NR	NR	NR	NR	0
MLTS	TP		NR	NR	NR	NR	NR	0
RADINFO	TP		NR	NR	NR	NR	NR	0
FINDS	TP		NR	NR	NR	NR	NR	0
RAATS	TP		NR	NR	NR	NR	NR	0
RMP	TP		NR	NR	NR	NR	NR	0
CA BOND EXP. PLAN	1.000		0	0	0	0	NR	0
NPDES	TP		NR	NR	NR	NR	NR	0
UIC	TP		NR	NR	NR	NR	NR	0
Cortese	0.500		0	0	0	NR	NR	0
HIST CORTESE	0.500		1	0	1	NR	NR	2
CUPA Listings	0.250		0	0	NR	NR	NR	0
Notify 65	1.000		0	0	0	0	NR	0
DRYCLEANERS	0.250		0	1	NR	NR	NR	1
WIP	0.250		0	0	NR	NR	NR	0
ENF	TP		NR	NR	NR	NR	NR	0
HAZNET	TP		NR	NR	NR	NR	NR	0
EMI	TP		NR	NR	NR	NR	NR	0
INDIAN RESERV	1.000		0	0	0	0	NR	0
SCRD DRYCLEANERS	0.500		0	0	0	NR	NR	0
WDS	TP		NR	NR	NR	NR	NR	0
Financial Assurance	TP		NR	NR	NR	NR	NR	0
PROC	0.500		0	0	0	NR	NR	0
HWT	0.250		0	0	NR	NR	NR	0
HWP	1.000		0	0	0	0	NR	0
MWMP	0.250		0	0	NR	NR	NR	0
LEAD SMELTERS	TP		NR	NR	NR	NR	NR	0
US AIRS	TP		NR	NR	NR	NR	NR	0
EPA WATCH LIST	TP		NR	NR	NR	NR	NR	0
US FIN ASSUR	TP		NR	NR	NR	NR	NR	0
COAL ASH EPA	0.500		0	0	0	NR	NR	0
PCB TRANSFORMER	TP		NR	NR	NR	NR	NR	0

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
COAL ASH DOE	TP		NR	NR	NR	NR	NR	0
2020 COR ACTION	0.250		0	0	NR	NR	NR	0
PRP	TP		NR	NR	NR	NR	NR	0
EDR HIGH RISK HISTORICAL RECORDS								
EDR Exclusive Records								
EDR MGP	1.000		0	0	0	0	NR	0
EDR US Hist Auto Stat	0.250		0	0	NR	NR	NR	0
EDR US Hist Cleaners	0.250		0	1	NR	NR	NR	1
EDR RECOVERED GOVERNMENT ARCHIVES								
Exclusive Recovered Govt. Archives								
RGA LUST	TP		NR	NR	NR	NR	NR	0
RGA LF	TP		NR	NR	NR	NR	NR	0
- Totals --		0	2	2	2	2	0	8

NOTES:

TP = Target Property

NR = Not Requested at this Search Distance

Sites may be listed in more than one database

1
North
< 1/8
0.035 mi.
184 ft.

IRVINE REGIONAL PARK
21501 CHAPMAN
ORANGE, CA 92669

HIST CORTESE **S104160912**
LUST **N/A**

Relative:
Lower

Actual:
614 ft.

HIST CORTESE:

Region:	CORTESE
Facility County Code:	30
Reg By:	LTNKA
Reg Id:	083001012T

Region:	CORTESE
Facility County Code:	30
Reg By:	LTNKA
Reg Id:	083001592T

LUST:

Region:	STATE
Global Id:	T0605900800
Latitude:	33.7931404
Longitude:	-117.8509238
Case Type:	LUST Cleanup Site
Status:	Completed - Case Closed
Status Date:	08/24/1990
Lead Agency:	ORANGE COUNTY LOP
Case Worker:	SK
Local Agency:	ORANGE COUNTY LOP
RB Case Number:	083001012T
LOC Case Number:	89UT113
File Location:	Local Agency
Potential Media Affect:	Soil
Potential Contaminants of Concern:	Gasoline
Site History:	Not reported

Click here to access the California GeoTracker records for this facility:

Contact:

Global Id:	T0605900800
Contact Type:	Regional Board Caseworker
Contact Name:	TOM E. MBEKE-EKANEM
Organization Name:	SANTA ANA RWQCB (REGION 8)
Address:	3737 MAIN STREET, SUITE 500
City:	RIVERSIDE
Email:	tmbeke-ekanem@waterboards.ca.gov
Phone Number:	9513202007

Global Id:	T0605900800
Contact Type:	Local Agency Caseworker
Contact Name:	SHYAMALA KALYANASUNDARAM
Organization Name:	ORANGE COUNTY LOP
Address:	1241 E. DYER ROAD SUITE 120
City:	SANTA ANA
Email:	ssundaram@ochca.com
Phone Number:	7144336262

Status History:

Global Id:	T0605900800
Status:	Open - Case Begin Date

IRVINE REGIONAL PARK (Continued) **S104160912**

Status Date: 05/30/1989

Global Id: T0605900800
Status: Completed - Case Closed
Status Date: 08/24/1990

Regulatory Activities:
Global Id: T0605900800
Action Type: Other
Date: 05/30/1989
Action: Leak Discovery

Global Id: T0605900800
Action Type: ENFORCEMENT
Date: 09/18/1990
Action: Closure/No Further Action Letter

Global Id: T0605900800
Action Type: Other
Date: 05/30/1989
Action: Leak Reported

ORANGE CO. LUST:
Region: ORANGE
Facility Id: 89UT113
Current Status: Certification (Case Closed)
Released Substance: Gasoline-Automotive (motor gasoline and additives), leaded & unleaded
Date Closed: 08/24/1990
Case Type: Soil Only
Record ID: RO0001805

LUST REG 8:
Region: 8
County: Orange
Regional Board: Santa Ana Region
Facility Status: Case Closed
Case Number: 083001012T
Local Case Num: 89UT113
Case Type: Soil only
Substance: Gasoline
Qty Leaked: 0
Abate Method: Not reported
Cross Street: Not reported
Enf Type: Not reported
Funding: Not reported
How Discovered: Tank Closure
How Stopped: Close Tank
Leak Cause: Unknown
Leak Source: Unknown
Global ID: T0605900800
How Stopped Date: 9/9/9999
Enter Date: Not reported
Date Confirmation of Leak Began: Not reported
Date Preliminary Assessment Began: Not reported
Discover Date: 5/30/1989

IRVINE REGIONAL PARK (Continued) **S104160912**

Enforcement Date:	Not reported
Close Date:	8/24/1990
Date Prelim Assessment Workplan Submitted:	Not reported
Date Pollution Characterization Began:	Not reported
Date Remediation Plan Submitted:	Not reported
Date Remedial Action Underway:	Not reported
Date Post Remedial Action Monitoring:	Not reported
Enter Date:	Not reported
GW Qualifies:	Not reported
Soil Qualifies:	Not reported
Operator:	Not reported
Facility Contact:	Not reported
Interim:	Not reported
Oversite Program:	LUST
Latitude:	33.790736
Longitude:	-117.7998831
MTBE Date:	Not reported
Max MTBE GW:	Not reported
MTBE Concentration:	0
Max MTBE Soil:	Not reported
MTBE Fuel:	1
MTBE Tested:	Site NOT Tested for MTBE.Includes Unknown and Not Analyzed.
MTBE Class:	*
Staff:	TME
Staff Initials:	KC
Lead Agency:	Local Agency
Local Agency:	30000L
Hydr Basin #:	Not reported
Beneficial:	MUN
Priority:	Not reported
Cleanup Fund Id:	Not reported
Work Suspended:	Not reported

Summary: Not reported

A2 **SANTIAGO HILLS CLEANERS** **DRYCLEANERS** **S105030782**
SSW **8500 E CHAPMAN AVE** **N/A**
1/8-1/4 **ORANGE, CA 92869**
0.225 mi.
1186 ft. **Site 1 of 2 in cluster A**

Relative:
Lower

Actual:
602 ft.

DRYCLEANERS:

EPA Id:	CAL000217113
NAICS Code:	81232
NAICS Description:	Drycleaning and Laundry Services (except Coin-Operated)
SIC Code:	7211
SIC Description:	Power Laundries, Family and Commercial
Create Date:	12/21/2000
Facility Active:	Yes
Inactive Date:	Not reported
Facility Addr2:	Not reported
Owner Name:	SONG KI BAIK
Owner Address:	8500 E CHAPMAN AVE
Owner Address 2:	Not reported
Owner Telephone:	7142881100
Contact Name:	SONG KIBAIK - OWNER
Contact Address:	8500 E CHAPMAN AVE
Contact Address 2:	Not reported
Contact Telephone:	7142881100

SANTIAGO HILLS CLEANERS (Continued) **S105030782**

Mailing Name:	Not reported
Mailing Address 1:	8500 E CHAPMAN AVE
Mailing Address 2:	Not reported
Mailing City:	ORANGE
Mailing State:	CA
Mailing Zip:	928690000
Owner Fax:	Not reported
Region Code:	0000000000

A3 **EDR US Hist Cleaners** **1015101219**
SSW **8500 E CHAPMAN AVE** **N/A**
1/8-1/4 **ORANGE, CA 92869**
0.225 mi.
1186 ft. **Site 2 of 2 in cluster A**

Relative: **Lower**

Actual: **602 ft.**

EDR Historical Cleaners:

Name:	SANTIAGO HILLS CARPET CLEANING
Year:	1999
Address:	8500 E CHAPMAN AVE
Name:	SANTIAGO HILLS CLEANERS
Year:	2001
Address:	8500 E CHAPMAN AVE
Name:	SANTIAGO HILLS CLEANERS
Year:	2002
Address:	8500 E CHAPMAN AVE
Name:	SANTIAGO HILLS CLEANERS
Year:	2003
Address:	8500 E CHAPMAN AVE
Name:	SANTIAGO HILLS CLEANERS
Year:	2004
Address:	8500 E CHAPMAN AVE
Name:	SANTIAGO HILLS CLEANERS
Year:	2005
Address:	8500 E CHAPMAN AVE
Name:	SANTIAGO HILLS CLEANERS
Year:	2006
Address:	8500 E CHAPMAN AVE
Name:	SANTIAGO HILLS CLEANERS
Year:	2007
Address:	8500 E CHAPMAN AVE
Name:	SANTIAGO HILLS CLEANERS
Year:	2008
Address:	8500 E CHAPMAN AVE
Name:	SANTIAGO HILLS CLEANERS
Year:	2010
Address:	8500 E CHAPMAN AVE
Name:	SANTIAGO HILLS CLEANERS & SHOE REPAI
Year:	2011

(Continued) **1015101219**

Address: 8500 E CHAPMAN AVE

4
SSE
1/4-1/2
0.363 mi.
1918 ft.

CHEVRON #9-3098
1409 CHAPMAN
ORANGE, CA 92668

HIST CORTESE **S103891649**
LUST **N/A**

Relative:
Higher

Actual:
654 ft.

HIST CORTESE:

Region:	CORTESE
Facility County Code:	30
Reg By:	LTNKA
Reg Id:	083001628T

LUST REG 8:

Region:	8
County:	Orange
Regional Board:	Santa Ana Region
Facility Status:	Case Closed
Case Number:	083001628T
Local Case Num:	Not reported
Case Type:	Soil only
Substance:	Gasoline
Qty Leaked:	Not reported
Abate Method:	Vapor Extraction
Cross Street:	MAIN
Enf Type:	Not reported
Funding:	Not reported
How Discovered:	Tank Closure
How Stopped:	Not reported
Leak Cause:	Overfill
Leak Source:	Tank
Global ID:	T0605901236
How Stopped Date:	12/18/1989
Enter Date:	9/15/1990
Date Confirmation of Leak Began:	12/18/1989
Date Preliminary Assessment Began:	4/20/1990
Discover Date:	12/18/1989
Enforcement Date:	Not reported
Close Date:	4/19/1994
Date Prelim Assessment Workplan Submitted:	1/19/1990
Date Pollution Characterization Began:	Not reported
Date Remediation Plan Submitted:	1/11/1990
Date Remedial Action Underway:	2/15/1991
Date Post Remedial Action Monitoring:	Not reported
Enter Date:	9/15/1990
GW Qualifies:	Not reported
Soil Qualifies:	Not reported
Operator:	Not reported
Facility Contact:	Not reported
Interim:	Not reported
Oversite Program:	LUST
Latitude:	33.7880696
Longitude:	-117.8668571
MTBE Date:	Not reported
Max MTBE GW:	Not reported
MTBE Concentration:	0

CHEVRON #9-3098 (Continued) **S103891649**

Max MTBE Soil:	Not reported
MTBE Fuel:	1
MTBE Tested:	Site NOT Tested for MTBE.Includes Unknown and Not Analyzed.
MTBE Class:	*
Staff:	RS
Staff Initials:	UNK
Lead Agency:	Local Agency
Local Agency:	Orange, Orange County
Hydr Basin #:	COASTAL PLAIN OF ORA
Beneficial:	Not reported
Priority:	Not reported
Cleanup Fund Id:	Not reported
Work Suspended:	Not reported

Summary: Not reported

B5 **IRVINE PARK- ARMY CAMP** **FUDS** **1009484313**
East **N/A**
1/2-1 **ORANGE, CA**
0.868 mi.
4583 ft. **Site 1 of 2 in cluster B**

Relative:
Lower

Actual:
597 ft.

FUDS:

Federal Facility ID:	CA9799F9952
FUDS #:	J09CA7129
INST ID:	54276
Facility Name:	IRVINE PARK- ARMY CAMP
City:	ORANGE
State:	CA
EPA Region:	09
County:	ORANGE
Congressional District:	42
US Army District:	Los Angeles District (SPL)
Fiscal Year:	2012
Telephone:	213-452-3920
NPL Status:	Not Listed
RAB:	Not reported
CTC:	12424.70
Current Owner:	Not reported
Current Prog:	Not reported
Future Prog:	Not reported
Acreage:	Not reported
Description:	The 160-acre site is located at Irvine Regional Park, in Orange County, California, approximately 5 miles east of the City of Orange. The site was known as Camp Rathke. The Army constructed four prefabricated steel barracks and some small wooden buildings, including a headquarters building. They used the Camp Irvine/Rathke site to train combat troops in field exercises and command post exercises. No facilities constructed by the Army remain in the park. The Army disposed of all 225 acres. The 160-acre lease was terminated in 1943, returning control of Irvine Park to Orange County, and the 65-acre lease with the private owner (predecessor to the Irvine Company) was terminated in 1946. The park building that was used as a PX still exists and is currently used for park offices. No facilities constructed by the Army remain in the park. Most of the subject property is owned by Orange County and is located within either Irvine Regional Park or Villa Park Dam Regional Park, except for 12 acres (part of the 65-acre area) that are owned by the Irvine Company and used for grazing. This property is known or suspected to contain

IRVINE PARK- ARMY CAMP (Continued) **1009484313**

military munitions and explosives of concern (e.g., unexploded ordnance) and therefore may present an explosive hazard

History: The Army acquired Irvine Park in lease from Orange County in 1942. The site was known as Camp Irvine during Army occupation. The existing Irvine Park soda fountain building was used by the army as their post exchange and communications center. The parking lot behind the PX was used for the motor pool. Living quarters at Camp Irvine consisted primarily of pup tents. Flooding in February/March 1943 caused the Army to abandoned their encampment in the park and move to the adjacent 65-acre property, which the Army leased from an individual (predecessor to the Irvine Company). This new site was dedicated as Camp Rathke on 25 April 1943. The 160-acre park was reopened to the public in May 1943, but it continued to be used by the Army on an informal basis. It is assumed that the 160-acre lease with Orange County was terminated in 1943 and, since Camp Rathke reportedly existed for 3 years, it is assumed that the 65-acre lease was cancelled in 1946. The Army disposed of all 225 acres. The 160-acre lease was terminated in 1943, returning control of Irvine Park to Orange County, and the 65-acre lease with Irvine (predecessor of the Irvine Company) was terminated in 1946. The park building that was used as a PX still exists and is currently used for park offices. Most of the subject property is owned by Orange County and is located within either Irvine Regional Park or Villa Park Dam Regional Park, except for 12 acres (part of the 65-acre area) that are owned by the Irvine Company and used for grazing.

Latitude: 33.79583333000
Longitude: -117.74583333

B6 **IRVINE PARK - ARMY CAMP** **ENVIROSTOR** **S110711874**
East **LOCATED ON APPROX. 225 ACRES WITHIN SANTIAGO CANYON AT THE B** **N/A**
1/2-1 **IRVINE PARK, CA 92697**
0.869 mi.
4587 ft. **Site 2 of 2 in cluster B**

Relative:
Lower

Actual:
597 ft.

ENVIROSTOR:

Facility ID:	80000831
Status:	Inactive - Action Required
Status Date:	03/05/2012
Site Code:	401507
Site Type:	Military Evaluation
Site Type Detailed:	FUDS
Acres:	640
NPL:	NO
Regulatory Agencies:	SMBRP
Lead Agency:	SMBRP
Program Manager:	Daniel Cordero
Supervisor:	Manny Alonzo
Division Branch:	Cleanup Cypress
Assembly:	68
Senate:	37
Special Program:	Not reported
Restricted Use:	NO
Site Mgmt Req:	NONE SPECIFIED
Funding:	DERA
Latitude:	33.79583
Longitude:	-117.7458
APN:	NONE SPECIFIED
Past Use:	FIRING RANGE - SMALL ARMS ETC...
Potential COC:	Explosives (UXO, MEC Lead

IRVINE PARK - ARMY CAMP (Continued) **S110711874**

Confirmed COC: 30013-NO 30011-NO
Potential Description: SOIL
Alias Name: CA99799F995200
Alias Type: Federal Facility ID
Alias Name: 401507
Alias Type: Project Code (Site Code)
Alias Name: 80000831
Alias Type: Envirostor ID Number
Alias Name: J09CA7129
Alias Type: Envirostor ID Number

Completed Info:
Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Inventory Project Report (INPR)
Completed Date: 09/27/1999
Comments: Not reported

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Preliminary Endangerment Assessment Tech Memo
Completed Date: 12/20/2010
Comments: TPP is complete.

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Preliminary Endangerment Assessment Workplan
Completed Date: 12/22/2010
Comments: Document with DTSC comments received.

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Preliminary Assessment/Site Inspection Report (PA/SI)
Completed Date: 09/21/2011
Comments: Not reported

Future Area Name: Not reported
Future Sub Area Name: Not reported
Future Document Type: Not reported
Future Due Date: Not reported
Schedule Area Name: Not reported
Schedule Sub Area Name: Not reported
Schedule Document Type: Not reported
Schedule Due Date: Not reported
Schedule Revised Date: Not reported

Count: 1 records. ORPHAN SUMMARY

City	EDR ID	Site Name	Site Address	Zip	Database(s)
ORANGE	S108407527	ORANGE CITY DUMP #9	N OF CHAPMAN & YORBA N OF CHPM		SWF/LF

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

To maintain currency of the following federal and state databases, EDR contacts the appropriate governmental agency on a monthly or quarterly basis, as required.

Number of Days to Update: Provides confirmation that EDR is reporting records that have been updated within 90 days from the date the government agency made the information available to the public.

STANDARD ENVIRONMENTAL RECORDS

Federal NPL site list

NPL: National Priority List

National Priorities List (Superfund). The NPL is a subset of CERCLIS and identifies over 1,200 sites for priority cleanup under the Superfund Program. NPL sites may encompass relatively large areas. As such, EDR provides polygon coverage for over 1,000 NPL site boundaries produced by EPA's Environmental Photographic Interpretation Center (EPIC) and regional EPA offices.

Date of Government Version: 12/16/2014
Date Data Arrived at EDR: 01/08/2015
Date Made Active in Reports: 02/09/2015
Number of Days to Update: 32

Source: EPA
Telephone: N/A
Last EDR Contact: 04/08/2015
Next Scheduled EDR Contact: 07/20/2015
Data Release Frequency: Quarterly

NPL Site Boundaries

Sources:

EPA's Environmental Photographic Interpretation Center (EPIC)
Telephone: 202-564-7333

EPA Region 1
Telephone 617-918-1143

EPA Region 6
Telephone: 214-655-6659

EPA Region 3
Telephone 215-814-5418

EPA Region 7
Telephone: 913-551-7247

EPA Region 4
Telephone 404-562-8033

EPA Region 8
Telephone: 303-312-6774

EPA Region 5
Telephone 312-886-6686

EPA Region 9
Telephone: 415-947-4246

EPA Region 10
Telephone 206-553-8665

Proposed NPL: Proposed National Priority List Sites

A site that has been proposed for listing on the National Priorities List through the issuance of a proposed rule in the Federal Register. EPA then accepts public comments on the site, responds to the comments, and places on the NPL those sites that continue to meet the requirements for listing.

Date of Government Version: 12/16/2014
Date Data Arrived at EDR: 01/08/2015
Date Made Active in Reports: 02/09/2015
Number of Days to Update: 32

Source: EPA
Telephone: N/A
Last EDR Contact: 04/08/2015
Next Scheduled EDR Contact: 07/20/2015
Data Release Frequency: Quarterly

NPL LIENS: Federal Superfund Liens

Federal Superfund Liens. Under the authority granted the USEPA by CERCLA of 1980, the USEPA has the authority to file liens against real property in order to recover remedial action expenditures or when the property owner received notification of potential liability. USEPA compiles a listing of filed notices of Superfund Liens.

Date of Government Version: 10/15/1991
Date Data Arrived at EDR: 02/02/1994
Date Made Active in Reports: 03/30/1994
Number of Days to Update: 56

Source: EPA
Telephone: 202-564-4267
Last EDR Contact: 08/15/2011
Next Scheduled EDR Contact: 11/28/2011
Data Release Frequency: No Update Planned

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Federal Delisted NPL site list

DELISTED NPL: National Priority List Deletions

The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) establishes the criteria that the EPA uses to delete sites from the NPL. In accordance with 40 CFR 300.425.(e), sites may be deleted from the NPL where no further response is appropriate.

