Draft
Initial Study/Mitigated Negative Declaration
Goetz Road Sewer Backbone Extension Project
Menifee, California

Prepared for
Eastern Municipal Water District
2270 Trumble Road
P.O. Box 8300
Perris, CA 92572-8300

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April 11, 2024

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1.0 Introduction

This Initial Study/Mitigated Negative Declaration (IS/MND) has been prepared in accordance with relevant provisions of the California Environmental Quality Act (CEQA) of 1970, as amended, and the CEQA Guidelines, as revised. This IS/MND evaluates the environmental effects of the proposed Goetz Road Sewer Backbone Extension Project (proposed project).

This IS/MND has also been prepared in conformance with the requirements of CEQA Plus, through documentation of project compliance with the following federal regulations: Federal Air Quality Act, Section 7 of Endangered Species Act, Migratory Bird Treaty Act, Section 106 of the National Historic Preservation Act, Protection of Wetlands, Farmland Protection Policy Act, Floodplain Management, and the Wild and Scenic Rivers Act.

The IS/MND includes the following components:

- A Draft IS/MND and the formal findings made by the Eastern Municipal Water District (District or EMWD) that the proposed project would not result in any significant effects on the environment, as identified in the CEQA IS Checklist.
- A detailed project description.
- The CEQA IS Checklist, which provides standards to evaluate the potential for significant environmental impacts from the proposed project and is adapted from Appendix G of the CEQA Guidelines. The proposed project is evaluated in 21 environmental issue categories to determine whether the proposed project's environmental impacts may be significant in any category. Brief discussions are provided that further substantiate the proposed project's anticipated environmental impacts in each category.

Because the proposed project fits into the definition of a "project" under Public Resources Code Section 21065 requiring discretionary approvals by the District, and because it could result in a significant effect on the environment, the proposed project is subject to CEQA review. The IS Checklist was prepared to determine the appropriate environmental document to satisfy CEQA requirements: an Environmental Impact Report (EIR), a Mitigated Negative Declaration (MND), or a Negative Declaration (ND). The analysis in this IS Checklist supports the conclusion that the proposed project may result in significant environmental impacts, but (1) revisions in the project plans or proposals made by or agreed to by the applicant before a proposed MND and IS are released for public review would avoid the effects or mitigate the effects to appoint where clearly no significant effects would occur, and (2) there is no substantial evidence, in light of the whole record before the District, that the proposed project as revised may have a significant effect on the environment; therefore, an MND has been prepared.

This IS/MND will be circulated for 30 days for public and agency review, during which time individuals and agencies may submit comments on the adequacy of the environmental review. Following the public review period, the District's Board will consider any comments received on the IS/MND when deciding whether to adopt the MND.

2.0 Project Description

1. Project Name:

Goetz Road Sewer Backbone Extension Project(proposed project)

2. Lead Agency:

Eastern Municipal Water District
2270 Trumble Road
Perris, CA 92570

3. Contact Person and Phone Number:

Joseph Broadhead
Principal Water Resource Specialist – CEQA/NEPA
Eastern Municipal Water District
2270 Trumble Road
Perris, CA 92570
(951) 928-3777
broadhej@emwd.org

4. Project Location:

The proposed project is located in Quail Valley, a community in the city of Menifee, California (Figure 1). Quail Valley is located within District service area. The project site is located within Section 25 of the U.S. Geological Survey Romoland quadrangle, Township 5 South, Range 4 West (U.S. Geological Survey 1979; see Figure 2). The project site encompasses the Goetz Road right-of-way from the intersection of Goetz Road and Rock Canyon Drive to the intersection of Goetz Road and Avenida Roble (Figure 3). The project site is bounded by the Canyon Heights Specific Plan Area (Subarea 7), Quail Valley Subarea 4 to the west, and Quail Valley Subarea 5 and Subarea 8 to the east. Figure 4 illustrates the project location in relation to the surrounding subareas.

5. Project Applicant/Sponsor:

Eastern Municipal Water District
2270 Trumble Road
Perris, CA 92570

6. General Plan Designation:

The project site is within the existing Goetz Road right-of-way and does not have a General Plan designation. Areas surrounding the project are designated Canyon Heights Specific Plan and 2.1-5 Residential (2.1-5R) to the west, and Commercial Retail (CR) to the east.

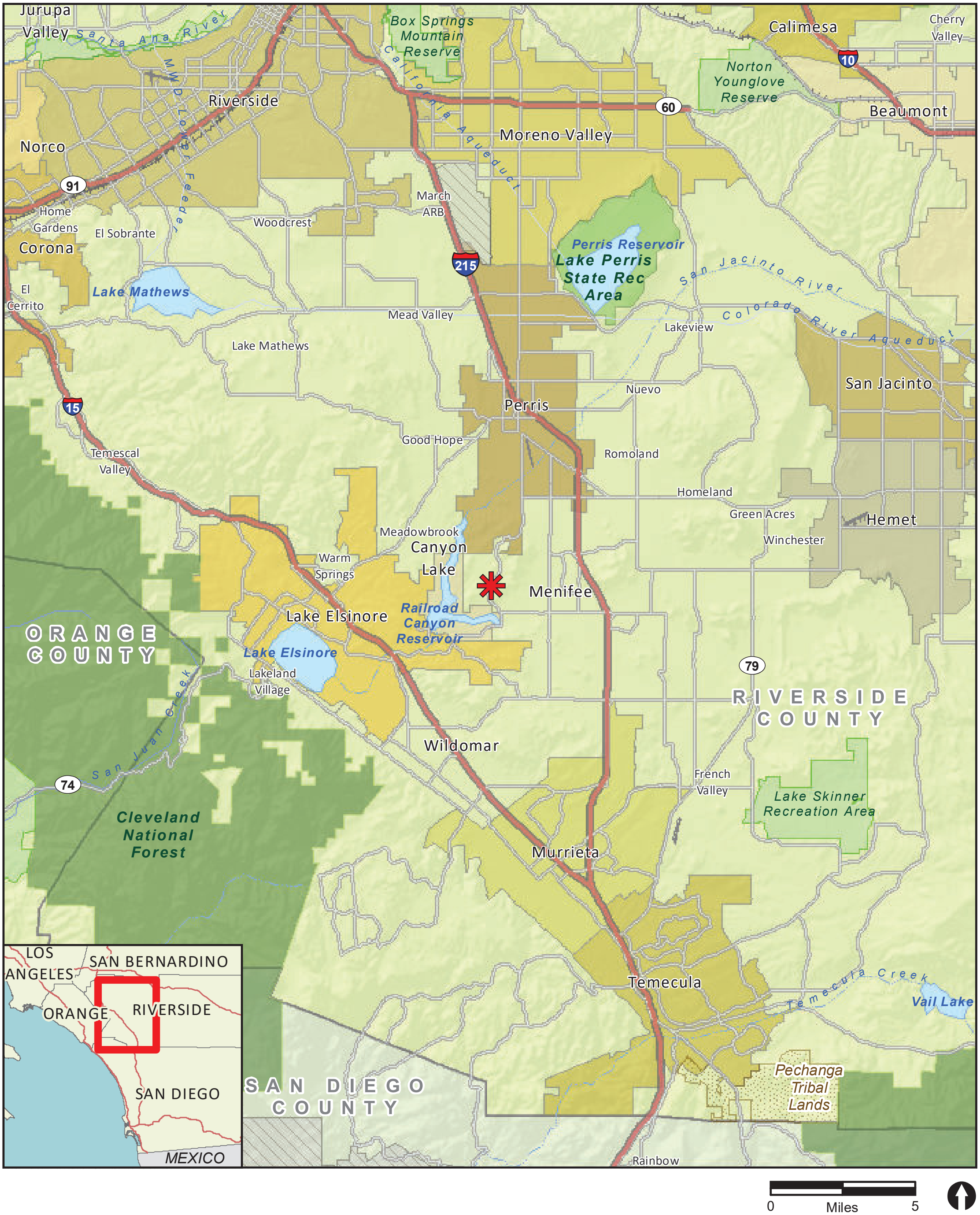

FIGURE 1
Regional Location

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Map Source: USGS 7.5 minute topographic map series, Romoland quadrangle, 1979, T05S R04W and T05S R03W

0 Feet 2,000

Project Boundary

FIGURE 2
Project Location on USGS Map

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Image Source: NearMap (flown January 2023)

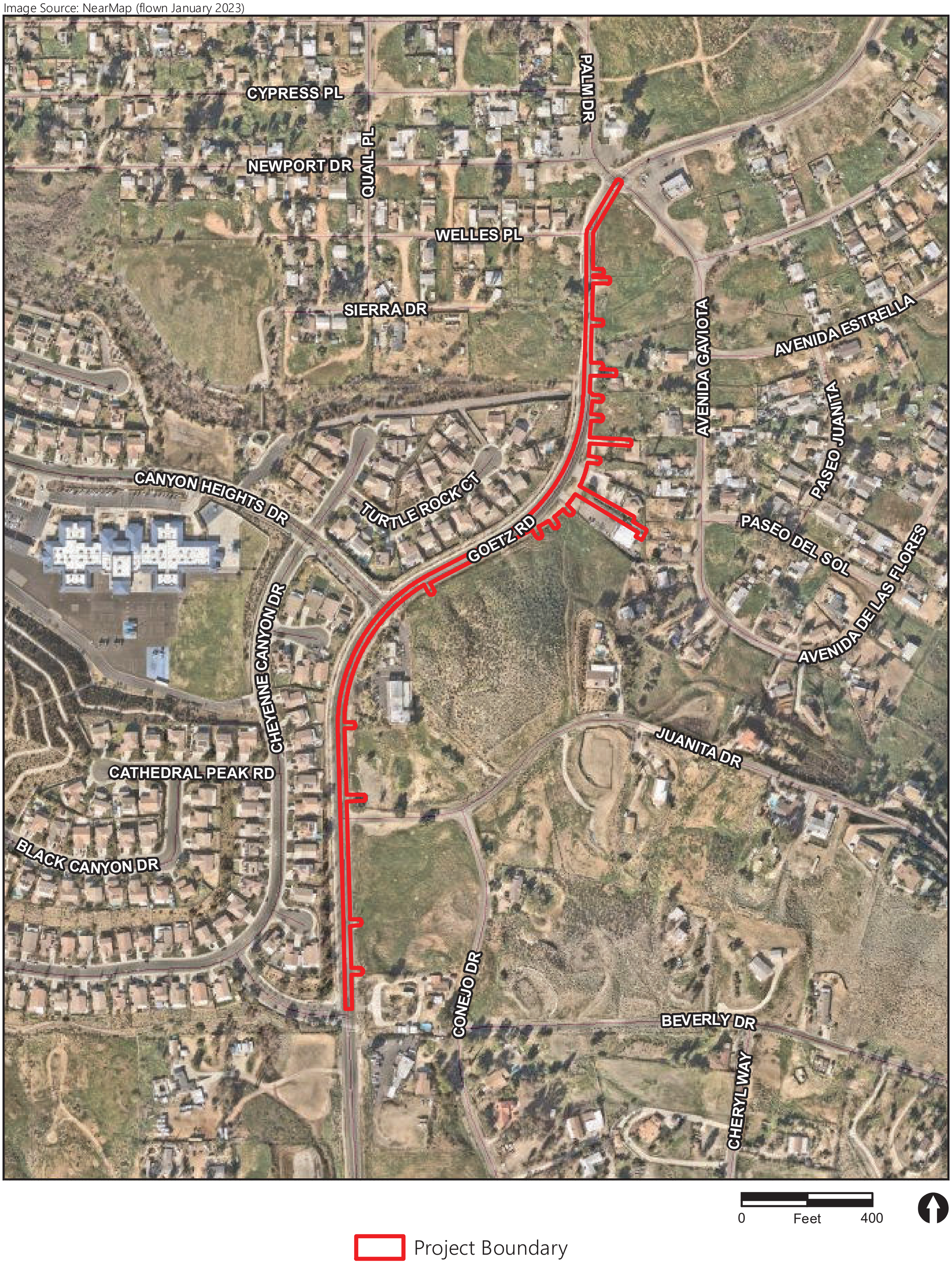

FIGURE 3
Project Location on Aerial Photograph

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Map Source: ERSC, Inc.

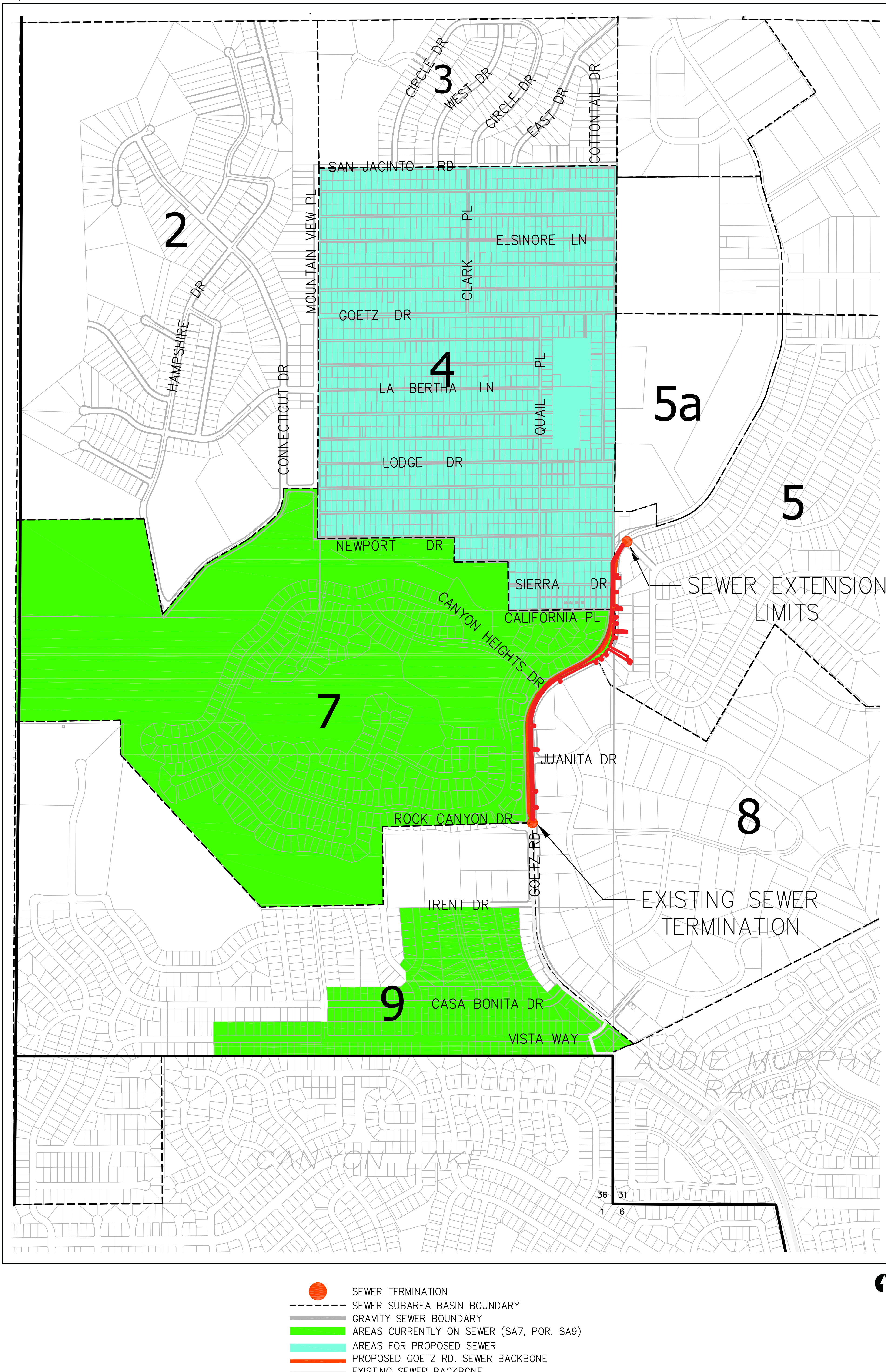

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FIGURE 4
Project Location in Relation to Subareas

7. Zoning:

The project site is within the existing Goetz Road right-of-way and does not have a zoning designation. Areas surrounding the project are zoned Canyon Heights Specific Plan and Low Density Residential-2 (LDR-2) to the west, and Commercial Retail (CR) to the east.

8. Project Overview:

Quail Valley is located within the District's service area, and has been divided into nine subareas. The existing Goetz Road Backbone terminates at the intersection of Goetz Road and Rock Canyon Road. However, future development has been planned within Subarea 5 north of the existing termination of Goetz Backbone. Therefore, extension of the Goetz Road Backbone would be necessary in order to provide connection to the District's sewer system within Subarea 5.

9. Project Purpose:

The proposed project would extend the existing Goetz Road trunk sewer to provide capacity needs for planned development within Subarea 5. The proposed trunk sewer extension may also connect to future improvements within Subarea 4; however, that area is currently undergoing a planning study to determine what improvements are needed. Figure 4 illustrates the limits of the existing and proposed trunk sewer lines.

10. Surrounding Land Use(s) and Project Setting:

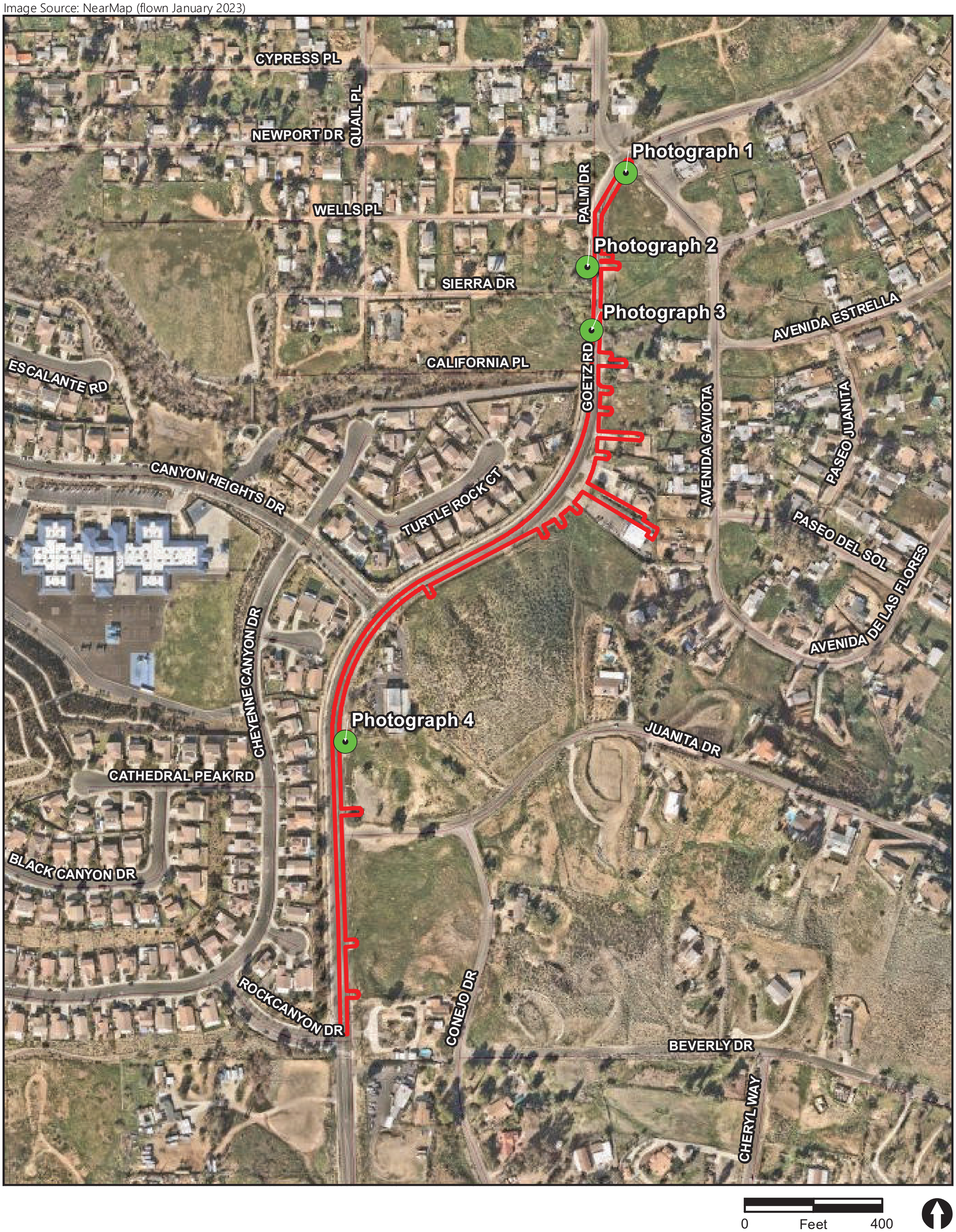
The project site encompasses the Goetz Road right-of-way (ROW) from the intersection of Goetz Road and Rock Canyon Drive to the intersection of Goetz Road and Avenida Roble. The project site is comprised of paved travel lanes and unpaved shoulders within existing right-of-way along Goetz Road. The project site is surrounded by residential land uses to the west, north and south, and a mix of undeveloped lots, residential, and commercial uses to the east. The elevation within the project site is approximately 1,535 feet above mean sea level (AMSL). Photographs 1 through 4 show the existing project site. Figure 5 identifies the locations of each photograph.

11. Proposed Project Description:

The proposed project would construct a new 15-inch diameter trunk sewer within the right-of-way of Goetz Road, from Avenida Roble to Rock Canyon Drive. The endpoint for the existing trunk sewer in Goetz Road is the manhole located at the intersection of Goetz Road and Rock Canyon Drive. The proposed project would extend the trunk sewer, south to north, starting from the intersection of Goetz Road and Rock Canyon Drive to the intersection of Avenida Roble and Goetz Road, approximately 2,911 linear feet.

The proposed project would also construct a new 8-inch sewer pipeline for collection of sewer laterals from properties fronting Goetz Road. The proposed 8-inch sewer would parallel the proposed 15-inch trunk sewer from approximately Canyon Heights Drive northerly for approximately 852 feet.

Image Source: NearMap (flown January 2023)



Project Boundary

Photograph Location

FIGURE 5

Photograph Locations

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PHOTOGRAPH 1
View of Project Site Looking West

PHOTOGRAPH 2
View of Project Site Looking East

PHOTOGRAPH 3
View of Project Site Looking East at Drainage

PHOTOGRAPH 4
View of Project Site Looking West

To provide the necessary separation between the water and sewer systems, and for constructability purposes, the project would relocate the existing 8-inch waterline within Goetz Road five feet west of its current alignment starting just north of Canyon Heights Drive, and continuing northerly for approximately 1,000 feet.

Construction

Table 1 presents the type and number of equipment that would be used during construction. The pipelines would be installed by open cut trench construction, with crossing of the existing culvert to be protected in place. The trenches are expected to be up to 6 feet wide and up to 30 feet deep for the trunk sewer. Equipment staging would be located at the southeast corner of Juanita Drive and Goetz Road and would require a temporary construction easement. Construction of the pipeline is anticipated to begin in April 2026 and end in April 2027, with construction occurring between the hours of 7:00 a.m. and 5:00 p.m. No night construction would occur. The proposed project would result in the potential export of up to 3,200 cubic yards of material. Construction would include approximately 30 linear feet per day due to hard soil conditions and traffic constraints. Excavation would occur via use of bedrock breaking/scraping methods. No blasting is anticipated. Traffic control plans would be prepared during the design phase and coordinated with the City of Menifee (City).

Table 1
Estimated Construction Equipment

Equipment	Number Required for Pipeline
Backhoe/Loader	1 each
Hydraulic Excavator	1
Utility Truck	3
Water Truck	1
Compressor	2
Pick-up Trucks	2 or 3
Dump Trucks	5 or 6
Concrete Saw	1
Sweeper	1
Paver	1
Pavement Breaker	1
Generator	2

All construction areas would be restored to pre-construction conditions (i.e., no permanent disturbance footprint) following construction activities. The width of resurfacing would be up to the nearest lane line or gutter in accordance with the City's repaving requirements.

Operations and Maintenance

Operations and maintenance of the proposed project would generally include ongoing inspection, cleaning, repair, and rehabilitation of sewer lines.

Spot monitoring at selected locations (i.e., key manhole nodes) would be required and routine sewer video inspection would occur approximately every three years, and cleaning would occur every five to ten years. Lift station operation and maintenance involves periodic inspection and troubleshooting to ensure proper and reliable functioning of equipment.

Modern sensing equipment, on-site camera monitoring, and remote telemetry notifications would allow the operator to minimize the dispatching of crews for some forms of periodic inspection.

Connection

Per Regional Water Quality Control Board's (RWQCB) Resolution R8-2020-0004, properties in all of Quail Valley within 200 feet of a sanitary sewer service, where a septic system is currently deployed, must connect to the sewer within 12 months of availability. Fourteen properties adjacent to Goetz Road would be required to connect to the new trunk sewer (see Figure 4).

12. Environmental Commitments

The following measures are EMWD construction best management practices (BMPs) that would be implemented as part of the proposed project:

- All construction work would require the contractor to implement fire hazard reduction measures, such as having fire extinguishers located on-site, use of spark arrestors on equipment, and using a spotter during welding activities.