Date of Government Version: 12/16/2014
Date Data Arrived at EDR: 01/08/2015
Date Made Active in Reports: 02/09/2015
Number of Days to Update: 32

Source: EPA
Telephone: N/A
Last EDR Contact: 04/08/2015
Next Scheduled EDR Contact: 07/20/2015
Data Release Frequency: Quarterly

Federal CERCLIS list

CERCLIS: Comprehensive Environmental Response, Compensation, and Liability Information System

CERCLIS contains data on potentially hazardous waste sites that have been reported to the USEPA by states, municipalities, private companies and private persons, pursuant to Section 103 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). CERCLIS contains sites which are either proposed to or on the National Priorities List (NPL) and sites which are in the screening and assessment phase for possible inclusion on the NPL.

Date of Government Version: 10/25/2013
Date Data Arrived at EDR: 11/11/2013
Date Made Active in Reports: 02/13/2014
Number of Days to Update: 94

Source: EPA
Telephone: 703-412-9810
Last EDR Contact: 05/29/2015
Next Scheduled EDR Contact: 09/07/2015
Data Release Frequency: Quarterly

FEDERAL FACILITY: Federal Facility Site Information listing

A listing of National Priority List (NPL) and Base Realignment and Closure (BRAC) sites found in the Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) Database where EPA Federal Facilities Restoration and Reuse Office is involved in cleanup activities.

Date of Government Version: 03/26/2015
Date Data Arrived at EDR: 04/08/2015
Date Made Active in Reports: 06/11/2015
Number of Days to Update: 64

Source: Environmental Protection Agency
Telephone: 703-603-8704
Last EDR Contact: 04/08/2015
Next Scheduled EDR Contact: 07/20/2015
Data Release Frequency: Varies

Federal CERCLIS NFRAP site List

CERCLIS-NFRAP: CERCLIS No Further Remedial Action Planned

Archived sites are sites that have been removed and archived from the inventory of CERCLIS sites. Archived status indicates that, to the best of EPA's knowledge, assessment at a site has been completed and that EPA has determined no further steps will be taken to list this site on the National Priorities List (NPL), unless information indicates this decision was not appropriate or other considerations require a recommendation for listing at a later time. This decision does not necessarily mean that there is no hazard associated with a given site; it only means that, based upon available information, the location is not judged to be a potential NPL site.

Date of Government Version: 10/25/2013
Date Data Arrived at EDR: 11/11/2013
Date Made Active in Reports: 02/13/2014
Number of Days to Update: 94

Source: EPA
Telephone: 703-412-9810
Last EDR Contact: 05/29/2015
Next Scheduled EDR Contact: 09/07/2015
Data Release Frequency: Quarterly

Federal RCRA CORRACTS facilities list

CORRACTS: Corrective Action Report

CORRACTS identifies hazardous waste handlers with RCRA corrective action activity.

Date of Government Version: 03/10/2015
Date Data Arrived at EDR: 03/31/2015
Date Made Active in Reports: 06/11/2015
Number of Days to Update: 72

Source: EPA
Telephone: 800-424-9346
Last EDR Contact: 03/31/2015
Next Scheduled EDR Contact: 07/13/2015
Data Release Frequency: Quarterly

Federal RCRA non-CORRACTS TSD facilities list

RCRA-TSDF: RCRA - Treatment, Storage and Disposal

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Transporters are individuals or entities that move hazardous waste from the generator offsite to a facility that can recycle, treat, store, or dispose of the waste. TSDFs treat, store, or dispose of the waste.

Date of Government Version: 03/10/2015
Date Data Arrived at EDR: 03/31/2015
Date Made Active in Reports: 06/11/2015
Number of Days to Update: 72

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 03/31/2015
Next Scheduled EDR Contact: 07/13/2015
Data Release Frequency: Quarterly

Federal RCRA generators list

RCRA-LQG: RCRA - Large Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Large quantity generators (LQGs) generate over 1,000 kilograms (kg) of hazardous waste, or over 1 kg of acutely hazardous waste per month.

Date of Government Version: 03/10/2015
Date Data Arrived at EDR: 03/31/2015
Date Made Active in Reports: 06/11/2015
Number of Days to Update: 72

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 03/31/2015
Next Scheduled EDR Contact: 07/13/2015
Data Release Frequency: Quarterly

RCRA-SQG: RCRA - Small Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Small quantity generators (SQGs) generate between 100 kg and 1,000 kg of hazardous waste per month.

Date of Government Version: 03/10/2015
Date Data Arrived at EDR: 03/31/2015
Date Made Active in Reports: 06/11/2015
Number of Days to Update: 72

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 03/31/2015
Next Scheduled EDR Contact: 07/13/2015
Data Release Frequency: Quarterly

RCRA-CESQG: RCRA - Conditionally Exempt Small Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Conditionally exempt small quantity generators (CESQGs) generate less than 100 kg of hazardous waste, or less than 1 kg of acutely hazardous waste per month.

Date of Government Version: 03/10/2015
Date Data Arrived at EDR: 03/31/2015
Date Made Active in Reports: 06/11/2015
Number of Days to Update: 72

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 03/31/2015
Next Scheduled EDR Contact: 07/13/2015
Data Release Frequency: Varies

Federal institutional controls / engineering controls registries

US ENG CONTROLS: Engineering Controls Sites List

A listing of sites with engineering controls in place. Engineering controls include various forms of caps, building foundations, liners, and treatment methods to create pathway elimination for regulated substances to enter environmental media or effect human health.

Date of Government Version: 03/16/2015
Date Data Arrived at EDR: 03/17/2015
Date Made Active in Reports: 06/02/2015
Number of Days to Update: 77

Source: Environmental Protection Agency
Telephone: 703-603-0695
Last EDR Contact: 06/01/2015
Next Scheduled EDR Contact: 09/14/2015
Data Release Frequency: Varies

US INST CONTROL: Sites with Institutional Controls

A listing of sites with institutional controls in place. Institutional controls include administrative measures, such as groundwater use restrictions, construction restrictions, property use restrictions, and post remediation care requirements intended to prevent exposure to contaminants remaining on site. Deed restrictions are generally required as part of the institutional controls.

Date of Government Version: 03/16/2015
Date Data Arrived at EDR: 03/17/2015
Date Made Active in Reports: 06/02/2015
Number of Days to Update: 77

Source: Environmental Protection Agency
Telephone: 703-603-0695
Last EDR Contact: 06/01/2015
Next Scheduled EDR Contact: 09/14/2015
Data Release Frequency: Varies

LUCIS: Land Use Control Information System

LUCIS contains records of land use control information pertaining to the former Navy Base Realignment and Closure properties.

Date of Government Version: 05/28/2015
Date Data Arrived at EDR: 05/29/2015
Date Made Active in Reports: 06/11/2015
Number of Days to Update: 13

Source: Department of the Navy
Telephone: 843-820-7326
Last EDR Contact: 05/18/2015
Next Scheduled EDR Contact: 08/31/2015
Data Release Frequency: Varies

Federal ERNS list

ERNS: Emergency Response Notification System

Emergency Response Notification System. ERNS records and stores information on reported releases of oil and hazardous substances.

Date of Government Version: 03/30/2015
Date Data Arrived at EDR: 03/31/2015
Date Made Active in Reports: 06/02/2015
Number of Days to Update: 63

Source: National Response Center, United States Coast Guard
Telephone: 202-267-2180
Last EDR Contact: 03/31/2015
Next Scheduled EDR Contact: 07/13/2015
Data Release Frequency: Annually

State- and tribal - equivalent NPL

RESPONSE: State Response Sites

Identifies confirmed release sites where DTSC is involved in remediation, either in a lead or oversight capacity. These confirmed release sites are generally high-priority and high potential risk.

Date of Government Version: 05/04/2015
Date Data Arrived at EDR: 05/05/2015
Date Made Active in Reports: 05/14/2015
Number of Days to Update: 9

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 05/05/2015
Next Scheduled EDR Contact: 08/17/2015
Data Release Frequency: Quarterly

State- and tribal - equivalent CERCLIS

ENVIROSTOR: EnviroStor Database

The Department of Toxic Substances Control's (DTSC's) Site Mitigation and Brownfields Reuse Program's (SMBRP's) EnviroStor database identifes sites that have known contamination or sites for which there may be reasons to investigate further. The database includes the following site types: Federal Superfund sites (National Priorities List (NPL)); State Response, including Military Facilities and State Superfund; Voluntary Cleanup; and School sites. EnviroStor provides similar information to the information that was available in CalSites, and provides additional site information, including, but not limited to, identification of formerly-contaminated properties that have been released for reuse, properties where environmental deed restrictions have been recorded to prevent inappropriate land uses, and risk characterization information that is used to assess potential impacts to public health and the environment at contaminated sites.

Date of Government Version: 05/04/2015
Date Data Arrived at EDR: 05/05/2015
Date Made Active in Reports: 05/14/2015
Number of Days to Update: 9

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 05/05/2015
Next Scheduled EDR Contact: 08/17/2015
Data Release Frequency: Quarterly

State and tribal landfill and/or solid waste disposal site lists

SWF/LF (SWIS): Solid Waste Information System

Active, Closed and Inactive Landfills. SWF/LF records typically contain an inve ntory of solid waste disposal facilities or landfills. These may be active or i nactive facilities or open dumps that failed to meet RCRA Section 4004 criteria for solid waste landfills or disposal sites.

Date of Government Version: 05/18/2015
Date Data Arrived at EDR: 05/20/2015
Date Made Active in Reports: 06/05/2015
Number of Days to Update: 16

Source: Department of Resources Recycling and Recovery
Telephone: 916-341-6320
Last EDR Contact: 05/20/2015
Next Scheduled EDR Contact: 08/31/2015
Data Release Frequency: Quarterly

State and tribal leaking storage tank lists

LUST REG 6V: Leaking Underground Storage Tank Case Listing

Leaking Underground Storage Tank locations. Inyo, Kern, Los Angeles, Mono, San Bernardino counties.

Date of Government Version: 06/07/2005
Date Data Arrived at EDR: 06/07/2005
Date Made Active in Reports: 06/29/2005
Number of Days to Update: 22

Source: California Regional Water Quality Control Board Victorville Branch Office (6)
Telephone: 760-241-7365
Last EDR Contact: 09/12/2011
Next Scheduled EDR Contact: 12/26/2011
Data Release Frequency: No Update Planned

LUST REG 9: Leaking Underground Storage Tank Report

Orange, Riverside, San Diego counties. For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 03/01/2001
Date Data Arrived at EDR: 04/23/2001
Date Made Active in Reports: 05/21/2001
Number of Days to Update: 28

Source: California Regional Water Quality Control Board San Diego Region (9)
Telephone: 858-637-5595
Last EDR Contact: 09/26/2011
Next Scheduled EDR Contact: 01/09/2012
Data Release Frequency: No Update Planned

LUST REG 6L: Leaking Underground Storage Tank Case Listing

For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 09/09/2003
Date Data Arrived at EDR: 09/10/2003
Date Made Active in Reports: 10/07/2003
Number of Days to Update: 27

Source: California Regional Water Quality Control Board Lahontan Region (6)
Telephone: 530-542-5572
Last EDR Contact: 09/12/2011
Next Scheduled EDR Contact: 12/26/2011
Data Release Frequency: No Update Planned

LUST: Geotracker's Leaking Underground Fuel Tank Report

Leaking Underground Storage Tank Incident Reports. LUST records contain an inventory of reported leaking underground storage tank incidents. Not all states maintain these records, and the information stored varies by state. For more information on a particular leaking underground storage tank sites, please contact the appropriate regulatory agency.

Date of Government Version: 03/13/2015
Date Data Arrived at EDR: 03/18/2015
Date Made Active in Reports: 03/24/2015
Number of Days to Update: 6

Source: State Water Resources Control Board
Telephone: see region list
Last EDR Contact: 06/17/2015
Next Scheduled EDR Contact: 09/28/2015
Data Release Frequency: Quarterly

LUST REG 1: Active Toxic Site Investigation

Del Norte, Humboldt, Lake, Mendocino, Modoc, Siskiyou, Sonoma, Trinity counties. For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 02/01/2001
Date Data Arrived at EDR: 02/28/2001
Date Made Active in Reports: 03/29/2001
Number of Days to Update: 29

Source: California Regional Water Quality Control Board North Coast (1)
Telephone: 707-570-3769
Last EDR Contact: 08/01/2011
Next Scheduled EDR Contact: 11/14/2011
Data Release Frequency: No Update Planned

LUST REG 2: Fuel Leak List

Leaking Underground Storage Tank locations. Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, Sonoma counties.

Date of Government Version: 09/30/2004
Date Data Arrived at EDR: 10/20/2004
Date Made Active in Reports: 11/19/2004
Number of Days to Update: 30

Source: California Regional Water Quality Control Board San Francisco Bay Region (2)
Telephone: 510-622-2433
Last EDR Contact: 09/19/2011
Next Scheduled EDR Contact: 01/02/2012
Data Release Frequency: Quarterly

LUST REG 5: Leaking Underground Storage Tank Database

Leaking Underground Storage Tank locations. Alameda, Alpine, Amador, Butte, Colusa, Contra Costa, Calveras, El Dorado, Fresno, Glenn, Kern, Kings, Lake, Lassen, Madera, Mariposa, Merced, Modoc, Napa, Nevada, Placer, Plumas, Sacramento, San Joaquin, Shasta, Solano, Stanislaus, Sutter, Tehama, Tulare, Tuolumne, Yolo, Yuba counties.

Date of Government Version: 07/01/2008
Date Data Arrived at EDR: 07/22/2008
Date Made Active in Reports: 07/31/2008
Number of Days to Update: 9

Source: California Regional Water Quality Control Board Central Valley Region (5)
Telephone: 916-464-4834
Last EDR Contact: 07/01/2011
Next Scheduled EDR Contact: 10/17/2011
Data Release Frequency: No Update Planned

LUST REG 4: Underground Storage Tank Leak List

Los Angeles, Ventura counties. For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 09/07/2004
Date Data Arrived at EDR: 09/07/2004
Date Made Active in Reports: 10/12/2004
Number of Days to Update: 35

Source: California Regional Water Quality Control Board Los Angeles Region (4)
Telephone: 213-576-6710
Last EDR Contact: 09/06/2011
Next Scheduled EDR Contact: 12/19/2011
Data Release Frequency: No Update Planned

LUST REG 3: Leaking Underground Storage Tank Database

Leaking Underground Storage Tank locations. Monterey, San Benito, San Luis Obispo, Santa Barbara, Santa Cruz counties.

Date of Government Version: 05/19/2003
Date Data Arrived at EDR: 05/19/2003
Date Made Active in Reports: 06/02/2003
Number of Days to Update: 14

Source: California Regional Water Quality Control Board Central Coast Region (3)
Telephone: 805-542-4786
Last EDR Contact: 07/18/2011
Next Scheduled EDR Contact: 10/31/2011
Data Release Frequency: No Update Planned

LUST REG 7: Leaking Underground Storage Tank Case Listing
Leaking Underground Storage Tank locations. Imperial, Riverside, San Diego, Santa Barbara counties.

Date of Government Version: 02/26/2004
Date Data Arrived at EDR: 02/26/2004
Date Made Active in Reports: 03/24/2004
Number of Days to Update: 27

Source: California Regional Water Quality Control Board Colorado River Basin Region (7)
Telephone: 760-776-8943
Last EDR Contact: 08/01/2011
Next Scheduled EDR Contact: 11/14/2011
Data Release Frequency: No Update Planned

LUST REG 8: Leaking Underground Storage Tanks
California Regional Water Quality Control Board Santa Ana Region (8). For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 02/14/2005
Date Data Arrived at EDR: 02/15/2005
Date Made Active in Reports: 03/28/2005
Number of Days to Update: 41

Source: California Regional Water Quality Control Board Santa Ana Region (8)
Telephone: 909-782-4496
Last EDR Contact: 08/15/2011
Next Scheduled EDR Contact: 11/28/2011
Data Release Frequency: Varies

SLIC: Statewide SLIC Cases
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 03/13/2015
Date Data Arrived at EDR: 03/18/2015
Date Made Active in Reports: 03/24/2015
Number of Days to Update: 6

Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 06/17/2015
Next Scheduled EDR Contact: 09/28/2015
Data Release Frequency: Varies

SLIC REG 1: Active Toxic Site Investigations
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 04/03/2003
Date Data Arrived at EDR: 04/07/2003
Date Made Active in Reports: 04/25/2003
Number of Days to Update: 18

Source: California Regional Water Quality Control Board, North Coast Region (1)
Telephone: 707-576-2220
Last EDR Contact: 08/01/2011
Next Scheduled EDR Contact: 11/14/2011
Data Release Frequency: No Update Planned

SLIC REG 2: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 09/30/2004
Date Data Arrived at EDR: 10/20/2004
Date Made Active in Reports: 11/19/2004
Number of Days to Update: 30

Source: Regional Water Quality Control Board San Francisco Bay Region (2)
Telephone: 510-286-0457
Last EDR Contact: 09/19/2011
Next Scheduled EDR Contact: 01/02/2012
Data Release Frequency: Quarterly

SLIC REG 3: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 05/18/2006
Date Data Arrived at EDR: 05/18/2006
Date Made Active in Reports: 06/15/2006
Number of Days to Update: 28

Source: California Regional Water Quality Control Board Central Coast Region (3)
Telephone: 805-549-3147
Last EDR Contact: 07/18/2011
Next Scheduled EDR Contact: 10/31/2011
Data Release Frequency: Semi-Annually

SLIC REG 4: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 11/17/2004
Date Data Arrived at EDR: 11/18/2004
Date Made Active in Reports: 01/04/2005
Number of Days to Update: 47

Source: Region Water Quality Control Board Los Angeles Region (4)
Telephone: 213-576-6600
Last EDR Contact: 07/01/2011
Next Scheduled EDR Contact: 10/17/2011
Data Release Frequency: Varies

SLIC REG 5: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 04/01/2005
Date Data Arrived at EDR: 04/05/2005
Date Made Active in Reports: 04/21/2005
Number of Days to Update: 16

Source: Regional Water Quality Control Board Central Valley Region (5)
Telephone: 916-464-3291
Last EDR Contact: 09/12/2011
Next Scheduled EDR Contact: 12/26/2011
Data Release Frequency: Semi-Annually

SLIC REG 6V: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 05/24/2005
Date Data Arrived at EDR: 05/25/2005
Date Made Active in Reports: 06/16/2005
Number of Days to Update: 22

Source: Regional Water Quality Control Board, Victorville Branch
Telephone: 619-241-6583
Last EDR Contact: 08/15/2011
Next Scheduled EDR Contact: 11/28/2011
Data Release Frequency: Semi-Annually

SLIC REG 6L: SLIC Sites
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 09/07/2004
Date Data Arrived at EDR: 09/07/2004
Date Made Active in Reports: 10/12/2004
Number of Days to Update: 35

Source: California Regional Water Quality Control Board, Lahontan Region
Telephone: 530-542-5574
Last EDR Contact: 08/15/2011
Next Scheduled EDR Contact: 11/28/2011
Data Release Frequency: No Update Planned

SLIC REG 7: SLIC List
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 11/24/2004
Date Data Arrived at EDR: 11/29/2004
Date Made Active in Reports: 01/04/2005
Number of Days to Update: 36

Source: California Regional Quality Control Board, Colorado River Basin Region
Telephone: 760-346-7491
Last EDR Contact: 08/01/2011
Next Scheduled EDR Contact: 11/14/2011
Data Release Frequency: No Update Planned

SLIC REG 8: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 04/03/2008
Date Data Arrived at EDR: 04/03/2008
Date Made Active in Reports: 04/14/2008
Number of Days to Update: 11

Source: California Region Water Quality Control Board Santa Ana Region (8)
Telephone: 951-782-3298
Last EDR Contact: 09/12/2011
Next Scheduled EDR Contact: 12/26/2011
Data Release Frequency: Semi-Annually

SLIC REG 9: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 09/10/2007
Date Data Arrived at EDR: 09/11/2007
Date Made Active in Reports: 09/28/2007
Number of Days to Update: 17

Source: California Regional Water Quality Control Board San Diego Region (9)
Telephone: 858-467-2980
Last EDR Contact: 08/08/2011
Next Scheduled EDR Contact: 11/21/2011
Data Release Frequency: Annually

INDIAN LUST R4: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Florida, Mississippi and North Carolina.

Date of Government Version: 09/30/2014
Date Data Arrived at EDR: 03/03/2015
Date Made Active in Reports: 03/13/2015
Number of Days to Update: 10

Source: EPA Region 4
Telephone: 404-562-8677
Last EDR Contact: 04/27/2015
Next Scheduled EDR Contact: 08/10/2015
Data Release Frequency: Semi-Annually

INDIAN LUST R5: Leaking Underground Storage Tanks on Indian Land
Leaking underground storage tanks located on Indian Land in Michigan, Minnesota and Wisconsin.

Date of Government Version: 01/30/2015
Date Data Arrived at EDR: 02/05/2015
Date Made Active in Reports: 03/09/2015
Number of Days to Update: 32

Source: EPA, Region 5
Telephone: 312-886-7439
Last EDR Contact: 04/27/2015
Next Scheduled EDR Contact: 08/10/2015
Data Release Frequency: Varies

INDIAN LUST R6: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in New Mexico and Oklahoma.