- Construction of the sewer pipeline would be subject to the rules and regulations of SCAQMD. The SCAQMD rules applicable to the proposed project may include the following:

  - **Rule 401, Visible Emissions.** This rule establishes the limit for visible emissions from stationary sources.
  - **Rule 402, Nuisance.** This rule prohibits the discharge of air pollutants from a facility that cause injury, detriment, nuisance, or annoyance to the public or damage to business or property.
  - **Rule 403, Fugitive Dust.** This rule requires fugitive dust sources to implement best available control measures for all sources and prohibits all forms of visible particulate matter from crossing any property line. SCAQMD Rule 403 is intended to reduce PM_{10} emissions from any transportation, handling, construction, or storage activity that has the potential to generate fugitive dust.
  - **Rule 431.2, Sulfur Content of Liquid Fuels.** The purpose of this rule is to limit the sulfur content in diesel and other liquid fuels for the purpose of reducing the formation of oxides of sulfur (SO_X) and particulates during combustion and of enabling the use of add-on control devices for diesel-fueled internal combustion engines. The rule applies to all refiners, importers, and other fuel suppliers such as distributors, marketers, and retailers, as well as to users of diesel, low-sulfur diesel, and other liquid fuels for stationary-source applications in the SCAQMD. The rule also affects diesel fuel supplied for mobile sources.
  - **Rule 1110.2, Emissions from Gaseous- and Liquid-Fueled Engines.** This rule applies to stationary and portable engines rated at greater than 50 horsepower. The purpose of Rule 1110.2 is to reduce NO_X, VOC, and CO emissions from engines. Emergency

engines, including those powering standby generators, are generally exempt from the emissions and monitoring requirements of this rule because they have permit conditions that limit operation to 200 hours or less per year as determined by an elapsed operating time meter.

  - **Rule 1113, Architectural Coatings.** This rule requires manufacturers, distributors, and end users of architectural and industrial maintenance coatings to reduce VOC emissions from the use of these coatings, primarily by placing limits on the VOC content of various coating categories.

- Specifications would require the contractor to implement standard fire prevention measures. EMWD Specifications Detailed Provisions Section 02201 – Construction Methods & Earthwork of the Standard Detailed Provisions (EMWD 2015) include the entire work and site, including storage areas, is inspected at frequent intervals to verify that fire prevention measures are constantly enforced; fully charged fire extinguishers of the appropriate type, supplemented with temporary fire hoses wherever an adequate water supply exists, are furnished and maintained; and flammable materials are stored in a manner that prevents spontaneous combustion or dispersion.

- Require contractor to prepare a Traffic Control Plan.

- Compliance with Title 22 of the California Code of Regulations and Hazardous Waste Control Law.

- The contractor would adhere to the following requirements to reduce construction noise to the extent feasible:

  - Construction activities would comply with Menifee Development Code (MDC) Section 9.210.060(C) and would only occur during daytime hours between 6:30 a.m. to 7:00 p.m.

  - Prior to construction, the District in coordination with the construction contractor, shall provide written notification to all properties within 50 feet of the proposed project facilities informing occupants of the type and duration of construction activities. Notification materials shall identify a method to contact the District's program manager with noise concerns. Prior to construction commencement, the District program manager shall establish a noise complaint process to allow for resolution of noise problems. This process shall be clearly described in the notifications.

  - Stationary noise-generating equipment shall be located as far from sensitive receptors as possible. Such equipment shall also be oriented to minimize noise that would be directed toward sensitive receptors. Whenever possible, other non-noise generating equipment (e.g., roll-off dumpsters) shall be positioned between the noise source and sensitive receptors.

  - Equipment and staging areas shall be located as far from sensitive receptors as possible. At the staging location, equipment and materials shall be kept as far from adjacent sensitive receptors as possible.

- Construction vehicles and equipment shall be maintained in the best possible working order; operated by an experienced, trained operator; and shall utilize the best available noise control techniques (including mufflers, use of intake silencers, ducts, engine enclosures and acoustically attenuating shields or shrouds).
- Unnecessary idling of internal combustion engines shall be prohibited. In practice, this would require turning off equipment if it would idle for five or more minutes.
- Electrically powered equipment shall be used instead of pneumatic or internal combustion powered equipment, where feasible.
- The use of noise-producing signals, including horns, whistles, alarms, and bells, shall be for safety warning purposes only.

- Compliance with the Division of Occupational Safety and Health of California Construction Safety Plan/Hazard Communication Program.
- Compliance with the Code of Federal Regulations Section 1910.120.
- Compliance with City of Menifee Municipal Code Chapter 6.40: Waste Reduction and Recycling Requirements for Construction and Demolition,

13. **Required Approvals:**

The proposed project would be required to obtain the permits and approvals presented in Table 2.

Table 2
Required Permits and Approvals

Permit/Approval	Permitting/Approving Agency	Permit/Approval Trigger
National Pollutant Discharge Elimination System (NPDES) Construction General Permit	California Regional Water Quality Control Board, Region 8	Required prior to construction activity, upon completion of Notice of Intent and Storm Water Pollution Prevention Program (SWPPP)
Encroachment Permit	City of Menifee	Required for any proposed sewer in the public street
Septic tank (on-site wastewater treatment systems [OWTS] permits	Riverside County Department of Health (DEH)	Any permitted septic system will require notification to DEH for abandonment
Traffic Control Permit	City of Menifee	Prior to work within the public right-of-way

14. **Have California Native American tribes traditionally and culturally affiliated with the project area requested consultation pursuant to Public Resources Code Section 21080.3.1? If so, is there a plan for consultation that includes, for example, the determination of significance of impacts to tribal cultural resources, procedures regarding confidentiality, etc.?**

On July 21, 2023, the District sent consultation notification letters to Native American tribes on the District's Master List pursuant to the requirements of Assembly Bill 52 pertaining to government-to-government consultation regarding the project. Six Native American tribes were contacted, and the District received responses from four tribes.

15. Summary of 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 and Forestry Resources	☐ Air Quality
☒ Biological Resources	☒ Cultural Resources	☐ Energy
☐ Geology/Soils	☐ Greenhouse Gas Emissions	☐ Hazards & Hazardous Materials
☐ Hydrology/Water Quality	☐ Land Use/Planning	☐ Mineral Resources
☐ Noise	☐ Population/Housing	☐ Public Services
☐ Recreation	☐ Transportation	☒ Tribal Cultural Resources
☐ Utilities/Service Systems	☐ Wildfire	☒ Mandatory Findings of Significance

3.0 Draft Mitigated Negative Declaration

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 shall be prepared.

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

☐ I find that the proposed project might have a significant effect on the environment and/or deficiencies exist relative to the City's General Plan Quality of Life Standards, and the extent of the deficiency exceeds the levels identified in the City's Environmental Quality Regulations pursuant to Zoning Code Article 47, Section 33-924 (b), and an ENVIRONMENTAL IMPACT REPORT shall be required.

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

☐ I find that, although the proposed project might have a significant effect on the environment, no further documentation is necessary because all 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.

Joe Broadhead
Signature

April 11, 2024
Date

Joe Broadhead
Printed Name

Principal Water Resources Specialist
Title

4.0 Initial Study Checklist

1. A brief explanation is required for all answers except "No Impact" answers that are adequately supported by the information sources a lead agency cites in the parentheses following each question. A "No Impact" answer is adequately supported if the referenced information sources show that the impact simply does not apply to projects like the one involved. A "No Impact answer should be explained where it is based on project specific factors as well as general standards.
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.
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 (mitigated) negative declaration. Section 15063(c)(3)(D).
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 significant.

4.1 Aesthetics

Would the proposed project:

Issue	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
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. In non-urbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings? (Public views are those that are experienced from a publicly accessible vantage point). If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality?	☐	☐	☒	☐
d. Create a new source of substantial light or glare that would adversely affect day or nighttime views in the area?	☐	☐	☒	☐

EXPLANATIONS:

a. Less Than Significant Impact

The project site is surrounded by residential land uses to the west, north and south, and a mix of undeveloped lots, residential and commercial uses to the east. Review of Exhibit CD-2 of the Community Design Element of the General Plan determined that the project site is not near any designated scenic corridors within the City (City of Menifee 2013). Given that Menifee is surrounded by hillsides and small mountains, distant scenic vista views are visible from locations surrounding the project site. Construction of the pipelines would occur within the Goetz Road right-of-way from the intersection of Goetz Road and Rock Canyon Drive to the intersection of Goetz Road and Avenida Roble. The pipelines would be installed by open cut trench construction and equipment staging would be located at the southeast corner of Juanita Drive and Goetz Road, which could temporarily partially obscure views of distant scenic vistas from locations surrounding the project site. However, all proposed improvements would be located underground and would not include any permanent aboveground components. Once construction was complete, all views of distant scenic vistas would be restored to their pre-project condition. Therefore, the proposed project would not have a substantial adverse effect on a scenic vista, and impacts would be less than significant.

b. No Impact

There are no officially designated State Scenic Highways within the city; therefore, the project site is not visible from a State Scenic Highway. The closest officially designated scenic highway to the project site is State Route 74. The official designation for State Route 74 begins at the west boundary of the San Bernardino National Forest and State Route 111 and ends at Palm Desert, which is approximately 27 miles east of the project site (California Department of Transportation [Caltrans] 2023). Therefore, the proposed project would not substantially damage any scenic resources within a state scenic highway. No impact would occur.

c. Less Than Significant Impact

The project site is surrounded by residential land uses to the west, north and south, and a mix of undeveloped lots, residential and commercial uses to the east. Construction activities associated with the proposed project (e.g., presence of construction vehicles, excavated materials, laydown areas) would create short-term visual effects for the surrounding residential areas. However, all proposed improvements would be located underground and would not include any permanent aboveground components. Once construction was complete, the visual character of the project site would be restored to their pre-project condition. Therefore, the project would not adversely affect the quality of public views of the project site and its surroundings, and impacts would be less than significant.

d. Less Than Significant Impact

Construction of the pipelines would be limited to daytime hours, Monday through Friday between 7:00 a.m. and 5:00 p.m. No night construction or lighting would occur. Further, the pipelines would be located underground and would not include any permanent aboveground components. Therefore, the proposed project would not create a new source of substantial light or glare that would adversely affect day or nighttime views in the area, and impacts would be less than significant.

4.2 Agriculture and Forestry Resources

Would the proposed project:

Issue	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
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 1220[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 non-agricultural use or conversion of forest land to non-forest use?	☐	☐	☐	☒

EXPLANATIONS:

a. No Impact

The project site is designated as Urban and Built-up Land by the Farmland Mapping and Monitoring Program (California Department of Conservation 2022). Construction of the pipeline would occur within the Goetz Road right-of-way from the intersection of Goetz Road and Rock Canyon Drive to the intersection of Goetz Road and Avenida Roble. Therefore, the proposed project would not convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance to non-agricultural uses. No impact would occur.

b. No Impact

The project site is within the existing Goetz Road right-of-way and does not have a General Plan or zoning designation. The project site and surrounding properties are not zoned for agricultural uses, nor are they subject to a Williamson Act contract. No impact would occur.

c. No Impact

The project site does not contain any forest or timberland as defined by Public Resources Code Section 12220[g], Public Resources Code Section 4526, or Government Code Section 51104(g) and is not zoned as forest or timberland. No impact would occur.

d. No Impact

The project site does not contain any forest or timberland as defined by Public Resources Code Section 12220[g], Public Resources Code Section 4526, or Government Code Section 51104(g). No impact would occur.

e. No Impact

There are no agricultural uses or forestlands on-site or in the vicinity of the project site. Therefore, the proposed project would not result in conversion of farmland or forest land. No impact would occur.

4.3 Air Quality

Would the proposed project:

Issue	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
a. Conflict with or obstruct implementation of the applicable air quality plan?	☐	☐	☒	☐
b. 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?	☐	☐	☒	☐
c. Expose sensitive receptors to substantial pollutant concentrations?	☐	☐	☒	☐

Issue	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
d. Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?	☐	☐	☒	☐

EXPLANATIONS:

a. Less Than Significant Impact

The proposed project is located within the South Coast Air Basin (SCAB) under the jurisdiction of the South Coast Air Quality Management District (SCAQMD). Air districts are tasked with regulating emissions to ensure that air quality in the SCAB does not exceed National or California Ambient Air Quality Standards (NAAQS and CAAQS). NAAQS and CAAQS represent the maximum levels of background pollution considered safe, with an adequate margin of safety, to protect the public health and welfare. NAAQS and CAAQS have been established for six common pollutants of concern known as criteria pollutants, which include ozone, carbon monoxide (CO), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), lead (Pb), and respirable particulate matter (PM_{10} and $PM_{2.5}$).

The SCAB is currently classified as a federal non-attainment area for ozone and $PM_{2.5}$ and a state non-attainment area for ozone, PM_{10}, and $PM_{2.5}$. The regional air quality plan, the 2016 Air Quality Management Plan (AQMP), outlines measures to reduce emissions of ozone and $PM_{2.5}$. Whereas reducing PM concentrations is achieved by reducing emissions of $PM_{2.5}$ to the atmosphere, reducing ozone concentrations is achieved by reducing the precursors of photochemical formation of ozone, volatile organic compounds (VOC), and oxides of nitrogen (NO_X).

Growth forecasting for the AQMP is based in part on the land uses established by local general plans. Thus, if a project is consistent with land use as designated in the local general plan, it can normally be considered consistent with the AQMP. Projects that propose a different land use than is identified in the local general plan may also be considered consistent with the AQMP if the proposed land use is less intensive than buildout under the current designation. For projects that propose a land use that is more intensive than the current designation, analysis that is more detailed is required to assess conformance with the AQMP.

The project site is within the existing Goetz Road right-of-way and does not have a General Plan designation or zoning. The proposed project includes the construction of a new 15-inch diameter sewer backbone in the right-of-way of Goetz Road, from Avenida Roble to Rock Canyon Drive. The proposed project does not include growth-generating components, but rather would extend the existing Goetz Road trunk sewer to provide capacity needs for planned development within Subarea 5. As such, the proposed project would be consistent with growth projections contained in the Menifee General Plan and AQMP forecasts. Based on these considerations and pursuant to SCAQMD guidelines, project-related emissions are accounted for in the AQMP. Therefore, the proposed project would not conflict with or obstruct implementation of the applicable air quality plan, and impacts would be less than significant.

b. Less Than Significant Impact

Regional Significance Thresholds

NAAQS and CAAQS have been established for six criteria pollutants (ozone, CO, SO_2, NO_2, lead, and PM). As described in Section 4.3a above, the SCAQMD is the air pollution control agency responsible for protecting the people and the environment of the SCAB from the effects of air pollution. Accordingly, the District evaluates project air quality emissions based on the quantitative emission thresholds originally established in the SCAQMD's CEQA Air Quality Handbook (SCAQMD 1993). SCAQMD's daily significance thresholds for impacts to regional air quality are shown in Table 3.

Table 3
SCAQMD Air Quality Significance Thresholds – Mass Daily Thresholds

Pollutant	Emissions (pounds)	
	Construction	Operational
Oxides of Nitrogen (NO_X)	100	55
Volatile Organic Compounds (VOC)	75	55
Coarse Particulate Matter (PM_{10})	150	150
Fine Particulate Matter ($PM_{2.5}$)	55	55
Oxides of Sulfur (SO_X)	150	150
Carbon Monoxide (CO)	550	550
Lead (Pb)	3	3
SOURCE: SCAQMD Air Quality Significance Thresholds (SCAQMD 2015).		

Construction of the sewer pipeline would be subject to the rules and regulations of SCAQMD. The SCAQMD rules applicable to the proposed project may include the following:

- **Rule 401, Visible Emissions.** This rule establishes the limit for visible emissions from stationary sources.
- **Rule 402, Nuisance.** This rule prohibits the discharge of air pollutants from a facility that cause injury, detriment, nuisance, or annoyance to the public or damage to business or property.
- **Rule 403, Fugitive Dust.** This rule requires fugitive dust sources to implement best available control measures for all sources and prohibits all forms of visible particulate matter from crossing any property line. SCAQMD Rule 403 is intended to reduce PM_{10} emissions from any transportation, handling, construction, or storage activity that has the potential to generate fugitive dust.
- **Rule 431.2, Sulfur Content of Liquid Fuels.** The purpose of this rule is to limit the sulfur content in diesel and other liquid fuels for the purpose of reducing the formation of oxides of sulfur (SO_X) and particulates during combustion and of enabling the use of add-on control devices for diesel-fueled internal combustion engines. The rule applies to all refiners, importers, and other fuel suppliers such as distributors, marketers, and retailers, as well as to users of diesel, low-sulfur diesel, and other liquid fuels for stationary-source applications in the SCAQMD. The rule also affects diesel fuel supplied for mobile sources.

- **Rule 1110.2, Emissions from Gaseous- and Liquid-Fueled Engines.** This rule applies to stationary and portable engines rated at greater than 50 horsepower. The purpose of Rule 1110.2 is to reduce NO_X, VOC, and CO emissions from engines. Emergency engines, including those powering standby generators, are generally exempt from the emissions and monitoring requirements of this rule because they have permit conditions that limit operation to 200 hours or less per year as determined by an elapsed operating time meter.

- **Rule 1113, Architectural Coatings.** This rule requires manufacturers, distributors, and end users of architectural and industrial maintenance coatings to reduce VOC emissions from the use of these coatings, primarily by placing limits on the VOC content of various coating categories.

Pipeline construction would result in short-term emissions related to pipeline construction activities, while operation would result in emissions related to vehicle/equipment use associated with routine inspection and maintenance. Routine sewer video inspection would occur approximately every three years, and cleaning would occur every five to ten years. These activities would be conducted by existing EMWD employees. Operational emissions associated with vehicle emissions from these maintenance activities would be negligible. Therefore, the analysis below focuses on emissions associated with construction activities.

Emissions associated with pipeline construction were modeled using the Sacramento Metropolitan Air Quality Management District's (SMAQMD) Roadway Construction Emissions Model (RCEM) Version 9.0.1 (SMAQMD 2022). The RCEM is a spreadsheet-based model that is able to use basic project information (e.g., total construction months, project type, total project area) to estimate a construction schedule and quantify exhaust emissions from heavy-duty construction equipment, haul trucks, and worker commute trips associated with linear construction projects. Version 9.0.1 of the model incorporates the most currently approved 2017 Emission Factor (EMFAC2017) model and Off-Road emissions factors model. The 2021 Emission Factor (EMFAC2021) model was released in January 2021; however, EMFAC2021 has not yet been approved for use by the U.S. Environmental Protection Agency (U.S EPA). EMFAC2017 is the most recent version of the model approved by the U.S. EPA, and was therefore used in this analysis. Use of EMFAC2021 would not result in emissions that are substantially different than those calculated in this analysis, particularly since the main source of emissions would be construction equipment which are calculated using the Off-Road emissions factor model methodologies incorporated into RCEM. Although RCEM was developed by SMAQMD, it is appropriate for use in the SCAQMD jurisdiction because it is applicable for all statewide construction projects that involve construction equipment that is subject to California Air Resources Board (CARB) construction equipment emissions standards and incorporates statewide emission factor models (EMFAC2017 and Off-Road). RCEM calculates fugitive dust, exhaust, and off-gas emissions from grubbing/land clearing, grading/excavation, drainage/utilities/sub-grade, and paving activities associated with construction projects that are linear in nature (e.g., road or levee construction, pipeline installation, transmission lines).

Construction is expected to begin in April 2026 and last approximately one year. CalEEMod was run under the assumption of an April 2024 construction start time; however, as 2026 would provide an improved regulatory environment and increased technological efficiency, this modelling provides a conservative estimate.

The pipeline alignment would consist of a total of approximately 4,763 linear feet, including 2,911 linear feet of new 15-inch diameter sewer, 852 linear feet of new 8-inch diameter sewer, and approximately 1,000 linear feet of a relocated water line. The total project area is 2.23 acres. Excavated soil would likely be replaced in the trench once the new pipeline is replaced; however, to be conservative, hauling was included in the analysis. Hauling emissions associated with asphalt removal were calculated assuming a total of 222 cubic yards of asphalt export (4,800 feet of paved road, 5 feet wide, and 3 inches deep). The proposed project would require export of approximately 3,200 cubic yards of soil. However, hauling emissions associated with soil export were calculated assuming export of 4,444 cubic yards of soil, which provides a conservative estimate. Asphalt hauling was modeled over the duration of the 1.2-month grubbing/land clear phase, and soil hauling was modeled over the duration of the 5.4-month grading/excavation phase. Modeled construction equipment is summarized in Table 4. This equipment was modeled during each phase of construction. Two signal boards, dump trucks used for asphalt and soil hauling, and employee vehicles were also included in the emission calculations. Based on RCEM default values, project construction would require up to 22 workers per day.

The maximum daily construction emissions are summarized in Table 4. Appendix A contains the RCEM calculations for this pipeline project. Appendix A also contains detailed calculations showing how the project size and hauling quantities were calculated.

Table 4
Maximum Daily Construction Emissions
(pounds per day)

	Pollutant					
	ROG	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
Grubbing/Land Clearing	4.16	32.19	40.63	0.10	6.37	2.33
Grading/Excavation	4.24	32.50	41.95	0.11	6.44	2.36
Drainage/Utilities/Sub-Grade	4.20	32.03	41.29	0.10	6.40	2.34
Paving	4.18	31.91	41.03	0.10	1.38	1.29
Maximum Daily Emissions	**4.24**	**32.50**	**41.95**	**0.11**	**6.44**	**2.36**
SCAQMD Threshold	*75*	*100*	*550*	*150*	*150*	*55*
Significant Impact?	No	No	No	No	No	No

ROG = reactive organic gases; NO_X = nitrogen oxides; CO = carbon monoxide; SO_X = sulfur oxides; PM_{10} = particulate matter less than 10 microns; $PM_{2.5}$ = particulate matter less than 2.5 microns

Construction emissions were compared to the significance thresholds presented in Table 3 to assess the significance of the air quality emissions resulting from pipeline construction. These thresholds are designed to provide limits below which project emissions would not significantly change regional air quality.

As shown in Table 4, maximum daily construction emissions associated with pipeline construction are projected to be less than the applicable thresholds for all criteria pollutants, including emissions for ozone precursors (reactive organic compounds [ROG] and NO_X), PM_{10}, and $PM_{2.5}$. Therefore, pipeline construction would not result in a cumulatively considerable net increase in emissions of ozone, PM_{10}, or $PM_{2.5}$, and impacts would be less than significant.

After installation of the underground pipeline, there would be occasional inspection and maintenance trips. Routine sewer video inspection would occur approximately every three years, and cleaning would occur every five to ten years. These activities would be conducted by existing EMWD employees. Operational emissions associated with vehicle emissions from these maintenance activities would be negligible. Therefore, project operation would not result in a cumulatively considerable net increase in emissions of ozone, PM_{10}, or $PM_{2.5}$, and impacts would be less than significant.

Localized Construction Impacts

In addition to these regional significance thresholds, the SCAQMD utilizes Localized Significance Thresholds (LST) to evaluate localized air quality impact to sensitive receptors in the vicinity of the proposed project (SCAQMD 2008). LSTs represent the maximum emissions from a project that will not cause or contribute to an exceedance of the most stringent applicable federal or state ambient air quality standard at the nearest residence or sensitive receptor. Localized air quality impacts would occur if pollutant concentrations at sensitive receptors exceeded applicable NAAQS or CAAQS.

The project site is located within Source Receptor Area 24. LSTs apply to on-site air emissions of CO, NO_2, PM_{10}, and $PM_{2.5}$. The LST methodology states that only on-site emissions should be compared to LSTs. Therefore, off-site emissions associated with worker travel, materials deliveries, and other mobiles sources are not evaluated against LSTs. The LSTs for a 2-acre site with receptors at 25 meters were conservatively used. The results of the LST analysis are provided in Table 5.

Table 5
Localized Construction Emissions

	Pollutant			
	NO_X	CO	PM_{10}	$PM_{2.5}$
Maximum Daily Emission	32.50	41.95	6.44	2.36
LST Threshold	*170*	*883*	*7*	*4*
Threshold Exceeded?	No	No	No	No

As shown in Table 5, maximum localized pipeline construction emissions would not exceed any of the SCAQMD recommended localized screening thresholds. Therefore, pipeline construction would not exceed the LST thresholds for CO, NO_X, PM_{10}, or $PM_{2.5}$, and impacts would be less than significant.

Localized Operational Impacts

After installation of the underground pipeline, there would be occasional inspection and maintenance trips. Routine sewer video inspection would occur approximately every three years, and cleaning would occur every five to ten years. These activities would be conducted by existing EMWD employees. Operational emissions associated with vehicle emissions from these maintenance activities would be negligible. Therefore, project operation would not exceed the LST thresholds for CO, NO_X, PM_{10}, or $PM_{2.5}$, and impacts would be less than significant.

c. Less Than Significant Impact

A sensitive receptor is a person in the population who is more susceptible to health effects due to exposure to an air contaminant than is the population at large. Examples of sensitive receptor locations in the community include residences, schools, playgrounds, childcare centers, churches, athletic facilities, retirement homes, and long-term health care facilities. The project site is surrounded by residential land uses to the west, north and south. Additionally, the Quail Valley Elementary School is located west of Goetz Road. Pollutants that have the potential to affect sensitive receptors include criteria pollutants, diesel particulate matter (DPM), and CO hotspots. Ozone is formed through the combination of ROG and NO_X, with help from sunlight and heat. Exposure to either can impact respiratory health, causing respiratory inflammation and asthma exacerbations. Health effects of DPM are wide ranging, with strong links to all-cause mortality, cardiovascular mortality and hospitalizations, and respiratory and asthma hospitalizations. Adverse health effects associated with CO include chest pain in heart patients, headaches, and reduced mental alertness. Impacts to sensitive receptors from criteria pollutants are discussed above in Section 4.3b, Localized Construction Impacts. DPM and CO hotspots are discussed below.