Date of Government Version: 01/23/2015
Date Data Arrived at EDR: 02/10/2015
Date Made Active in Reports: 03/13/2015
Number of Days to Update: 31

Source: EPA Region 6
Telephone: 214-665-6597
Last EDR Contact: 01/26/2015
Next Scheduled EDR Contact: 05/11/2015
Data Release Frequency: Varies

INDIAN LUST R9: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Arizona, California, New Mexico and Nevada

Date of Government Version: 01/08/2015
Date Data Arrived at EDR: 01/08/2015
Date Made Active in Reports: 02/09/2015
Number of Days to Update: 32

Source: Environmental Protection Agency
Telephone: 415-972-3372
Last EDR Contact: 01/08/2015
Next Scheduled EDR Contact: 05/11/2015
Data Release Frequency: Quarterly

INDIAN LUST R8: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Colorado, Montana, North Dakota, South Dakota, Utah and Wyoming.

Date of Government Version: 01/28/2015
Date Data Arrived at EDR: 01/30/2015
Date Made Active in Reports: 03/13/2015
Number of Days to Update: 42

Source: EPA Region 8
Telephone: 303-312-6271
Last EDR Contact: 04/27/2015
Next Scheduled EDR Contact: 08/10/2015
Data Release Frequency: Quarterly

INDIAN LUST R1: Leaking Underground Storage Tanks on Indian Land
A listing of leaking underground storage tank locations on Indian Land.

Date of Government Version: 02/01/2013
Date Data Arrived at EDR: 05/01/2013
Date Made Active in Reports: 11/01/2013
Number of Days to Update: 184

Source: EPA Region 1
Telephone: 617-918-1313
Last EDR Contact: 04/03/2015
Next Scheduled EDR Contact: 08/10/2015
Data Release Frequency: Varies

INDIAN LUST R10: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Alaska, Idaho, Oregon and Washington.

Date of Government Version: 02/03/2015
Date Data Arrived at EDR: 02/12/2015
Date Made Active in Reports: 03/13/2015
Number of Days to Update: 29
Source: EPA Region 10
Telephone: 206-553-2857
Last EDR Contact: 04/27/2015
Next Scheduled EDR Contact: 08/10/2015
Data Release Frequency: Quarterly

INDIAN LUST R7: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Iowa, Kansas, and Nebraska

Date of Government Version: 09/23/2014
Date Data Arrived at EDR: 11/25/2014
Date Made Active in Reports: 01/29/2015
Number of Days to Update: 65
Source: EPA Region 7
Telephone: 913-551-7003
Last EDR Contact: 04/27/2015
Next Scheduled EDR Contact: 08/10/2015
Data Release Frequency: Varies

State and tribal registered storage tank lists

UST: Active UST Facilities
Active UST facilities gathered from the local regulatory agencies

Date of Government Version: 03/13/2015
Date Data Arrived at EDR: 03/18/2015
Date Made Active in Reports: 03/26/2015
Number of Days to Update: 8
Source: SWRCB
Telephone: 916-341-5851
Last EDR Contact: 06/17/2015
Next Scheduled EDR Contact: 09/28/2015
Data Release Frequency: Semi-Annually

AST: Aboveground Petroleum Storage Tank Facilities
A listing of aboveground storage tank petroleum storage tank locations.

Date of Government Version: 08/01/2009
Date Data Arrived at EDR: 09/10/2009
Date Made Active in Reports: 10/01/2009
Number of Days to Update: 21
Source: California Environmental Protection Agency
Telephone: 916-327-5092
Last EDR Contact: 07/13/2015
Next Scheduled EDR Contact: 04/13/2015
Data Release Frequency: Quarterly

INDIAN UST R7: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 7 (Iowa, Kansas, Missouri, Nebraska, and 9 Tribal Nations).

Date of Government Version: 09/23/2014
Date Data Arrived at EDR: 11/25/2014
Date Made Active in Reports: 01/29/2015
Number of Days to Update: 65
Source: EPA Region 7
Telephone: 913-551-7003
Last EDR Contact: 04/27/2015
Next Scheduled EDR Contact: 08/10/2015
Data Release Frequency: Varies

INDIAN UST R10: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 10 (Alaska, Idaho, Oregon, Washington, and Tribal Nations).

Date of Government Version: 02/03/2015
Date Data Arrived at EDR: 02/12/2015
Date Made Active in Reports: 03/13/2015
Number of Days to Update: 29
Source: EPA Region 10
Telephone: 206-553-2857
Last EDR Contact: 04/27/2015
Next Scheduled EDR Contact: 08/10/2015
Data Release Frequency: Quarterly

INDIAN UST R9: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 9 (Arizona, California, Hawaii, Nevada, the Pacific Islands, and Tribal Nations).

Date of Government Version: 12/14/2014
Date Data Arrived at EDR: 02/13/2015
Date Made Active in Reports: 03/13/2015
Number of Days to Update: 28

Source: EPA Region 9
Telephone: 415-972-3368
Last EDR Contact: 01/26/2015
Next Scheduled EDR Contact: 05/11/2015
Data Release Frequency: Quarterly

INDIAN UST R8: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 8 (Colorado, Montana, North Dakota, South Dakota, Utah, Wyoming and 27 Tribal Nations).

Date of Government Version: 01/29/2015
Date Data Arrived at EDR: 01/30/2015
Date Made Active in Reports: 03/13/2015
Number of Days to Update: 42

Source: EPA Region 8
Telephone: 303-312-6137
Last EDR Contact: 04/27/2015
Next Scheduled EDR Contact: 08/10/2015
Data Release Frequency: Quarterly

INDIAN UST R1: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 1 (Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont and ten Tribal Nations).

Date of Government Version: 02/01/2013
Date Data Arrived at EDR: 05/01/2013
Date Made Active in Reports: 01/27/2014
Number of Days to Update: 271

Source: EPA, Region 1
Telephone: 617-918-1313
Last EDR Contact: 04/28/2015
Next Scheduled EDR Contact: 08/10/2015
Data Release Frequency: Varies

INDIAN UST R4: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 4 (Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee and Tribal Nations)

Date of Government Version: 09/30/2014
Date Data Arrived at EDR: 03/03/2015
Date Made Active in Reports: 03/13/2015
Number of Days to Update: 10

Source: EPA Region 4
Telephone: 404-562-9424
Last EDR Contact: 04/27/2015
Next Scheduled EDR Contact: 08/10/2015
Data Release Frequency: Semi-Annually

INDIAN UST R5: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 5 (Michigan, Minnesota and Wisconsin and Tribal Nations).

Date of Government Version: 01/30/2015
Date Data Arrived at EDR: 02/05/2015
Date Made Active in Reports: 03/13/2015
Number of Days to Update: 36

Source: EPA Region 5
Telephone: 312-886-6136
Last EDR Contact: 04/27/2015
Next Scheduled EDR Contact: 08/10/2015
Data Release Frequency: Varies

INDIAN UST R6: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 6 (Louisiana, Arkansas, Oklahoma, New Mexico, Texas and 65 Tribes).

Date of Government Version: 01/23/2015
Date Data Arrived at EDR: 02/13/2015
Date Made Active in Reports: 03/13/2015
Number of Days to Update: 28

Source: EPA Region 6
Telephone: 214-665-7591
Last EDR Contact: 01/26/2015
Next Scheduled EDR Contact: 05/11/2015
Data Release Frequency: Semi-Annually

FEMA UST: Underground Storage Tank Listing

A listing of all FEMA owned underground storage tanks.

Date of Government Version: 01/01/2010
Date Data Arrived at EDR: 02/16/2010
Date Made Active in Reports: 04/12/2010
Number of Days to Update: 55

Source: FEMA
Telephone: 202-646-5797
Last EDR Contact: 04/13/2015
Next Scheduled EDR Contact: 07/27/2015
Data Release Frequency: Varies

State and tribal voluntary cleanup sites

INDIAN VCP R1: Voluntary Cleanup Priority Listing
A listing of voluntary cleanup priority sites located on Indian Land located in Region 1.

Date of Government Version: 09/29/2014
Date Data Arrived at EDR: 10/01/2014
Date Made Active in Reports: 11/06/2014
Number of Days to Update: 36

Source: EPA, Region 1
Telephone: 617-918-1102
Last EDR Contact: 04/02/2015
Next Scheduled EDR Contact: 07/13/2015
Data Release Frequency: Varies

INDIAN VCP R7: Voluntary Cleanup Priority Lisitng
A listing of voluntary cleanup priority sites located on Indian Land located in Region 7.

Date of Government Version: 03/20/2008
Date Data Arrived at EDR: 04/22/2008
Date Made Active in Reports: 05/19/2008
Number of Days to Update: 27

Source: EPA, Region 7
Telephone: 913-551-7365
Last EDR Contact: 04/20/2009
Next Scheduled EDR Contact: 07/20/2009
Data Release Frequency: Varies

VCP: Voluntary Cleanup Program Properties
Contains low threat level properties with either confirmed or unconfirmed releases and the project proponents have request that DTSC oversee investigation and/or cleanup activities and have agreed to provide coverage for DTSC's costs.

Date of Government Version: 05/04/2015
Date Data Arrived at EDR: 05/05/2015
Date Made Active in Reports: 05/14/2015
Number of Days to Update: 9

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 05/05/2015
Next Scheduled EDR Contact: 08/17/2015
Data Release Frequency: Quarterly

ADDITIONAL ENVIRONMENTAL RECORDS

Local Brownfield lists

US BROWNFIELDS: A Listing of Brownfields Sites
Brownfields are real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant. Cleaning up and reinvesting in these properties takes development pressures off of undeveloped, open land, and both improves and protects the environment. Assessment, Cleanup and Redevelopment Exchange System (ACRES) stores information reported by EPA Brownfields grant recipients on brownfields properties assessed or cleaned up with grant funding as well as information on Targeted Brownfields Assessments performed by EPA Regions. A listing of ACRES Brownfield sites is obtained from Cleanups in My Community. Cleanups in My Community provides information on Brownfields properties for which information is reported back to EPA, as well as areas served by Brownfields grant programs.

Date of Government Version: 03/23/2015
Date Data Arrived at EDR: 03/24/2015
Date Made Active in Reports: 06/02/2015
Number of Days to Update: 70

Source: Environmental Protection Agency
Telephone: 202-566-2777
Last EDR Contact: 03/24/2015
Next Scheduled EDR Contact: 07/06/2015
Data Release Frequency: Semi-Annually

Local Lists of Landfill / Solid Waste Disposal Sites

ODI: Open Dump Inventory
An open dump is defined as a disposal facility that does not comply with one or more of the Part 257 or Part 258 Subtitle D Criteria.

Date of Government Version: 06/30/1985
Date Data Arrived at EDR: 08/09/2004
Date Made Active in Reports: 09/17/2004
Number of Days to Update: 39
Source: Environmental Protection Agency
Telephone: 800-424-9346
Last EDR Contact: 06/09/2004
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

DEBRIS REGION 9: Torres Martinez Reservation Illegal Dump Site Locations
A listing of illegal dump sites location on the Torres Martinez Indian Reservation located in eastern Riverside County and northern Imperial County, California.

Date of Government Version: 01/12/2009
Date Data Arrived at EDR: 05/07/2009
Date Made Active in Reports: 09/21/2009
Number of Days to Update: 137
Source: EPA, Region 9
Telephone: 415-947-4219
Last EDR Contact: 04/23/2015
Next Scheduled EDR Contact: 08/10/2015
Data Release Frequency: No Update Planned

SWRCY: Recycler Database
A listing of recycling facilities in California.

Date of Government Version: 03/16/2015
Date Data Arrived at EDR: 03/18/2015
Date Made Active in Reports: 03/26/2015
Number of Days to Update: 8
Source: Department of Conservation
Telephone: 916-323-3836
Last EDR Contact: 06/17/2015
Next Scheduled EDR Contact: 09/28/2015
Data Release Frequency: Quarterly

HAULERS: Registered Waste Tire Haulers Listing
A listing of registered waste tire haulers.

Date of Government Version: 05/26/2015
Date Data Arrived at EDR: 05/28/2015
Date Made Active in Reports: 06/05/2015
Number of Days to Update: 8
Source: Integrated Waste Management Board
Telephone: 916-341-6422
Last EDR Contact: 05/18/2015
Next Scheduled EDR Contact: 08/31/2015
Data Release Frequency: Varies

INDIAN ODI: Report on the Status of Open Dumps on Indian Lands
Location of open dumps on Indian land.

Date of Government Version: 12/31/1998
Date Data Arrived at EDR: 12/03/2007
Date Made Active in Reports: 01/24/2008
Number of Days to Update: 52
Source: Environmental Protection Agency
Telephone: 703-308-8245
Last EDR Contact: 05/01/2015
Next Scheduled EDR Contact: 08/17/2015
Data Release Frequency: Varies

WMUDS/SWAT: Waste Management Unit Database
Waste Management Unit Database System. WMUDS is used by the State Water Resources Control Board staff and the Regional Water Quality Control Boards for program tracking and inventory of waste management units. WMUDS is composed of the following databases: Facility Information, Scheduled Inspections Information, Waste Management Unit Information, SWAT Program Information, SWAT Report Summary Information, SWAT Report Summary Data, Chapter 15 (formerly Subchapter 15) Information, Chapter 15 Monitoring Parameters, TPCA Program Information, RCRA Program Information, Closure Information, and Interested Parties Information.

Date of Government Version: 04/01/2000
Date Data Arrived at EDR: 04/10/2000
Date Made Active in Reports: 05/10/2000
Number of Days to Update: 30
Source: State Water Resources Control Board
Telephone: 916-227-4448
Last EDR Contact: 05/06/2015
Next Scheduled EDR Contact: 08/24/2015
Data Release Frequency: No Update Planned

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Local Lists of Hazardous waste / Contaminated Sites

US CDL: Clandestine Drug Labs

A listing of clandestine drug lab locations. The U.S. Department of Justice ("the Department") provides this web site as a public service. It contains addresses of some locations where law enforcement agencies reported they found chemicals or other items that indicated the presence of either clandestine drug laboratories or dumpsites. In most cases, the source of the entries is not the Department, and the Department has not verified the entry and does not guarantee its accuracy. Members of the public must verify the accuracy of all entries by, for example, contacting local law enforcement and local health departments.

Date of Government Version: 02/25/2015
Date Data Arrived at EDR: 03/10/2015
Date Made Active in Reports: 03/25/2015
Number of Days to Update: 15

Source: Drug Enforcement Administration
Telephone: 202-307-1000
Last EDR Contact: 05/29/2015
Next Scheduled EDR Contact: 09/14/2015
Data Release Frequency: Quarterly

HIST CAL-SITES: Calsites Database

The Calsites database contains potential or confirmed hazardous substance release properties. In 1996, California EPA reevaluated and significantly reduced the number of sites in the Calsites database. No longer updated by the state agency. It has been replaced by ENVIROSTOR.

Date of Government Version: 08/08/2005
Date Data Arrived at EDR: 08/03/2006
Date Made Active in Reports: 08/24/2006
Number of Days to Update: 21

Source: Department of Toxic Substance Control
Telephone: 916-323-3400
Last EDR Contact: 02/23/2009
Next Scheduled EDR Contact: 05/25/2009
Data Release Frequency: No Update Planned

SCH: School Property Evaluation Program

This category contains proposed and existing school sites that are being evaluated by DTSC for possible hazardous materials contamination. In some cases, these properties may be listed in the CalSites category depending on the level of threat to public health and safety or the environment they pose.

Date of Government Version: 05/04/2015
Date Data Arrived at EDR: 05/05/2015
Date Made Active in Reports: 05/14/2015
Number of Days to Update: 9

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 05/05/2015
Next Scheduled EDR Contact: 08/17/2015
Data Release Frequency: Quarterly

TOXIC PITS: Toxic Pits Cleanup Act Sites

Toxic PITS Cleanup Act Sites. TOXIC PITS identifies sites suspected of containing hazardous substances where cleanup has not yet been completed.

Date of Government Version: 07/01/1995
Date Data Arrived at EDR: 08/30/1995
Date Made Active in Reports: 09/26/1995
Number of Days to Update: 27

Source: State Water Resources Control Board
Telephone: 916-227-4364
Last EDR Contact: 01/26/2009
Next Scheduled EDR Contact: 04/27/2009
Data Release Frequency: No Update Planned

CDL: Clandestine Drug Labs

A listing of drug lab locations. Listing of a location in this database does not indicate that any illegal drug lab materials were or were not present there, and does not constitute a determination that the location either requires or does not require additional cleanup work.

Date of Government Version: 12/31/2014
Date Data Arrived at EDR: 03/10/2015
Date Made Active in Reports: 03/18/2015
Number of Days to Update: 8

Source: Department of Toxic Substances Control
Telephone: 916-255-6504
Last EDR Contact: 04/13/2015
Next Scheduled EDR Contact: 07/27/2015
Data Release Frequency: Varies

US HIST CDL: National Clandestine Laboratory Register

A listing of clandestine drug lab locations. The U.S. Department of Justice ("the Department") provides this web site as a public service. It contains addresses of some locations where law enforcement agencies reported they found chemicals or other items that indicated the presence of either clandestine drug laboratories or dumpsites. In most cases, the source of the entries is not the Department, and the Department has not verified the entry and does not guarantee its accuracy. Members of the public must verify the accuracy of all entries by, for example, contacting local law enforcement and local health departments.

Date of Government Version: 02/25/2015
Date Data Arrived at EDR: 03/10/2015
Date Made Active in Reports: 03/25/2015
Number of Days to Update: 15

Source: Drug Enforcement Administration
Telephone: 202-307-1000
Last EDR Contact: 05/29/2015
Next Scheduled EDR Contact: 09/14/2015
Data Release Frequency: No Update Planned

Local Lists of Registered Storage Tanks

CA FID UST: Facility Inventory Database

The Facility Inventory Database (FID) contains a historical listing of active and inactive underground storage tank locations from the State Water Resource Control Board. Refer to local/county source for current data.

Date of Government Version: 10/31/1994
Date Data Arrived at EDR: 09/05/1995
Date Made Active in Reports: 09/29/1995
Number of Days to Update: 24

Source: California Environmental Protection Agency
Telephone: 916-341-5851
Last EDR Contact: 12/28/1998
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

UST MENDOCINO: Mendocino County UST Database

A listing of underground storage tank locations in Mendocino County.

Date of Government Version: 09/23/2009
Date Data Arrived at EDR: 09/23/2009
Date Made Active in Reports: 10/01/2009
Number of Days to Update: 8

Source: Department of Public Health
Telephone: 707-463-4466
Last EDR Contact: 06/01/2015
Next Scheduled EDR Contact: 09/14/2015
Data Release Frequency: Annually

HIST UST: Hazardous Substance Storage Container Database

The Hazardous Substance Storage Container Database is a historical listing of UST sites. Refer to local/county source for current data.

Date of Government Version: 10/15/1990
Date Data Arrived at EDR: 01/25/1991
Date Made Active in Reports: 02/12/1991
Number of Days to Update: 18

Source: State Water Resources Control Board
Telephone: 916-341-5851
Last EDR Contact: 07/26/2001
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

SWEEPS UST: SWEEPS UST Listing

Statewide Environmental Evaluation and Planning System. This underground storage tank listing was updated and maintained by a company contacted by the SWRCB in the early 1990's. The listing is no longer updated or maintained. The local agency is the contact for more information on a site on the SWEEPS list.

Date of Government Version: 06/01/1994
Date Data Arrived at EDR: 07/07/2005
Date Made Active in Reports: 08/11/2005
Number of Days to Update: 35

Source: State Water Resources Control Board
Telephone: N/A
Last EDR Contact: 06/03/2005
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

Local Land Records

LIENS 2: CERCLA Lien Information

A Federal CERCLA ('Superfund') lien can exist by operation of law at any site or property at which EPA has spent Superfund monies. These monies are spent to investigate and address releases and threatened releases of contamination. CERCLIS provides information as to the identity of these sites and properties.

Date of Government Version: 02/18/2014
Date Data Arrived at EDR: 03/18/2014
Date Made Active in Reports: 04/24/2014
Number of Days to Update: 37

Source: Environmental Protection Agency
Telephone: 202-564-6023
Last EDR Contact: 04/27/2015
Next Scheduled EDR Contact: 08/10/2015
Data Release Frequency: Varies

LIENS: Environmental Liens Listing

A listing of property locations with environmental liens for California where DTSC is a lien holder.

Date of Government Version: 03/11/2015
Date Data Arrived at EDR: 03/13/2015
Date Made Active in Reports: 03/24/2015
Number of Days to Update: 11

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 06/05/2015
Next Scheduled EDR Contact: 09/21/2015
Data Release Frequency: Varies

DEED: Deed Restriction Listing

Site Mitigation and Brownfields Reuse Program Facility Sites with Deed Restrictions & Hazardous Waste Management Program Facility Sites with Deed / Land Use Restriction. The DTSC Site Mitigation and Brownfields Reuse Program (SMBRP) list includes sites cleaned up under the program's oversight and generally does not include current or former hazardous waste facilities that required a hazardous waste facility permit. The list represents deed restrictions that are active. Some sites have multiple deed restrictions. The DTSC Hazardous Waste Management Program (HWMP) has developed a list of current or former hazardous waste facilities that have a recorded land use restriction at the local county recorder's office. The land use restrictions on this list were required by the DTSC HWMP as a result of the presence of hazardous substances that remain on site after the facility (or part of the facility) has been closed or cleaned up. The types of land use restriction include deed notice, deed restriction, or a land use restriction that binds current and future owners.

Date of Government Version: 03/09/2015
Date Data Arrived at EDR: 03/10/2015
Date Made Active in Reports: 03/18/2015
Number of Days to Update: 8

Source: DTSC and SWRCB
Telephone: 916-323-3400
Last EDR Contact: 06/09/2015
Next Scheduled EDR Contact: 09/21/2015
Data Release Frequency: Semi-Annually

Records of Emergency Release Reports

HMIRS: Hazardous Materials Information Reporting System

Hazardous Materials Incident Report System. HMIRS contains hazardous material spill incidents reported to DOT.

Date of Government Version: 03/30/2015
Date Data Arrived at EDR: 03/31/2015
Date Made Active in Reports: 06/11/2015
Number of Days to Update: 72

Source: U.S. Department of Transportation
Telephone: 202-366-4555
Last EDR Contact: 03/31/2015
Next Scheduled EDR Contact: 07/13/2015
Data Release Frequency: Annually

CHMIRS: California Hazardous Material Incident Report System

California Hazardous Material Incident Reporting System. CHMIRS contains information on reported hazardous material incidents (accidental releases or spills).

Date of Government Version: 04/14/2015
Date Data Arrived at EDR: 04/29/2015
Date Made Active in Reports: 05/21/2015
Number of Days to Update: 22

Source: Office of Emergency Services
Telephone: 916-845-8400
Last EDR Contact: 04/27/2015
Next Scheduled EDR Contact: 08/10/2015
Data Release Frequency: Varies

LDS: Land Disposal Sites Listing

The Land Disposal program regulates of waste discharge to land for treatment, storage and disposal in waste management units.

Date of Government Version: 03/13/2015
Date Data Arrived at EDR: 03/18/2015
Date Made Active in Reports: 03/24/2015
Number of Days to Update: 6

Source: State Water Qualilty Control Board
Telephone: 866-480-1028
Last EDR Contact: 06/17/2015
Next Scheduled EDR Contact: 09/28/2015
Data Release Frequency: Quarterly

MCS: Military Cleanup Sites Listing

The State Water Resources Control Board and nine Regional Water Quality Control Boards partner with the Department of Defense (DoD) through the Defense and State Memorandum of Agreement (DSMOA) to oversee the investigation and remediation of water quality issues at military facilities.

Date of Government Version: 03/13/2015
Date Data Arrived at EDR: 03/18/2015
Date Made Active in Reports: 03/24/2015
Number of Days to Update: 6

Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 06/17/2015
Next Scheduled EDR Contact: 09/28/2015
Data Release Frequency: Quarterly

SPILLS 90: SPILLS90 data from FirstSearch

Spills 90 includes those spill and release records available exclusively from FirstSearch databases. Typically, they may include chemical, oil and/or hazardous substance spills recorded after 1990. Duplicate records that are already included in EDR incident and release records are not included in Spills 90.

Date of Government Version: 06/06/2012
Date Data Arrived at EDR: 01/03/2013
Date Made Active in Reports: 02/22/2013
Number of Days to Update: 50

Source: FirstSearch
Telephone: N/A
Last EDR Contact: 01/03/2013
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

Other Ascertainable Records

RCRA NonGen / NLR: RCRA - Non Generators / No Longer Regulated

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Non-Generators do not presently generate hazardous waste.

Date of Government Version: 03/10/2015
Date Data Arrived at EDR: 03/31/2015
Date Made Active in Reports: 06/11/2015
Number of Days to Update: 72

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 03/31/2015
Next Scheduled EDR Contact: 07/13/2015
Data Release Frequency: Varies

DOT OPS: Incident and Accident Data

Department of Transporation, Office of Pipeline Safety Incident and Accident data.

Date of Government Version: 07/31/2012
Date Data Arrived at EDR: 08/07/2012
Date Made Active in Reports: 09/18/2012
Number of Days to Update: 42

Source: Department of Transporation, Office of Pipeline Safety
Telephone: 202-366-4595
Last EDR Contact: 05/05/2015
Next Scheduled EDR Contact: 08/17/2015
Data Release Frequency: Varies

DOD: Department of Defense Sites

This data set consists of federally owned or administered lands, administered by the Department of Defense, that have any area equal to or greater than 640 acres of the United States, Puerto Rico, and the U.S. Virgin Islands.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 11/10/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 62

Source: USGS
Telephone: 888-275-8747
Last EDR Contact: 04/14/2015
Next Scheduled EDR Contact: 07/27/2015
Data Release Frequency: Semi-Annually

FUDS: Formerly Used Defense Sites

The listing includes locations of Formerly Used Defense Sites properties where the US Army Corps of Engineers is actively working or will take necessary cleanup actions.

Date of Government Version: 06/06/2014
Date Data Arrived at EDR: 09/10/2014
Date Made Active in Reports: 09/18/2014
Number of Days to Update: 8

Source: U.S. Army Corps of Engineers
Telephone: 202-528-4285
Last EDR Contact: 06/12/2015
Next Scheduled EDR Contact: 09/21/2015
Data Release Frequency: Varies

CONSENT: Superfund (CERCLA) Consent Decrees

Major legal settlements that establish responsibility and standards for cleanup at NPL (Superfund) sites. Released periodically by United States District Courts after settlement by parties to litigation matters.

Date of Government Version: 12/31/2014
Date Data Arrived at EDR: 04/17/2015
Date Made Active in Reports: 06/02/2015
Number of Days to Update: 46

Source: Department of Justice, Consent Decree Library
Telephone: Varies
Last EDR Contact: 03/30/2015
Next Scheduled EDR Contact: 07/13/2015
Data Release Frequency: Varies

ROD: Records Of Decision

Record of Decision. ROD documents mandate a permanent remedy at an NPL (Superfund) site containing technical and health information to aid in the cleanup.

Date of Government Version: 11/25/2013
Date Data Arrived at EDR: 12/12/2013
Date Made Active in Reports: 02/24/2014
Number of Days to Update: 74

Source: EPA
Telephone: 703-416-0223
Last EDR Contact: 06/12/2015
Next Scheduled EDR Contact: 09/21/2015
Data Release Frequency: Annually

UMTRA: Uranium Mill Tailings Sites

Uranium ore was mined by private companies for federal government use in national defense programs. When the mills shut down, large piles of the sand-like material (mill tailings) remain after uranium has been extracted from the ore. Levels of human exposure to radioactive materials from the piles are low; however, in some cases tailings were used as construction materials before the potential health hazards of the tailings were recognized.

Date of Government Version: 09/14/2010
Date Data Arrived at EDR: 10/07/2011
Date Made Active in Reports: 03/01/2012
Number of Days to Update: 146

Source: Department of Energy
Telephone: 505-845-0011
Last EDR Contact: 05/26/2015
Next Scheduled EDR Contact: 09/07/2015
Data Release Frequency: Varies

US MINES: Mines Master Index File

Contains all mine identification numbers issued for mines active or opened since 1971. The data also includes violation information.

Date of Government Version: 12/30/2014
Date Data Arrived at EDR: 12/31/2014
Date Made Active in Reports: 01/29/2015
Number of Days to Update: 29

Source: Department of Labor, Mine Safety and Health Administration
Telephone: 303-231-5959
Last EDR Contact: 06/03/2015
Next Scheduled EDR Contact: 09/14/2015
Data Release Frequency: Semi-Annually

TRIS: Toxic Chemical Release Inventory System

Toxic Release Inventory System. TRIS identifies facilities which release toxic chemicals to the air, water and land in reportable quantities under SARA Title III Section 313.

Date of Government Version: 12/31/2013
Date Data Arrived at EDR: 02/12/2015
Date Made Active in Reports: 06/02/2015
Number of Days to Update: 110

Source: EPA
Telephone: 202-566-0250
Last EDR Contact: 01/29/2015
Next Scheduled EDR Contact: 06/08/2015
Data Release Frequency: Annually

TSCA: Toxic Substances Control Act

Toxic Substances Control Act. TSCA identifies manufacturers and importers of chemical substances included on the TSCA Chemical Substance Inventory list. It includes data on the production volume of these substances by plant site.

Date of Government Version: 12/31/2012
Date Data Arrived at EDR: 01/15/2015
Date Made Active in Reports: 01/29/2015
Number of Days to Update: 14

Source: EPA
Telephone: 202-260-5521
Last EDR Contact: 03/27/2015
Next Scheduled EDR Contact: 07/06/2015
Data Release Frequency: Every 4 Years

FTTS: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
FTTS tracks administrative cases and pesticide enforcement actions and compliance activities related to FIFRA, TSCA and EPCRA (Emergency Planning and Community Right-to-Know Act). To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 04/09/2009
Date Data Arrived at EDR: 04/16/2009
Date Made Active in Reports: 05/11/2009
Number of Days to Update: 25

Source: EPA/Office of Prevention, Pesticides and Toxic Substances
Telephone: 202-566-1667
Last EDR Contact: 05/20/2015
Next Scheduled EDR Contact: 09/07/2015
Data Release Frequency: Quarterly

FTTS INSP: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
A listing of FIFRA/TSCA Tracking System (FTTS) inspections and enforcements.

Date of Government Version: 04/09/2009
Date Data Arrived at EDR: 04/16/2009
Date Made Active in Reports: 05/11/2009
Number of Days to Update: 25

Source: EPA
Telephone: 202-566-1667
Last EDR Contact: 05/20/2015
Next Scheduled EDR Contact: 09/07/2015
Data Release Frequency: Quarterly

HIST FTTS: FIFRA/TSCA Tracking System Administrative Case Listing
A complete administrative case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

Date of Government Version: 10/19/2006
Date Data Arrived at EDR: 03/01/2007
Date Made Active in Reports: 04/10/2007
Number of Days to Update: 40

Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 12/17/2007
Next Scheduled EDR Contact: 03/17/2008
Data Release Frequency: No Update Planned

HIST FTTS INSP: FIFRA/TSCA Tracking System Inspection & Enforcement Case Listing
A complete inspection and enforcement case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

Date of Government Version: 10/19/2006
Date Data Arrived at EDR: 03/01/2007
Date Made Active in Reports: 04/10/2007
Number of Days to Update: 40

Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 12/17/2008
Next Scheduled EDR Contact: 03/17/2008
Data Release Frequency: No Update Planned

SSTS: Section 7 Tracking Systems
Section 7 of the Federal Insecticide, Fungicide and Rodenticide Act, as amended (92 Stat. 829) requires all registered pesticide-producing establishments to submit a report to the Environmental Protection Agency by March 1st each year. Each establishment must report the types and amounts of pesticides, active ingredients and devices being produced, and those having been produced and sold or distributed in the past year.

Date of Government Version: 12/31/2009
Date Data Arrived at EDR: 12/10/2010
Date Made Active in Reports: 02/25/2011
Number of Days to Update: 77

Source: EPA
Telephone: 202-564-4203
Last EDR Contact: 04/10/2015
Next Scheduled EDR Contact: 08/10/2015
Data Release Frequency: Annually

ICIS: Integrated Compliance Information System

The Integrated Compliance Information System (ICIS) supports the information needs of the national enforcement and compliance program as well as the unique needs of the National Pollutant Discharge Elimination System (NPDES) program.

Date of Government Version: 01/23/2015
Date Data Arrived at EDR: 02/06/2015
Date Made Active in Reports: 03/09/2015
Number of Days to Update: 31

Source: Environmental Protection Agency
Telephone: 202-564-5088
Last EDR Contact: 04/09/2015
Next Scheduled EDR Contact: 07/27/2015
Data Release Frequency: Quarterly

PADS: PCB Activity Database System

PCB Activity Database. PADS Identifies generators, transporters, commercial storers and/or brokers and disposers of PCB's who are required to notify the EPA of such activities.

Date of Government Version: 07/01/2014
Date Data Arrived at EDR: 10/15/2014
Date Made Active in Reports: 11/17/2014
Number of Days to Update: 33

Source: EPA
Telephone: 202-566-0500
Last EDR Contact: 04/17/2015
Next Scheduled EDR Contact: 07/27/2015
Data Release Frequency: Annually

MLTS: Material Licensing Tracking System

MLTS is maintained by the Nuclear Regulatory Commission and contains a list of approximately 8,100 sites which possess or use radioactive materials and which are subject to NRC licensing requirements. To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 03/31/2015
Date Data Arrived at EDR: 04/09/2015
Date Made Active in Reports: 06/11/2015
Number of Days to Update: 63

Source: Nuclear Regulatory Commission
Telephone: 301-415-7169
Last EDR Contact: 06/04/2015
Next Scheduled EDR Contact: 09/21/2015
Data Release Frequency: Quarterly

RADINFO: Radiation Information Database

The Radiation Information Database (RADINFO) contains information about facilities that are regulated by U.S. Environmental Protection Agency (EPA) regulations for radiation and radioactivity.

Date of Government Version: 04/07/2015
Date Data Arrived at EDR: 04/09/2015
Date Made Active in Reports: 06/11/2015
Number of Days to Update: 63

Source: Environmental Protection Agency
Telephone: 202-343-9775
Last EDR Contact: 04/09/2015
Next Scheduled EDR Contact: 07/20/2015
Data Release Frequency: Quarterly

FINDS: Facility Index System/Facility Registry System

Facility Index System. FINDS contains both facility information and 'pointers' to other sources that contain more detail. EDR includes the following FINDS databases in this report: PCS (Permit Compliance System), AIRS (Aerometric Information Retrieval System), DOCKET (Enforcement Docket used to manage and track information on civil judicial enforcement cases for all environmental statutes), FURS (Federal Underground Injection Control), C-DOCKET (Criminal Docket System used to track criminal enforcement actions for all environmental statutes), FFIS (Federal Facilities Information System), STATE (State Environmental Laws and Statutes), and PADS (PCB Activity Data System).

Date of Government Version: 01/18/2015
Date Data Arrived at EDR: 02/27/2015
Date Made Active in Reports: 03/25/2015
Number of Days to Update: 26

Source: EPA
Telephone: (415) 947-8000
Last EDR Contact: 06/10/2015
Next Scheduled EDR Contact: 09/21/2015
Data Release Frequency: Quarterly

RAATS: RCRA Administrative Action Tracking System

RCRA Administration Action Tracking System. RAATS contains records based on enforcement actions issued under RCRA pertaining to major violators and includes administrative and civil actions brought by the EPA. For administration actions after September 30, 1995, data entry in the RAATS database was discontinued. EPA will retain a copy of the database for historical records. It was necessary to terminate RAATS because a decrease in agency resources made it impossible to continue to update the information contained in the database.

Date of Government Version: 04/17/1995
Date Data Arrived at EDR: 07/03/1995
Date Made Active in Reports: 08/07/1995
Number of Days to Update: 35

Source: EPA
Telephone: 202-564-4104
Last EDR Contact: 06/02/2008
Next Scheduled EDR Contact: 09/01/2008
Data Release Frequency: No Update Planned

RMP: Risk Management Plans

When Congress passed the Clean Air Act Amendments of 1990, it required EPA to publish regulations and guidance for chemical accident prevention at facilities using extremely hazardous substances. The Risk Management Program Rule (RMP Rule) was written to implement Section 112(r) of these amendments. The rule, which built upon existing industry codes and standards, requires companies of all sizes that use certain flammable and toxic substances to develop a Risk Management Program, which includes a(n): Hazard assessment that details the potential effects of an accidental release, an accident history of the last five years, and an evaluation of worst-case and alternative accidental releases; Prevention program that includes safety precautions and maintenance, monitoring, and employee training measures; and Emergency response program that spells out emergency health care, employee training measures and procedures for informing the public and response agencies (e.g the fire department) should an accident occur.

Date of Government Version: 02/01/2015
Date Data Arrived at EDR: 02/13/2015
Date Made Active in Reports: 03/25/2015
Number of Days to Update: 40

Source: Environmental Protection Agency
Telephone: 202-564-8600
Last EDR Contact: 04/27/2015
Next Scheduled EDR Contact: 08/10/2015
Data Release Frequency: Varies

BRS: Biennial Reporting System

The Biennial Reporting System is a national system administered by the EPA that collects data on the generation and management of hazardous waste. BRS captures detailed data from two groups: Large Quantity Generators (LQG) and Treatment, Storage, and Disposal Facilities.

Date of Government Version: 12/31/2011
Date Data Arrived at EDR: 02/26/2013
Date Made Active in Reports: 04/19/2013
Number of Days to Update: 52

Source: EPA/NTIS
Telephone: 800-424-9346
Last EDR Contact: 05/29/2015
Next Scheduled EDR Contact: 09/07/2015
Data Release Frequency: Biennially

CA BOND EXP. PLAN: Bond Expenditure Plan

Department of Health Services developed a site-specific expenditure plan as the basis for an appropriation of Hazardous Substance Cleanup Bond Act funds. It is not updated.

Date of Government Version: 01/01/1989
Date Data Arrived at EDR: 07/27/1994
Date Made Active in Reports: 08/02/1994
Number of Days to Update: 6

Source: Department of Health Services
Telephone: 916-255-2118
Last EDR Contact: 05/31/1994
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

UIC: UIC Listing

A listing of wells identified as underground injection wells, in the California Oil and Gas Wells database.

Date of Government Version: 11/19/2014
Date Data Arrived at EDR: 12/15/2014
Date Made Active in Reports: 01/29/2015
Number of Days to Update: 45

Source: Deaprtment of Conservation
Telephone: 916-445-2408
Last EDR Contact: 03/20/2015
Next Scheduled EDR Contact: 06/29/2015
Data Release Frequency: Varies

NPDES: NPDES Permits Listing
A listing of NPDES permits, including stormwater.

Date of Government Version: 05/18/2015
Date Data Arrived at EDR: 05/20/2015
Date Made Active in Reports: 06/11/2015
Number of Days to Update: 22
Source: State Water Resources Control Board
Telephone: 916-445-9379
Last EDR Contact: 05/20/2015
Next Scheduled EDR Contact: 08/31/2015
Data Release Frequency: Quarterly

CORTESE: "Cortese" Hazardous Waste & Substances Sites List
The sites for the list are designated by the State Water Resource Control Board (LUST), the Integrated Waste Board (SWF/LS), and the Department of Toxic Substances Control (Cal-Sites).

Date of Government Version: 03/10/2015
Date Data Arrived at EDR: 03/31/2015
Date Made Active in Reports: 04/10/2015
Number of Days to Update: 10
Source: CAL EPA/Office of Emergency Information
Telephone: 916-323-3400
Last EDR Contact: 03/31/2015
Next Scheduled EDR Contact: 07/13/2015
Data Release Frequency: Quarterly

HIST CORTESE: Hazardous Waste & Substance Site List
The sites for the list are designated by the State Water Resource Control Board [LUST], the Integrated Waste Board [SWF/LS], and the Department of Toxic Substances Control [CALSITES]. This listing is no longer updated by the state agency.

Date of Government Version: 04/01/2001
Date Data Arrived at EDR: 01/22/2009
Date Made Active in Reports: 04/08/2009
Number of Days to Update: 76
Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 01/22/2009
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

NOTIFY 65: Proposition 65 Records
Listings of all Proposition 65 incidents reported to counties by the State Water Resources Control Board and the Regional Water Quality Control Board. This database is no longer updated by the reporting agency.

Date of Government Version: 10/21/1993
Date Data Arrived at EDR: 11/01/1993
Date Made Active in Reports: 11/19/1993
Number of Days to Update: 18
Source: State Water Resources Control Board
Telephone: 916-445-3846
Last EDR Contact: 06/17/2015
Next Scheduled EDR Contact: 10/05/2015
Data Release Frequency: No Update Planned

DRYCLEANERS: Cleaner Facilities
A list of drycleaner related facilities that have EPA ID numbers. These are facilities with certain SIC codes: power laundries, family and commercial; garment pressing and cleaner's agents; linen supply; coin-operated laundries and cleaning; drycleaning plants, except rugs; carpet and upholster cleaning; industrial launderers; laundry and garment services.

Date of Government Version: 02/18/2015
Date Data Arrived at EDR: 02/20/2015
Date Made Active in Reports: 03/12/2015
Number of Days to Update: 20
Source: Department of Toxic Substance Control
Telephone: 916-327-4498
Last EDR Contact: 06/05/2015
Next Scheduled EDR Contact: 09/21/2015
Data Release Frequency: Annually

WIP: Well Investigation Program Case List
Well Investigation Program case in the San Gabriel and San Fernando Valley area.

Date of Government Version: 07/03/2009
Date Data Arrived at EDR: 07/21/2009
Date Made Active in Reports: 08/03/2009
Number of Days to Update: 13
Source: Los Angeles Water Quality Control Board
Telephone: 213-576-6726
Last EDR Contact: 03/30/2015
Next Scheduled EDR Contact: 07/13/2015
Data Release Frequency: Varies

ENF: Enforcement Action Listing

A listing of Water Board Enforcement Actions. Formal is everything except Oral/Verbal Communication, Notice of Violation, Expedited Payment Letter, and Staff Enforcement Letter.

Date of Government Version: 04/30/2015
Date Data Arrived at EDR: 05/01/2015
Date Made Active in Reports: 05/13/2015
Number of Days to Update: 12

Source: State Water Resoruces Control Board
Telephone: 916-445-9379
Last EDR Contact: 04/27/2015
Next Scheduled EDR Contact: 08/10/2015
Data Release Frequency: Varies

HAZNET: Facility and Manifest Data

Facility and Manifest Data. The data is extracted from the copies of hazardous waste manifests received each year by the DTSC. The annual volume of manifests is typically 700,000 - 1,000,000 annually, representing approximately 350,000 - 500,000 shipments. Data are from the manifests submitted without correction, and therefore many contain some invalid values for data elements such as generator ID, TSD ID, waste category, and disposal method. This database begins with calendar year 1993.

Date of Government Version: 12/31/2013
Date Data Arrived at EDR: 10/15/2014
Date Made Active in Reports: 11/19/2014
Number of Days to Update: 35

Source: California Environmental Protection Agency
Telephone: 916-255-1136
Last EDR Contact: 04/17/2015
Next Scheduled EDR Contact: 07/27/2015
Data Release Frequency: Annually

EMI: Emissions Inventory Data

Toxics and criteria pollutant emissions data collected by the ARB and local air pollution agencies.