Diesel Particulate Matter

Construction of the pipeline would result in short-term diesel exhaust emissions from on-site heavy-duty equipment. Construction of the pipeline would result in the generation of diesel exhaust DPM emissions from the use of off-road diesel equipment required for construction activities and on-road diesel equipment used to bring materials to and from the project site.

Generation of DPM from construction projects typically occurs in a single area for a short period. Construction is anticipated to last for approximately one year. The dose to which the 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 extent of exposure that person has with the substance. Dose is positively correlated with time, meaning that a longer exposure period would result in a higher exposure level for the Maximally Exposed Individual. The risks estimated for a Maximally Exposed Individual are higher if a fixed exposure occurs over a longer period of time. According to the Office of Environmental Health Hazard Assessment (OEHHA), health risk assessments, which determine the exposure of sensitive receptors to toxic emissions, should be based on a 30-year exposure period; however, such assessments should be limited to the period/duration of activities associated with the proposed project (OEHHA 2015). Although the alignment is located adjacent to residential and school uses, construction equipment would only be located adjacent to a particular sensitive receptor for a matter of days or weeks since work would move along the alignment. Thus, because the duration of proposed construction activities near any specific sensitive receptor would be minimal and would be significantly less than the 30-year exposure period used in health risk assessments, the impacts would be less than significant.

Additionally, with ongoing implementation of U.S. EPA and CARB requirements for cleaner fuels; off-road diesel engine retrofits; and new, low-emission diesel engine types, the DPM emissions of individual equipment would be reduced over time. As discussed previously, all construction equipment is subject to the CARB In-Use Off-Road Diesel-Fueled Fleets Regulation, which limits unnecessary idling to 5 minutes, requires all construction fleets to be labeled and reported to CARB, bans Tier 0 equipment and phases out Tier 1 and 2 equipment (thereby replacing fleets with cleaner equipment), and requires that fleets comply with Best Available Control Technology requirements. Therefore, due to the limited duration of construction activities, the limited amount of time equipment would be located adjacent to any specific sensitive receptor, and implementation of the In-Use Off-Road Diesel-Fueled Fleets Regulation, DPM generated by project construction is not expected to create conditions where the probability is greater than 10 in 1 million of contracting cancer for the Maximally Exposed Individual or to generate ground-level concentrations of noncarcinogenic TACs that exceed a Hazard Index greater than 1 for the Maximally Exposed Individual. Therefore, pipeline construction would not expose sensitive receptors to substantial pollutant concentration, and impacts would be less than significant.

Carbon Monoxide Hot Spots

A CO hot spot is an area of localized CO pollution that is caused by severe vehicle congestion on major roadways, typically near intersections. CO hot spots have the potential to violate state and federal CO standards at intersections, even if the broader basin is in attainment for federal and state levels. CO hot spots occur nearly exclusively at signalized intersections operating at level of service (LOS) E or F. Due to increased requirements for cleaner vehicles, equipment, and fuels, CO levels in the state have dropped substantially. All air basins are attainment or maintenance areas for CO. Therefore, more recent screening procedures based on more current methodologies have been developed. The SMAQMD developed a screening threshold in 2011, which states that any project involving an intersection experiencing 31,600 vehicles per hour or more will require detailed analysis. In addition, the Bay Area Air Quality Management District developed a screening threshold in 2010 which states that any project involving an intersection experiencing 44,000 vehicles per hour would require detailed analysis.

The pipeline construction component of the proposed project would generate vehicle trips during construction in the form of haul trucks and worker commute vehicles. Based on the RCEM emission calculations prepared for project construction, up to 22 daily worker trips would occur during peak construction activities, and two daily hauling trips would be required. Signalized intersections affected by the proposed project include the intersections of Goetz Road with Rock Canyon Road, Canyon Heights Road, and Avenida Roble. Based on the Traffic Study prepared for the Quail Hill project, which is located just north of the proposed alignment, the year 2025 traffic volume on Goetz Road north of Newport Road (which includes the entirety of the project alignment) is 15,935 average daily traffic (Urban Crossroads 2022). Peak hour traffic volumes are typically 10 percent of the average daily traffic. Based on this, the peak hour volume on Goetz Road would be approximately 1,590 vehicles. Assuming Rock Canyon Road, Canyon Heights Road, and Avenida Roble carry similar traffic volumes, the peak hour turning volumes at each of these intersections are projected to be well less than 31,600 vehicles. The addition of construction traffic to area roadways would not cause any intersections to operate at LOS E or F and would not significantly increase peak hourly volumes. Construction vehicle generation would also be temporary. Therefore, pipeline construction would not generate CO hot spots, and potential impacts would be less than significant.

d. Less Than Significant Impact

The potential for an odor impact is dependent on a number of variables, including the nature of the odor source, distance between the receptor and odor source, and local meteorological conditions. During construction, diesel equipment may generate some nuisance odors from equipment exhaust. Additionally, paving activities have the potential to generate odors while laying asphalt. Sensitive receptors near the project site/pipeline alignment include residential and school uses. However, exposure to odors associated with project construction would be short-term and temporary in nature. In addition, construction activities within the project site would be required to comply with SCAQMD Rule 402, which prohibits the discharge of odorous emissions that would create a public nuisance. Further, per CARB's Airborne Toxic Control Measures 13 (California Code of Regulations Chapter 10 Section 2485), the applicant shall not allow idling time to exceed five minutes unless more time is required per engine manufacturers' specifications or for safety reasons. Compliance with this regulation would reduce odors from equipment exhaust. Given the short-term nature of construction, compliance with SCAQMD Rule 402, and the distance to the nearest sensitive receptors, project construction would not generate odors that would affect a substantial number of people, and impacts would be less than significant.

The following list provides some common types of facilities that are known producers of objectionable odors (Bay Area Air Quality Management District 2017). This list of facilities is not meant to be all-inclusive.

- Wastewater Treatment Plant
- Wastewater Pumping Facilities
- Sanitary Landfill
- Transfer Station
- Composting Facility
- Petroleum Refinery
- Asphalt Batch Plant
- Chemical Manufacturing
- Fiberglass Manufacturing
- Painting/Coating Operations
- Rendering Plant
- Coffee Roaster
- Food Processing Facility
- Confined Animal Facility/Feed Lot/Dairy
- Green Waste and Recycling Operations
- Metal Smelting Plants

The proposed project does not include any of these uses that are typically associated with odor complaints. There would be no operational source of odors associated with the proposed project, as the water pipeline would be completely enclosed and underground. Therefore, project operation would not generate substantial amounts of odors adversely affecting a substantial number of people. No impact would occur.

4.4 Biological Resources

Would the proposed project:

Issue	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
a. Have substantial adverse effects, 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 (CDFW) or U.S. Fish and Wildlife Service (USFWS)?	☐	☒	☐	☐
b. Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, and regulations or by the CDFW or USFWS?	☐	☐	☒	☐
c. Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	☐	☒	☐	☐
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 tree preservation policy or ordinance?	☐	☐	☒	☐

Issue	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
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?	☐	☒	☐	☐

EXPLANATIONS:

The following section is based on the Biological Resources Survey prepared by RECON Environmental, Inc. (RECON) on March 27, 2024 (Appendix B), the Burrowing Owl Site Assessment prepared by RECON on March 15, 2024 (Appendix B, Attachment 1), and the Aquatic Resources Delineation Report prepared by RECON on March 27, 2024 (Appendix B, Attachment 2).

a. Potentially Significant Unless Mitigation Incorporated

A general biological resources survey was conducted for the project site and a 50-foot buffer from the intersection of Goetz Road and Rock Canyon Drive to the intersection of Goetz Road and Avenida Roble, totaling 7.15 acres.

Vegetation Communities/Land Cover Types

The project site supports disturbed land and urban/developed. The 50-foot buffer surrounding the project site supports disturbed wetland, disturbed land, and urban/developed. The acreages of each vegetation community/land cover types are presented in Table 6 and the locations of these vegetation community/land cover types are presented in Figure 6. Descriptions of each vegetation community/land cover type are provided below.

Table 6
Vegetation Communities and Land Cover Types within Survey Area
(acres)

Vegetation Communities	Project Site	Survey Area (Project Site Plus 50-foot Buffer)
Disturbed Wetland	--	0.05
Disturbed Land	0.28	0.81
Urban/Developed	1.95	6.29
TOTAL	**2.23**	**7.15**

Image Source: NearMap (flown January 2023)

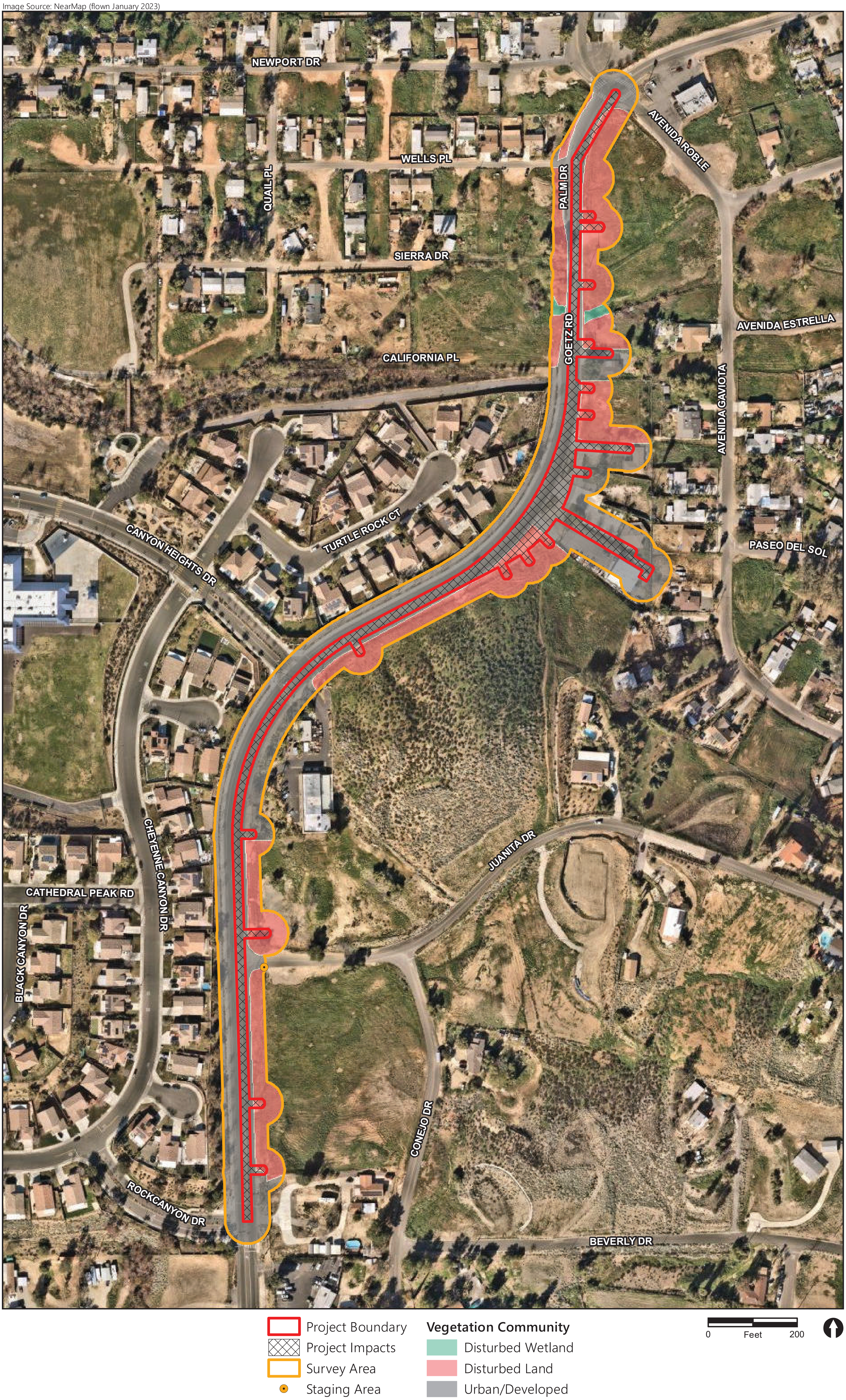

FIGURE 6
Impacts to Biological Resources

RECON

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Disturbed Wetland

Disturbed wetland is present adjacent to Goetz Road along the western and eastern edges of the project site totaling 0.04 acre. This area of disturbed wetland is immediately adjacent to Goetz Road and is surrounded on either side by disturbed land. The disturbed wetland consists of an ephemeral drainage channel, connected via a culvert under Goetz Road. The disturbed wetland is characterized primarily by low-growing species such as hyssop loosestrife (*Lythrum hyssopifolia*), African umbrella plant *(Cyperus involucratus)*, mariposa rush (*Juncus dubius)*, curly dock (*Rumex crispus*), and rabbitfoot grass (*Polypogon monspeliensis*). A stand of Mexican palo verde (*Parkinsonia aculeata*) and several individual willows (*Salix* spp.) and mule fat (*Baccharis salicifolia* ssp. *salicifolia*) occur as scattered, isolated individuals along the length of the drainage channel.

Disturbed Land

Disturbed land accounts for undeveloped lots on either side of Goetz Road and consists of a variety of non-native species including short-pod mustard (*Hirschfeldia incana*), stinknet (*Oncosiphon piluliferum*), filaree (*Erodium* sp.) ripgut grass (*Bromus diandrus*), and red brome (*Bromus rubens*). A few native species including Coulter’s lupine (*Lupinus sparsiflorus*), caterpillar phacelia (*Phacelia cicutaria* var. *hispida*), and California sand-aster (*Corethrogyne filaginifolia* var. *filaginifolia*) are present.

Urban/Developed

Urban/developed accounts for the majority of the project site and occurs mostly as paved roadway. Urban/developed also includes concrete sidewalks, a decomposed granite walkway, and residential and commercial development. Vegetation within this land cover type primarily consists of ornamental landscaping.

Plant Species

The general biological survey was conducted in May 2023 during the flowering period of sensitive plant species known to occur within two miles of the project site. No sensitive plants were observed within or adjacent to the project site. Therefore, no impacts to sensitive plant species are anticipated to result from the proposed project and no mitigation would be required.

Wildlife

No special-status wildlife species, including species covered by the Western Riverside County Multiple Species Habitat Conservation Plan (MSHCP), were detected within or adjacent to the project site during the biological survey. A portion of the project site is located within the MSHCP survey area for burrowing owl. A habitat assessment for burrowing owl was conducted in accordance with MSHCP guidelines (Appendix B, Attachment 1), and no burrowing owl individuals, California ground squirrel (*Otopermophilus* [=*Spermophilus*] *beecheyi*), or burrow or burrow surrogates were observed. No suitable habitat was observed. The project site consists primarily of Goetz Road and associated roadside, which is a major thoroughfare, and developed residential lots. The disturbed areas within the project site and surrounding area are immediately adjacent to Goetz Road and are heavily disturbed, with dense non-native vegetation and evidence of repeated disturbance from mowing and vehicles. Due to the lack of suitable habitat, focused burrowing owl surveys are not required. The project site is located within the Stephens’ Kangaroo Rat HCP area. As lead agency, the District is not a participant in the Stephens' Kangaroo Rat HCP; however, the project demonstrates it would not prevent implementation of the conservation goals and objectives of the HCP as the project site is not part of a Stephens' kangaroo rat core reserve (Riverside County Habitat Conservation Agency [RCHCA] 1996).

The majority of the project site and survey area, including disturbed wetland, disturbed and urban/developed land, has potential to support migratory and nesting bird species protected by the Migratory Bird Treaty Act or California Fish and Game Code 3503.5. Urban-adapted species in particular have been known to nest within ornamental vegetation and non-native trees and shrubs and under the eaves of houses. Direct impacts to nesting and migratory birds are not anticipated. Direct impacts associated with the proposed project would be limited to disturbed land and urban/developed land associated with the existing roadway and sewer laterals from properties fronting Goetz Road. However, indirect noise impacts may occur to migratory and nesting birds if they are nesting in the adjacent habitat should construction occur during the general avian breeding season (January 15 to August 31). These species are protected by the California Fish and Game Code Section 3503.5, and impacts to nesting individuals would be considered significant. Implementation of mitigation measure BIO-1 would reduce potential impacts to migratory and nesting birds to a level less than significant.

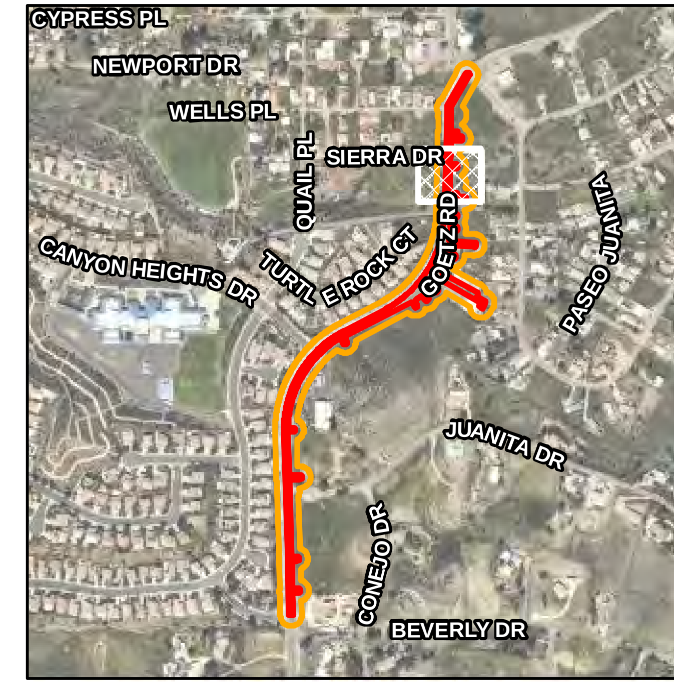
b. Less Than Significant Impact

Direct impacts associated with the proposed project would be limited to disturbed land and urban/developed land associated with the existing roadway and sewer laterals from properties fronting Goetz Road. Therefore, the proposed project would not have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, and regulations or by the CDFW or USFWS, and impacts would be less than significant.

c. Potentially Significant Unless Mitigation Incorporated

The Aquatic Resource Delineation Report prepared for the project (Appendix B, Attachment 2) delineated potential jurisdictional wetlands and waterways within the project site and a 50-foot buffer following guidelines set forth by the U.S. Army Corps of Engineers (USACE; 1987 and 2008) to determine the presence and extent of wetlands and/or waters under the jurisdiction of USACE, CDFW, and RWQCB. Table 7 presents the acreage of potential jurisdiction resources within the jurisdictional survey area and Figure 7 presents the locations of the aquatic resources identified in the survey area. The wetland and non-wetland waters consist of the culverted drainage underlying Goetz Road and flowing west in the northern portion of the survey area. The wetlands and non-wetland waters would likely be considered USACE Waters of the U.S., RWQCB Waters of the State, and CDFW Waters of the State. Potential USACE wetland Waters of the U.S. on-site and within the survey area include wetlands adjacent to Goetz Road (0.05 acre; see Figure 7). Potential USACE non-wetland Waters of the U.S. on-site and within the survey area include the culverted drainage underlying Goetz Road (0.01 acre; 41 linear feet; see Figure 7). The potential wetland and non-wetland Waters of State under RWQCB jurisdiction, as well as the areas of potential CDFW jurisdiction, entirely overlap the potential USACE Waters of the U.S described above.

Image Source: NearMap (flown January 2023)



Project Boundary
Survey Area
Culvert
Photo Point
OHWM Sample Transect
WDP Sample Point
Upland
Wetland
Aquatic Resources
Non-wetland Waters
Wetland Waters

0 Feet 25

FIGURE 7
Aquatic Resources Delineated within the Survey Area

RECON

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Table 7 Potential Jurisdictional Resources within Survey Area (acres)	
Jurisdictional Resource	Acreage in Survey Area (linear feet)
USACE Waters of the U.S.	**0.06**
Wetland Waters of the U.S.	0.05 (89)
Non-wetland Waters of the U.S.	0.01* (41)
RWQCB Waters of the State	**0.06**
Wetland Waters of the State	0.05 (89)
Non-wetland Waters of the State	0.01* (41)
CDFW Jurisdictional Resources	**0.05**
Wetland	0.05 (89)
Streambed	0.01* (41)
*Any discrepancies in total are due to rounding.	

The project would avoid direct impacts to potentially jurisdictional non-wetland waters by avoiding the culverts underlying the roadways. However, the project has potential to result in indirect impacts to potential jurisdictional resources occurring adjacent to the project site as a result of runoff, erosion, siltation, or chemical and particulate pollution during project construction, which would be considered a significant impact. Implementation of mitigation measure BIO-2 would this impact to a level less than significant.

d. Less Than Significant Impact

As discussed in the Biological Resources Survey (see Appendix B), the project site consists of a heavily used paved road and an associated right-of-way that are primarily surrounded by residential properties and disturbed land. Though undeveloped land adjacent to the project site may provide habitat for urban-adapted species and local wildlife movement, it is not anticipated that these habitats would constitute a significant regional corridor due to the fragmented and disturbed nature of the undeveloped areas. The culverted vegetated channel that runs under Goetz Road appears to be mowed on an annual basis and is therefore unlikely to support significant wildlife movement. Furthermore, the proposed project would avoid impacts to the culvert underlying Goetz Road. In addition, Goetz Road is a three-lane paved road that supports a high volume of traffic, which is a deterrent for wildlife movement apart from birds. Furthermore, the project site is unlikely to support wildlife nursery sites or large roosting or breeding colonies due to the high density of residential and commercial development adjacent to the project site. Therefore, the proposed project would not 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, and impacts would be less than significant.

e. Less Than Significant Impact

The Menifee General Plan 2030 (Open Space and Conservation Element OSC-8: Biological) provides policies related to protecting biological resources and implementing the MSHCP. As discussed in further detail below, the proposed project would be consistent with the MSHCP, and therefore would not conflict with any Menifee General Plan 2030 policies pertaining to implementation of the MSHCP.

Furthermore, implementation of mitigation measures BIO-1 and BIO-2 described below would ensure consistency with the remaining policies related to the protection of biological resources. Although the City's Development Code (Chapter 9.200 Tree Preservation) has a Tree Preservation Ordinance that provides regulations and guidelines for the protection of existing trees, the project would not require any tree removal. Therefore, the proposed project would not conflict with any local policies or ordinances protecting biological resources, and impacts would be less than significant.

f. Potentially Significant Unless Mitigation Incorporated

The MSHCP is a comprehensive multi-jurisdictional habitat conservation plan focusing on the conservation of species and their associated habitats in western Riverside County. The MSHCP area encompasses 1.26 million acres (1,966 square miles), including all unincorporated Riverside County land west of the crest of the San Jacinto Mountains to the Orange County line, as well as the cities of Temecula, Murrieta, Lake Elsinore, Canyon Lake, Norco, Corona, Riverside, Moreno Valley, Banning, Beaumont, Calimesa, Perris, Hemet, Menifee, and San Jacinto. The MSHCP serves as an HCP pursuant to Section 10(a)(1)(B) of the FESA, as amended, as well as a natural community conservation plan under the Natural Community Conservation Planning Act of 2001. The MSHCP allocates responsibility for assembly and management of its Conservation Areas to local, state, and federal governments, as well as private and public entities engaged in construction that may impact MSHCP covered species.

The project site is located within the MSHCP area (Western Riverside County Regional Conservation Authority [WRCRCA 2003). As lead agency, the District is not a participant in the MSHCP; however, the project demonstrates it would not prevent implementation of the conservation goals and objectives of the MSHCP. The project is not located within a designated criteria cell, so no mitigation for impacts to vegetation communities would be required by the MSHCP. As described Section 4.3c above, implementation of mitigation measure BIO-2 would avoid impacts to potentially jurisdictional non-wetland waters. A portion of the project site is located within the MSHCP survey area for burrowing owl. As described in Section 4.3a above, a habitat assessment for burrowing owl was conducted in accordance with MSHCP guidelines and no burrowing owl individuals, California ground squirrel (*Otopermophilus* [=*Spermophilus*] *beecheyi)*, or burrow or burrow surrogates were observed. No suitable habitat was observed. The project site consists primarily of Goetz Road and associated roadside, which is a major thoroughfare, and developed residential lots. The disturbed areas within the project site and surrounding area are immediately adjacent to Goetz Road and are heavily disturbed, with dense non-native vegetation and evidence of repeated disturbance from mowing and vehicles. Due to the lack of suitable habitat, focused burrowing owl surveys are not required.