Date of Government Version: 12/31/2012
Date Data Arrived at EDR: 03/25/2014
Date Made Active in Reports: 04/28/2014
Number of Days to Update: 34

Source: California Air Resources Board
Telephone: 916-322-2990
Last EDR Contact: 03/27/2015
Next Scheduled EDR Contact: 07/06/2015
Data Release Frequency: Varies

INDIAN RESERV: Indian Reservations

This map layer portrays Indian administered lands of the United States that have any area equal to or greater than 640 acres.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 12/08/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 34

Source: USGS
Telephone: 202-208-3710
Last EDR Contact: 04/14/2015
Next Scheduled EDR Contact: 07/27/2015
Data Release Frequency: Semi-Annually

SCRD DRYCLEANERS: State Coalition for Remediation of Drycleaners Listing

The State Coalition for Remediation of Drycleaners was established in 1998, with support from the U.S. EPA Office of Superfund Remediation and Technology Innovation. It is comprised of representatives of states with established drycleaner remediation programs. Currently the member states are Alabama, Connecticut, Florida, Illinois, Kansas, Minnesota, Missouri, North Carolina, Oregon, South Carolina, Tennessee, Texas, and Wisconsin.

Date of Government Version: 03/07/2011
Date Data Arrived at EDR: 03/09/2011
Date Made Active in Reports: 05/02/2011
Number of Days to Update: 54

Source: Environmental Protection Agency
Telephone: 615-532-8599
Last EDR Contact: 05/21/2015
Next Scheduled EDR Contact: 08/31/2015
Data Release Frequency: Varies

LEAD SMELTER 1: Lead Smelter Sites

A listing of former lead smelter site locations.

Date of Government Version: 11/25/2014
Date Data Arrived at EDR: 11/26/2014
Date Made Active in Reports: 01/29/2015
Number of Days to Update: 64

Source: Environmental Protection Agency
Telephone: 703-603-8787
Last EDR Contact: 04/10/2015
Next Scheduled EDR Contact: 07/20/2015
Data Release Frequency: Varies

LEAD SMELTER 2: Lead Smelter Sites

A list of several hundred sites in the U.S. where secondary lead smelting was done from 1931and 1964. These sites may pose a threat to public health through ingestion or inhalation of contaminated soil or dust

Date of Government Version: 04/05/2001
Date Data Arrived at EDR: 10/27/2010
Date Made Active in Reports: 12/02/2010
Number of Days to Update: 36

Source: American Journal of Public Health
Telephone: 703-305-6451
Last EDR Contact: 12/02/2009
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

WDS: Waste Discharge System

Sites which have been issued waste discharge requirements.

Date of Government Version: 06/19/2007
Date Data Arrived at EDR: 06/20/2007
Date Made Active in Reports: 06/29/2007
Number of Days to Update: 9

Source: State Water Resources Control Board
Telephone: 916-341-5227
Last EDR Contact: 05/20/2015
Next Scheduled EDR Contact: 09/07/2015
Data Release Frequency: Quarterly

PRP: Potentially Responsible Parties

A listing of verified Potentially Responsible Parties

Date of Government Version: 10/25/2013
Date Data Arrived at EDR: 10/17/2014
Date Made Active in Reports: 10/20/2014
Number of Days to Update: 3

Source: EPA
Telephone: 202-564-6023
Last EDR Contact: 05/14/2015
Next Scheduled EDR Contact: 08/24/2015
Data Release Frequency: Quarterly

2020 COR ACTION: 2020 Corrective Action Program List

The EPA has set ambitious goals for the RCRA Corrective Action program by creating the 2020 Corrective Action Universe. This RCRA cleanup baseline includes facilities expected to need corrective action. The 2020 universe contains a wide variety of sites. Some properties are heavily contaminated while others were contaminated but have since been cleaned up. Still others have not been fully investigated yet, and may require little or no remediation. Inclusion in the 2020 Universe does not necessarily imply failure on the part of a facility to meet its RCRA obligations.

Date of Government Version: 04/22/2013
Date Data Arrived at EDR: 03/03/2015
Date Made Active in Reports: 03/09/2015
Number of Days to Update: 6

Source: Environmental Protection Agency
Telephone: 703-308-4044
Last EDR Contact: 05/14/2015
Next Scheduled EDR Contact: 08/24/2015
Data Release Frequency: Varies

EPA WATCH LIST: EPA WATCH LIST

EPA maintains a "Watch List" to facilitate dialogue between EPA, state and local environmental agencies on enforcement matters relating to facilities with alleged violations identified as either significant or high priority. Being on the Watch List does not mean that the facility has actually violated the law only that an investigation by EPA or a state or local environmental agency has led those organizations to allege that an unproven violation has in fact occurred. Being on the Watch List does not represent a higher level of concern regarding the alleged violations that were detected, but instead indicates cases requiring additional dialogue between EPA, state and local agencies - primarily because of the length of time the alleged violation has gone unaddressed or unresolved.

Date of Government Version: 08/30/2013
Date Data Arrived at EDR: 03/21/2014
Date Made Active in Reports: 06/17/2014
Number of Days to Update: 88

Source: Environmental Protection Agency
Telephone: 617-520-3000
Last EDR Contact: 05/07/2015
Next Scheduled EDR Contact: 08/24/2015
Data Release Frequency: Quarterly

PROC: Certified Processors Database

A listing of certified processors.

Date of Government Version: 03/16/2015
Date Data Arrived at EDR: 03/18/2015
Date Made Active in Reports: 03/24/2015
Number of Days to Update: 6

Source: Department of Conservation
Telephone: 916-323-3836
Last EDR Contact: 06/17/2015
Next Scheduled EDR Contact: 09/28/2015
Data Release Frequency: Quarterly

Financial Assurance 1: Financial Assurance Information Listing
Financial Assurance information

Date of Government Version: 04/30/2015
Date Data Arrived at EDR: 05/01/2015
Date Made Active in Reports: 05/13/2015
Number of Days to Update: 12

Source: Department of Toxic Substances Control
Telephone: 916-255-3628
Last EDR Contact: 04/27/2015
Next Scheduled EDR Contact: 08/10/2015
Data Release Frequency: Varies

Financial Assurance 2: Financial Assurance Information Listing
A listing of financial assurance information for solid waste facilities. Financial assurance is intended to ensure that resources are available to pay for the cost of closure, post-closure care, and corrective measures if the owner or operator of a regulated facility is unable or unwilling to pay.

Date of Government Version: 05/18/2015
Date Data Arrived at EDR: 05/22/2015
Date Made Active in Reports: 06/05/2015
Number of Days to Update: 14

Source: California Integrated Waste Management Board
Telephone: 916-341-6066
Last EDR Contact: 05/18/2015
Next Scheduled EDR Contact: 08/31/2015
Data Release Frequency: Varies

PCB TRANSFORMER: PCB Transformer Registration Database
The database of PCB transformer registrations that includes all PCB registration submittals.

Date of Government Version: 02/01/2011
Date Data Arrived at EDR: 10/19/2011
Date Made Active in Reports: 01/10/2012
Number of Days to Update: 83

Source: Environmental Protection Agency
Telephone: 202-566-0517
Last EDR Contact: 05/01/2015
Next Scheduled EDR Contact: 08/10/2015
Data Release Frequency: Varies

US FIN ASSUR: Financial Assurance Information
All owners and operators of facilities that treat, store, or dispose of hazardous waste are required to provide proof that they will have sufficient funds to pay for the clean up, closure, and post-closure care of their facilities.

Date of Government Version: 03/09/2015
Date Data Arrived at EDR: 03/10/2015
Date Made Active in Reports: 03/25/2015
Number of Days to Update: 15

Source: Environmental Protection Agency
Telephone: 202-566-1917
Last EDR Contact: 05/14/2015
Next Scheduled EDR Contact: 08/31/2015
Data Release Frequency: Quarterly

COAL ASH EPA: Coal Combustion Residues Surface Impoundments List
A listing of coal combustion residues surface impoundments with high hazard potential ratings.

Date of Government Version: 07/01/2014
Date Data Arrived at EDR: 09/10/2014
Date Made Active in Reports: 10/20/2014
Number of Days to Update: 40

Source: Environmental Protection Agency
Telephone: N/A
Last EDR Contact: 06/12/2015
Next Scheduled EDR Contact: 09/21/2015
Data Release Frequency: Varies

MWMP: Medical Waste Management Program Listing
The Medical Waste Management Program (MWMP) ensures the proper handling and disposal of medical waste by permitting and inspecting medical waste Offsite Treatment Facilities (PDF) and Transfer Stations (PDF) throughout the state. MWMP also oversees all Medical Waste Transporters.

Date of Government Version: 01/16/2015
Date Data Arrived at EDR: 03/10/2015
Date Made Active in Reports: 03/18/2015
Number of Days to Update: 8

Source: Department of Public Health
Telephone: 916-558-1784
Last EDR Contact: 06/09/2015
Next Scheduled EDR Contact: 09/21/2015
Data Release Frequency: Varies

US AIRS MINOR: Air Facility System Data
A listing of minor source facilities.

Date of Government Version: 10/16/2014
Date Data Arrived at EDR: 10/31/2014
Date Made Active in Reports: 11/17/2014
Number of Days to Update: 17

Source: EPA
Telephone: 202-564-2496
Last EDR Contact: 03/30/2015
Next Scheduled EDR Contact: 07/13/2015
Data Release Frequency: Annually

US AIRS (AFS): Aerometric Information Retrieval System Facility Subsystem (AFS)
The database is a sub-system of Aerometric Information Retrieval System (AIRS). AFS contains compliance data on air pollution point sources regulated by the U.S. EPA and/or state and local air regulatory agencies. This information comes from source reports by various stationary sources of air pollution, such as electric power plants, steel mills, factories, and universities, and provides information about the air pollutants they produce. Action, air program, air program pollutant, and general level plant data. It is used to track emissions and compliance data from industrial plants.

Date of Government Version: 10/16/2014
Date Data Arrived at EDR: 10/31/2014
Date Made Active in Reports: 11/17/2014
Number of Days to Update: 17

Source: EPA
Telephone: 202-564-2496
Last EDR Contact: 03/30/2015
Next Scheduled EDR Contact: 07/13/2015
Data Release Frequency: Annually

HWP: EnviroStor Permitted Facilities Listing
Detailed information on permitted hazardous waste facilities and corrective action ("cleanups") tracked in EnviroStor.

Date of Government Version: 05/26/2015
Date Data Arrived at EDR: 05/28/2015
Date Made Active in Reports: 06/05/2015
Number of Days to Update: 8

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 05/28/2015
Next Scheduled EDR Contact: 09/07/2015
Data Release Frequency: Quarterly

HWT: Registered Hazardous Waste Transporter Database
A listing of hazardous waste transporters. In California, unless specifically exempted, it is unlawful for any person to transport hazardous wastes unless the person holds a valid registration issued by DTSC. A hazardous waste transporter registration is valid for one year and is assigned a unique registration number.

Date of Government Version: 04/13/2015
Date Data Arrived at EDR: 04/15/2015
Date Made Active in Reports: 04/23/2015
Number of Days to Update: 8

Source: Department of Toxic Substances Control
Telephone: 916-440-7145
Last EDR Contact: 04/15/2015
Next Scheduled EDR Contact: 07/27/2015
Data Release Frequency: Quarterly

COAL ASH DOE: Steam-Electric Plant Operation Data
A listing of power plants that store ash in surface ponds.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 08/07/2009
Date Made Active in Reports: 10/22/2009
Number of Days to Update: 76

Source: Department of Energy
Telephone: 202-586-8719
Last EDR Contact: 04/15/2015
Next Scheduled EDR Contact: 07/27/2015
Data Release Frequency: Varies

FEDLAND: Federal and Indian Lands
Federally and Indian administrated lands of the United States. Lands included are administrated by: Army Corps of Engineers, Bureau of Reclamation, National Wild and Scenic River, National Wildlife Refuge, Public Domain Land, Wilderness, Wilderness Study Area, Wildlife Management Area, Bureau of Indian Affairs, Bureau of Land Management, Department of Justice, Forest Service, Fish and Wildlife Service, National Park Service.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 02/06/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 339

Source: U.S. Geological Survey
Telephone: 888-275-8747
Last EDR Contact: 04/14/2015
Next Scheduled EDR Contact: 07/27/2015
Data Release Frequency: N/A

EDR HIGH RISK HISTORICAL RECORDS

EDR Exclusive Records

EDR MGP: EDR Proprietary Manufactured Gas Plants

The EDR Proprietary Manufactured Gas Plant Database includes records of coal gas plants (manufactured gas plants) compiled by EDR's researchers. Manufactured gas sites were used in the United States from the 1800's to 1950's to produce a gas that could be distributed and used as fuel. These plants used whale oil, rosin, coal, or a mixture of coal, oil, and water that also produced a significant amount of waste. Many of the byproducts of the gas production, such as coal tar (oily waste containing volatile and non-volatile chemicals), sludges, oils and other compounds are potentially hazardous to human health and the environment. The byproduct from this process was frequently disposed of directly at the plant site and can remain or spread slowly, serving as a continuous source of soil and groundwater contamination.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

EDR US Hist Auto Stat: EDR Exclusive Historic Gas Stations

EDR has searched selected national collections of business directories and has collected listings of potential gas station/filling station/service station sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include gas station/filling station/service station establishments. The categories reviewed included, but were not limited to gas, gas station, gasoline station, filling station, auto, automobile repair, auto service station, service station, etc. This database falls within a category of information EDR classifies as "High Risk Historical Records", or HRHR. EDR's HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

EDR US Hist Cleaners: EDR Exclusive Historic Dry Cleaners

EDR has searched selected national collections of business directories and has collected listings of potential dry cleaner sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include dry cleaning establishments. The categories reviewed included, but were not limited to dry cleaners, cleaners, laundry, laundromat, cleaning/laundry, wash & dry etc. This database falls within a category of information EDR classifies as "High Risk Historical Records", or HRHR. EDR's HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

EDR RECOVERED GOVERNMENT ARCHIVES

Exclusive Recovered Govt. Archives

RGA LUST: Recovered Government Archive Leaking Underground Storage Tank

The EDR Recovered Government Archive Leaking Underground Storage Tank database provides a list of LUST incidents derived from historical databases and includes many records that no longer appear in current government lists. Compiled from Records formerly available from the State Water Resources Control Board in California.

Date of Government Version: N/A
Date Data Arrived at EDR: 07/01/2013
Date Made Active in Reports: 12/30/2013
Number of Days to Update: 182

Source: State Water Resources Control Board
Telephone: N/A
Last EDR Contact: 06/01/2012
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

RGA LF: Recovered Government Archive Solid Waste Facilities List

The EDR Recovered Government Archive Landfill database provides a list of landfills derived from historical databases and includes many records that no longer appear in current government lists. Compiled from Records formerly available from the Department of Resources Recycling and Recovery in California.

Date of Government Version: N/A
Date Data Arrived at EDR: 07/01/2013
Date Made Active in Reports: 01/13/2014
Number of Days to Update: 196

Source: Department of Resources Recycling and Recovery
Telephone: N/A
Last EDR Contact: 06/01/2012
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

COUNTY RECORDS

ALAMEDA COUNTY:

Contaminated Sites

A listing of contaminated sites overseen by the Toxic Release Program (oil and groundwater contamination from chemical releases and spills) and the Leaking Underground Storage Tank Program (soil and ground water contamination from leaking petroleum USTs).

Date of Government Version: 01/21/2015
Date Data Arrived at EDR: 01/28/2015
Date Made Active in Reports: 02/26/2015
Number of Days to Update: 29

Source: Alameda County Environmental Health Services
Telephone: 510-567-6700
Last EDR Contact: 05/21/2015
Next Scheduled EDR Contact: 07/13/2015
Data Release Frequency: Semi-Annually

Underground Tanks

Underground storage tank sites located in Alameda county.

Date of Government Version: 01/21/2015
Date Data Arrived at EDR: 01/28/2015
Date Made Active in Reports: 02/26/2015
Number of Days to Update: 29

Source: Alameda County Environmental Health Services
Telephone: 510-567-6700
Last EDR Contact: 05/21/2015
Next Scheduled EDR Contact: 07/13/2015
Data Release Frequency: Semi-Annually

AMADOR COUNTY:

CUPA Facility List

Cupa Facility List

Date of Government Version: 03/09/2015
Date Data Arrived at EDR: 03/24/2015
Date Made Active in Reports: 03/31/2015
Number of Days to Update: 7

Source: Amador County Environmental Health
Telephone: 209-223-6439
Last EDR Contact: 06/05/2015
Next Scheduled EDR Contact: 09/21/2015
Data Release Frequency: Varies

BUTTE COUNTY:

CUPA Facility Listing
Cupa facility list.

Date of Government Version: 11/20/2014
Date Data Arrived at EDR: 11/24/2014
Date Made Active in Reports: 01/07/2015
Number of Days to Update: 44

Source: Public Health Department
Telephone: 530-538-7149
Last EDR Contact: 04/14/2015
Next Scheduled EDR Contact: 04/27/2015
Data Release Frequency: No Update Planned

CALVERAS COUNTY:

CUPA Facility Listing
Cupa Facility Listing

Date of Government Version: 04/17/2015
Date Data Arrived at EDR: 04/21/2015
Date Made Active in Reports: 05/07/2015
Number of Days to Update: 16

Source: Calveras County Environmental Health
Telephone: 209-754-6399
Last EDR Contact: 03/30/2015
Next Scheduled EDR Contact: 07/13/2015
Data Release Frequency: Quarterly

COLUSA COUNTY:

CUPA Facility List
Cupa facility list.

Date of Government Version: 06/11/2014
Date Data Arrived at EDR: 06/13/2014
Date Made Active in Reports: 07/07/2014
Number of Days to Update: 24

Source: Health & Human Services
Telephone: 530-458-0396
Last EDR Contact: 06/12/2015
Next Scheduled EDR Contact: 08/24/2015
Data Release Frequency: Varies

CONTRA COSTA COUNTY:

Site List
List includes sites from the underground tank, hazardous waste generator and business plan/2185 programs.

Date of Government Version: 05/26/2015
Date Data Arrived at EDR: 05/29/2015
Date Made Active in Reports: 06/11/2015
Number of Days to Update: 13

Source: Contra Costa Health Services Department
Telephone: 925-646-2286
Last EDR Contact: 05/04/2015
Next Scheduled EDR Contact: 08/17/2015
Data Release Frequency: Semi-Annually

DEL NORTE COUNTY:

CUPA Facility List
Cupa Facility list

Date of Government Version: 05/19/2015
Date Data Arrived at EDR: 05/22/2015
Date Made Active in Reports: 06/05/2015
Number of Days to Update: 14

Source: Del Norte County Environmental Health Division
Telephone: 707-465-0426
Last EDR Contact: 05/18/2015
Next Scheduled EDR Contact: 08/17/2015
Data Release Frequency: Varies

EL DORADO COUNTY:

CUPA Facility List
CUPA facility list.

Date of Government Version: 05/26/2015
Date Data Arrived at EDR: 05/29/2015
Date Made Active in Reports: 06/05/2015
Number of Days to Update: 7

Source: El Dorado County Environmental Management Department
Telephone: 530-621-6623
Last EDR Contact: 05/04/2015
Next Scheduled EDR Contact: 08/17/2015
Data Release Frequency: Varies

FRESNO COUNTY:

CUPA Resources List
Certified Unified Program Agency. CUPA's are responsible for implementing a unified hazardous materials and hazardous waste management regulatory program. The agency provides oversight of businesses that deal with hazardous materials, operate underground storage tanks or aboveground storage tanks.

Date of Government Version: 03/31/2015
Date Data Arrived at EDR: 04/15/2015
Date Made Active in Reports: 04/23/2015
Number of Days to Update: 8

Source: Dept. of Community Health
Telephone: 559-445-3271
Last EDR Contact: 04/06/2015
Next Scheduled EDR Contact: 07/20/2015
Data Release Frequency: Semi-Annually

HUMBOLDT COUNTY:

CUPA Facility List
CUPA facility list.

Date of Government Version: 03/11/2015
Date Data Arrived at EDR: 03/13/2015
Date Made Active in Reports: 03/24/2015
Number of Days to Update: 11

Source: Humboldt County Environmental Health
Telephone: N/A
Last EDR Contact: 05/26/2015
Next Scheduled EDR Contact: 09/07/2015
Data Release Frequency: Varies

IMPERIAL COUNTY:

CUPA Facility List
Cupa facility list.

Date of Government Version: 04/27/2015
Date Data Arrived at EDR: 04/28/2015
Date Made Active in Reports: 05/13/2015
Number of Days to Update: 15

Source: San Diego Border Field Office
Telephone: 760-339-2777
Last EDR Contact: 04/27/2015
Next Scheduled EDR Contact: 08/10/2015
Data Release Frequency: Varies

INYO COUNTY:

CUPA Facility List
Cupa facility list.

Date of Government Version: 09/10/2013
Date Data Arrived at EDR: 09/11/2013
Date Made Active in Reports: 10/14/2013
Number of Days to Update: 33

Source: Inyo County Environmental Health Services
Telephone: 760-878-0238
Last EDR Contact: 05/21/2015
Next Scheduled EDR Contact: 09/07/2015
Data Release Frequency: Varies

KERN COUNTY:

Underground Storage Tank Sites & Tank Listing
Kern County Sites and Tanks Listing.

Date of Government Version: 07/22/2014
Date Data Arrived at EDR: 11/12/2014
Date Made Active in Reports: 12/19/2014
Number of Days to Update: 37

Source: Kern County Environment Health Services Department
Telephone: 661-862-8700
Last EDR Contact: 06/12/2015
Next Scheduled EDR Contact: 08/24/2015
Data Release Frequency: Quarterly

KINGS COUNTY:

CUPA Facility List
A listing of sites included in the county's Certified Unified Program Agency database. California's Secretary for Environmental Protection established the unified hazardous materials and hazardous waste regulatory program as required by chapter 6.11 of the California Health and Safety Code. The Unified Program consolidates the administration, permits, inspections, and enforcement activities.

Date of Government Version: 05/26/2015
Date Data Arrived at EDR: 05/28/2015
Date Made Active in Reports: 06/15/2015
Number of Days to Update: 18

Source: Kings County Department of Public Health
Telephone: 559-584-1411
Last EDR Contact: 05/21/2015
Next Scheduled EDR Contact: 09/07/2015
Data Release Frequency: Varies

LAKE COUNTY:

CUPA Facility List
Cupa facility list

Date of Government Version: 05/05/2015
Date Data Arrived at EDR: 05/07/2015
Date Made Active in Reports: 05/20/2015
Number of Days to Update: 13

Source: Lake County Environmental Health
Telephone: 707-263-1164
Last EDR Contact: 04/16/2015
Next Scheduled EDR Contact: 08/03/2015
Data Release Frequency: Varies

LOS ANGELES COUNTY:

San Gabriel Valley Areas of Concern
San Gabriel Valley areas where VOC contamination is at or above the MCL as designated by region 9 EPA office.

Date of Government Version: 03/30/2009
Date Data Arrived at EDR: 03/31/2009
Date Made Active in Reports: 10/23/2009
Number of Days to Update: 206

Source: EPA Region 9
Telephone: 415-972-3178
Last EDR Contact: 06/17/2015
Next Scheduled EDR Contact: 10/05/2015
Data Release Frequency: No Update Planned

HMS: Street Number List
Industrial Waste and Underground Storage Tank Sites.

Date of Government Version: 11/24/2014
Date Data Arrived at EDR: 01/30/2015
Date Made Active in Reports: 03/04/2015
Number of Days to Update: 33

Source: Department of Public Works
Telephone: 626-458-3517
Last EDR Contact: 04/13/2015
Next Scheduled EDR Contact: 07/27/2015
Data Release Frequency: Semi-Annually

List of Solid Waste Facilities
Solid Waste Facilities in Los Angeles County.

Date of Government Version: 04/20/2015
Date Data Arrived at EDR: 04/20/2015
Date Made Active in Reports: 05/07/2015
Number of Days to Update: 17

Source: La County Department of Public Works
Telephone: 818-458-5185
Last EDR Contact: 04/20/2015
Next Scheduled EDR Contact: 08/03/2015
Data Release Frequency: Varies

City of Los Angeles Landfills

Landfills owned and maintained by the City of Los Angeles.

Date of Government Version: 03/05/2009
Date Data Arrived at EDR: 03/10/2009
Date Made Active in Reports: 04/08/2009
Number of Days to Update: 29

Source: Engineering & Construction Division
Telephone: 213-473-7869
Last EDR Contact: 04/15/2015
Next Scheduled EDR Contact: 08/03/2015
Data Release Frequency: Varies

Site Mitigation List

Industrial sites that have had some sort of spill or complaint.

Date of Government Version: 01/15/2015
Date Data Arrived at EDR: 01/29/2015
Date Made Active in Reports: 03/10/2015
Number of Days to Update: 40

Source: Community Health Services
Telephone: 323-890-7806
Last EDR Contact: 04/16/2015
Next Scheduled EDR Contact: 08/03/2015
Data Release Frequency: Annually

City of El Segundo Underground Storage Tank

Underground storage tank sites located in El Segundo city.

Date of Government Version: 03/30/2015
Date Data Arrived at EDR: 04/02/2015
Date Made Active in Reports: 04/13/2015
Number of Days to Update: 11

Source: City of El Segundo Fire Department
Telephone: 310-524-2236
Last EDR Contact: 03/06/2015
Next Scheduled EDR Contact: 08/03/2015
Data Release Frequency: Semi-Annually

City of Long Beach Underground Storage Tank

Underground storage tank sites located in the city of Long Beach.

Date of Government Version: 03/03/2015
Date Data Arrived at EDR: 05/26/2015
Date Made Active in Reports: 06/11/2015
Number of Days to Update: 16

Source: City of Long Beach Fire Department
Telephone: 562-570-2563
Last EDR Contact: 04/27/2015
Next Scheduled EDR Contact: 08/10/2015
Data Release Frequency: Annually

City of Torrance Underground Storage Tank

Underground storage tank sites located in the city of Torrance.

Date of Government Version: 04/14/2015
Date Data Arrived at EDR: 04/23/2015
Date Made Active in Reports: 05/11/2015
Number of Days to Update: 18

Source: City of Torrance Fire Department
Telephone: 310-618-2973
Last EDR Contact: 04/13/2015
Next Scheduled EDR Contact: 07/27/2015
Data Release Frequency: Semi-Annually

MADERA COUNTY:

CUPA Facility List

A listing of sites included in the county's Certified Unified Program Agency database. California's Secretary for Environmental Protection established the unified hazardous materials and hazardous waste regulatory program as required by chapter 6.11 of the California Health and Safety Code. The Unified Program consolidates the administration, permits, inspections, and enforcement activities.

Date of Government Version: 05/28/2015
Date Data Arrived at EDR: 05/29/2015
Date Made Active in Reports: 06/15/2015
Number of Days to Update: 17

Source: Madera County Environmental Health
Telephone: 559-675-7823
Last EDR Contact: 05/22/2015
Next Scheduled EDR Contact: 09/07/2015
Data Release Frequency: Varies

MARIN COUNTY:

Underground Storage Tank Sites
Currently permitted USTs in Marin County.

Date of Government Version: 10/08/2014
Date Data Arrived at EDR: 10/22/2014
Date Made Active in Reports: 12/15/2014
Number of Days to Update: 54

Source: Public Works Department Waste Management
Telephone: 415-499-6647
Last EDR Contact: 05/05/2015
Next Scheduled EDR Contact: 07/20/2015
Data Release Frequency: Semi-Annually

MERCED COUNTY:

CUPA Facility List
CUPA facility list.

Date of Government Version: 05/22/2015
Date Data Arrived at EDR: 05/26/2015
Date Made Active in Reports: 06/05/2015
Number of Days to Update: 10

Source: Merced County Environmental Health
Telephone: 209-381-1094
Last EDR Contact: 05/22/2015
Next Scheduled EDR Contact: 09/07/2015
Data Release Frequency: Varies

MONO COUNTY:

CUPA Facility List
CUPA Facility List

Date of Government Version: 02/27/2015
Date Data Arrived at EDR: 03/06/2015
Date Made Active in Reports: 03/10/2015
Number of Days to Update: 4

Source: Mono County Health Department
Telephone: 760-932-5580
Last EDR Contact: 06/01/2015
Next Scheduled EDR Contact: 09/14/2015
Data Release Frequency: Varies

MONTEREY COUNTY:

CUPA Facility Listing
CUPA Program listing from the Environmental Health Division.

Date of Government Version: 03/19/2015
Date Data Arrived at EDR: 03/20/2015
Date Made Active in Reports: 03/31/2015
Number of Days to Update: 11

Source: Monterey County Health Department
Telephone: 831-796-1297
Last EDR Contact: 05/26/2015
Next Scheduled EDR Contact: 09/07/2015
Data Release Frequency: Varies

NAPA COUNTY:

Sites With Reported Contamination
A listing of leaking underground storage tank sites located in Napa county.

Date of Government Version: 12/05/2011
Date Data Arrived at EDR: 12/06/2011
Date Made Active in Reports: 02/07/2012
Number of Days to Update: 63

Source: Napa County Department of Environmental Management
Telephone: 707-253-4269
Last EDR Contact: 06/01/2015
Next Scheduled EDR Contact: 09/14/2015
Data Release Frequency: No Update Planned

Closed and Operating Underground Storage Tank Sites
Underground storage tank sites located in Napa county.

Date of Government Version: 01/15/2008
Date Data Arrived at EDR: 01/16/2008
Date Made Active in Reports: 02/08/2008
Number of Days to Update: 23

Source: Napa County Department of Environmental Management
Telephone: 707-253-4269
Last EDR Contact: 06/01/2015
Next Scheduled EDR Contact: 09/14/2015
Data Release Frequency: No Update Planned

NEVADA COUNTY:

CUPA Facility List
CUPA facility list.

Date of Government Version: 02/12/2015
Date Data Arrived at EDR: 02/13/2015
Date Made Active in Reports: 03/03/2015
Number of Days to Update: 18

Source: Community Development Agency
Telephone: 530-265-1467
Last EDR Contact: 05/04/2015
Next Scheduled EDR Contact: 08/17/2015
Data Release Frequency: Varies

ORANGE COUNTY:

List of Industrial Site Cleanups
Petroleum and non-petroleum spills.

Date of Government Version: 05/01/2015
Date Data Arrived at EDR: 05/12/2015
Date Made Active in Reports: 06/05/2015
Number of Days to Update: 24

Source: Health Care Agency
Telephone: 714-834-3446
Last EDR Contact: 05/06/2015
Next Scheduled EDR Contact: 08/24/2015
Data Release Frequency: Annually

List of Underground Storage Tank Cleanups
Orange County Underground Storage Tank Cleanups (LUST).

Date of Government Version: 05/01/2015
Date Data Arrived at EDR: 05/12/2015
Date Made Active in Reports: 06/08/2015
Number of Days to Update: 27

Source: Health Care Agency
Telephone: 714-834-3446
Last EDR Contact: 05/06/2015
Next Scheduled EDR Contact: 08/24/2015
Data Release Frequency: Quarterly

List of Underground Storage Tank Facilities
Orange County Underground Storage Tank Facilities (UST).

Date of Government Version: 05/01/2015
Date Data Arrived at EDR: 05/12/2015
Date Made Active in Reports: 06/11/2015
Number of Days to Update: 30

Source: Health Care Agency
Telephone: 714-834-3446
Last EDR Contact: 05/12/2015
Next Scheduled EDR Contact: 08/24/2015
Data Release Frequency: Quarterly

PLACER COUNTY:

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Master List of Facilities
List includes aboveground tanks, underground tanks and cleanup sites.

Date of Government Version: 03/10/2015
Date Data Arrived at EDR: 03/12/2015
Date Made Active in Reports: 03/18/2015
Number of Days to Update: 6
Source: Placer County Health and Human Services
Telephone: 530-745-2363
Last EDR Contact: 06/21/2015
Next Scheduled EDR Contact: 09/21/2015
Data Release Frequency: Semi-Annually

RIVERSIDE COUNTY:

Listing of Underground Tank Cleanup Sites
Riverside County Underground Storage Tank Cleanup Sites (LUST).

Date of Government Version: 04/28/2015
Date Data Arrived at EDR: 04/30/2015
Date Made Active in Reports: 05/13/2015
Number of Days to Update: 13
Source: Department of Environmental Health
Telephone: 951-358-5055
Last EDR Contact: 03/23/2015
Next Scheduled EDR Contact: 07/06/2015
Data Release Frequency: Quarterly

Underground Storage Tank Tank List
Underground storage tank sites located in Riverside county.

Date of Government Version: 04/28/2015
Date Data Arrived at EDR: 04/30/2015
Date Made Active in Reports: 05/13/2015
Number of Days to Update: 13
Source: Department of Environmental Health
Telephone: 951-358-5055
Last EDR Contact: 03/23/2015
Next Scheduled EDR Contact: 07/06/2015
Data Release Frequency: Quarterly

SACRAMENTO COUNTY:

Toxic Site Clean-Up List
List of sites where unauthorized releases of potentially hazardous materials have occurred.

Date of Government Version: 02/02/2015
Date Data Arrived at EDR: 04/08/2015
Date Made Active in Reports: 04/16/2015
Number of Days to Update: 8
Source: Sacramento County Environmental Management
Telephone: 916-875-8406
Last EDR Contact: 04/08/2015
Next Scheduled EDR Contact: 07/20/2015
Data Release Frequency: Quarterly

Master Hazardous Materials Facility List
Any business that has hazardous materials on site - hazardous material storage sites, underground storage tanks, waste generators.

Date of Government Version: 02/02/2015
Date Data Arrived at EDR: 04/08/2015
Date Made Active in Reports: 04/16/2015
Number of Days to Update: 8
Source: Sacramento County Environmental Management
Telephone: 916-875-8406
Last EDR Contact: 04/08/2015
Next Scheduled EDR Contact: 07/20/2015
Data Release Frequency: Quarterly

SAN BERNARDINO COUNTY:

Hazardous Material Permits
This listing includes underground storage tanks, medical waste handlers/generators, hazardous materials handlers, hazardous waste generators, and waste oil generators/handlers.

Date of Government Version: 03/02/2015
Date Data Arrived at EDR: 03/03/2015
Date Made Active in Reports: 03/10/2015
Number of Days to Update: 7

Source: San Bernardino County Fire Department Hazardous Materials Division
Telephone: 909-387-3041
Last EDR Contact: 05/12/2015
Next Scheduled EDR Contact: 08/24/2015
Data Release Frequency: Quarterly

SAN DIEGO COUNTY:

Hazardous Materials Management Division Database

The database includes: HE58 - This report contains the business name, site address, business phone number, establishment 'H' permit number, type of permit, and the business status. HE17 - In addition to providing the same information provided in the HE58 listing, HE17 provides inspection dates, violations received by the establishment, hazardous waste generated, the quantity, method of storage, treatment/disposal of waste and the hauler, and information on underground storage tanks. Unauthorized Release List - Includes a summary of environmental contamination cases in San Diego County (underground tank cases, non-tank cases, groundwater contamination, and soil contamination are included.)

Date of Government Version: 09/23/2013
Date Data Arrived at EDR: 09/24/2013
Date Made Active in Reports: 10/17/2013
Number of Days to Update: 23

Source: Hazardous Materials Management Division
Telephone: 619-338-2268
Last EDR Contact: 06/05/2015
Next Scheduled EDR Contact: 09/21/2015
Data Release Frequency: Quarterly

Solid Waste Facilities

San Diego County Solid Waste Facilities.

Date of Government Version: 10/31/2014
Date Data Arrived at EDR: 11/21/2014
Date Made Active in Reports: 12/29/2014
Number of Days to Update: 38

Source: Department of Health Services
Telephone: 619-338-2209
Last EDR Contact: 04/27/2015
Next Scheduled EDR Contact: 08/10/2015
Data Release Frequency: Varies

Environmental Case Listing

The listing contains all underground tank release cases and projects pertaining to properties contaminated with hazardous substances that are actively under review by the Site Assessment and Mitigation Program.

Date of Government Version: 03/23/2010
Date Data Arrived at EDR: 06/15/2010
Date Made Active in Reports: 07/09/2010
Number of Days to Update: 24

Source: San Diego County Department of Environmental Health
Telephone: 619-338-2371
Last EDR Contact: 06/03/2015
Next Scheduled EDR Contact: 09/21/2015
Data Release Frequency: No Update Planned

SAN FRANCISCO COUNTY:

Local Oversite Facilities

A listing of leaking underground storage tank sites located in San Francisco county.

Date of Government Version: 09/19/2008
Date Data Arrived at EDR: 09/19/2008
Date Made Active in Reports: 09/29/2008
Number of Days to Update: 10

Source: Department Of Public Health San Francisco County
Telephone: 415-252-3920
Last EDR Contact: 05/06/2015
Next Scheduled EDR Contact: 08/24/2015
Data Release Frequency: Quarterly

Underground Storage Tank Information

Underground storage tank sites located in San Francisco county.

Date of Government Version: 11/29/2010
Date Data Arrived at EDR: 03/10/2011
Date Made Active in Reports: 03/15/2011
Number of Days to Update: 5

Source: Department of Public Health
Telephone: 415-252-3920
Last EDR Contact: 05/06/2015
Next Scheduled EDR Contact: 08/24/2015
Data Release Frequency: Quarterly

SAN JOAQUIN COUNTY:

San Joaquin Co. UST
A listing of underground storage tank locations in San Joaquin county.

Date of Government Version: 03/24/2015
Date Data Arrived at EDR: 03/25/2015
Date Made Active in Reports: 03/31/2015
Number of Days to Update: 6
Source: Environmental Health Department
Telephone: N/A
Last EDR Contact: 06/17/2015
Next Scheduled EDR Contact: 10/05/2015
Data Release Frequency: Semi-Annually

SAN LUIS OBISPO COUNTY:

CUPA Facility List
Cupa Facility List.

Date of Government Version: 05/22/2015
Date Data Arrived at EDR: 05/26/2015
Date Made Active in Reports: 06/10/2015
Number of Days to Update: 15
Source: San Luis Obispo County Public Health Department
Telephone: 805-781-5596
Last EDR Contact: 05/20/2015
Next Scheduled EDR Contact: 09/07/2015
Data Release Frequency: Varies

SAN MATEO COUNTY:

Business Inventory
List includes Hazardous Materials Business Plan, hazardous waste generators, and underground storage tanks.

Date of Government Version: 04/13/2015
Date Data Arrived at EDR: 04/15/2015
Date Made Active in Reports: 04/23/2015
Number of Days to Update: 8
Source: San Mateo County Environmental Health Services Division
Telephone: 650-363-1921
Last EDR Contact: 06/15/2015
Next Scheduled EDR Contact: 09/28/2015
Data Release Frequency: Annually

Fuel Leak List
A listing of leaking underground storage tank sites located in San Mateo county.

Date of Government Version: 03/16/2015
Date Data Arrived at EDR: 03/17/2015
Date Made Active in Reports: 03/24/2015
Number of Days to Update: 7
Source: San Mateo County Environmental Health Services Division
Telephone: 650-363-1921
Last EDR Contact: 06/10/2015
Next Scheduled EDR Contact: 06/29/2015
Data Release Frequency: Semi-Annually

SANTA BARBARA COUNTY:

CUPA Facility Listing
CUPA Program Listing from the Environmental Health Services division.

Date of Government Version: 09/08/2011
Date Data Arrived at EDR: 09/09/2011
Date Made Active in Reports: 10/07/2011
Number of Days to Update: 28
Source: Santa Barbara County Public Health Department
Telephone: 805-686-8167
Last EDR Contact: 05/22/2015
Next Scheduled EDR Contact: 09/07/2015
Data Release Frequency: Varies

SANTA CLARA COUNTY:

Cupa Facility List
Cupa facility list

Date of Government Version: 02/23/2015
Date Data Arrived at EDR: 02/25/2015
Date Made Active in Reports: 03/03/2015
Number of Days to Update: 6

Source: Department of Environmental Health
Telephone: 408-918-1973
Last EDR Contact: 06/05/2015
Next Scheduled EDR Contact: 09/07/2015
Data Release Frequency: Varies

HIST LUST - Fuel Leak Site Activity Report
A listing of open and closed leaking underground storage tanks. This listing is no longer updated by the county. Leaking underground storage tanks are now handled by the Department of Environmental Health.

Date of Government Version: 03/29/2005
Date Data Arrived at EDR: 03/30/2005
Date Made Active in Reports: 04/21/2005
Number of Days to Update: 22

Source: Santa Clara Valley Water District
Telephone: 408-265-2600
Last EDR Contact: 03/23/2009
Next Scheduled EDR Contact: 06/22/2009
Data Release Frequency: No Update Planned

LOP Listing
A listing of leaking underground storage tanks located in Santa Clara county.

Date of Government Version: 03/03/2014
Date Data Arrived at EDR: 03/05/2014
Date Made Active in Reports: 03/18/2014
Number of Days to Update: 13

Source: Department of Environmental Health
Telephone: 408-918-3417
Last EDR Contact: 06/01/2015
Next Scheduled EDR Contact: 09/14/2015
Data Release Frequency: Annually

Hazardous Material Facilities
Hazardous material facilities, including underground storage tank sites.

Date of Government Version: 05/07/2015
Date Data Arrived at EDR: 05/12/2015
Date Made Active in Reports: 06/08/2015
Number of Days to Update: 27

Source: City of San Jose Fire Department
Telephone: 408-535-7694
Last EDR Contact: 05/07/2015
Next Scheduled EDR Contact: 08/24/2015
Data Release Frequency: Annually

SANTA CRUZ COUNTY:

CUPA Facility List
CUPA facility listing.

Date of Government Version: 05/22/2015
Date Data Arrived at EDR: 05/26/2015
Date Made Active in Reports: 06/08/2015
Number of Days to Update: 13

Source: Santa Cruz County Environmental Health
Telephone: 831-464-2761
Last EDR Contact: 05/22/2015
Next Scheduled EDR Contact: 09/07/2015
Data Release Frequency: Varies

SHASTA COUNTY:

CUPA Facility List
Cupa Facility List.

Date of Government Version: 03/11/2015
Date Data Arrived at EDR: 03/13/2015
Date Made Active in Reports: 03/24/2015
Number of Days to Update: 11

Source: Shasta County Department of Resource Management
Telephone: 530-225-5789
Last EDR Contact: 05/26/2015
Next Scheduled EDR Contact: 09/07/2015
Data Release Frequency: Varies

SOLANO COUNTY:

Leaking Underground Storage Tanks
A listing of leaking underground storage tank sites located in Solano county.

Date of Government Version: 03/13/2015
Date Data Arrived at EDR: 03/19/2015
Date Made Active in Reports: 03/24/2015
Number of Days to Update: 5

Source: Solano County Department of Environmental Management
Telephone: 707-784-6770
Last EDR Contact: 06/10/2015
Next Scheduled EDR Contact: 09/28/2015
Data Release Frequency: Quarterly

Underground Storage Tanks
Underground storage tank sites located in Solano county.

Date of Government Version: 03/13/2015
Date Data Arrived at EDR: 03/20/2015
Date Made Active in Reports: 03/31/2015
Number of Days to Update: 11

Source: Solano County Department of Environmental Management
Telephone: 707-784-6770
Last EDR Contact: 06/10/2015
Next Scheduled EDR Contact: 09/28/2015
Data Release Frequency: Quarterly

SONOMA COUNTY:

Cupa Facility List
Cupa Facility list

Date of Government Version: 03/31/2015
Date Data Arrived at EDR: 04/02/2015
Date Made Active in Reports: 04/10/2015
Number of Days to Update: 8

Source: County of Sonoma Fire & Emergency Services Department
Telephone: 707-565-1174
Last EDR Contact: 03/30/2015
Next Scheduled EDR Contact: 07/13/2015
Data Release Frequency: Varies

Leaking Underground Storage Tank Sites
A listing of leaking underground storage tank sites located in Sonoma county.