In 1996, USFWS approved a long-term HCP for Stephens' kangaroo rat and granted an incidental take permit for Riverside County covering an estimated 30,000 acres of occupied habitat within portions of unincorporated Riverside County and 10 member cities: Perris, Temecula, Murrieta, Lake Elsinore, Corona, Riverside, Moreno Valley, Perris, Hemet, and Wildomar (RCHCA 1996). The Stephens' Kangaroo Rat HCP authorizes the incidental take of half of the occupied habitat remaining in the HCP area while using development fees to implement the plan, purchase private property, and create a reserve system. The Stephens' Kangaroo Rat HCP and corresponding permits are in effect for areas covered by the MSHCP; however, the Stephens' Kangaroo Rat HCP and the MSHCP remain separate. The Stephens' Kangaroo Rat Fee Areas are subject to mandatory conservation measures as outlined in the Stephens' Kangaroo Rat HCP (RCHCA 1996) and as subsequently modified.

The project site is located within the Stephens' Kangaroo Rat HCP area. As lead agency, the District is not a participant in the Stephens' Kangaroo Rat HCP; however, the project demonstrates it would not prevent implementation of the conservation goals and objectives of the HCP as the project site is not part of a Stephens' kangaroo rat core reserve (RCHCA 1996). Therefore, the proposed project would not conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan, and impacts would be less than significant.

Mitigation Measures

BIO-1: Migratory and Nesting Birds

Construction shall be conducted outside of the avian and raptor breeding season, which is generally defined as January 15 to August 31. If construction must take place during the nesting season, a qualified biologist shall perform a preconstruction survey for nesting birds within the project site and a 500-foot buffer. The nesting bird survey shall occur no more than seven days prior to the start of construction. If active bird nests are confirmed to be present during the preconstruction survey, a buffer zone shall be established by a qualified biologist until the qualified biologist until the biologist has verified that the young have fledged, or the nest has otherwise become inactive.

BIO-2: Aquatic Resources

To avoid indirect impacts to potentially jurisdictional features, best management practices, such as the use of silt fences, fiber rolls, and/or gravel bags, shall be implemented. No equipment maintenance or fueling shall be performed within 100 feet of the adjacent wetlands where petroleum products or other pollutants from the equipment may enter this area.

4.5 Cultural Resources

Would the proposed project:

Issue	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
a. Cause a substantial adverse change in the significance of an historical resource pursuant to §15064.5?	☐	☐	☒	☐
b. Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?	☐	☐	☒	☐

Issue	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
c. Disturb human remains, including those interred outside of formal cemeteries?	☐	☒	☐	☐

EXPLANATIONS:

A Cultural Resources Constraints Report for the Quail Valley Subarea 4 Project was prepared in December 2020 by RECON, which included an evaluation of the development footprint of the proposed project (Appendix C - Confidential). The Cultural Resources Constraints Report provides documentation necessary to satisfy CEQA-Plus investigation, Section 106 of the National Historic Preservation Act (NHPA), and the National Environmental Policy Act (NEPA). This Cultural Resources Constraints Report included a cultural resources records search, Native American and local historic group consultation, historical map and imagery review, and a windshield survey on December 28, 2020. Additionally, RECON archaeologist Nathanial Yerka conducted a cultural resources pedestrian survey of the area of potential effect (APE), which consisted of the entire project site, on November 15, 2023. The results of the pedestrian survey are presented below.

a. Less Than Significant

The record search completed for the project site did not identify any prehistoric or historic resources within, or immediately adjacent to, the project site. Additionally, the pedestrian survey did not identify any prehistoric or historic cultural resources within the APE. Therefore, the proposed project would not cause a substantial adverse change in the significance of an historical resource pursuant to Section 15064.5 and impacts would be less than significant.

b. Less Than Significant

As described in Section 4.5a above, no archaeological resources have been previously recorded within or immediately adjacent to the project site. The pedestrian survey determined that the APE consists of a mix of developed and disturbed land composed of constructed roadway, driveways, and undeveloped shoulders. The project APE is fully disturbed, primarily due to construction of Goetz Road, which consists of paved roadway, cut-banks and fill areas, graded shoulders, curb-and-gutter alignments, ornamental planters, concrete sidewalk, and signal poles. The lateral locations include curb-and-gutter alignments, developed residential and commercial driveways, walking paths, ornamental vegetation, underground utilities, and utility poles.

In addition, a letter was sent on July 20, 2020 to the Native American Heritage Commission (NAHC) requesting a search of their Sacred Lands File to identify spiritually significant and/or sacred sites or traditional use areas in the project vicinity. The NAHC was also asked to provide a list of local Native American tribes, bands, or individuals that may have concerns or interests regarding cultural resources potentially occurring within the area of potential effect. A response was received from the NAHC on July 21, 2020 indicating that their Sacred Lands File search results were negative. As a result, the possibility of buried significant cultural resources being present is considered low. Therefore, the proposed project would not cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5. Impacts would be less than significant.

c. Potentially Significant Unless Mitigation Incorporated

There are no formal cemeteries or recorded burials in the vicinity of the project site. While no human remains are anticipated to be discovered during project construction, in the unexpected event that human remains are encountered during construction, mitigation measure CUL-1 would require the project to follow Public Resources Code Section 5097.98 and California Health and Safety Code Section 7050.5. Implementation of mitigation measure CUL-1 would reduce potential impacts to a level less than significant.

Mitigation Measures

CUL-1: Human Remains

If Native American human remains are encountered, Public Resources Code Section 5097.98 and California Health and Safety Code Section 7050.5 will be followed. If human remains are encountered, no further disturbance shall occur until the Riverside County Coroner has made the necessary findings as to origin. Further, pursuant to California Public Resources Code Section 5097.98(b), remains shall be left in place and free from disturbance until a final decision as to the treatment and disposition has been made. If the Riverside County Coroner determines the remains to be Native American, the coroner shall contact the NAHC within 24 hours. Subsequently, the NAHC shall identify the person or persons it believes to be the "most likely descendant." The most likely descendant (MLD) shall then make recommendations and engage in consultations concerning the treatment of the remains as provided in Public Resources Code Section 5097.98.

4.6 Energy

Would the proposed project:

Issue	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
a. Result in potentially significant environmental impacts due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?	☐	☐	☒	☐
b. Conflict with or obstruct a state or local plan for renewable energy or energy efficiency?	☐	☐	☒	☐

EXPLANATIONS:

a. Less Than Significant Impact

Construction of the proposed project would consume energy during both construction and operation. Energy use during construction would occur within two general categories: vehicle fuel used by workers commuting to and from the construction site, and fuel use by vehicles and other equipment to haul materials and conduct construction activities. While construction activities would consume fuels, project-related consumption of such resources would be temporary and would cease upon the completion of construction. In addition, mobile equipment energy usage during construction would be minimized as the proposed project would comply with CARB's idling regulations, which restrict idling diesel vehicles and equipment to five minutes. Additionally, consistent with state requirements, all construction equipment would meet CARB Tier 3 In-Use Off-Road Diesel Engine Standards. Engines are required to meet certain emission standards, and groups of standards are referred to as Tiers. A Tier 0 engine is unregulated with no emission controls, and each progression of standard level (i.e., Tier 1, Tier 2, Tier 3, etc.) generate lower emissions, use less energy, and are more advanced technologically than the previous tier. CARB's Tier 3 In-Use Off-Road Diesel Engine Standards requires that construction equipment fleets become cleaner and use less energy over time. The fuel consumed during construction would also be typical of similar construction projects and would not require the use of new energy resources beyond what are typically consumed in California. Therefore, construction of the proposed project would not result in wasteful, inefficient, or unnecessary consumption of energy resources, and impacts would be less than significant.

Operational energy usage would be minimal and would consist of occasional maintenance worker vehicle trips. Therefore, operation of the proposed project would not result in a wasteful, inefficient, or unnecessary consumption of energy resources, and impacts would be less than significant.

b. Less Than Significant Impact

Equipment required for pipeline construction would be subject to CARB's idling regulations and Tier 3 In-Use Off-Road Diesel Engine Standards. Operation of the proposed project would not require ongoing or regular use of a substantial amount of energy. Therefore, the proposed project would not conflict with any state or local plans for renewable energy or energy efficiency, and impacts would be less than significant.

4.7 Geology and Soils

Would the proposed project:

Issue	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
a. Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:				
i. Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault?	☐	☐	☒	☐
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 direct or indirect risks to life or property?	☐	☐	☒	☐

Issue	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No 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?	☐	☐	☐	☒
f. Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☐	☐	☒	☐

EXPLANATIONS:

The following section is based on the Geotechnical Investigation Report prepared by Inland Foundation Engineering, Inc. on November 20, 2020 (Appendix D) and the Supplemental Geotechnical Investigation Report prepared by Inland Foundation Engineering, Inc. on February 15, 2022 (Appendix E).

a.i. Less Than Significant Impact

The proposed project would not be associated with significant levels of risk of loss, injury or death from rupture of a known earthquake fault. Based on California's Geological Survey's Earthquake Fault Zone Map (California Geological Survey 2022), the project site is not within a Fault Zone. The nearest potentially active fault mapped in accordance with the Alquist-Priolo Earthquake Fault Zoning Act is the Glen Ivy North fault, which is a segment of the Elsinore Fault Zone. The Glen Ivy North Fault is located approximately 5.28 miles southwest of the project site. Therefore, the risk of earthquake ground rupture is low, and impacts related to the exposure of people or structures to rupture of a known earthquake fault would be less than significant.

a.ii. Less Than Significant Impact

The project site is located in a seismically active southern California region. However, the proposed project is limited to construction of sewer pipelines and would not introduce any residential, commercial, or other uses that could expose people to strong ground shaking. Therefore, impacts related to strong seismic shaking would be less than significant.

a.iii. Less Than Significant Impact

Liquefaction is the process by which clay-free soil, such as sands and silts, temporarily lose cohesion and strength and turn into a fluid state during a severe ground shaking event. This primarily occurs in areas saturated with high groundwater levels and recent deposits of sands and silts. The proposed project alignment would not be located within a state or county-designated liquefaction hazard zone. In addition, the project site is generally underlain by medium dense older alluvial soils and relatively shallow bedrock which are not susceptible to liquefaction. Therefore, impacts related to liquefaction would be less than significant.

a.iv. Less Than Significant Impact

Seismically induced landslides and other slope failures are common occurrences during or after earthquakes in areas of significant relief. As previously stated, the project site is not within a fault zone. The nearest potentially active fault mapped in accordance with the Alquist-Priolo Earthquake Fault Zoning Act is the Glen Ivy North fault, which is a segment of the Elsinore Fault Zone. The proposed pipeline alignments would be located within a relatively flat, paved roadway, and project design and construction would adhere to the recommendations in the Supplemental Geotechnical Investigation Report (see Appendix E). In addition, construction would be in accordance with the California Building Code (CBC) to meet all seismic design parameters. Therefore, through code compliance and adherence to the Geotechnical Investigation recommendations, the proposed project would not cause or increase the potential for landslides, and impacts would be less than significant.

b. Less Than Significant Impact

The proposed project would implement best management practices (BMPs) during construction consistent with the requirements of the NPDES Construction General Permit and the City standards that are designed to minimize erosion potential by controlling storm water flows and minimization of topsoil loss. Therefore, compliance with the requirements of the NPDES Construction General Permit would prevent substantial soil erosion or the loss of topsoil, and impacts would be less than significant.

c. Less Than Significant Impact

As described in the Section 4.7aiii. above, the project site is not located within a liquefaction hazard zone. Project excavation and pipeline construction would be conducted consistent with requirements of the 2022 CBC regarding unstable soils. Adherence to these guidelines would ensure that impacts associated with unstable soils would be less than significant.

d. Less Than Significant Impact

Expansive soils are those known to absorb water resulting in swelling. Expansive soils could cause serious damage to even lightweight structures such as roads, sidewalks, and driveways (Define Civil 2022). Construction of the pipelines would adhere to the recommendations in the Supplemental Geotechnical Investigation Report (see Appendix E). In addition, project excavation and construction would be conducted consistent with requirements of the CBC regarding expansive soils. Adherence to these guidelines and recommendations would ensure that impacts associated with expansive soils would be less than significant.

e. No Impact

The proposed project does not propose the use of septic tanks or alternative wastewater disposal systems. No impact would occur.

f. Less than Significant Impact

The project site is located within an area identified as having low paleontological sensitivity and undetermined sensitivity in Exhibit OSC-4 Paleologic Resource Sensitivity, of the Menifee General Plan (City of Menifee 2013). The project site is developed with paved roads that have been disturbed previously. Therefore, the possibility of buried paleontological resources being present within the project site is considered low, and impacts would be less than significant.

4.8 Greenhouse Gas Emissions

Would the proposed project:

Issue	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
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?	☐	☐	☒	☐

EXPLANATIONS:

a. Less Than Significant Impact

The District has not adopted its own greenhouse gas (GHG) thresholds of significance for CEQA. The SCAQMD published its Interim CEQA GHG Significance Thresholds for Stationary Sources, Rules, and Plans in 2008 (SCAQMD 2008). The interim thresholds are a tiered approach; projects may be determined to be less than significant under each tier or require further analysis under subsequent tiers. For the proposed project, the most appropriate screening threshold for determining GHG emissions is the SCAQMD proposed Tier 3 screening threshold (SCAQMD 2010); therefore, a significant impact would occur if the proposed project would exceed the SCAQMD proposed Tier 3 screening threshold of 3,000 metric tons carbon dioxide equivalent (MT CO_2E) per year. Based on guidance from the SCAQMD, total construction GHG emissions resulting from a project should be amortized over the lifetime of a project, which is defined as 30 years (SCAQMD 2009).

Pipeline construction would result in short-term emissions from construction activities. Construction emissions were calculated using RCEM and the parameters discussed in detail in Section 4.3b above. Total construction GHG emissions are summarized in Table 8.

Table 8 Summary of Total Construction GHG Emissions	
Phase/Year	GHG Emissions ($MT CO_2E$)
Grubbing/Land Clearing	119
Grading/Excavation	566
Drainage/Utilities/Sub-Grade	362
Paving	179
Total Construction Emissions	**1,226**
Amortized Construction Emissions	*41*
SCAQMD Tier 3 Threshold per year	*3,000*
SOURCE: Appendix A. NOTE: Totals may vary due to rounding	

As shown in Table 8, the proposed project would result in a total of 1,226 MT CO_2E over the entire construction period, which would be 41 MT CO_2E per year when amortized over the lifetime of the proposed project. After installation of the underground pipeline, there would be occasional inspection and maintenance trips. Routine sewer video inspection would occur approximately every three years, and cleaning would occur every five to ten years. These activities would be conducted by existing EMWD employees. Operational emissions associated with vehicle emissions from these maintenance activities would be negligible and there would be no other source of operational emissions. Overall, GHG emissions generated during construction and operation would be less than the 3,000 MT CO_2E annual screening threshold. Therefore, the proposed project would not generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment, and impacts would be less than significant.

b. Less Than Significant Impact

Executive Order (EO) S-3-05 and EO B-30-15 established GHG emission reduction targets for the state, and Assembly Bill 32 launched the CARB Climate Change Scoping Plan that outlined the reduction measures needed to reach the 2020 target, which the state has achieved. As required by Senate Bill 32, CARB's 2017 Scoping Plan outlines reduction measures needed to achieve the interim 2030 target, and the 2022 Scoping Plan outlines the path towards carbon neutrality by 2045. As detailed in the response under Section 4.8a above, the proposed project would result in construction GHG emissions below the SCAQMD proposed Tier 3 screening threshold of 3,000 MT CO_2E per year. Pipeline construction within the project site would not result in emissions that would adversely affect statewide attainment of GHG emission reduction goals as described in Assembly Bill 32, EOs S-3-05 and B-30-15, and Senate Bill 32. Therefore, construction emissions would have a less than cumulatively considerable contribution to global climate change.

Anaerobic decomposition in septic tanks produces fugitive emissions of methane. The proposed project would reduce the reliance on septic systems thereby reducing GHG emissions related to wastewater. The proposed project would not result in a significant increase in regional vehicle miles traveled since vehicle trips would be limited to occasional maintenance trips that would be performed by existing/planned District staff. The proposed project would be consistent with land use designations, as it is limited to a sewer pipeline extension and would not result in any permanent changes to the existing land use plan. The proposed project would not conflict with the transportation-related GHG reduction goals outlined in the Regional Transportation Plan because it is limited to a sewer pipeline extension to provide capacity needs for planned development within Subarea 5 and would not introduce any residential, commercial, or other uses that would generate vehicle trips. Operational vehicle trips would be limited to occasional maintenance activities. Furthermore, the proposed project would not conflict with energy efficiency standards or conflict with Southern California Edison's Renewables Portfolio Standard renewable energy goals as these are not applicable to project construction and operation. Therefore, the proposed project would not conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing GHG emissions, and impacts would be less than significant.

4.9 Hazards and Hazardous Materials

Would the proposed project:

Issue	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
a. Create a significant hazard to the public or the environment through 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?	☐	☐	☒	☐

Issue	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
e. For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard or excessive noise for people residing or working in the project area?	☐	☐	☐	☒
f. Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☐	☒	☐
g. Expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires?	☐	☐	☒	☐

EXPLANATIONS:

a. Less Than Significant Impact

The proposed project is limited to construction of a sewer pipeline and would not involve the routine transport, use, or disposal of significant hazardous materials. Project construction may involve the use of small amounts of solvents, cleaners, paint, oils and fuel for equipment. However, these materials are not acutely hazardous, and use of these common hazardous materials in small quantities would not represent a significant hazard to the public or environment. Additionally, project construction would be required to be undertaken in compliance with applicable federal, state, and local regulations pertaining to the proper use of these common hazardous materials. Compliance with these regulations is mandatory per standard permitting conditions.

At the state level, Title 22 of the California Code of Regulations and Hazardous Waste Control Law, Chapter 6.5 establishes the Department of Toxic Substance Control (DTSC). DTSC regulates the generation, transportation, treatment, storage, and disposal of hazardous waste under the Resource Recovery and Conservation Act and the California Hazardous Waste Control Law. Both laws impose “cradle to grave” regulatory systems for handling hazardous waste in a manner that protects human health and the environment. The California Environmental Protection Agency has delegated some of its authority under the Hazardous Waste Control Law to county health departments and other Certified Unified Program Agencies, including the Riverside County Department of Environmental Health.

At the federal level, the International Fire Code (IFC), created by the International Code Council, is the primary means for authorizing and enforcing procedures and mechanisms to ensure the safe handling and storage of any substance that may pose a threat to public health and safety. The IFC regulates the use, handling, and storage requirements for hazardous materials at fixed facilities. The IFC and the International Building Code (IBC) use a hazard classification system to determine what protective measures are required to protect fire and life safety. These measures may include construction standards, separations from property lines, and specialized equipment. To ensure that these safety measures are met, the IFC employs a permit system based on hazard classification. Therefore, the proposed project would not create a significant hazard to the public or the environment through routine transport, use, or disposal of hazardous materials, and impacts would be less than significant.

b. Less Than Significant Impact

As described in Section 4.9a above, operation of the proposed pipelines would not involve the routine transport, use, or disposal of significant hazardous materials. Furthermore, project construction would be required to implement the Division of Occupational Safety and Health of California Construction Safety Plan/Hazard Communication Program; in case of accidental release, the proposed project would be required to comply with the Code of Federal Regulations Section 1910.120. Roadways would be restored to pre-existing conditions once construction is completed. Therefore, the proposed project would not create upset and accident conditions that could result in the release of hazardous materials, and impacts would be less than significant.

c. Less Than Significant Impact

Quail Valley Elementary School is located approximately 400 feet west of the project site. Construction of the proposed project would not require the use of acutely hazardous materials and would be limited to the use of small amounts of lubricants, cleaners, paint, oils, adhesives, solvents, asphalt, and fuel for equipment. Use of these common hazardous materials in small quantities would not represent a significant hazard to the public or environment, and the use and handling of hazardous materials during construction would be conducted consistent with all applicable regulations (see Section 4.9a, above). Therefore, the proposed project would not emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school, and impacts would be less than significant.

d. Less Than Significant Impact

Review of the EnviroStor and GeoTracker databases determined that the project site is not located on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 (Department of Toxic Substances Control 2023 and State Water Resources Control Board 2023). Therefore, the proposed project is not located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5, and impacts would be less than significant.

e. No Impact

The project site is not located within the vicinity of a private airstrip. The nearest airport is the Perris Valley Airport, located approximately 4.2 miles northeast of the project site. In addition, Exhibits LU-5a through LU-5c in the Menifee General Plan (City of Menifee 2013) show that the project site is not located within an airport land use plan or within two miles of a public airport. Therefore, the project would not result in a safety hazard or excessive noise due to an airport. No impact would occur.

f. Less Than Significant Impact

Goetz Road is identified as an evacuation route in Exhibit S-9 of the Menifee General Plan (City of Menifee 2013). Construction of the proposed project within the right-of-way of Goetz Road would be temporary, and a Traffic Control Plan approved by the City would be required to ensure that traffic conditions are maintained, thereby allowing for emergency access during construction. Roadways would be restored to pre-existing conditions once construction is completed. Therefore, the proposed project would not impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan, and impacts would be less than significant.

g. Less Than Significant Impact

The project site is located in a High Fire Hazard Severity Zone as identified in Exhibit S-6 of the Menifee General Plan (City of Murrieta 2013). However, the project would not introduce any habitable structures that could expose people to a significant risk of loss, injury, or death involving wildland fires. Human presence would be limited to temporary construction and periodic maintenance. All construction would be required to comply with fire protection and prevention requirements specified by state law (California Code of Regulations) and the California Division of Occupational Safety and Health. This includes various measures such as easy accessibility of firefighting equipment, proper storage of combustible liquids, no smoking in service and refueling areas, and worker training for firefighter extinguisher use. Therefore, the proposed project would not expose people or structures, either directly or indirectly, to a significant risk of loss, injury, or death involving wildland fires, and impacts would be less than significant.

4.10 Hydrology and Water Quality

Would the proposed project:

Issue	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
a. Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality?	☐	☐	☒	☐
b. Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?	☐	☐	☒	☐

Issue	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
c. Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or through the addition of impervious surfaces in a manner, which would:	☐	☐	☒	☐
i. result in substantial erosion or siltation on- or off-site;	☐	☐	☒	☐
ii. substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site;	☐	☐	☒	☐
iii. create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or	☐	☐	☒	☐
iv. impede or redirect flood flows?	☐	☐	☒	☐
d. In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?	☐	☐	☐	☒
e. Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?	☐	☐	☒	☐

EXPLANATIONS:

a. Less Than Significant Impact

Construction of the proposed pipelines would have the potential to generate erosion/sedimentation and pollutants that could impact water quality. However, the proposed project would be subject to the NPDES permit requirements overseen by the District, including preparation and implementation of a SWPPP for the prevention of polluted runoff during construction. The proposed project would be required to prepare and implement a SWPPP identifying feasible BMPs prior to the commencement of construction activities, and to incorporate water quality design features to address potential erosion and siltation impacts. Upon completion of construction activities, the project site would be restored to pre-existing conditions. Therefore, the proposed project would not violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality, and impacts would be less than significant.

b. Less Than Significant Impact

Project construction would not increase the amount of impervious surface area, and therefore would not interfere with groundwater recharge. The proposed project would not introduce any residential, commercial, or other uses that would use groundwater. Therefore, the proposed project would not significantly decrease groundwater supplies or interfere with groundwater recharge or obstruct sustainable groundwater management, and impacts would be less than significant.

c.i. Less Than Significant Impact

Project construction would be located within the existing right-of-way of paved roads. As described in Section 4.10a above, the proposed project would implement construction BMPs, identified in the proposed project SWPPP, consistent with the NPDES Construction General Permit that would prevent erosion and storm water runoff during construction. Roadways would be restored to pre-existing conditions once construction is complete. Therefore, the proposed project would not substantially alter the drainage pattern of the site or the surrounding area in a manner that would result in substantial erosion or siltation on- or off-site, and impacts would be less than significant.

c.ii. Less Than Significant Impact

As described in Section 4.10a above, the proposed project would implement construction BMPs, identified in the proposed project SWPPP, consistent with the NPDES Construction General Permit that would control the rate or amount of surface runoff. Roadways would be restored to pre-existing conditions once construction is complete, and the proposed project would not result in an increase in the amount of impervious surface in the post-project condition. Therefore, the proposed project would not substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site, and impacts would be less than significant.

c.iii. Less Than Significant Impact

As described in Section 4.10a above, the proposed project would implement construction BMPs, identified in the proposed project SWPPP, consistent with the NPDES Construction General Permit that would minimize erosion and prevent pollution from affecting water quality and control the rate or amount of surface runoff. Roadways would be restored to pre-existing conditions once construction is complete, and the proposed project would not result in an increase in the amount of impervious surface in the post-project condition. Therefore, the proposed project would not 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, and impacts would be less than significant.

c.iv. Less Than Significant Impact

The project site is not located within a high-risk area or special flood hazard area as identified in Exhibit S-5 in the Menifee General Plan (City of Menifee 2013). The proposed project would be limited to construction of pipelines that would be located underground within developed ROWs and would not impede or redirect flood flows. Roadways would be restored to pre-existing conditions once construction is complete, and the proposed project would not result in an increase in the amount of impervious surface impervious surface in the post-project condition. Therefore, the proposed project would not impede or redirect flood flows, and impacts would be less than significant.

d. No Impact

Review of Exhibit S-5 of the Menifee General Plan determined that the project site is not located within an area mapped by the Federal Emergency Management Agency as the 100- or 500-year floodplain, or any other high-risk or special flood hazard area(City of Menifee 2013). The project site is located approximately 30 miles inland from the Pacific Ocean, and therefore is not subject to risk associated with tsunami. The nearest body of water, Canyon Lake, is located approximately 1.2 miles east of the project site. However, the proposed project is limited to sewer pipeline extension and would not introduce any residential, commercial, or other uses that could expose people to seiche inundation events. Additionally, the sewer pipeline extension would be located below ground, and the proposed project would not introduce any above ground structures that could release pollutants during a flood. Therefore, the proposed project would not result in impacts associated with flood hazard, tsunami, seiche zones, or release of pollutants due to project inundation. No impact would occur.

e. Less Than Significant Impact

As described in Section 4.10a above, project construction would implement construction BMPs, identified in the proposed project SWPPP, consistent with the NPDES Construction General Permit that would prevent erosion and pollution from affecting water quality. As described in Section 4.10b above, the proposed project would not decrease groundwater supplies or interfere with groundwater recharge. Therefore, the proposed project would not conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan, and impacts would be less than significant.