Date of Government Version: 04/01/2015
Date Data Arrived at EDR: 04/02/2015
Date Made Active in Reports: 04/13/2015
Number of Days to Update: 11

Source: Department of Health Services
Telephone: 707-565-6565
Last EDR Contact: 03/30/2015
Next Scheduled EDR Contact: 07/13/2015
Data Release Frequency: Quarterly

SUTTER COUNTY:

Underground Storage Tanks
Underground storage tank sites located in Sutter county.

Date of Government Version: 03/09/2015
Date Data Arrived at EDR: 03/10/2015
Date Made Active in Reports: 03/18/2015
Number of Days to Update: 8

Source: Sutter County Department of Agriculture
Telephone: 530-822-7500
Last EDR Contact: 06/05/2015
Next Scheduled EDR Contact: 09/21/2015
Data Release Frequency: Semi-Annually

TUOLUMNE COUNTY:

CUPA Facility List
Cupa facility list

Date of Government Version: 05/05/2015
Date Data Arrived at EDR: 05/07/2015
Date Made Active in Reports: 05/13/2015
Number of Days to Update: 6

Source: Divison of Environmental Health
Telephone: 209-533-5633
Last EDR Contact: 04/27/2015
Next Scheduled EDR Contact: 08/10/2015
Data Release Frequency: Varies

VENTURA COUNTY:

Business Plan, Hazardous Waste Producers, and Operating Underground Tanks

The BWT list indicates by site address whether the Environmental Health Division has Business Plan (B), Waste Producer (W), and/or Underground Tank (T) information.

Date of Government Version: 04/27/2015
Date Data Arrived at EDR: 05/22/2015
Date Made Active in Reports: 06/05/2015
Number of Days to Update: 14

Source: Ventura County Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 05/18/2015
Next Scheduled EDR Contact: 08/31/2015
Data Release Frequency: Quarterly

Inventory of Illegal Abandoned and Inactive Sites

Ventura County Inventory of Closed, Illegal Abandoned, and Inactive Sites.

Date of Government Version: 12/01/2011
Date Data Arrived at EDR: 12/01/2011
Date Made Active in Reports: 01/19/2012
Number of Days to Update: 49

Source: Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 04/02/2015
Next Scheduled EDR Contact: 07/20/2015
Data Release Frequency: Annually

Listing of Underground Tank Cleanup Sites

Ventura County Underground Storage Tank Cleanup Sites (LUST).

Date of Government Version: 05/29/2008
Date Data Arrived at EDR: 06/24/2008
Date Made Active in Reports: 07/31/2008
Number of Days to Update: 37

Source: Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 05/18/2015
Next Scheduled EDR Contact: 08/31/2015
Data Release Frequency: Quarterly

Medical Waste Program List

To protect public health and safety and the environment from potential exposure to disease causing agents, the Environmental Health Division Medical Waste Program regulates the generation, handling, storage, treatment and disposal of medical waste throughout the County.

Date of Government Version: 04/27/2015
Date Data Arrived at EDR: 04/29/2015
Date Made Active in Reports: 05/13/2015
Number of Days to Update: 14

Source: Ventura County Resource Management Agency
Telephone: 805-654-2813
Last EDR Contact: 04/27/2015
Next Scheduled EDR Contact: 08/10/2015
Data Release Frequency: Quarterly

Underground Tank Closed Sites List

Ventura County Operating Underground Storage Tank Sites (UST)/Underground Tank Closed Sites List.

Date of Government Version: 02/27/2015
Date Data Arrived at EDR: 03/18/2015
Date Made Active in Reports: 03/26/2015
Number of Days to Update: 8

Source: Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 06/17/2015
Next Scheduled EDR Contact: 09/28/2015
Data Release Frequency: Quarterly

YOLO COUNTY:

Underground Storage Tank Comprehensive Facility Report

Underground storage tank sites located in Yolo county.

Date of Government Version: 03/26/2015
Date Data Arrived at EDR: 04/01/2015
Date Made Active in Reports: 04/13/2015
Number of Days to Update: 12

Source: Yolo County Department of Health
Telephone: 530-666-8646
Last EDR Contact: 06/17/2015
Next Scheduled EDR Contact: 10/05/2015
Data Release Frequency: Annually

YUBA COUNTY:

CUPA Facility List
CUPA facility listing for Yuba County.

Date of Government Version: 05/18/2015
Date Data Arrived at EDR: 05/19/2015
Date Made Active in Reports: 06/05/2015
Number of Days to Update: 17

Source: Yuba County Environmental Health Department
Telephone: 530-749-7523
Last EDR Contact: 05/18/2015
Next Scheduled EDR Contact: 08/17/2015
Data Release Frequency: Varies

OTHER DATABASE(S)

Depending on the geographic area covered by this report, the data provided in these specialty databases may or may not be complete. For example, the existence of wetlands information data in a specific report does not mean that all wetlands in the area covered by the report are included. Moreover, the absence of any reported wetlands information does not necessarily mean that wetlands do not exist in the area covered by the report.

CT MANIFEST: Hazardous Waste Manifest Data
Facility and manifest data. Manifest is a document that lists and tracks hazardous waste from the generator through transporters to a tsd facility.

Date of Government Version: 07/30/2013
Date Data Arrived at EDR: 08/19/2013
Date Made Active in Reports: 10/03/2013
Number of Days to Update: 45

Source: Department of Energy & Environmental Protection
Telephone: 860-424-3375
Last EDR Contact: 05/18/2015
Next Scheduled EDR Contact: 08/31/2015
Data Release Frequency: No Update Planned

NJ MANIFEST: Manifest Information
Hazardous waste manifest information.

Date of Government Version: 12/31/2012
Date Data Arrived at EDR: 04/29/2015
Date Made Active in Reports: 05/29/2015
Number of Days to Update: 30

Source: Department of Environmental Protection
Telephone: N/A
Last EDR Contact: 04/14/2015
Next Scheduled EDR Contact: 07/27/2015
Data Release Frequency: Annually

NY MANIFEST: Facility and Manifest Data
Manifest is a document that lists and tracks hazardous waste from the generator through transporters to a TSD facility.

Date of Government Version: 05/01/2015
Date Data Arrived at EDR: 05/06/2015
Date Made Active in Reports: 05/20/2015
Number of Days to Update: 14

Source: Department of Environmental Conservation
Telephone: 518-402-8651
Last EDR Contact: 05/06/2015
Next Scheduled EDR Contact: 08/17/2015
Data Release Frequency: Annually

PA MANIFEST: Manifest Information
Hazardous waste manifest information.

Date of Government Version: 12/31/2013
Date Data Arrived at EDR: 07/21/2014
Date Made Active in Reports: 08/25/2014
Number of Days to Update: 35

Source: Department of Environmental Protection
Telephone: 717-783-8990
Last EDR Contact: 04/16/2015
Next Scheduled EDR Contact: 08/03/2015
Data Release Frequency: Annually

RI MANIFEST: Manifest information
Hazardous waste manifest information

Date of Government Version: 12/31/2013
Date Data Arrived at EDR: 07/15/2014
Date Made Active in Reports: 08/13/2014
Number of Days to Update: 29

Source: Department of Environmental Management
Telephone: 401-222-2797
Last EDR Contact: 05/26/2015
Next Scheduled EDR Contact: 09/07/2015
Data Release Frequency: Annually

WI MANIFEST: Manifest Information
Hazardous waste manifest information.

Date of Government Version: 12/31/2014
Date Data Arrived at EDR: 03/19/2015
Date Made Active in Reports: 04/07/2015
Number of Days to Update: 19

Source: Department of Natural Resources
Telephone: N/A
Last EDR Contact: 06/11/2015
Next Scheduled EDR Contact: 09/28/2015
Data Release Frequency: Annually

Oil/Gas Pipelines
Source: PennWell Corporation
Telephone: 281-546-1505
Petroleum Bundle (Crude Oil, Refined Products, Petrochemicals, Gas Liquids (LPG/NGL), and Specialty Gases (Miscellaneous)) N = Natural Gas Bundle (Natural Gas, Gas Liquids (LPG/NGL), and Specialty Gases (Miscellaneous)). This map includes information copyrighted by PennWell Corporation. This information is provided on a best effort basis and PennWell Corporation does not guarantee its accuracy nor warrant its fitness for any particular purpose. Such information has been reprinted with the permission of PennWell.

Electric Power Transmission Line Data
Source: PennWell Corporation
Telephone: 800-823-6277
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Sensitive Receptors: There are individuals deemed sensitive receptors due to their fragile immune systems and special sensitivity to environmental discharges. These sensitive receptors typically include the elderly, the sick, and children. While the location of all sensitive receptors cannot be determined, EDR indicates those buildings and facilities - schools, daycares, hospitals, medical centers, and nursing homes - where individuals who are sensitive receptors are likely to be located.

AHA Hospitals:
Source: American Hospital Association, Inc.
Telephone: 312-280-5991
The database includes a listing of hospitals based on the American Hospital Association's annual survey of hospitals.

Medical Centers: Provider of Services Listing
Source: Centers for Medicare & Medicaid Services
Telephone: 410-786-3000
A listing of hospitals with Medicare provider number, produced by Centers of Medicare & Medicaid Services, a federal agency within the U.S. Department of Health and Human Services.

Nursing Homes
Source: National Institutes of Health
Telephone: 301-594-6248
Information on Medicare and Medicaid certified nursing homes in the United States.

Public Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics' primary database on elementary and secondary public education in the United States. It is a comprehensive, annual, national statistical database of all public elementary and secondary schools and school districts, which contains data that are comparable across all states.

Private Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics' primary database on private school locations in the United States.

Daycare Centers: Licensed Facilities
Source: Department of Social Services
Telephone: 916-657-4041

Flood Zone Data: This data, available in select counties across the country, was obtained by EDR in 2003 & 2011 from the Federal Emergency Management Agency (FEMA). Data depicts 100-year and 500-year flood zones as defined by FEMA.

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002, 2005 and 2010 from the U.S. Fish and Wildlife Service.

Scanned Digital USGS 7.5' Topographic Map (DRG)
Source: United States Geologic Survey
A digital raster graphic (DRG) is a scanned image of a U.S. Geological Survey topographic map. The map images are made by scanning published paper maps on high-resolution scanners. The raster image is georeferenced and fit to the Universal Transverse Mercator (UTM) projection.

STREET AND ADDRESS INFORMATION

GEOCHECK ®- PHYSICAL SETTING SOURCE ADDENDUM

TARGET PROPERTY ADDRESS

IRWD ILP NORTH CONVERSION PROJECT
JAMBOREE ROAD
ORANGE, CA 92869

TARGET PROPERTY COORDINATES

Latitude (North):	33.7955 - 33° 47' 43.80''
Longitude (West):	117.7609 - 117° 45' 39.24''
Universal Tranverse Mercator:	Zone 11
UTM X (Meters):	429562.2
UTM Y (Meters):	3739548.2
Elevation:	628 ft. above sea level

USGS TOPOGRAPHIC MAP

Target Property Map:	33117-G7 ORANGE, CA
Most Recent Revision:	1981
East Map:	33117-G6 BLACK STAR CANYON, CA
Most Recent Revision:	1988

EDR's GeoCheck Physical Setting Source Addendum is provided to assist the environmental professional in forming an opinion about the impact of potential contaminant migration.

Assessment of the impact of contaminant migration generally has two principal investigative components:

1. Groundwater flow direction, and
2. Groundwater flow velocity.

Groundwater flow direction may be impacted by surface topography, hydrology, hydrogeology, characteristics of the soil, and nearby wells. Groundwater flow velocity is generally impacted by the nature of the geologic strata.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

GROUNDWATER FLOW DIRECTION INFORMATION

Groundwater flow direction for a particular site is best determined by a qualified environmental professional using site-specific well data. If such data is not reasonably ascertainable, it may be necessary to rely on other sources of information, such as surface topographic information, hydrologic information, hydrogeologic data collected on nearby properties, and regional groundwater flow information (from deep aquifers).

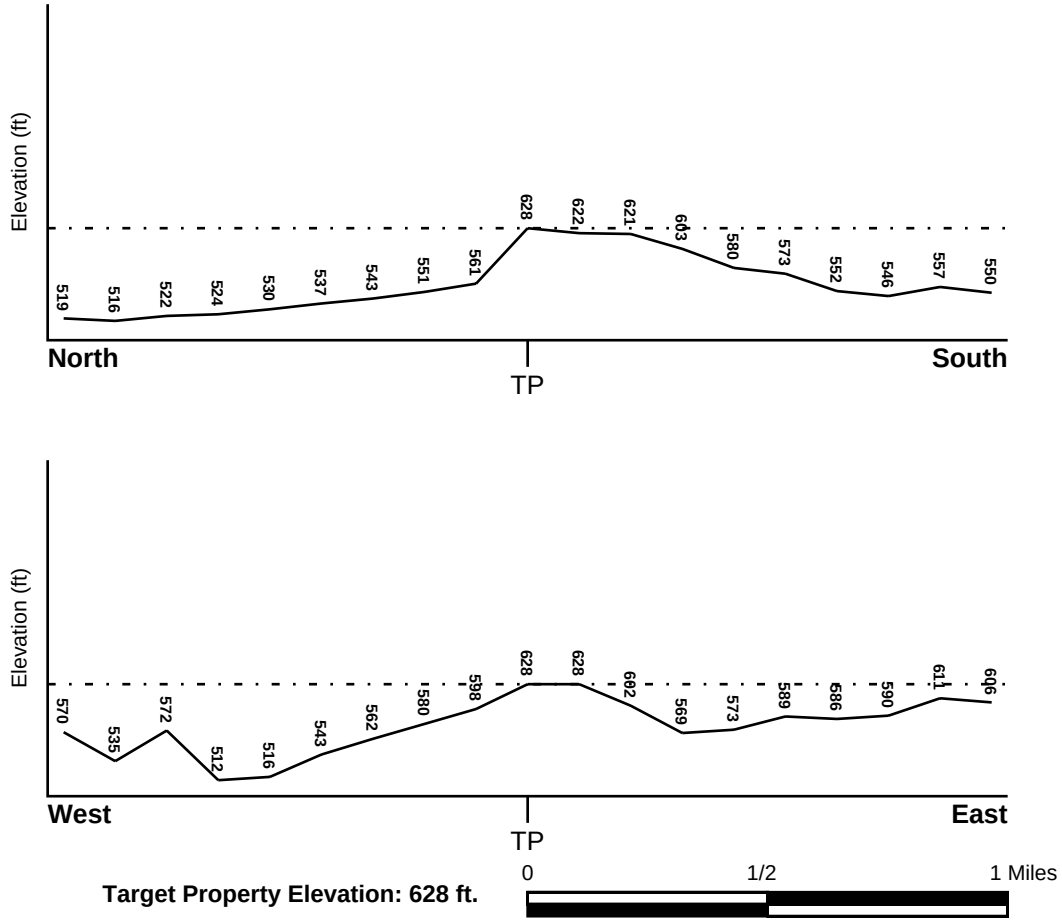
TOPOGRAPHIC INFORMATION

Surface topography may be indicative of the direction of surficial groundwater flow. This information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

TARGET PROPERTY TOPOGRAPHY

General Topographic Gradient: General North

SURROUNDING TOPOGRAPHY: ELEVATION PROFILES



Target Property Elevation: 628 ft.

Source: Topography has been determined from the USGS 7.5' Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be field verified.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

HYDROLOGIC INFORMATION

Surface water can act as a hydrologic barrier to groundwater flow. Such hydrologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

Refer to the Physical Setting Source Map following this summary for hydrologic information (major waterways and bodies of water).

FEMA FLOOD ZONE

Target Property County	FEMA Flood Electronic Data
ORANGE, CA	YES - refer to the Overview Map and Detail Map

Flood Plain Panel at Target Property: 06059C - FEMA DFIRM Flood data

Additional Panels in search area: Not Reported

NATIONAL WETLAND INVENTORY

NWI Quad at Target Property	NWI Electronic Data Coverage
ORANGE	YES - refer to the Overview Map and Detail Map

HYDROGEOLOGIC INFORMATION

Hydrogeologic information obtained by installation of wells on a specific site can often be an indicator of groundwater flow direction in the immediate area. Such hydrogeologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

Site-Specific Hydrogeological Data*:

Search Radius:	1.25 miles
Status:	Not found

AQUIFLOW®

Search Radius: 1.000 Mile.

EDR has developed the AQUIFLOW Information System to provide data on the general direction of groundwater flow at specific points. EDR has reviewed reports submitted by environmental professionals to regulatory authorities at select sites and has extracted the date of the report, groundwater flow direction as determined hydrogeologically, and the depth to water table.

MAP ID	LOCATION FROM TP	GENERAL DIRECTION GROUNDWATER FLOW
Not Reported		

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

GROUNDWATER FLOW VELOCITY INFORMATION

Groundwater flow velocity information for a particular site is best determined by a qualified environmental professional using site specific geologic and soil strata data. If such data are not reasonably ascertainable, it may be necessary to rely on other sources of information, including geologic age identification, rock stratigraphic unit and soil characteristics data collected on nearby properties and regional soil information. In general, contaminant plumes move more quickly through sandy-gravelly types of soils than silty-clayey types of soils.

GEOLOGIC INFORMATION IN GENERAL AREA OF TARGET PROPERTY

Geologic information can be used by the environmental professional in forming an opinion about the relative speed at which contaminant migration may be occurring.

ROCK STRATIGRAPHIC UNIT

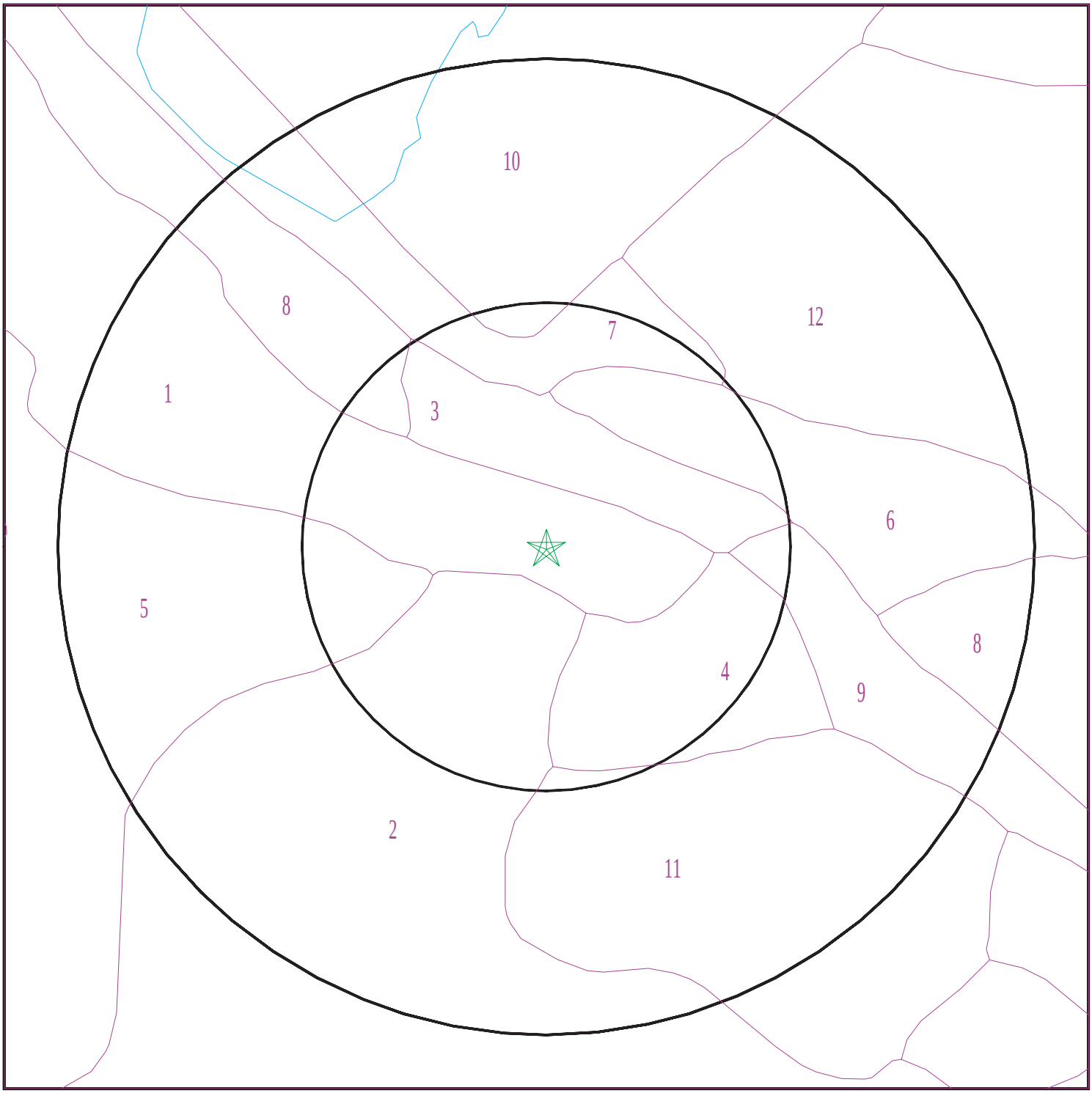
Era:	Cenozoic
System:	Tertiary
Series:	Paleocene
Code:	Tx *(decoded above as Era, System & Series)*

GEOLOGIC AGE IDENTIFICATION

Category: Stratified Sequence

Geologic Age and Rock Stratigraphic Unit Source: P.G. Schruben, R.E. Arndt and W.J. Bawiec, Geology of the Conterminous U.S. at 1:2,500,000 Scale - a digital representation of the 1974 P.B. King and H.M. Beikman Map, USGS Digital Data Series DDS - 11 (1994).