4.11 Land Use and Planning

Would the proposed project:

Issue	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
a. Physically divide an established community?	☐	☐	☒	☐
b. Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect?	☐	☐	☒	☐

EXPLANATIONS:

a. Less Than Significant Impact

The proposed project is limited to a sewer pipeline extension and would not result in any permanent changes to the existing land use plan or circulation network. The proposed project would extend the existing Goetz Road trunk sewer to provide capacity needs for planned development within Subarea 5. The proposed pipelines would be located within Goetz Road right-of-way from the intersection of Goetz Road and Rock Canyon Drive to the intersection of Goetz Road and Avenida Roble. Portions of the roadways would be closed during construction, and equipment staging would be located at the southeast corner of Juanita Drive and Goetz Road, requiring a temporary construction easement. Traffic control measures could create a temporary nuisance to residents adjacent to the project site; however, construction activities would be temporary. Access along Goetz Road would be maintained during construction. Operation of the proposed project would not result in any access restrictions since the pipelines are located underground. Ongoing maintenance would also not result in a disruption to the surrounding properties. Therefore, the proposed project would not physically divide an established community and impacts would be less than significant.

b. Less Than Significant Impact

The project site is within the existing Goetz Road right-of-way and does not have a General Plan designation or zoning. The proposed project is limited to a sewer pipeline extension and would not physically impact any surrounding land uses. The pipelines would be located below ground and would not result in any permanent changes above ground. As described in Section 4.4f above, the proposed project would be consistent with MSHCP, and would mitigate all potential impacts related to biological resources to a level less than significant. As described throughout this Draft IS/MND, all other impacts not requiring mitigation would be less than significant or would have no impact. Therefore, the proposed project would not conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect, and no impact would occur.

4.12 Mineral Resources

Would the proposed project:

Issue	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
a. Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	☐	☐	☐	☒
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?	☐	☐	☐	☒

EXPLANATIONS:

a. No Impact

Review of Exhibit OSC-3 of the Conservation Element of the Menifee General Plan 2030 determined that the project site is designated as MRZ-3, land for which the significance of mineral resources cannot be determined (City of Menifee 2013). Land classified as Mineral Resource Zone 3 is not considered a significant mineral resource. Therefore, the proposed project would not result in the loss of availability of known mineral resources that would be of value to the region and the residents of the state or of a locally important mineral resource recovery site. No impact would occur.

b. No Impact

There are no active mineral resource extraction facilities within the City (City of Menifee 2013). Therefore, the proposed project would not impact a locally important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan. No impact would occur.

4.13 Noise

Would the proposed project:

Issue	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
a. Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☐	☐	☒	☐
b. Generation of excessive ground borne vibration or ground borne noise levels?	☐	☐	☒	☐
c. For a project located within the vicinity of a private airstrip or an airport land use plan, or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the area to excessive noise levels?	☐	☐	☐	☒

EXPLANATIONS:

a. Less Than Significant Impact

Noise Fundamentals

Noise is defined as sound that is loud, unpleasant, unexpected, or undesired, and therefore, may cause general annoyance, interference with speech communication, sleep disturbance, and, in the extreme, hearing impairment. Decibels (dB) are the standard unit of measurement of the sound pressure generated by noise sources and are measured on a logarithmic scale that quantifies sound intensity in a manner similar to the Richter scale for earthquake magnitudes. A doubling of the energy of a noise source, such as doubling of traffic volume, would increase the noise level by 3 dB; a halving of the noise energy would result in a 3 dB decrease.

The human ear is not equally sensitive to all frequencies within the sound spectrum. To accommodate this phenomenon, the A-weighted scale, which approximates the frequency response of the average young ear when listening to most ordinary everyday sounds, was devised. Noise levels using A-weighted measurements are written as dB(A). It is widely accepted that the average healthy ear can barely perceive changes of 3 dB(A) (increase or decrease) and that a change of 5 dB(A) is readily perceptible. An increase of 10 dB(A) is perceived as twice as loud, and a decrease of 10 dB(A) is perceived as half as loud (Caltrans 2013).

The impact of noise is not a function of loudness alone. The time of day when noise occurs and the duration of the noise are also important. In addition, most noise that lasts for more than a few seconds is variable in its intensity. Consequently, a variety of noise descriptors has been developed. The noise descriptors used for this study are the equivalent noise level (L_{eq}), the maximum noise level, and the community noise equivalent level (CNEL).

The L_{eq} is the equivalent steady-state noise level in a stated period of time that is calculated by averaging the acoustic energy over a time period; when no period is specified, a 1-hour period is assumed. The maximum noise level is the highest sound level occurring during a specific period.

The CNEL is a 24-hour equivalent sound level. The CNEL calculation applies an additional 5 dB(A) penalty to noise occurring during evening hours, between 7:00 p.m. and 10:00 p.m., and a 10 dB(A) penalty is added to noise occurring during the night, between 10:00 p.m. and 7:00 a.m. These increases for certain times are intended to account for the added sensitivity of humans to noise during the evening and night.

Regulatory Framework

The District, as a public agency, is not subject to other jurisdictional agencies' established noise standards. Likewise, as a public agency, the District is not subject to the City or County ordinances and would not be required to obtain variances. The District has not established an applicable noise standard of its own for permanent or temporary ambient noise levels. However, the District follows a "good neighbor" approach to adhering to local noise standards. The noise standards of the City are used for the purposes of evaluating the significance of the proposed project's noise levels for the purposes of this analysis under CEQA.

The MDC establishes the following noise provisions relative to the project: All construction activities shall adhere to MDC Section 9.210.060(C), which requires projects within the City located within one-quarter of a mile from an occupied residence to operate Monday through Saturday, except nationally recognized holidays, from 6:30 a.m. to 7:00 p.m. and prohibits construction from occurring on Sunday or nationally recognized holidays unless approval is obtained from the City Building Official or City Engineer. Compliance with MDC Section 9.210.060(C) would reduce construction-related noise impacts.

Neither the City General Plan Noise Element or MDC establish numeric maximum acceptable construction source noise levels at potentially affected receivers for CEQA analysis purposes. Therefore, a numerical construction threshold based on Federal Transit Administration (FTA) Transit Noise and Vibration Impact Assessment Manual is used for analysis of daytime construction impacts (FTA 2006). According to the FTA, project construction noise criteria should account for the existing noise environment, the absolute noise levels during construction activities, the duration of the construction, and the adjacent land use. Due to the lack of standardized construction noise thresholds, the FTA provides guidelines that can be considered reasonable criteria for construction noise assessment. The FTA considers a daytime exterior construction noise level of 80 dB(A) L_{eq} as a reasonable threshold for noise sensitive residential land use.

Construction Noise

Noise impacts from construction are a function of the noise generated by equipment, the location and sensitivity of nearby land uses, and the timing and duration of the noise-generating activities. Table 9 presents a list of noise generation levels for various types of equipment anticipated to be used for construction of the pipeline. The duty cycle is the amount of time that equipment generates the reported noise level during typical, standard equipment operation. The noise levels and duty cycles summarized in Table 9 are based on measurements and studies conducted by Federal Highway Administration (FHWA) and the FTA.

Table 9
Typical Construction Equipment Noise Levels

Equipment	Maximum Noise Level at 50 Feet [dB(A) L_{max}]	Typical Duty Cycle	Maximum Average Hourly Noise Level [dB(A) L_{eq}]
Backhoe/Loader	80	40%	76
Compressor	80	40%	76
Concrete Saw	90	20%	83
Generator	82	50%	79
Hydraulic Excavator	85	40%	81
Paver	85	50%	82
Pavement Breaker	85	20%	78
Sweeper[1]	84	40%	80
Water Truck[1]	84	40%	80
Utility Truck[2,3]	78	5%	65
Dump Trucks[3]	84	5%	71

SOURCE: FHWA 2006, FTA 2006.
[1]Sweeper and water truck noise assumed to be comparable to tractor noise.
[2]Utility truck noise assumed to be comparable to flat-bed truck noise.
[3]The dump truck and utility truck duty cycle was adjusted to 5 percent to represent the time this equipment is arriving at and departing from the site. Engines would be idle all other times.

Due to the complex nature of construction sites, construction noise from a linear project, such as a pipeline project, is assessed from the centerline of the alignment and work area. Maximum noise levels would occur when the construction equipment is nearest to a noise sensitive receiver. Although construction equipment may temporarily be located at the point on the alignment nearest to a receiver, throughout the day equipment would move along the alignment. Therefore, the distance from a receiver to the centerline of the alignment is not the same as the average distance during a given day from the receiver to construction equipment. Thus, average noise levels correlate to the area of active construction. Residential receivers are located in the project vicinity at a distance of 65 feet or more from the pipeline alignment. Due to hard soil conditions, it is estimated that approximately 30 feet of the pipeline would be constructed per day. For a receiver that is set back

65 feet from the active work area alignment, using the Pythagorean theorem ($a^2 + b^2 = c^2$), it is calculated that the receiver is at an average distance of 67 feet from the construction equipment ($\sqrt{(65^2 + 30^2)} = 67$). As construction activities begin to move faster than 30 feet per day after hard soil is excavated, the average distance between the receiver and the construction activity would increase and therefore the average noise level would decrease.

Construction noise levels were calculated assuming the simultaneous use of two pieces of construction equipment during each phase. Although more construction equipment would be present on-site, not all would be used at the same time. Noise levels from construction activities are typically considered point sources and would drop off at a rate of -6 dB(A) per doubling of distance over hard site surfaces, such as streets and parking lots. Construction noise attenuation is calculated using the following formula:

$$N_R = N_C + 20 \times \text{Log}(D_C/D_R)$$

Where,

N_R = Noise level at receiver

N_C = Construction equipment reference noise level

D_C = Construction equipment reference noise level distance (i.e., 50 feet)

D_R = Distance to receiver (i.e., 67 feet)

The average noise level at the residential receivers were then calculated for each phase. The results are summarized in Table 10. Noise calculations are provided in Appendix F.

Table 10
Construction Equipment Noise Levels

Phase	Equipment	Maximum Average Hourly Noise Level at 50 Feet [dB(A) L_{eq}]	Phase Duration (months)	Active Construction Area (feet/day)	Average Distance to Receiver (feet)	Average Noise Level at Receiver [dB(A) L_{eq}]
Grubbing/ Land Clearing	Concrete Saw	83	1.2	30	67	80
	Dump Truck	71				
	Total	**83**				
Grading/ Excavation	Excavator	81	5.4	30	67	79
	Front End Loader	76				
	Total	**82**				
Drainage/ Utilities/ Subgrade	Excavator	81	3.6	30	67	79
	Utility Truck	74				
	Total	**82**				
Paving	Paver	82	1.8	30	67	79
	Utility Truck	65				
	Total	**82**				

As shown in Table 10, construction noise levels are not anticipated to exceed 80 dB(A) L_{eq} at the adjacent residential uses. Furthermore, project construction would adhere to the following measures to the extent feasible:

- Construction activities would comply with MDC Section 9.210.060(C) and would only occur during daytime hours between 6:30 a.m. to 7:00 p.m.
- Prior to construction, the District in coordination with the construction contractor, shall provide written notification to all properties within 50 feet of the proposed project facilities informing occupants of the type and duration of construction activities. Notification materials shall identify a method to contact the District's program manager with noise concerns. Prior to construction commencement, the District program manager shall establish a noise complaint process to allow for resolution of noise problems. This process shall be clearly described in the notifications.
- Stationary noise-generating equipment shall be located as far from sensitive receptors as possible. Such equipment shall also be oriented to minimize noise that would be directed toward sensitive receptors. Whenever possible, other non-noise generating equipment (e.g., roll-off dumpsters) shall be positioned between the noise source and sensitive receptors.
- Equipment and staging areas shall be located as far from sensitive receptors as possible. At the staging location, equipment and materials shall be kept as far from adjacent sensitive receptors as possible.
- Construction vehicles and equipment shall be maintained in the best possible working order; operated by an experienced, trained operator; and shall utilize the best available noise control techniques (including mufflers, use of intake silencers, ducts, engine enclosures and acoustically attenuating shields or shrouds).
- Unnecessary idling of internal combustion engines shall be prohibited. In practice, this would require turning off equipment if it would idle for five or more minutes.
- Electrically powered equipment shall be used instead of pneumatic or internal combustion powered equipment, where feasible.
- The use of noise-producing signals, including horns, whistles, alarms, and bells, shall be for safety warning purposes only.

The below-ground pipeline would not generate noise during operation. Noise may be associated with occasional vehicle maintenance trips, but these trips would be negligible. Therefore, operation of the proposed project would not generate a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project, and impacts would be less than significant.

b. Less Than Significant Impact

Human reaction to vibration is dependent on the environment the receiver is in, as well as individual sensitivity. For example, outdoor vibration is rarely noticeable and generally not considered annoying. Typically, humans must be inside a structure for vibrations to become noticeable and/or annoying (FTA 2006). Based on several federal studies, the threshold of perception is 0.035 inch per second (in/sec) peak particle velocity (PPV), with 0.24 in/sec PPV being a distinctly perceptible (Caltrans 2013). Based on best available data, impacts for hydraulic breakers, or hammers, and other non-transient sources such as those associated with project construction shall be considered significant if the PPV exceeds 0.2 in/sec. Vibration perception would occur at structures, as people do not perceive vibrations without vibrating structures.

Construction activities produce varying degrees of ground vibration depending on the equipment and methods employed. While ground vibrations from typical construction activities rarely reach levels high enough to cause damage to structures, special consideration must be made when sensitive or historic land uses are near the construction site. The construction activities that typically generate the highest levels of vibration are blasting and impact pile driving. The proposed project would not require pile driving or blasting. The equipment with the greatest potential to generate vibration would be a jack hammer. According to the FTA, jack hammers generate vibration levels of 0.035 in/sec PPV at 25 feet. This vibration level would attenuate to 0.012 in/sec PPV at 65 feet, and therefore would not be perceptible at the nearest structures. Therefore, project construction would not generate excessive ground borne vibration or ground borne noise levels, and impacts would be less than significant.

Operation of the proposed project would not generate groundborne noise or vibration. No impact would occur.

c. No Impact

The project site is not located within the vicinity of a private airstrip. The nearest airport is the Perris Valley Airport, located approximately 4.2 miles northeast of the project site. In addition, Exhibits LU-5a through LU-5c in the Menifee General Plan (City of Menifee, 2013) show that the project site is not located within an airport land use plan or within two miles of a public airport. Therefore, the project would not result in a safety hazard or excessive noise due to an airport. No impact would occur.

4.14 Population and Housing

Would the proposed project:

Issue	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
a. Induce substantial unplanned population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	☐	☐	☒	☐
b. Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒

EXPLANATIONS:

a. Less Than Significant Impact

The proposed project is limited to a sewer pipeline extension and would not introduce any residential, commercial, or other uses. The proposed project would extend the existing Goetz Road trunk sewer to provide capacity needs for planned development within Subarea 5. As such, the project would meet existing and future demand for planned development and would not provide for excess capacity that could induce growth. Per RWQCB's Resolution R8-2020-0004, properties in all of Quail Valley within 200 feet of a sanitary sewer service, where a septic system is currently deployed, must connect to said sanitary sewer within 12 months of sewer availability. Since the subject portion of Goetz Road would host the trunk sewer extension, the 14 properties adjacent to that portion of Goetz Road would be required to connect to the trunk sewer introduced by the proposed project (see Figure 4). The proposed project would also involve abandonment of any existing septic systems. Note, the property near Canyon Heights Drive (29160 Goetz Road) would be unable to connect to the collector due to its septic system's location being too far to the south. Therefore, the project would not induce substantial unplanned population growth either directly or indirectly, and impacts would be less than significant.

b. No Impact

The proposed project is limited to a sewer pipeline extension within the existing right-of-way of Goetz Road and would not impact any existing residential structures. Therefore, the proposed project would not displace any existing people or housing. No impact would occur.

4.15 Public Services

Would the proposed project:

Issue	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
a. 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:				
i. Fire protection?	☐	☐	☐	☒
ii. Police protection?	☐	☐	☐	☒
iii. Schools?	☐	☐	☐	☒
iv. Parks?	☐	☐	☐	☒
v. Other public facilities?	☐	☐	☐	☒

EXPLANATIONS:

a.i through a.v. No Impact

The proposed project is limited to a sewer pipeline extension, and would not introduce any residential, commercial, or other uses that would require fire protection services, police protection services, school facilities, parks, or other public facilities. Other public facilities include libraries and government administrative services. The proposed project would extend the existing Goetz Road trunk sewer to provide capacity needs for planned development within Subarea 5. The proposed project is limited to a sewer pipeline extension, and would not introduce any residential uses that would generate any student enrollment that would increase demand for school services, parks, or other public facilities. As such, the project would meet existing and future demand for planned development and would not provide for excess capacity that could induce growth. Therefore, the proposed project would not require new or expanded fire protection facilities, police protection services, school facilities, parks, or other public facilities. No impact would occur.

4.16 Recreation

Would the proposed project:

Issue	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
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?	☐	☐	☐	☒

EXPLANATIONS:

a. No Impact

The proposed project is limited to a sewer pipeline extension and would not introduce any residential uses that would increase demand for parks. The proposed project would extend the existing Goetz Road trunk sewer to provide capacity needs for planned development within Subarea 5. As such, the project would meet existing and future demand for planned development and would not provide for excess capacity that could induce growth that would increase demand for parks. Therefore, no impacts to existing neighborhood and regional parks or other recreational facilities are anticipated to result from the proposed project.

b. No Impact

The proposed project is limited to a sewer pipeline extension and would not include recreational facilities or require the construction or expansion of recreational facilities. No impact would occur.

4.17 Transportation/Traffic

Would the proposed project:

Issue	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
a. Conflict with a program, plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities?	☐	☐	☒	☐
b. Conflict or be inconsistent with CEQA Guidelines Section 15064.3, subdivision (b)?	☐	☐	☒	☐
c. Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☐	☐	☒	☐
d. Result in inadequate emergency access?	☐	☐	☒	☐

EXPLANATIONS:

a. Less Than Significant Impact

The proposed project is limited to a sewer pipeline extension and would not introduce any residential, commercial, or other uses that would generate vehicle trips. The proposed pipelines would primarily serve the Quail Valley community. Operational traffic trips would be limited to periodic maintenance and inspection that would not affect intersection and roadway operations. Vehicle trips associated with project construction would be minimal and would not affect intersection and roadway segment operations on the surrounding roadway network.

Access to the project site for pipeline construction would be via Goetz Road. A Traffic Control Plan would be submitted to the City for approval. Excavation areas within the Goetz Road right-of-way would be plated during non-working hours. To allow the coordination of daily construction activity, the Traffic Control Plan would include measures to ensure that traffic conditions are maintained as near normal as practicable. Such measures would likely include standard efforts such as the use of cones, barriers, signs, and flaggers, where applicable. The proposed project would generate vehicle trips during construction in the form of haul trucks and worker commute vehicles; however, the number of vehicles generated would be limited and would not likely result in congestion on nearby roadways. Roadways would be restored to pre-existing conditions once construction is completed.

A bus stop for route 61 is located 112 feet north of the intersection of Rock Canyon Drive and Goetz Road, within the project site. Another bus stop for route 61 is located northwest of the project site on Palm Drive. The Traffic Control Plan would maintain access for Route 61 during construction. Furthermore, construction would not occur within sidewalks, and pedestrian and bicycle access would be maintained along Goetz Road. Goetz road would be restored to pre-existing conditions once construction is completed Therefore, project would not conflict with a program, plan, ordinance, or policy addressing the circulation system, and impacts would be less than significant.

b. Less Than Significant Impact

The proposed project would not result in any changes to the amount of travel required for local residents. Therefore, preparation of a Vehicle Miles Traveled Analysis per CEQA Guidelines Section 15064.3, subdivision (b) was not required, and impacts would be less than significant.

c. Less Than Significant Impact

The proposed project is limited to construction of sewer pipelines and would not result in any permanent changes to the existing circulation network. Construction within the right-of-way for Goetz Road would be temporary and include traffic control measures to allow continued access. Roadways would be restored to pre-existing conditions once construction is completed. Therefore, the proposed project would not substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses, and impacts would be less than significant.

d. Less Than Significant Impact

Construction within Goetz Road right-of-way would be temporary and include a Traffic Control Plan to allow continued access. Goetz road would be restored to pre-existing conditions once construction is completed. As described in Section 4.17a above, vehicle trips generated during construction and operation would not affect intersection and roadway operations. Therefore, the proposed project would not result in inadequate emergency access to or from the project site, and impacts would be less than significant.

4.18 Tribal Cultural Resources

Would the proposed project:

Issue	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
a. Would the project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and				

Issue	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:				
i. Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code Section 5020.1(k)?	☐	☐	☐	☒
ii. A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision © of Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision © of Public Resource Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe?	☐	☒	☐	☐

EXPLANATIONS:

a.i. No Impact

Assembly Bill 52 establishes a formal consultation process between the lead agency, the District, and all California Native American tribes within the area regarding tribal cultural resource evaluation. Assembly Bill 52 mandates that the lead agency must provide formal written notification to the designated contact of traditionally and culturally affiliated California Native American tribes that have previously requested notice. Native American tribes are notified early in the project review phase by written notification that includes a brief description of the proposed project, location, and the lead agency's contact information. The tribal contact then has 30 days to request project-specific consultation pursuant to this section (Public Resources Code Section 21080.1).

As a part of the consultation pursuant Public Resources Code Section21080.3.1(b), both parties may suggest mitigation measures (Public Resources Code Section 21082.3) that can avoid or substantially lessen potential significant impacts to tribal cultural resources or provide alternatives that would avoid significant impacts to a tribal cultural resource. The California Native American tribe may request consultation on mitigation measures, alternatives to the proposed project, or significant effects. The consultation may also include discussion on the environmental review, the significance of tribal cultural resources, the significance of the proposed project's impact on the tribal cultural resources, project alternatives, or the measures planned to preserve or mitigate impacts on resources. Consultation shall end when either (1) both parties agree on the mitigation measures to avoid or mitigate significant effects on a tribal cultural resource, or (2) a party, acting in good faith and after reasonable effort, concludes that mutual agreement cannot be reached.

Per Assembly Bill 52, the District initiated consultation with Native American tribes that are traditionally and culturally affiliated with the geographic area of the proposed project to identify resources of cultural or spiritual value to the tribe. On July 21, 2023, the District sent consultation notification letters to Native American tribes on the District's Master List pursuant to the requirements of Assembly Bill 52 pertaining to government-to government consultation. Table 11 summarizes the consultation efforts. To date, EMWD has conducted consultation with one federally recognized Native Tribe: The Pechanga Band of Luiseno Indians. An additional five Native American tribes were contacted but declined consultation or did not respond, as noted in Table 11.

Table 11
Assembly Bill 52 Consultation

Tribe	Individual Contacted	Date Letter Mailed	Response Received	Consultation Held
Soboba	Joseph Ontiveros	July 21, 2023	DNR	N/A
Pechanga	Ebru Ozdil	July 21, 2023	Accepted	November 8, 2023
Rincon	Cheryl Madrigal	July 21, 2023	Undecided	N/A
Agua Caliente	Pattie Garcia	July 21, 2023	Declined	N/A
San Manuel	Ryan Nordness	July 21, 2023	Declined	N/A
Morongo	Laura Chatterton	July 21, 2023	DNR	N/A
DNR = Did not respond; N/A = Consultation was not requested				

As described in Section 4.5a above, the record search completed for the project did not identify any historic resources within, or immediately adjacent to, the project site. Additionally, the pedestrian survey did not identify any historic cultural resources within the project site. Therefore, the project would not cause a substantial adverse change to a tribal cultural resource that would qualify or be eligible for listing in the California Register of Historical Resources or the local register of historical resources in accordance with the Public Resources Code Section 5020.1(k). No impact would occur.

a.ii. Potentially Significant Unless Mitigation Incorporated

During the consultation meeting with the Pechanga Band of Indians (Pechanga Tribe) on November 8, 2023, the Pechanga Tribe highlighted their concerns for the general area noting that it is within Traditional Use Areas and considered sensitive as there are existing sites in the surrounding areas. The tribe expressed concern with potential unearthing of unknown artifacts during grading, which would be considered significant. Implementation of mitigation measures TRIBAL-1 through TRIBAL-4 would reduce potential impacts to tribal cultural resources to a level less than significant.

Mitigation Measures

TRIBAL-1 Tribal Resources Monitoring Agreement

At least 30 days prior to the start of ground-disturbing activities, Eastern Municipal Water District (District) shall contact the Consulting Tribe(s) to develop Cultural Resources Treatment Monitoring Agreement (Agreement). The Agreement shall address the treatment of archaeological resources that may be tribal cultural resources inadvertently discovered on the project site; project grading; ground disturbance and development scheduling; the designation, responsibilities, and participation of tribal monitor(s) during grading, excavation, and ground disturbing activities; and compensation for the tribal monitors, including overtime, weekend rates, and mileage reimbursement.

TRIBAL-2 Tribal Monitoring

Prior to the start of ground-disturbing activities, a tribal monitor may participate in the construction workers archaeological resources sensitivity training, conducted by the project archaeologist. At least seven business days prior to ground-disturbing activities, the District shall notify the tribe of the grading/excavation schedule and coordinate the tribal monitoring schedule.

A tribal monitor shall be present for ground-disturbing activities associated with the Project. Both the project archaeologist and tribal monitor working together will determine the areas with a potential for encountering potential tribal cultural resources. Both the archaeologist and tribal monitor shall have the authority to stop and redirect grading activities in order to evaluate the nature and significance of any archaeological resources discovered within the project limits. Such evaluation shall include culturally appropriate temporary and permanent treatment pursuant to the Cultural Resources Treatment and Monitoring Agreement, which may include avoidance of tribal cultural resources, in-place preservation, data recovery, and/or reburial so the resources are not subject to further disturbance in perpetuity. Any reburial shall occur at a location determined between the District and the consulting tribe as described in TRIBAL-4. Treatment may also include curation of the resources at a tribal curation facility or an archaeological curation facility, as determined in discussion among the District, the tribe, and the project archaeologist as addressed in the Cultural Resources Treatment and Monitoring Agreement. The on-site tribal monitoring shall end when all ground-disturbing activities on the project site are completed, or when the tribal representatives and tribal monitor have indicated that the project site has little or no potential for impacting tribal cultural resources.

TRIBAL-3 Disposition of Inadvertent Discoveries

In the event that tribal cultural resources are recovered during the course of grading, the District shall relinquish ownership of all cultural resources, including sacred items, burial goods, archaeological artifacts, and non-human remains. The District will coordinate with the project archaeologist and the tribe to conduct analysis of recovered resources. If it is determined that the resource is a Native American resource and thus significant under CEQA, avoidance of the resource will be explored as the preferred option and on-site reburial will be evaluated as the second option. If avoidance and on-site reburial are not possible, a treatment plan shall be prepared with state guidelines and in consultation with the tribe. The treatment plan may include, but would not be limited to capping in place, excavation and removal of the resource, interpretive displays, sensitive area signage, or other mutually agreed upon measures. Treatment may also include curation of the cultural resources at a tribal curation facility, as determined by the District and the consulting tribe.

TRIBAL-4 Non-Disclosure of Reburial Locations

It is understood by all parties that unless otherwise required by law, the site of any reburial of culturally sensitive resources shall not be disclosed and shall not be governed by public disclosure requirements of the California Public Records Act. The coroner, pursuant to the specific exemption set forth in California Government Code 6254(r), parties, and lead agencies will be asked to withhold public disclosure information related to such reburial.

4.19 Utilities and Service Systems

Would the proposed project:

Issue	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
a. Require or result in the relocation or construction of new or expanded water or wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects?	☐	☐	☐	☒
b. Have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry, and multiple dry years?	☐	☐	☒	☐
c. Result in a determination by the wastewater treatment provided 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?	☐	☐	☐	☒

Issue	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
d. Generate solid waste in excess of state or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals?	☐	☐	☒	☐
e. Comply with federal, state, and local statutes and regulation related to solid waste?	☐	☐	☒	☐

EXPLANATIONS:

a. No Impact

The proposed project is limited to a sewer pipeline extension and would not introduce any residential, commercial, or other uses that would require expanded water or wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities. The proposed project would extend the existing Goetz Road trunk sewer to provide capacity needs for planned development within Subarea 5. Therefore, the proposed project would not result in increased utilities demand that would cause significant environmental effects. No impact would occur.

b. Less Than Significant Impact

The proposed project is limited to a sewer pipeline extension and would not introduce any residential, commercial, or other uses that would require water supply. The proposed project would extend the existing Goetz Road trunk sewer to provide capacity needs for planned development within Subarea 5. Water consumption would be limited to small amounts during construction. Therefore, the proposed project would have sufficient water supplies available to serve the project, and impacts would be less than significant.

c. No Impact

The proposed project is limited to a sewer pipeline extension and would not introduce any residential, commercial, or other uses that would require expanded wastewater treatment capacity. The proposed project would extend the existing Goetz Road trunk sewer to provide capacity needs for planned development within Subarea 5. Therefore, the proposed project would not exceed existing wastewater treatment capacity and would accommodate existing and planned growth in the City. No impact would occur.

d. Less Than Significant Impact

Project construction would generate small amounts of waste that would likely be disposed of at either the Badlands Sanitary Landfill in Moreno Valley, the Lamb Canyon Landfill, located in Beaumont, or the El Sobrante Landfill, located in Corona. The Badlands Landfill has a remaining capacity of 15,748,799 cubic yards and a maximum permitted throughput of 4,800 tons per day, the

Lamb Canyon Landfill has a remaining capacity of 19,242,950 cubic yards and a maximum permitted throughput of 5,000 tons per day and the El Sobrante Landfill has a remaining capacity of 3,271,203 cubic yards and a maximum permitted throughput of 400 tons per day (California Department of Resources Recycling and Recovery 2023). All three landfills would have sufficient capacity to accommodate the small amounts of waste that would be generated during construction. Operation of the proposed project would not generate any solid waste. Therefore, the proposed project would not generate solid waste in excess of state or local standards, or in excess of the capacity of local infrastructure, and impacts would be less than significant.

e. Less Than Significant Impact

As described in Section 4.19d above, the proposed project would generate small amounts of waste during construction that would be disposed of at either the Badlands Sanitary Landfill, located in Moreno Valley, the Lamb Canyon Landfill, located in Beaumont, or the El Sobrante Landfill, located in Corona, which all have adequate capacity. The proposed project would dispose of these small amounts of waste, and recycle materials as feasible, consistent with the requirements of Chapter 6.40 of the City's Municipal Code. Operation of the proposed project would not generate any solid waste. Therefore, the proposed project would comply with federal, state, and local statutes and regulation related to solid waste, and impacts would be less than significant.

4.20 Wildfire

Would the proposed project:

Issue	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
a. Substantially impair an adopted emergency response plan or emergency evacuation plan?	☐	☐	☒	☐
b. Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to, pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire?	☐	☐	☐	☒
c. Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines, or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment?	☐	☐	☐	☒

Issue	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
d. Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes?	☐	☐	☐	☒

EXPLANATIONS:

a. Less Than Significant Impact

Goetz Road is identified as an evacuation route in Exhibit S-9 of the Menifee General Plan (City of Menifee 2013). However, construction within the right-of-way of Goetz Road would be temporary, and a Traffic Control Plan would be required to ensure that traffic conditions are maintained. Roadways would be restored to pre-existing conditions once construction is completed. Therefore, the proposed project would not impair an adopted emergency response plan or emergency evacuation plan, and impacts would be less than significant.

b. No Impact

As described in Section 4.9, the project site is located in a High Fire Hazard Severity Zone as identified in Exhibit S-6 in the Menifee General Plan (City of Murrieta 2013). However, the proposed project would not introduce any habitable structures that could expose people or structures to a significant risk of loss, injury, or death involving wildland fires. Human presence would be limited to temporary construction and periodic maintenance. Upon completion of pipeline construction, roadways would be restored to pre-existing conditions. Therefore, the project would not exacerbate wildfire risks, and thereby expose project occupants to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire. No impact would occur.

c. No Impact

As described in Section 4.9, the project site is located in a High Fire Hazard Severity Zone as identified in Exhibit S-6 in the Menifee General Plan (City of Murrieta 2013); however, the project is limited to a sewer pipeline extension and would not require any additional infrastructure. The pipeline would be installed underground, and roadways would be restored to pre-existing conditions once construction is completed. Therefore, the proposed project would not require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment. No impact would occur.

d. No Impact

As described in Section 4.9, the project site is located in a High Fire Hazard Severity Zone as identified in Exhibit S-6 in the Menifee General Plan (City of Murrieta 2013). However, the proposed project would not introduce any habitable structures that could expose people or structures to a significant risk of loss, injury, or death involving wildland fires. Human presence would be limited to temporary construction and periodic maintenance. Upon completion of pipeline construction, roadways would be restored to pre-existing conditions. The project site is not located within a high-risk area or special flood hazard area as identified in Exhibit S-5 in the Menifee General Plan (City of Menifee 2013). Therefore, the proposed project would not expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes. No impact would occur.

4.21 Mandatory Findings of Significance

Does the proposed project:

Issue	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
a. Have the potential to substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, substantially reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	☐	☒	☐	☐
b. 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 futures projects)?	☐	☒	☐	☐
c. Have environmental effects, which will cause substantial adverse effects on human beings, either directly or indirectly?	☐	☐	☒	☐

EXPLANATIONS:

a. Potentially Significant Unless Mitigation Incorporated

As described in Section 4.4a above, implementation of mitigation measure BIO-1 would reduce potential impacts to migratory and nesting birds. In addition, as described in Section 4.4c, implementation of mitigation measure BIO-2 would reduce potential impacts to jurisdictional features. The project does not have the potential to result in any other impacts that would substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, or substantially reduce the number or restrict the range of a rare or endangered plant or animal. As described in Section 4.5, the proposed project would not impact any historical or archeological resources.

b. Potentially Significant Unless Mitigation Incorporated

As described in the Draft IS/MND, all potential impacts would be mitigated to a level less than significant. Air quality is a regional issue and the cumulative study area for air quality impacts encompasses the SCAB as a whole. Therefore, the cumulative analysis addresses regional air quality plans and policies, such as the NAAQS, CAAQS, and SCAQMD 2016 AQMP as well as the project's contribution to a net increase of any criteria pollutant for which the SCAB is listed as a non-attainment area. As described in Section 4.3a above, the proposed project does not include growth-generating components, but rather would provide sewer service to existing development. As such, the proposed project would be consistent with growth projections contained in the Menifee General Plan and AQMP forecasts. Based on these considerations and pursuant to SCAQMD guidelines, project-related emissions are accounted for in the AQMP. Therefore, the proposed project would not conflict with or obstruct implementation of the applicable air quality plan. As described in Section 4.4 above, the proposed project would be consistent with the MSHCP. Projects that are consistent with the MSHCP would not contribute a cumulative impact to biological resources. As described in Section 4.5, implementation of mitigation measure CUL-1 would reduce potential impacts on human remains to a level less than significant. As described in Section 4.18, implementation of mitigation measures TRIBAL-1 through TRIBAL-4 would reduce potential impacts to tribal cultural resources to a level less than significant, thereby avoiding cumulative impacts. As described throughout the Draft IS/MND, all other project-level impacts not requiring mitigation would be less than significant or have no impact. Therefore, the project would not result in any project-level significant impacts that could contribute to an existing cumulative impact on the environment.

c. Less Than Significant Impact

As described in Sections 4.1 through 4.20, the proposed project would not result in any substantial adverse direct or indirect impacts to human beings. Therefore, impacts would be less than significant.

5.0 Federal Cross-Cutting Environmental Regulation Evaluation

Should the proposed project apply for funding from a federal program (U.S. Environmental Protection Agency) or a partially funded federal program (State Water Resources Control Board's [SWRCB] Clean Water State Revolving Fund), federal environmental review requirements must be met. Although CEQA was modeled after the NEPA, where there are differences between the state's process under CEQA and the applicable federal statutes and regulations, the federal statutes and regulations must be followed for a federal entity to fulfill its NEPA review requirements before releasing federal funds. Compliance is set out in the Code of Federal Regulations (CFR) at 40 CFR Section 35.3575 (Application of Federal cross-cutting authorities) and 7 CFR Section 1970 (Environmental Policies and Procedures). This section describes the proposed project's status of compliance with the federal cross-cutting regulations (also referred to as CEQA-Plus) and the consultation that has or will occur. These policies and procedures are based on the SWRCB's Appendix I: State Environmental Review Process, which addresses the U.S. EPA review requirements that build upon the state environmental review requirements under CEQA.

5.1 Federal Endangered Species Act

The Federal Endangered Species Act (FESA) establishes a program for the conservation of threatened and endangered plants and animals and the habitats in which they depend. Section 7 (16 United States Code [U.S.C.] Section 1531 et seq.) requires federal agencies to ensure their actions are not likely to jeopardize the continued existence of threatened or endangered species or result in the destruction or adverse modification of designated critical habitat. If a project could result in an incidental (unintentional but not unexpected) take of a threatened or endangered (listed) species, federal agencies must undergo consultation with the USFWS and/or National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service (NMFS) to obtain a Biological Opinion (BO). If the federal agency finds that the project is not likely to adversely affect listed species, the federal agency can consult informally, and if USFWS and NFMS agree with that finding, a concurrence letter can be issued. If the BO finds that the project could jeopardize the existence or habitat of a listed species ("jeopardy" opinion), the agency cannot authorize the project until it is modified to obtain a "non-jeopardy" opinion.

As described in Section 4.4 Biological Resources, the project site does not contain suitable habitat for any special status plant or special status wildlife species. The project site is located within the boundaries of the MSHCP plan area. The MSHCP allocates responsibility for assembly and management of its Conservation Areas to local, state, and federal governments, as well as private and public entities engaged in construction that may impact MSHCP covered species. The project site is not located inside or adjacent to any Criteria Area, Criteria Cell, or Conservation Area identified for conservation potential by the MSHCP; however, the project site is adjacent to various undeveloped parcels that are located within an MSHCP burrowing owl survey area. As lead agency, the District is not a participant in the MSHCP; however, due to the project's location adjacency to an MSHCP burrowing owl survey area, a Burrowing Owl Site Assessment was prepared by RECON in accordance with the guidelines developed by the County of Riverside (see Appendix B, Attachment

1). These guidelines require the project site and a 500-foot buffer surrounding the project site (burrowing owl survey area) be surveyed for burrowing owl. No burrowing owls, suitable burrows, California ground squirrel or suitable habitat were observed during the survey within the project site or the 500-foot buffer. Thus, burrowing owl surveys in accordance with the guidelines developed by the County of Riverside are not required.

Direct impacts to nesting and migratory birds are not anticipated. However, indirect noise impacts may occur to migratory and nesting birds if they are nesting in the adjacent habitat should construction occur during the general avian breeding season (February 1 to September 15). Implementation of mitigation measure BIO-1 would avoid impacts to nesting birds. Therefore, EMWD would be in compliance with the FESA.

5.2 National Historic Preservation Act

The NHPA (16 U.S.C. Section 470) establishes a program to protect, preserve, rehabilitate, and restore significant historical, archaeological, and cultural resources. Section 106 requires federal agencies to take into account effects on historic properties and involves a step-by-step procedure described in detail in the implementing regulations (36 CFR Part 800).

As described in Section 4.5 above, a Cultural Resources Constraints Report for the Quail Valley Subarea 4 Project was prepared in December 2020, which included an evaluation of the development footprint of the proposed project (Appendix C - Confidential). The Cultural Resources Constraints Report provides documentation to satisfy a CEQA-Plus investigation, and the requirements of NEPA, including Section 106 of the NHPA. This Cultural Resources Constraints Report included a cultural resources records search, historical map and imagery review, and a windshield survey on December 28, 2020. . RECON archaeologist Nathanial Yerka conducted a cultural resources pedestrian survey of the APE, which consisted of the entire project site, on November 15, 2023.

As described in Section 4.5 above, the record search completed for the project site did not identify any prehistoric or historic resources within, or immediately adjacent to, the project site. Additionally, the cultural resources pedestrian survey of the APE did not identify any prehistoric or historic cultural resources within the project site. A letter was sent on July 20, 2020 to the NAHC requesting a search of their Sacred Lands File to identify spiritually significant and/or sacred sites or traditional use areas in the project vicinity. A response was received from the NAHC on July 21, 2020 indicating that their Sacred Lands File search results were negative.

In compliance with Section 106 of the NHPA, the District sent government-to-government consultation initiation letters on January 12, 2024, to the tribal members provided in the NAHC list. Twenty-seven Native American tribes were contacted, and the District received responses from two tribes. Implementation of mitigation measures TRIBAL-1 through TRIBAL-4 would minimize, reduce, and avoid adverse effects on tribal cultural resources. Therefore, the proposed project will not result in an adverse effect to any historic properties as defined under Section 106 of the NHPA.

5.3 Clean Air Act

The U.S. Congress adopted general conformity requirements as part of the Clean Air Act (CAA) Amendments in 1990 and the U.S. EPA implemented those requirements in 1993 (Section 176 of the CAA (42 U.S.C. Section 7506) and 40 CFR Part 93, Subpart B). General Conformity requires that all federal actions "conform" with the State Implementation Plan as approved or promulgated by U.S. EPA. The purpose of the general conformity program is to ensure that actions taken by the federal government do not undermine state or local efforts to achieve and maintain the national ambient air quality standards. Before a federal action is taken, it must be evaluated for conformity with the State Implementation Plan. All "reasonably foreseeable" emissions predicted to result from the action are taken into consideration. These include direct and indirect emissions and must be identified as to location and quantity. If it is found that the action would create emissions above de minimis threshold (minimum threshold for which a conformity determination must be performed) levels specified in U.S. EPA regulations (40 CFR Section 93.153(b)), or if the activity is considered "regionally significant" because its emissions exceed 10 percent of an area's total emissions, the action cannot proceed unless mitigation measures are specified that would bring the proposed project into conformity.

As described in Section 4.3 Air Quality, the proposed project lies within the SCAB, which is designated an extreme nonattainment area for ozone and serious nonattainment area for $PM_{2.5}$. It is also designated as a maintenance area for CO. The General Conformity *de minimis* levels applicable to the SCAB and the estimated annual emissions due to construction are shown in Table 12. The results of the air quality modeling showed that pollutant emissions would not exceed SCAB General Conformity de minimis thresholds. Therefore, the general conformity requirements do not apply to the Project's emissions, it is exempt from a conformity determination, and the Project would comply with the CAA.

Table 12
Total Annual Construction Emissions
(tons per year)

	Pollutant					
	ROG	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
Grubbing/Land Clearing	0.05	0.42	0.54	0.00	0.08	0.03
Grading/Excavation	0.25	1.93	2.49	0.01	0.38	0.14
Drainage/Utilities/Sub-Grade	0.17	1.27	1.64	0.00	0.25	0.09
Paving	0.08	0.63	0.81	0.00	0.03	0.03
Total Annual Emissions	**0.56**	**4.26**	**5.48**	**0.01**	**0.75**	**0.29**
General Conformity de minimis level	*10*	*10*	*100*	--	--	*70*
Significant Impact?	No	No	No	No	No	No

ROG = reactive organic gases; NO_X = nitrogen oxides; CO = carbon monoxide; SO_X = sulfur oxides; PM_{10} = particulate matter less than 10 microns; $PM_{2.5}$ = particulate matter less than 2.5 microns

5.4 Coastal Zone Management Act

The Coastal Zone Management Act (CZMA; 16 U.S.C. Section 1451 et seq.) is managed by NOAA's Office of Ocean and Coastal Resource Management and designed to balance land and water issues in coastal zones. It also aims to "preserve, protect, develop, and where possible, to restore or enhance the resources of the nation's coastal zone." Within California, the CZMA is administered by the San Francisco Bay Conservation and Development Commission, the California Coastal Conservancy, and the California Coastal Commission.

As described in Section 4.10 Hydrology and Water Quality, the proposed project site is located approximately 30 miles from the Pacific Ocean. Therefore, no portion of the proposed project is within the coastal zone and the CZMA does not apply.

5.5 Farmland Protection Policy Act

The Farmland Protection Policy Act (7 U.S.C. Section 4201 et seq.) requires a federal agency to consider the effects of its actions and programs on the nation's farmlands. The Farmland Protection Policy Act is intended to minimize the impacts of federal programs with respect to the conversion of farmland to nonagricultural uses. It assures that, to the extent possible, federal programs are administered to be compatible with state, local, and private programs and policies to protect farmland.

As described in Section 4.2 Agriculture and Forestry Resources, the project site is not classified as Prime Farmland, Unique Farmland, or Farmland of Statewide Importance. Therefore, the proposed project would have no impact on the Farmland Protection Policy Act.

5.6 Executive Order 11988—Floodplain Management

EO 11988 requires federal agencies to recognize the values of floodplains and to consider the public benefits from restoring and preserving floodplains. As described under Section 4.10 Hydrology and Water Quality, the proposed project site is not located within the 100- or 500-year flood zone. The pipelines, once constructed, would be located underground and not susceptible to inundation in the event of flooding. The proposed project would not permanently alter existing flood channels, rivers, or floodplains. Because the proposed project would be located outside the 100- or 500-year floodplain, the proposed project would not increase flood hazards or interfere with floodplain management. The proposed project would be in compliance with this EO.

5.7 Federal Migratory Bird Treaty Act, Bald and Golden Eagle Protection Act, and Executive Order 13168

The Migratory Bird Treaty Act (16 U.S.C. Sections 703–712) and the Bald and Golden Eagle Protection Act (16 U.S.C. Section 668-668c) prohibit the take of migratory birds (or any part, nest, or eggs of any such bird) and the take and commerce of eagles. EO 13168 requires that any project with federal involvement address impacts of federal actions on migratory birds.

As described in Section 4.4 Biological Resources, nesting habitat within the project site is not anticipated. No nests or birds exhibiting nesting behaviors were observed during the reconnaissance site visit performed as part of the Biological Resources Assessment. However, indirect noise impacts may occur to migratory and nesting birds if they are nesting in the adjacent habitat should construction occur during the general avian breeding season (February 1 to September 15). These species are protected by the California Fish and Game Code Section 3503.5 and impacts to nesting individuals would need to be avoided. Implementation of mitigation measure BIO-1 avoid impacts to nesting birds, including those protected under the Migratory Bird Treaty Act, Bald and Golden Eagle Protection Act, and EO 13168. Therefore, EMWD would be in compliance with the Federal Migratory Bird Treaty Act, Bald and Golden Eagle Protection Act, and EO 13168.

5.8 Fish and Wildlife Coordination Act

The Fish and Wildlife Coordination Act as amended (16 U.S.C. Section 661 et seq.) is intended to promote conservation of fish and wildlife resources by preventing their loss or damage, and to provide for development and improvement of fish and wildlife resources in connection with water projects. Federal agencies undertaking water projects are required to fully consider recommendations made by USFWS, NMFS, and state wildlife agencies when any waterbody is impounded, diverted, controlled, or modified for any purpose. Compliance with the Fish and Wildlife Coordination Act is to be coordinated with FESA consultation.

The proposed project would not impound, divert or control surface water source. Therefore, the proposed project would not substantially decrease groundwater supplies or interfere with groundwater recharge such that there would be an adverse effect on fish and wildlife resources. The proposed project would not conflict with the Fish and Wildlife Coordination Act.

5.9 Executive Order 11990—Protection of Wetlands

Under EO 11990, federal agencies must avoid affecting wetlands unless it is determined that no practicable alternative is available. The EO directs federal agencies to provide leadership and act to minimize the destruction, loss, or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands in implementing civil works.

As described in Section 4.4 Biological Resources, an Aquatic Resources Delineation Report was prepared for the proposed project by RECON (see Appendix B, Attachment 2). The Aquatic Resources Delineation Report is used to identify and map the potential extent of the federal jurisdictional Waters of the U.S. As discussed in the Aquatic Resources Delineation Report, the extent of aquatic resources associated with watercourses that would likely be considered CDFW jurisdiction within the project site totals 0.12 acre wetland and 0.01 acre streambed for a total of 0.13 acre. The proposed project would avoid direct impacts to potentially jurisdictional non-wetland waters by avoiding the culverts underlying the roadways. However, the project has potential to result in indirect impacts to potential jurisdictional resources occurring adjacent to the project site. Implementation of mitigation measure BIO-2 would require the proposed project to avoid indirect impacts to potentially jurisdictional features through implementation of best management practices, such as the use of silt fences, fiber rolls, and/or gravel bags. Therefore, EMWD would be in compliance with EO 11990.

5.10 Executive Order 13112—Invasive Species

Under EO 13112, federal agencies must prevent and control introductions of invasive non-native species in a cost-effective and environmentally conscious manner to minimize their economic, ecological, and human health impacts. As directed by this EO, a national invasive species management plan guides federal actions to minimize invasive species and their impacts. To support implementation of this plan, USACE released a memorandum describing the USACE Invasive Species Policy. As part of this policy, all civil works projects are required to address invasive species and potential impacts the project may have.