SSURGO SOIL MAP - 4330930.2s



Target Property
SSURGO Soil
Water

0 1/16 1/8 1/4 Miles

N

SITE NAME:	IRWD ILP North Conversion Project	CLIENT:	Bonterra Psomas
ADDRESS:	Jamboree Road Orange CA 92869	CONTACT:	Jeff Gershon
LAT/LONG:	33.7955 / 117.7609	INQUIRY #:	4330930.2s
		DATE:	June 18, 2015 7:01 pm

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

DOMINANT SOIL COMPOSITION IN GENERAL AREA OF TARGET PROPERTY

The U.S. Department of Agriculture's (USDA) Soil Conservation Service (SCS) leads the National Cooperative Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map in a soil survey is a representation of soil patterns in a landscape. The following information is based on Soil Conservation Service SSURGO data.

Soil Map ID: 1

Soil Component Name: YORBA

Soil Surface Texture: gravelly sandy loam

Hydrologic Group: Class D - Very slow infiltration rates. Soils are clayey, have a high water table, or are shallow to an impervious layer.

Soil Drainage Class: Well drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: Moderate

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	11 inches	gravelly sandy loam	Granular materials (35 pct. or less passing No. 200), Stone Fragments, Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Sands with fines, Clayey sand. COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 42 Min: 4	Max: 6.5 Min: 5.6
2	11 inches	40 inches	very gravelly sandy clay loam	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	COARSE-GRAINED SOILS, Gravels, Gravels with fines, Clayey Gravel	Max: 1.4 Min: 0.42	Max: 8.4 Min: 5.6
3	40 inches	62 inches	very gravelly sandy loam	Granular materials (35 pct. or less passing No. 200), Stone Fragments, Gravel and Sand.	COARSE-GRAINED SOILS, Gravels, Gravels with fines, Silty Gravel	Max: 14 Min: 4	Max: 8.4 Min: 5.1

Soil Map ID: 2

Soil Component Name: ALO

Soil Surface Texture: clay

Hydrologic Group: Class D - Very slow infiltration rates. Soils are clayey, have a high water table, or are shallow to an impervious layer.

Soil Drainage Class: Well drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: High

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	25 inches	clay	Not reported	Not reported	Max: 1.4 Min: 0.42	Max: 8.4 Min: 6.1
2	25 inches	29 inches	weathered bedrock	Not reported	Not reported	Max: Min:	Max: Min:

Soil Map ID: 3

Soil Component Name: ALO VARIANT

Soil Surface Texture: clay

Hydrologic Group: Class D - Very slow infiltration rates. Soils are clayey, have a high water table, or are shallow to an impervious layer.

Soil Drainage Class: Well drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: High

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	25 inches	clay	Not reported	Not reported	Max: 1.4 Min: 0.42	Max: 7.8 Min: 6.1
2	25 inches	38 inches	clay	Not reported	Not reported	Max: 1.4 Min: 0.42	Max: 8.4 Min: 7.9
3	38 inches	42 inches	weathered bedrock	Not reported	Not reported	Max: Min:	Max: Min:

Soil Map ID: 4

Soil Component Name: ALO

Soil Surface Texture: clay

Hydrologic Group: Class D - Very slow infiltration rates. Soils are clayey, have a high water table, or are shallow to an impervious layer.

Soil Drainage Class: Well drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: High

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	14 inches	22 inches	clay	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Lean Clay	Max: 1.4 Min: 0.42	Max: 8.4 Min: 6.1
2	22 inches	25 inches	weathered bedrock	Not reported	Not reported	Max: 1.4 Min: 0	Max: Min:
3	0 inches	14 inches	clay	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit 50% or more), Fat Clay.	Max: 1.4 Min: 0.42	Max: 8.4 Min: 6.1

Soil Map ID: 5

Soil Component Name: MYFORD

Soil Surface Texture: sandy loam

Hydrologic Group: Class D - Very slow infiltration rates. Soils are clayey, have a high water table, or are shallow to an impervious layer.

Soil Drainage Class: Moderately well drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: High

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	7 inches	sandy loam	Not reported	Not reported	Max: 42 Min: 14	Max: 6 Min: 5.1
2	7 inches	11 inches	sandy clay	Not reported	Not reported	Max: 0.42 Min: 0.01	Max: 8.4 Min: 5.6
3	11 inches	20 inches	sandy clay loam	Not reported	Not reported	Max: 0.42 Min: 0.01	Max: 8.4 Min: 5.6
4	20 inches	64 inches	sandy clay loam	Not reported	Not reported	Max: 0.42 Min: 0.01	Max: 8.4 Min: 6.1
5	64 inches	79 inches	sandy loam	Not reported	Not reported	Max: 14 Min: 4	Max: 6.5 Min: 6.1

Soil Map ID: 6

Soil Component Name: MYFORD

Soil Surface Texture: sandy loam

Hydrologic Group: Class D - Very slow infiltration rates. Soils are clayey, have a high water table, or are shallow to an impervious layer.

Soil Drainage Class: Moderately well drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: High

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	11 inches	sandy loam	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Lean Clay. FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), silt.	Max: 42 Min: 14	Max: 6 Min: 5.1
2	11 inches	18 inches	sandy clay	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Lean Clay	Max: 0.42 Min: 0.01	Max: 8.4 Min: 5.6
3	18 inches	27 inches	sandy clay loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Lean Clay	Max: 0.42 Min: 0.01	Max: 8.4 Min: 5.6
4	27 inches	70 inches	sandy clay loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Lean Clay	Max: 0.42 Min: 0.01	Max: 8.4 Min: 6.1
5	70 inches	79 inches	sandy loam	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Lean Clay. FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), silt.	Max: 14 Min: 4	Max: 6.5 Min: 6.1

Soil Map ID: 7

Soil Component Name: CAPISTRANO

Soil Surface Texture: sandy loam

Hydrologic Group: Class B - Moderate infiltration rates. Deep and moderately deep, moderately well and well drained soils with moderately coarse textures.

Soil Drainage Class: Well drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: Low

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	27 inches	sandy loam	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 42 Min: 14	Max: 7.3 Min: 5.6
2	27 inches	64 inches	fine sandy loam	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 42 Min: 14	Max: 7.3 Min: 5.6

Soil Map ID: 8

Soil Component Name: SOPER

Soil Surface Texture: gravelly loam

Hydrologic Group: Class C - Slow infiltration rates. Soils with layers impeding downward movement of water, or soils with moderately fine or fine textures.

Soil Drainage Class: Well drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: Moderate

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	9 inches	gravelly loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	COARSE-GRAINED SOILS, Sands, Sands with fines, Clayey sand. COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 14 Min: 4	Max: 7.3 Min: 6.1
2	9 inches	29 inches	gravelly clay loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Lean Clay	Max: 4 Min: 1.4	Max: 7.8 Min: 6.1
3	29 inches	33 inches	weathered bedrock	Not reported	Not reported	Max: 4 Min: 1.4	Max: Min:

Soil Map ID: 9

Soil Component Name: BALCOM

Soil Surface Texture: clay loam

Hydrologic Group: Class B - Moderate infiltration rates. Deep and moderately deep, moderately well and well drained soils with moderately coarse textures.

Soil Drainage Class: Well drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: Moderate

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	29 inches	clay loam	Not reported	Not reported	Max: 4 Min: 1.4	Max: 8.4 Min: 7.9
2	29 inches	33 inches	weathered bedrock	Not reported	Not reported	Max: Min:	Max: Min:

Soil Map ID: 10

Soil Component Name: PITS

Soil Surface Texture: extremely gravelly coarse sand

Hydrologic Group: Class A - High infiltration rates. Soils are deep, well drained to excessively drained sands and gravels.

Soil Drainage Class:
Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: Not Reported

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	5 inches	extremely gravelly coarse sand	Not reported	Not reported	Max: 141 Min: 42	Max: Min:
2	5 inches	59 inches	extremely gravelly sand	Not reported	Not reported	Max: 141 Min: 42	Max: Min:

Soil Map ID: 11

Soil Component Name: BALCOM

Soil Surface Texture: clay loam

Hydrologic Group: Class B - Moderate infiltration rates. Deep and moderately deep, moderately well and well drained soils with moderately coarse textures.

Soil Drainage Class: Well drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: Moderate

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	33 inches	clay loam	Not reported	Not reported	Max: 4 Min: 1.4	Max: 8.4 Min: 7.9
2	33 inches	38 inches	weathered bedrock	Not reported	Not reported	Max: Min:	Max: Min:

Soil Map ID: 12

Soil Component Name: SOBOBA

Soil Surface Texture: gravelly loamy sand

Hydrologic Group: Class A - High infiltration rates. Soils are deep, well drained to excessively drained sands and gravels.

Soil Drainage Class: Excessively drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: Low

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	9 inches	gravelly loamy sand	Granular materials (35 pct. or less passing No. 200), Stone Fragments, Gravel and Sand.	COARSE-GRAINED SOILS, Gravels, Gravels with fines, Silty Gravel	Max: 141 Min: 141	Max: 7.8 Min: 6.1

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
2	9 inches	59 inches	very gravelly sand	Granular materials (35 pct. or less passing No. 200), Stone Fragments, Gravel and Sand.	COARSE-GRAINED SOILIS, Gravels, Clean Gravels, Well-graded gravel.	Max: 141 Min: 141	Max: 7.8 Min: 6.1

LOCAL / REGIONAL WATER AGENCY RECORDS

EDR Local/Regional Water Agency records provide water well information to assist the environmental professional in assessing sources that may impact ground water flow direction, and in forming an opinion about the impact of contaminant migration on nearby drinking water wells.

WELL SEARCH DISTANCE INFORMATION

DATABASE	SEARCH DISTANCE (miles)
Federal USGS	1.000
Federal FRDS PWS	Nearest PWS within 1 mile
State Database	1.000

FEDERAL USGS WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
No Wells Found		

FEDERAL FRDS PUBLIC WATER SUPPLY SYSTEM INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
No PWS System Found		

Note: PWS System location is not always the same as well location.

STATE DATABASE WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

STATE DATABASE WELL INFORMATION

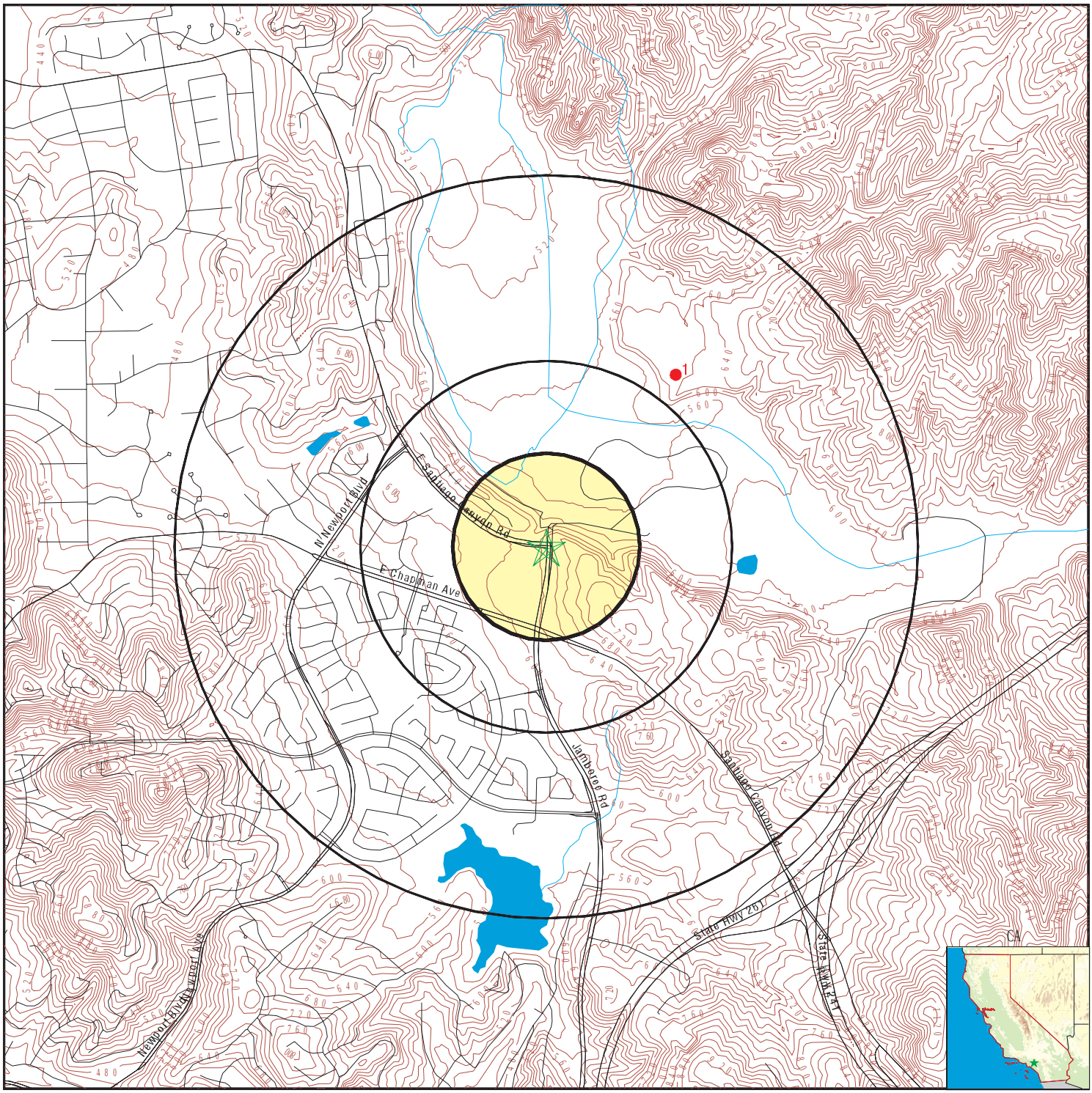
MAP ID	WELL ID	LOCATION FROM TP
No Wells Found		

OTHER STATE DATABASE INFORMATION

STATE OIL/GAS WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
1	CAOG11000217865	1/2 - 1 Mile NE

PHYSICAL SETTING SOURCE MAP - 4330930.2s



- County Boundary
- Major Roads
- Contour Lines
- Earthquake Fault Lines
- Earthquake epicenter, Richter 5 or greater
- Water Wells
- Public Water Supply Wells
- Cluster of Multiple Icons
- Groundwater Flow Direction
- GI Indeterminate Groundwater Flow at Location
- GV Groundwater Flow Varies at Location
- HD Closest Hydrogeological Data
- Oil, gas or related wells

SITE NAME: IRWD ILP North Conversion Project	CLIENT: Bonterra Psomas
ADDRESS: Jamboree Road Orange CA 92869	CONTACT: Jeff Gershon INQUIRY #: 4330930.2s
LAT/LONG: 33.7955 / 117.7609	DATE: June 18, 2015 7:01 pm

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID
Direction
Distance

Database EDR ID Number

1
NE
1/2 - 1 Mile

OIL_GAS **CAOG11000217865**

District nun:	1	Api number:	05901082
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	I
Operator name:	National Security Oil Co.		
County name:	Orange	Fieldname:	Any Field
Area name:	Any Area	Section:	30
Township:	04S	Range:	08W
Base meridian:	SB	Elevation:	Not Reported
Locationde:	Not Reported		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Not Reported	Wellnumber:	1
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	30-DEC-99
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	30-DEC-99	Completion:	30-DEC-99
Directiona:	Unknown	Gissymbol:	PDH
Site id:	CAOG11000217865		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS
RADON

AREA RADON INFORMATION

State Database: CA Radon

Radon Test Results

Zipcode	Num Tests	> 4 pCi/L
92869	37	1

Federal EPA Radon Zone for ORANGE County: 3

Note: Zone 1 indoor average level > 4 pCi/L.
: Zone 2 indoor average level >= 2 pCi/L and <= 4 pCi/L.
: Zone 3 indoor average level < 2 pCi/L.

Federal Area Radon Information for ORANGE COUNTY, CA

Number of sites tested: 30

Area	Average Activity	% <4 pCi/L	% 4-20 pCi/L	% >20 pCi/L
Living Area - 1st Floor	0.763 pCi/L	100%	0%	0%
Living Area - 2nd Floor	Not Reported	Not Reported	Not Reported	Not Reported
Basement	Not Reported	Not Reported	Not Reported	Not Reported

PHYSICAL SETTING SOURCE RECORDS SEARCHED

TOPOGRAPHIC INFORMATION

USGS 7.5' Digital Elevation Model (DEM)
Source: United States Geologic Survey
EDR acquired the USGS 7.5' Digital Elevation Model in 2002 and updated it in 2006. The 7.5 minute DEM corresponds to the USGS 1:24,000- and 1:25,000-scale topographic quadrangle maps. The DEM provides elevation data with consistent elevation units and projection.

Scanned Digital USGS 7.5' Topographic Map (DRG)
Source: United States Geologic Survey
A digital raster graphic (DRG) is a scanned image of a U.S. Geological Survey topographic map. The map images are made by scanning published paper maps on high-resolution scanners. The raster image is georeferenced and fit to the Universal Transverse Mercator (UTM) projection.

HYDROLOGIC INFORMATION

Flood Zone Data: This data, available in select counties across the country, was obtained by EDR in 2003 & 2011 from the Federal Emergency Management Agency (FEMA). Data depicts 100-year and 500-year flood zones as defined by FEMA.

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002, 2005 and 2010 from the U.S. Fish and Wildlife Service.

HYDROGEOLOGIC INFORMATION

AQUIFLOW^{R} Information System
Source: EDR proprietary database of groundwater flow information
EDR has developed the AQUIFLOW Information System (AIS) to provide data on the general direction of groundwater flow at specific points. EDR has reviewed reports submitted to regulatory authorities at select sites and has extracted the date of the report, hydrogeologically determined groundwater flow direction and depth to water table information.

GEOLOGIC INFORMATION

Geologic Age and Rock Stratigraphic Unit
Source: P.G. Schruben, R.E. Arndt and W.J. Bawiec, Geology of the Conterminous U.S. at 1:2,500,000 Scale - A digital representation of the 1974 P.B. King and H.M. Beikman Map, USGS Digital Data Series DDS - 11 (1994).

STATSGO: State Soil Geographic Database
Source: Department of Agriculture, Natural Resources Conservation Services
The U.S. Department of Agriculture's (USDA) Natural Resources Conservation Service (NRCS) leads the national Conservation Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map in a soil survey is a representation of soil patterns in a landscape. Soil maps for STATSGO are compiled by generalizing more detailed (SSURGO) soil survey maps.

SSURGO: Soil Survey Geographic Database
Source: Department of Agriculture, Natural Resources Conservation Services (NRCS)
Telephone: 800-672-5559
SSURGO is the most detailed level of mapping done by the Natural Resources Conservation Services, mapping scales generally range from 1:12,000 to 1:63,360. Field mapping methods using national standards are used to construct the soil maps in the Soil Survey Geographic (SSURGO) database. SSURGO digitizing duplicates the original soil survey maps. This level of mapping is designed for use by landowners, townships and county natural resource planning and management.

PHYSICAL SETTING SOURCE RECORDS SEARCHED

LOCAL / REGIONAL WATER AGENCY RECORDS

FEDERAL WATER WELLS

PWS: Public Water Systems
Source: EPA/Office of Drinking Water
Telephone: 202-564-3750
Public Water System data from the Federal Reporting Data System. A PWS is any water system which provides water to at least 25 people for at least 60 days annually. PWSs provide water from wells, rivers and other sources.

PWS ENF: Public Water Systems Violation and Enforcement Data
Source: EPA/Office of Drinking Water
Telephone: 202-564-3750
Violation and Enforcement data for Public Water Systems from the Safe Drinking Water Information System (SDWIS) after August 1995. Prior to August 1995, the data came from the Federal Reporting Data System (FRDS).

USGS Water Wells: USGS National Water Inventory System (NWIS)
This database contains descriptive information on sites where the USGS collects or has collected data on surface water and/or groundwater. The groundwater data includes information on wells, springs, and other sources of groundwater.

STATE RECORDS

Water Well Database
Source: Department of Water Resources
Telephone: 916-651-9648

California Drinking Water Quality Database
Source: Department of Public Health
Telephone: 916-324-2319
The database includes all drinking water compliance and special studies monitoring for the state of California since 1984. It consists of over 3,200,000 individual analyses along with well and water system information.

OTHER STATE DATABASE INFORMATION

California Oil and Gas Well Locations
Source: Department of Conservation
Telephone: 916-323-1779
Oil and Gas well locations in the state.

RADON

State Database: CA Radon
Source: Department of Health Services
Telephone: 916-324-2208
Radon Database for California

Area Radon Information
Source: USGS
Telephone: 703-356-4020
The National Radon Database has been developed by the U.S. Environmental Protection Agency (USEPA) and is a compilation of the EPA/State Residential Radon Survey and the National Residential Radon Survey. The study covers the years 1986 - 1992. Where necessary data has been supplemented by information collected at private sources such as universities and research institutions.

EPA Radon Zones
Source: EPA
Telephone: 703-356-4020
Sections 307 & 309 of IRAA directed EPA to list and identify areas of U.S. with the potential for elevated indoor radon levels.

PHYSICAL SETTING SOURCE RECORDS SEARCHED

OTHER

Airport Landing Facilities: Private and public use landing facilities
Source: Federal Aviation Administration, 800-457-6656

Epicenters: World earthquake epicenters, Richter 5 or greater
Source: Department of Commerce, National Oceanic and Atmospheric Administration

California Earthquake Fault Lines: The fault lines displayed on EDR's Topographic map are digitized quaternary fault lines, prepared in 1975 by the United State Geological Survey. Additional information (also from 1975) regarding activity at specific fault lines comes from California's Preliminary Fault Activity Map prepared by the California Division of Mines and Geology.

STREET AND ADDRESS INFORMATION