Non-native plant species observed in the project site during the field survey included short-pod mustard (*Hirschfeldia incana*), stinknet (*Oncosiphon piluliferum*), filaree (*Erodium* sp.) ripgut brome (*Bromus diandrus*), and red brome (*Bromus rubens*), with a few native species including Coulter's lupine (*Lupinus sparsiflorus*), caterpillar phacelia (*Phacelia cicutaria* var. *hispida*), and California sand-aster (*Corethrogyne filaginifolia* var. *filaginifolia*).

Measures that control the spread of invasive species during construction will be implemented, such as using excavated soil onsite as fill to the extent possible and cleaning construction vehicle track-out on unpaved roads. In areas where revegetation is required, use of native species will be required, per the SWPPP, to ensure that introduction of invasive species does not occur. EMWD would therefore be in compliance with EO 13112.

5.11 Wild and Scenic Rivers Act

The Wild and Scenic Rivers Act (6 U.S.C. Section 1271 et seq.) was passed to preserve and protect designated rivers for their natural, cultural, and recreational value.

There are no designated wild and scenic rivers that cross, or are located adjacent to the project site, nor will any designated rivers be adversely affected by the proposed project. Therefore, the proposed project would not result in any impacts related to the Wild and Scenic Rivers Act.

5.12 Safe Drinking Water Act—Source Water Protection

Section 1424(e) of the Safe Drinking Water Act (42 U.S.C. Section 300f et seq.) established the U.S. EPA's Sole Source Aquifer Program. This program protects communities from groundwater contamination from federally funded projects.

Within U.S. EPA's Region 9, which includes California, there are nine sole source aquifers. None of these sole source aquifers are located beneath the project site (U.S. EPA 2019). Therefore, the Sole Source Aquifer Program does not apply to the proposed project and the proposed project would be in compliance with Section 1424(e) of the Safe Drinking Water Act.

5.13 Executive Order 13195—Trails for America in the 21st Century

The EO 13195 requires federal agencies to protect, connect, promote, and assist trails of all types throughout the Unites States.

According to Section 4.15 Public Services, there are no trails within the project site that would be temporarily or permanently impacted by the proposed project. Therefore, no adverse effects on trails would occur and the proposed project would be in compliance with EO 13195.

5.14 Executive Order 13007—Indian Sacred Sites

Sacred Sites are defined in EO 13007 as "any specific, discrete, narrowly delineated location on federal land that is identified by an Indian tribe, or Indian individual determined to be an appropriately authoritative representative of an Indian religion, as sacred by virtue of its established religious significance to, or ceremonial use by, an Indian religion; provided that the tribe or appropriately authoritative representative of an Indian religion has informed the agency of the existence of such a site."

As described in Section 4.18 Tribal Cultural Resources, the search of the Sacred Lands File at the NAHC performed as part of the Cultural Resources Constraints Report was negative. EMWD also conducted consultation with local Native American groups and local historical societies to obtain additional information, and performed an intensive pedestrian survey of the APE on November 15, 2023. Based on the results of these efforts, no Indian sacred sites were identified in the APE that would be impacted or adversely affected by the proposed project. Mitigation measure CUL-1 Human Remains would ensure proper procedures are in place if human remains are discovered during construction and for the remains analyzed to determine origin and disposition pursuant to PRC Section 5097.98. Therefore, EMWD would be in compliance with EO 13007.

5.15 Magnuson-Stevens Fishery Conservation and Management Act

The Magnuson-Stevens Fishery Conservation and Management Act as amended (16 U.S.C. Section 1801 et seq.) is the primary act governing federal management of fisheries in federal waters, from the 3-nautical-mile state territorial sea limit to the outer limit of the U.S. Exclusive Economic Zone. The act establishes exclusive U.S. management authority over all fishing within the U.S. Exclusive Economic Zone, all anadromous fish throughout their migratory range except when in a foreign nation's waters, and all fish on the continental shelf. The act establishes eight Regional Fishery Management Councils responsible for the preparation of fishery management plans to achieve the optimum yield from U.S. fisheries in their regions. The act also requires federal agencies to consult with the NMFS on actions that could damage essential fish habitat, as defined in the 1996 Sustainable Fisheries Act (Public Law 104-297). Essential fish habitat includes those habitats that support the different life stages of each managed species. A single species may use different habitats that consist of both the water column and underlying surface (e.g., streambed) throughout its life to support breeding, spawning, nursery, feeding, and protection functions.

As described in Section 4.4 Biological Resources, the proposed project would not be located in or impact any U.S. federal waters regulated under the Magnuson-Stevens Act. Therefore, the proposed project would have no impact on resident or migratory fish or fish habitat in the project site, and EMWD would be in compliance with the Magnuson-Stevens Act.

5.16 Executive Order 12898—Environmental Justice

This section describes the existing socioeconomic resources in the proposed project site and the regulatory setting pertaining to environmental justice-related issues. This section also evaluates the potential for the proposed project to disproportionately affect minority or low-income groups. The U.S. EPA (2023) defines environmental justice as:

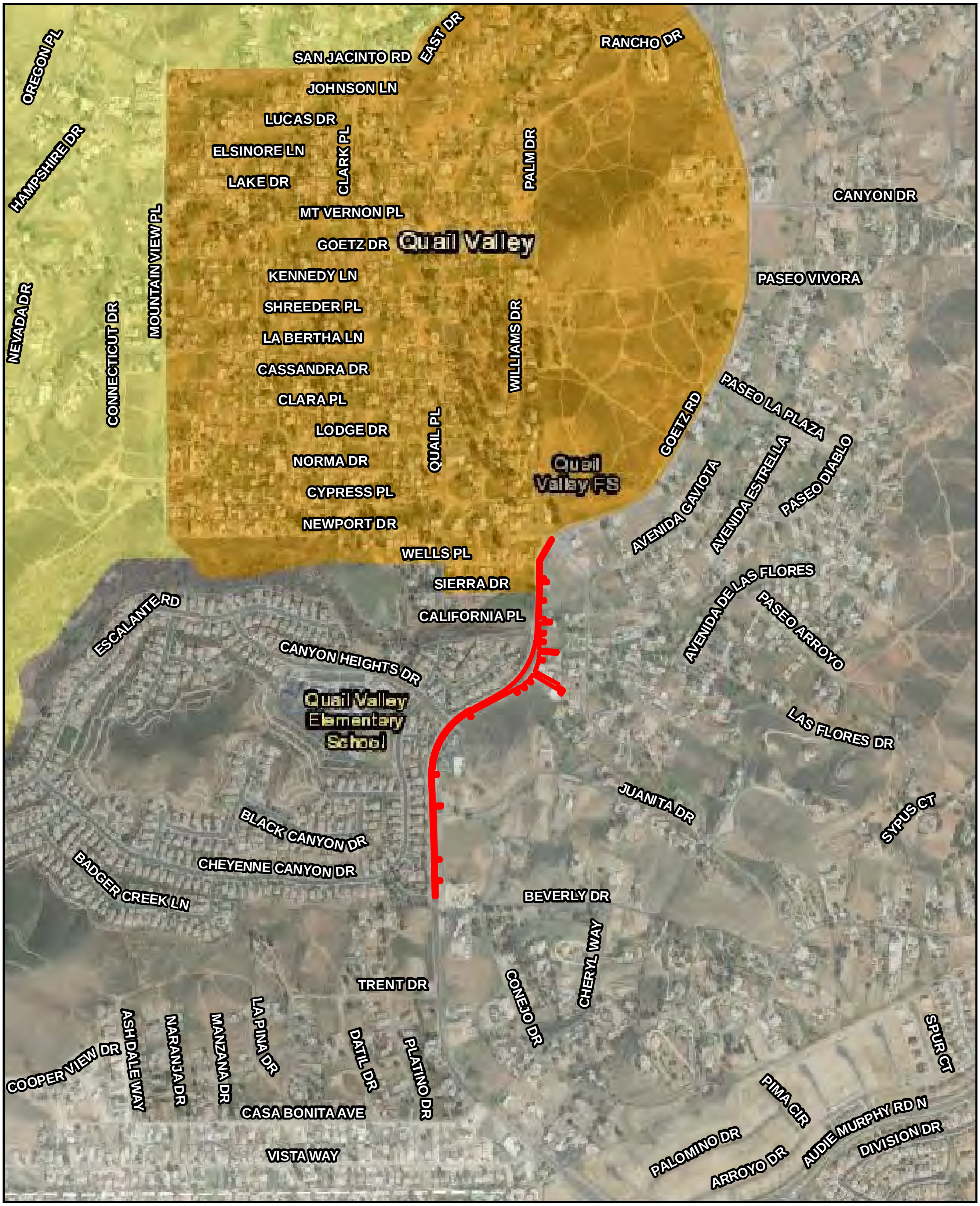
> The fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Fair treatment means no group of people, including racial, ethnic, or economic groups should bear a disproportionate share of the negative environmental consequences resulting from industrial, municipal, and commercial operations or the execution of federal, state, local, and tribal programs and policies.

According to U.S. EPA guidelines, a minority population is present in a study area if the minority population of the affected area exceeds 50 percent, or if the minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis.

The proposed project would be located in the Quail Valley community in the city of Menifee, California. According to the U.S. EPA's Environmental Screening and Mapping Tool (EJScreen), the majority of the project site is located within the 60-70 percentile, and the northernmost segment is located adjacent to the 90-95 percentile minority population (Figure 8). Therefore, the proposed project site is composed of a minority population exceeding 50 percent.

U.S. EPA guidelines recommend that analyses of low-income communities consider the U.S. Census Bureau's poverty level definitions, as well as applicable state and regional definitions of low-income and poverty communities.

The Department of Water Resources (DWR) defines a Disadvantaged Community (DAC) as a community with a median household income (MHI) less than 80 percent of the California MHI and a Severely Disadvantaged Community (SDAC) as a community with an MHI less than 60 percent of the California MHI. To identify the location of DAC and SDAC communities for its mapping tool, DWR (DWR 2023), relies on 2012-2016 American Community Survey data, which defines the statewide MHI was $63,783. A DAC would therefore be a community with an MHI of $51,026 or less and an SDAC would be a community with an MHI of $38,270 or less. According to the DWR Mapping Tool as shown in Figure 9, the majority of the project site is located within the less than 50 percentile, and the northernmost segment is located adjacent to the 90-95 percentile.



Project Boundary

0 Feet 1,000

Demographic Index (National Percentiles)

90 - 95 Percentile

80 - 90 Percentile

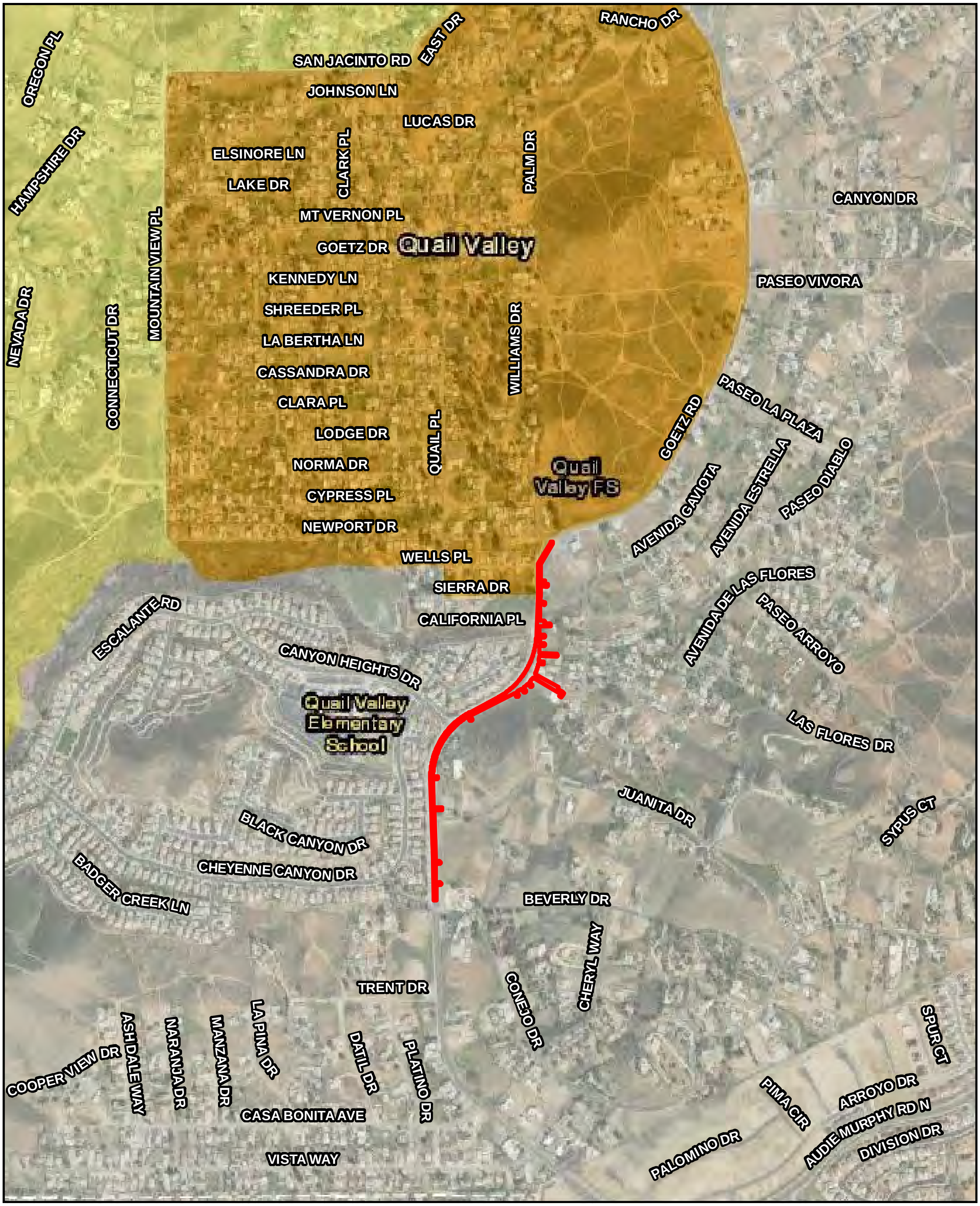
60 - 70 Percentile

Less Than 50 Percentile

RECON

FIGURE 8
Minority Population

M:\JOBS5\9878.11\common_gis\fig8_mnd.mxd 03/25/2024 bma



Project Boundary

Low Income (National Percentiles)

90 - 95 Percentile

80 - 90 Percentile

Less Than 50 Percentile

RECON

M:\JOBS5\9878.11\common_gis\fig9_mnd.mxd 03/25/2024 bma

FIGURE 9
Disadvantaged Communities

For the purposes of this analysis, an environmental justice impact would be significant if the proposed project would directly, indirectly, or cumulatively cause disproportionately high and adverse impacts to minority or low-income populations.

The proposed project would extend the existing Goetz Road trunk sewer to meet capacity needs for existing development. Although construction of the proposed project has the potential for short-term environmental impacts related to air quality, noise, hazards and hazardous materials, and transportation as described in Chapter 4.0 above, such activities would be intermittent and temporary and would cease upon completion of work activities. Where potential impacts would occur (e.g., biological resources), mitigation measures have been identified to reduce such effects to less than significant levels. Operation of the proposed project would have the long-term benefit of providing reliable wastewater services for the community which is served by EWMD.

In consideration of the benefits provided to these communities through implementation of the proposed project and with the identified mitigation measures, the proposed project would not result in any disproportionately high and adverse impacts on minority or low-income communities. Therefore, the proposed project would be in compliance with EO 12898.

6.0 Preparers

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Cailin Lyons, Biology Director
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Benjamin Arp, GIS Specialist
Stacey Higgins, Senior Production Specialist

7.0 Sources Consulted

Project Description

Eastern Municipal Water District (EMWD)
2015 EMWD Specifications Detailed Provisions Section 02201 – Construction Methods & Earthwork of the Standard Detailed Provisions.

U.S. Geological Survey (USGS)
1979 Murrieta quadrangle, Township 7 South, Range 3 West.

Aesthetics

California Department of Transportation (Caltrans)
2023 California State Scenic Highway Scenic Map. https://caltrans.maps.arcgis.com/apps/webappviewer/index.html?id=465dfd3d807c46cc8e8057116f1aacaa. Accessed October 25, 2023.

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2013 The City of Menifee General Plan Vision 2030.

Agriculture and Forestry Resources

California Department of Conservation
2022 California Important Farmland Finder. https://maps.conservation.ca.gov/dlrp/ciff/. Accessed October 25, 2023.

Air Quality

Bay Area Air Quality Management District
2017 California Environmental Quality Act Air Quality Guidelines. May.

Office of Environmental Health Hazard Assessment (OEHHA)
2015 Air Toxics Hot Spots Program Guidance Manual for the Preparation of Risk Assessments (Guidance Manual), February.

Sacramento Metropolitan Air Quality Management District (SMAQMD)
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South Coast Air Quality Management District (SCAQMD)
1993 SCAQMD CEQA Air Handbook. November.

2008 Final Localized Significance Threshold Methodology. July.

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Urban Crossroads
2022 Quail Hill (TTM No. 37692) Traffic Study. Accessed at https://ceqanet.opr.ca.gov/2022100107. Revised February 2022.

Biological Resources

Riverside County Habitat Conservation Agency (RCHCA)
1996 Habitat Conservation Plan for the Stephens' Kangaroo Rat in Western Riverside County.

U.S. Army Corps of Engineers (USACE)
1987 Corps of Engineers Wetlands Delineation Manual.

2008 Wetland Determination Data Form – Arid West Region.

Western Riverside County Regional Conservation Authority (WRCRCA)
2003 Western Riverside County Multiple Species Habitat Conservation Plan. Prepared by Dudek and Associates. Approved February. https://www.wrc-rca.org/Permit_Docs/MSHCP/MSHCP-Volume%201.pdf. https://rctlma.org/Portals/0/mshcp/volume3/Exhibit_C.html; https://rctlma.org/Portals/0/mshcp/volume3/Exhibit_E.html; and https://rctlma.org/multiple-species-habitat-conservation-plan-mshcp-volume-1-table-9-2.

Geology and Soils

California Geological Survey
2022 CGS Earthquake Zones. https://maps.conservation.ca.gov/cgs/EQZApp/.

Define Civil
2022 Expansive Soils – Identification – Types – Fixing – Properties -Examples. https://definecivil.com/expansive-soils/.

Menifee, City of
2013 The City of Menifee General Plan Vision 2030.

Greenhouse Gas Emissions

South Coast Air Quality Management District (SCAQMD)
2008 Interim CEQA GHG Significance Thresholds for Stationary Sources, Rules, and Plans.

2009 Greenhouse Gas CEQA Significance Threshold Stakeholder Working Group 14. http://www.aqmd.gov/ceqa/handbook/GHG/2009/nov19mtg/ghgmtg14.pdf.

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Hazards and Hazardous Materials

Department of Toxic Substances Control
2023 EnviroStor. https://www.envirostor.dtsc.ca.gov/public/.

State Water Resources Control Board
2023 GeoTracker. https://geotracker.waterboards.ca.gov/.

Menifee, City of

2013 The City of Menifee General Plan Vision 2030.

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Hydrology and Water Quality

Menifee, City of

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Mineral Resources

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California Department of Transportation (Caltrans)

2013 Technical Noise Supplement. November.

Federal Highway Administration (FHWA)

2006 Roadway Construction Noise Model User's Guide. FHWA-HEP-05-054, SOT-VNTSC-FHWA-05-01. Final Report. January.

Federal Transit Administration (FTA)

2006 Transit Noise and Vibration Impact Assessment. Washington, DC. May.

Utilities and Service Systems

California Department of Resources Recycling and Recovery (CalRecycle)

2023 Solid Waste Information System. https://www2.calrecycle.ca.gov/swfacilities/Directory/.

Wildfire

Menifee, City of

2013 The City of Menifee General Plan Vision 2030.

Federal Cross-Cutting Environmental Regulation Evaluation

California Department of Water Resources (DWR).

2023 DAC Mapping Tool. https://water.ca.gov/Work-With-Us/Grants-And-Loans/Mapping-Tools.

U.S. Environmental Protection Agency (U.S. EPA)

2023 Learn About Environmental Justice. https://www.epa.gov/environmentaljustice/learn-about-environmental-justice#:~:text=Environmental%20justice%20(EJ)%20is%20the,environmental%20laws%2C%20regulations%20and%20policies.

APPENDICES

APPENDIX A

Air Quality Calculations

Goetz Road Trunk Sewer
Calculation Details

Pipeline Length:

4,800	feet
5,280	feet/mile
0.91	miles

Project Area:

2.23	acres

Asphalt Export:

4,800	feet paved
5	feet wide
0.25	feet deep (3 inch asphalt depth)
6,000	cubic feet
27	cubic feet/cubic yard
222.22	cubic yards
20	cubic yard truck capacity
12	hauling trips (rounded up)
1.2	month grubbing/land clearing phase
22	work days/month
26.4	days
9	cubic yards/day (rounded up)

Soil Export

4,800	feet long
5	feet wide
10	feet deep
240,000	cubic feet
27	cubic feet/cubic yard
8,888.89	cubic yards
4,444.44	cubic yards hauled away (half)
20	cubic yard truck capacity
223	hauling trips (rounded up)
5.4	month grading/excavation phase
22	work days/month
118.8	days
38	cubic yards/day (rounded up)

Road Construction Emissions Model, Version 9.0.1

Daily Emission Estimates for -> Goetz Road Trunk Sewer

Project Phases (Pounds)	ROG (lbs/day)	CO (lbs/day)	NOx (lbs/day)	Total PM10 (lbs/day)	Exhaust PM10 (lbs/day)	Fugitive Dust PM10 (lbs/day)	Total PM2.5 (lbs/day)	Exhaust PM2.5 (lbs/day)	Fugitive Dust PM2.5 (lbs/day)	SOx (lbs/day)	CO2 (lbs/day)	CH4 (lbs/day)	N2O (lbs/day)	CO2e (lbs/day)
Grubbing/Land Clearing	4.16	40.63	32.19	6.37	1.37	5.00	2.33	1.29	1.04	0.10	9,877.24	2.36	0.11	9,968.13
Grading/Excavation	4.24	41.95	32.50	6.44	1.44	5.00	2.36	1.32	1.04	0.11	10,399.30	2.37	0.13	10,498.59
Drainage/Utilities/Sub-Grade	4.20	41.29	32.03	6.40	1.40	5.00	2.34	1.30	1.04	0.10	9,983.92	2.36	0.09	10,071.25
Paving	4.18	41.03	31.91	1.38	1.38	0.00	1.29	1.29	0.00	0.10	9,901.48	2.36	0.09	9,988.16
Maximum (pounds/day)	4.24	41.95	32.50	6.44	1.44	5.00	2.36	1.32	1.04	0.11	10,399.30	2.37	0.13	10,498.59
Total (tons/construction project)	0.56	5.48	4.26	0.75	0.19	0.56	0.29	0.17	0.12	0.01	1,339.51	0.31	0.02	1,351.78

Notes:
- Project Start Year -> 2024
- Project Length (months) -> 12
- Total Project Area (acres) -> 2
- Maximum Area Disturbed/Day (acres) -> 1
- Water Truck Used? -> Yes

Phase	Total Material Imported/Exported Volume (yd^3/day) Soil	Asphalt	Daily VMT (miles/day) Soil Hauling	Asphalt Hauling	Worker Commute	Water Truck
Grubbing/Land Clearing	0	9	0	30	280	5
Grading/Excavation	38	0	60	0	880	5
Drainage/Utilities/Sub-Grade	0	0	0	0	600	5
Paving	0	0	0	0	480	5

PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.

Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns G and H. Total PM2.5 emissions shown in Column I are the sum of exhaust and fugitive dust emissions shown in columns J and K.

CO2e emissions are estimated by multiplying mass emissions for each GHG by its global warming potential (GWP), 1 , 25 and 298 for CO2, CH4 and N2O, respectively. Total CO2e is then estimated by summing CO2e estimates over all GHGs.

Total Emission Estimates by Phase for -> Goetz Road Trunk Sewer

Project Phases (Tons for all except CO2e. Metric tonnes for CO2e)	ROG (tons/phase)	CO (tons/phase)	NOx (tons/phase)	Total PM10 (tons/phase)	Exhaust PM10 (tons/phase)	Fugitive Dust PM10 (tons/phase)	Total PM2.5 (tons/phase)	Exhaust PM2.5 (tons/phase)	Fugitive Dust PM2.5 (tons/phase)	SOx (tons/phase)	CO2 (tons/phase)	CH4 (tons/phase)	N2O (tons/phase)	CO2e (MT/phase)
Grubbing/Land Clearing	0.05	0.54	0.42	0.08	0.02	0.07	0.03	0.02	0.01	0.00	130.38	0.03	0.00	119.37
Grading/Excavation	0.25	2.49	1.93	0.38	0.09	0.30	0.14	0.08	0.06	0.01	617.72	0.14	0.01	565.74
Drainage/Utilities/Sub-Grade	0.17	1.64	1.27	0.25	0.06	0.20	0.09	0.05	0.04	0.00	395.36	0.09	0.00	361.81
Paving	0.08	0.81	0.63	0.03	0.03	0.00	0.03	0.03	0.00	0.00	196.05	0.05	0.00	179.41
Maximum (tons/phase)	0.25	2.49	1.93	0.38	0.09	0.30	0.14	0.08	0.06	0.01	617.72	0.14	0.01	565.74
Total (tons/construction project)	0.56	5.48	4.26	0.75	0.19	0.56	0.29	0.17	0.12	0.01	1339.51	0.31	0.02	1,226.33

PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.

Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns G and H. Total PM2.5 emissions shown in Column I are the sum of exhaust and fugitive dust emissions shown in columns J and K.

CO2e emissions are estimated by multiplying mass emissions for each GHG by its global warming potential (GWP), 1 , 25 and 298 for CO2, CH4 and N2O, respectively. Total CO2e is then estimated by summing CO2e estimates over all GHGs.

The CO2e emissions are reported as metric tons per phase.

Road Construction Emissions Model Version 9.0.1
Data Entry Worksheet

Note: Required data input sections have a yellow background.
Optional data input sections have a blue background. Only areas with a yellow or blue background can be modified. Program defaults have a white background.
The user is required to enter information in cells D10 through D24, E28 through G35, and D38 through D41 for all project types.
Please use "Clear Data Input & User Overrides" button first before changing the Project Type or begin a new project.

To begin a new project, click this button to clear data previously entered. This button will only work if you opted not to disable macros when loading this spreadsheet.

SACRAMENTO METROPOLITAN AIR QUALITY MANAGEMENT DISTRICT

Input Type

Project Name	Goetz Road Trunk Sewer	
Construction Start Year	2024	Enter a Year between 2014 and 2040 (inclusive)
Project Type For 4: Other Linear Project Type, please provide project specific off-road equipment population and vehicle trip data	4	1) New Road Construction : Project to build a roadway from bare ground, which generally requires more site preparation than widening an existing roadway 2) Road Widening : Project to add a new lane to an existing roadway 3) Bridge/Overpass Construction : Project to build an elevated roadway, which generally requires some different equipment than a new roadway, such as a crane 4) Other Linear Project Type: Non-roadway project such as a pipeline, transmission line, or levee construction
Project Construction Time	12.00	months
Working Days per Month	22.00	days (assume 22 if unknown)
Predominant Soil/Site Type: Enter 1, 2, or 3 (for project within "Sacramento County", follow soil type selection instructions in cells E18 to E20 otherwise see instructions provided in cells J18 to J22)	2	1) Sand Gravel : Use for quaternary deposits (Delta/West County) 2) Weathered Rock-Earth : Use for Laguna formation (Jackson Highway area) or the lone formation (Scott Road, Rancho Murieta) 3) Blasted Rock : Use for Salt Springs Slate or Copper Hill Volcanics (Folsom South of Highway 50, Rancho Murieta)
Project Length	0.60	miles
Total Project Area	2.23	acres
Maximum Area Disturbed/Day	0.50	acres
Water Trucks Used?	1	1. Yes 2. No

Please note that the soil type instructions provided in cells E18 to E20 are specific to Sacramento County. Maps available from the California Geologic Survey (see weblink below) can be used to determine soil type outside Sacramento County. NEW LINK 8-2-2022.

https://maps.conservation.ca.gov/cgs/gmc/

Material Hauling Quantity Input

Material Type	Phase	Haul Truck Capacity (yd^3) (assume 20 if unknown)	Import Volume (yd^3/day)	Export Volume (yd^3/day)
Soil	Grubbing/Land Clearing			
	Grading/Excavation	20.00		38.00
	Drainage/Utilities/Sub-Grade			
	Paving			
Asphalt	Grubbing/Land Clearing	20.00		9.00
	Grading/Excavation			
	Drainage/Utilities/Sub-Grade			
	Paving			

Mitigation Options

On-road Fleet Emissions Mitigation		Select "2010 and Newer On-road Vehicles Fleet" option when the on-road heavy-duty truck fleet for the project will be limited to vehicles of model year 2010 or newer
Off-road Equipment Emissions Mitigation		Select "20% NOx and 45% Exhaust PM reduction" option if the project will be required to use a lower emitting off-road construction fleet. The SMAQMD Construction Mitigation Calculator can be used to confirm compliance with this mitigation measure (http://www.airquality.org/Businesses/CEQA-Land-Use-Planning/Mitigation). Select "Tier 4 Equipment" option if some or all off-road equipment used for the project meets CARB Tier 4 Standard

The remaining sections of this sheet contain areas that require modification when 'Other Project Type' is selected.

Note: The program's estimates of construction period phase length can be overridden in cells D50 through D53, and F50 through F53.

Construction Periods	User Override of Construction Months	Program Calculated Months	User Override of Phase Starting Date	Program Default Phase Starting Date
Grubbing/Land Clearing		1.20		1/1/2024
Grading/Excavation		5.40		2/7/2024
Drainage/Utilities/Sub-Grade		3.60		7/21/2024
Paving		1.80		11/8/2024
Totals (Months)	12			

Note: Soil Hauling emission default values can be overridden in cells D61 through D64, and F61 through F64.

Soil Hauling Emissions / **User Input**	User Override of Miles/Round Trip	Program Estimate of Miles/Round Trip	User Override of Truck Round Trips/Day	Default Values Round Trips/Day	Calculated Daily VMT
Miles/round trip: Grubbing/Land Clearing	30.00			0	0.00
Miles/round trip: Grading/Excavation	30.00			2	60.00
Miles/round trip: Drainage/Utilities/Sub-Grade	30.00			0	0.00
Miles/round trip: Paving	30.00			0	0.00

Emission Rates	**ROG**	**CO**	**NOx**	**PM10**	**PM2.5**	**SOx**	**CO2**	**CH4**	**N2O**	**CO2e**
Grubbing/Land Clearing (grams/mile)	0.03	0.41	3.02	0.11	0.05	0.02	1,693.55	0.00	0.27	1,772.92
Grading/Excavation (grams/mile)	0.03	0.41	3.02	0.11	0.05	0.02	1,693.55	0.00	0.27	1,772.92
Draining/Utilities/Sub-Grade (grams/mile)	0.03	0.41	3.02	0.11	0.05	0.02	1,693.55	0.00	0.27	1,772.92
Paving (grams/mile)	0.03	0.41	3.02	0.11	0.05	0.02	1,692.89	0.00	0.27	1,772.22
Grubbing/Land Clearing (grams/trip)	0.00	0.00	4.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grading/Excavation (grams/trip)	0.00	0.00	4.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Draining/Utilities/Sub-Grade (grams/trip)	0.00	0.00	4.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving (grams/trip)	0.00	0.00	4.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling Emissions	**ROG**	**CO**	**NOx**	**PM10**	**PM2.5**	**SOx**	**CO2**	**CH4**	**N2O**	**CO2e**
Pounds per day - Grubbing/Land Clearing	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tons per const. Period - Grubbing/Land Clearing	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pounds per day - Grading/Excavation	0.00	0.05	0.42	0.01	0.01	0.00	224.02	0.00	0.04	234.52
Tons per const. Period - Grading/Excavation	0.00	0.00	0.02	0.00	0.00	0.00	13.31	0.00	0.00	13.93
Pounds per day - Drainage/Utilities/Sub-Grade	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tons per const. Period - Drainage/Utilities/Sub-Grade	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pounds per day - Paving	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tons per const. Period - Paving	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total tons per construction project	0.00	0.00	0.02	0.00	0.00	0.00	13.31	0.00	0.00	13.93

Note: Asphalt Hauling emission default values can be overridden in cells D91 through D94, and F91 through F94.

Asphalt Hauling Emissions / **User Input**	User Override of Miles/Round Trip	Program Estimate of Miles/Round Trip	User Override of Truck Round Trips/Day	Default Values Round Trips/Day	Calculated Daily VMT
Miles/round trip: Grubbing/Land Clearing	30.00			1	30.00
Miles/round trip: Grading/Excavation	30.00			0	0.00
Miles/round trip: Drainage/Utilities/Sub-Grade	30.00			0	0.00
Miles/round trip: Paving	30.00			0	0.00

Emission Rates	**ROG**	**CO**	**NOx**	**PM10**	**PM2.5**	**SOx**	**CO2**	**CH4**	**N2O**	**CO2e**
Grubbing/Land Clearing (grams/mile)	0.03	0.41	3.02	0.11	0.05	0.02	1,693.55	0.00	0.27	1,772.92
Grading/Excavation (grams/mile)	0.03	0.41	3.02	0.11	0.05	0.02	1,693.55	0.00	0.27	1,772.92
Draining/Utilities/Sub-Grade (grams/mile)	0.03	0.41	3.02	0.11	0.05	0.02	1,693.55	0.00	0.27	1,772.92
Paving (grams/mile)	0.03	0.41	3.02	0.11	0.05	0.02	1,692.89	0.00	0.27	1,772.22
Grubbing/Land Clearing (grams/trip)	0.00	0.00	4.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grading/Excavation (grams/trip)	0.00	0.00	4.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Draining/Utilities/Sub-Grade (grams/trip)	0.00	0.00	4.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving (grams/trip)	0.00	0.00	4.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Emissions	**ROG**	**CO**	**NOx**	**PM10**	**PM2.5**	**SOx**	**CO2**	**CH4**	**N2O**	**CO2e**
Pounds per day - Grubbing/Land Clearing	0.00	0.03	0.21	0.01	0.00	0.00	112.01	0.00	0.02	117.26
Tons per const. Period - Grubbing/Land Clearing	0.00	0.00	0.00	0.00	0.00	0.00	1.48	0.00	0.00	1.55
Pounds per day - Grading/Excavation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tons per const. Period - Grading/Excavation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pounds per day - Drainage/Utilities/Sub-Grade	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tons per const. Period - Drainage/Utilities/Sub-Grade	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pounds per day - Paving	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tons per const. Period - Paving	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total tons per construction project	0.00	0.00	0.00	0.00	0.00	0.00	1.48	0.00	0.00	1.55

Note: Worker commute default values can be overridden in cells D121 through D126.

Worker Commute Emissions	User Override of Worker			
User Input	Commute Default Values	Default Values		
Miles/ one-way trip	20		Calculated	Calculated
One-way trips/day	2		Daily Trips	Daily VMT
No. of employees: Grubbing/Land Clearing	7		14	280.00
No. of employees: Grading/Excavation	22		44	880.00
No. of employees: Drainage/Utilities/Sub-Grade	15		30	600.00
No. of employees: Paving	12		24	480.00

Emission Rates	ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e
Grubbing/Land Clearing (grams/mile)	0.01	0.84	0.06	0.05	0.02	0.00	306.70	0.00	0.01	308.54
Grading/Excavation (grams/mile)	0.01	0.84	0.06	0.05	0.02	0.00	306.70	0.00	0.01	308.54
Draining/Utilities/Sub-Grade (grams/mile)	0.01	0.84	0.06	0.05	0.02	0.00	306.70	0.00	0.01	308.54
Paving (grams/mile)	0.01	0.84	0.06	0.05	0.02	0.00	306.35	0.00	0.01	308.19
Grubbing/Land Clearing (grams/trip)	0.98	2.66	0.27	0.00	0.00	0.00	65.99	0.07	0.03	76.61
Grading/Excavation (grams/trip)	0.98	2.66	0.27	0.00	0.00	0.00	65.99	0.07	0.03	76.61
Draining/Utilities/Sub-Grade (grams/trip)	0.98	2.66	0.27	0.00	0.00	0.00	65.99	0.07	0.03	76.61
Paving (grams/trip)	0.98	2.66	0.27	0.00	0.00	0.00	65.92	0.07	0.03	76.52
Emissions	**ROG**	**CO**	**NOx**	**PM10**	**PM2.5**	**SOx**	**CO2**	**CH4**	**N2O**	**CO2e**
Pounds per day - Grubbing/Land Clearing	0.04	0.60	0.05	0.03	0.01	0.00	191.36	0.00	0.00	192.82
Tons per const. Period - Grubbing/Land Clearing	0.00	0.01	0.00	0.00	0.00	0.00	2.53	0.00	0.00	2.55
Pounds per day - Grading/Excavation	0.12	1.88	0.15	0.09	0.04	0.01	601.42	0.01	0.01	606.02
Tons per const. Period - Grading/Excavation	0.01	0.11	0.01	0.01	0.00	0.00	35.72	0.00	0.00	36.00
Pounds per day - Drainage/Utilities/Sub-Grade	0.08	1.29	0.10	0.06	0.03	0.00	410.06	0.01	0.01	413.20
Tons per const. Period - Drainage/Utilities/Sub-Grade	0.00	0.05	0.00	0.00	0.00	0.00	16.24	0.00	0.00	16.36
Pounds per day - Paving	0.07	1.03	0.08	0.05	0.02	0.00	327.68	0.01	0.01	330.18
Tons per const. Period - Paving	0.00	0.02	0.00	0.00	0.00	0.00	6.49	0.00	0.00	6.54
Total tons per construction project	0.01	0.19	0.02	0.01	0.00	0.00	60.98	0.00	0.00	61.44

Note: Water Truck default values can be overridden in cells D153 through D156, I153 through I156, and F153 through F156.

Water Truck Emissions	User Override of	Program Estimate of	User Override of Truck	Default Values	Calculated	User Override of	Default Values	Calculated
User Input	Default # Water Trucks	Number of Water Trucks	Round Trips/Vehicle/Day	Round Trips/Vehicle/Day	Trips/day	Miles/Round Trip	Miles/Round Trip	Daily VMT
Grubbing/Land Clearing - Exhaust	1		1.00			5.00		5.00
Grading/Excavation - Exhaust	1		1.00			5.00		5.00
Drainage/Utilities/Subgrade	1		1.00			5.00		5.00
Paving	1		1.00			5.00		5.00

Emission Rates	ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e
Grubbing/Land Clearing (grams/mile)	0.03	0.41	3.02	0.11	0.05	0.02	1,693.55	0.00	0.27	1,772.92
Grading/Excavation (grams/mile)	0.03	0.41	3.02	0.11	0.05	0.02	1,693.55	0.00	0.27	1,772.92
Draining/Utilities/Sub-Grade (grams/mile)	0.03	0.41	3.02	0.11	0.05	0.02	1,693.55	0.00	0.27	1,772.92
Paving (grams/mile)	0.03	0.41	3.02	0.11	0.05	0.02	1,692.89	0.00	0.27	1,772.22
Grubbing/Land Clearing (grams/trip)	0.00	0.00	4.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grading/Excavation (grams/trip)	0.00	0.00	4.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Draining/Utilities/Sub-Grade (grams/trip)	0.00	0.00	4.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving (grams/trip)	0.00	0.00	4.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Emissions	**ROG**	**CO**	**NOx**	**PM10**	**PM2.5**	**SOx**	**CO2**	**CH4**	**N2O**	**CO2e**
Pounds per day - Grubbing/Land Clearing	0.00	0.00	0.04	0.00	0.00	0.00	18.67	0.00	0.00	19.54
Tons per const. Period - Grubbing/Land Clearing	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.00	0.00	0.26
Pounds per day - Grading/Excavation	0.00	0.00	0.04	0.00	0.00	0.00	18.67	0.00	0.00	19.54
Tons per const. Period - Grading/Excavation	0.00	0.00	0.00	0.00	0.00	0.00	1.11	0.00	0.00	1.16
Pounds per day - Drainage/Utilities/Sub-Grade	0.00	0.00	0.04	0.00	0.00	0.00	18.67	0.00	0.00	19.54
Tons per const. Period - Drainage/Utilities/Sub-Grade	0.00	0.00	0.00	0.00	0.00	0.00	0.74	0.00	0.00	0.77
Pounds per day - Paving	0.00	0.00	0.04	0.00	0.00	0.00	18.66	0.00	0.00	19.54
Tons per const. Period - Paving	0.00	0.00	0.00	0.00	0.00	0.00	0.37	0.00	0.00	0.39
Total tons per construction project	0.00	0.00	0.01	0.00	0.00	0.00	2.46	0.00	0.00	2.58

Note: Fugitive dust default values can be overridden in cells D183 through D185.

Fugitive Dust	User Override of Max Acreage Disturbed/Day	Default Maximum Acreage/Day	PM10 pounds/day	PM10 tons/per period	PM2.5 pounds/day	PM2.5 tons/per period
Fugitive Dust - Grubbing/Land Clearing			5.00	0.07	1.04	0.01
Fugitive Dust - Grading/Excavation			5.00	0.30	1.04	0.06
Fugitive Dust - Drainage/Utilities/Subgrade			5.00	0.20	1.04	0.04

Values in cells D195 through D228, D246 through D279, D297 through D330, and D348 through D381 are required when 'Other Project Type' is selected.

Off-Road Equipment Emissions

Grubbing/Land Clearing	Default Number of Vehicles	Mitigation Option Override of	Default		ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e
Override of Default Number of Vehicles	*Program-estimate*	Default Equipment Tier (applicable only when "Tier 4 Mitigation" Option Selected)	Equipment Tier	Type	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day
			Model Default Tier	Aerial Lifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.00			Model Default Tier	Air Compressors	0.48	4.83	3.25	0.16	0.16	0.01	750.53	0.04	0.01	753.27
1.00			Model Default Tier	Bore/Drill Rigs	0.21	2.04	1.90	0.06	0.06	0.01	917.36	0.30	0.01	927.26
			Model Default Tier	Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.00			Model Default Tier	Concrete/Industrial Saws	0.31	3.65	2.41	0.11	0.11	0.01	592.67	0.03	0.00	594.70
			Model Default Tier	Cranes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Crawler Tractors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.00			Model Default Tier	Excavators	0.18	3.27	1.40	0.07	0.06	0.01	500.27	0.16	0.00	505.66
			Model Default Tier	Forklifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.00			Model Default Tier	Generator Sets	0.57	7.33	5.09	0.22	0.22	0.01	1,246.07	0.05	0.01	1,250.12
			Model Default Tier	Graders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3.00			Model Default Tier	Off-Highway Trucks	1.49	9.75	9.98	0.36	0.33	0.04	3,841.05	1.24	0.03	3,882.41
			Model Default Tier	Other Construction Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Other General Industrial Equipn	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Other Material Handling Equipm	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.00			Model Default Tier	Pavers	0.18	2.89	1.74	0.08	0.07	0.00	455.16	0.15	0.00	460.07
			Model Default Tier	Paving Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Plate Compactors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Pumps	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Rollers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Rubber Tired Dozers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.00			Model Default Tier	Rubber Tired Loaders	0.25	1.50	2.33	0.08	0.07	0.01	605.51	0.20	0.01	612.05
			Model Default Tier	Scrapers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.00			Model Default Tier	Signal Boards	0.11	0.60	0.72	0.03	0.03	0.00	98.63	0.01	0.00	99.13
			Model Default Tier	Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.00			Model Default Tier	Sweepers/Scrubbers	0.17	1.92	1.61	0.10	0.09	0.00	246.18	0.08	0.00	248.83
1.00			Model Default Tier	Tractors/Loaders/Backhoes	0.14	2.24	1.45	0.07	0.06	0.00	301.77	0.10	0.00	305.01
			Model Default Tier	Trenchers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Welders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

User-Defined Off-road Equipment — If non-default vehicles are used, please provide information in 'Non-default Off-road Equipment' tab

Number of Vehicles	Equipment Tier	Type	ROG pounds/day	CO pounds/day	NOx pounds/day	PM10 pounds/day	PM2.5 pounds/day	SOx pounds/day	CO2 pounds/day	CH4 pounds/day	N2O pounds/day	CO2e pounds/day
0.00	N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

		ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e
Grubbing/Land Clearing	pounds per day	4.12	40.00	31.89	1.34	1.27	0.10	9,555.20	2.35	0.08	9,638.51
Grubbing/Land Clearing	tons per phase	0.05	0.53	0.42	0.02	0.02	0.00	126.13	0.03	0.00	127.23

Grading/Excavation Override of Default Number of Vehicles	Default Number of Vehicles *Program-estimate*	Mitigation Option Override of Default Equipment Tier (applicable only when "Tier 4 Mitigation" Option Selected)	Default Equipment Tier	Type	ROG pounds/day	CO pounds/day	NOx pounds/day	PM10 pounds/day	PM2.5 pounds/day	SOx pounds/day	CO2 pounds/day	CH4 pounds/day	N2O pounds/day	CO2e pounds/day
			Model Default Tier	Aerial Lifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.00			Model Default Tier	Air Compressors	0.48	4.83	3.25	0.16	0.16	0.01	750.53	0.04	0.01	753.27
1.00			Model Default Tier	Bore/Drill Rigs	0.21	2.04	1.90	0.06	0.06	0.01	917.36	0.30	0.01	927.26
			Model Default Tier	Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.00			Model Default Tier	Concrete/Industrial Saws	0.31	3.65	2.41	0.11	0.11	0.01	592.67	0.03	0.00	594.70
			Model Default Tier	Cranes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Crawler Tractors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.00			Model Default Tier	Excavators	0.18	3.27	1.40	0.07	0.06	0.01	500.27	0.16	0.00	505.66
			Model Default Tier	Forklifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.00			Model Default Tier	Generator Sets	0.57	7.33	5.09	0.22	0.22	0.01	1,246.07	0.05	0.01	1,250.12
			Model Default Tier	Graders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3.00			Model Default Tier	Off-Highway Trucks	1.49	9.75	9.98	0.36	0.33	0.04	3,841.05	1.24	0.03	3,882.41
			Model Default Tier	Other Construction Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Other General Industrial Equipn	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Other Material Handling Equipm	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.00			Model Default Tier	Pavers	0.18	2.89	1.74	0.08	0.07	0.00	455.16	0.15	0.00	460.07
			Model Default Tier	Paving Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Plate Compactors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Pumps	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Rollers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Rubber Tired Dozers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.00			Model Default Tier	Rubber Tired Loaders	0.25	1.50	2.33	0.08	0.07	0.01	605.51	0.20	0.01	612.05
			Model Default Tier	Scrapers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.00			Model Default Tier	Signal Boards	0.11	0.60	0.72	0.03	0.03	0.00	98.63	0.01	0.00	99.13
			Model Default Tier	Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.00			Model Default Tier	Sweepers/Scrubbers	0.17	1.92	1.61	0.10	0.09	0.00	246.18	0.08	0.00	248.83
1.00			Model Default Tier	Tractors/Loaders/Backhoes	0.14	2.24	1.45	0.07	0.06	0.00	301.77	0.10	0.00	305.01
			Model Default Tier	Trenchers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Welders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

User-Defined Off-road Equipment If non-default vehicles are used, please provide information in 'Non-default Off-road Equipment' tab

Number of Vehicles	Equipment Tier	Type	ROG pounds/day	CO pounds/day	NOx pounds/day	PM10 pounds/day	PM2.5 pounds/day	SOx pounds/day	CO2 pounds/day	CH4 pounds/day	N2O pounds/day	CO2e pounds/day
0.00	N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

		ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e
Grading/Excavation	pounds per day	4.12	40.00	31.89	1.34	1.27	0.10	9,555.20	2.35	0.08	9,638.51
Grading/Excavation	tons per phase	0.24	2.38	1.89	0.08	0.08	0.01	567.58	0.14	0.00	572.53

Drainage/Utilities/Subgrade	Default Number of Vehicles	Mitigation Option Override of Default Equipment Tier (applicable only when "Tier 4 Mitigation" Option Selected)	Default Equipment Tier		ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e
Override of Default Number of Vehicles	*Program-estimate*		Equipment Tier		pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day
			Model Default Tier	Aerial Lifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.00			Model Default Tier	Air Compressors	0.48	4.83	3.25	0.16	0.16	0.01	750.53	0.04	0.01	753.27
1.00			Model Default Tier	Bore/Drill Rigs	0.21	2.04	1.90	0.06	0.06	0.01	917.36	0.30	0.01	927.26
			Model Default Tier	Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.00			Model Default Tier	Concrete/Industrial Saws	0.31	3.65	2.41	0.11	0.11	0.01	592.67	0.03	0.00	594.70
			Model Default Tier	Cranes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Crawler Tractors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.00			Model Default Tier	Excavators	0.18	3.27	1.40	0.07	0.06	0.01	500.27	0.16	0.00	505.66
			Model Default Tier	Forklifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.00			Model Default Tier	Generator Sets	0.57	7.33	5.09	0.22	0.22	0.01	1,246.07	0.05	0.01	1,250.12
			Model Default Tier	Graders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3.00			Model Default Tier	Off-Highway Trucks	1.49	9.75	9.98	0.36	0.33	0.04	3,841.05	1.24	0.03	3,882.41
			Model Default Tier	Other Construction Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Other General Industrial Equipn	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Other Material Handling Equipn	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.00			Model Default Tier	Pavers	0.18	2.89	1.74	0.08	0.07	0.00	455.16	0.15	0.00	460.07
			Model Default Tier	Paving Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Plate Compactors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Pumps	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Rollers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Rubber Tired Dozers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.00			Model Default Tier	Rubber Tired Loaders	0.25	1.50	2.33	0.08	0.07	0.01	605.51	0.20	0.01	612.05
			Model Default Tier	Scrapers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.00			Model Default Tier	Signal Boards	0.11	0.60	0.72	0.03	0.03	0.00	98.63	0.01	0.00	99.13
			Model Default Tier	Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.00			Model Default Tier	Sweepers/Scrubbers	0.17	1.92	1.61	0.10	0.09	0.00	246.18	0.08	0.00	248.83
1.00			Model Default Tier	Tractors/Loaders/Backhoes	0.14	2.24	1.45	0.07	0.06	0.00	301.77	0.10	0.00	305.01
			Model Default Tier	Trenchers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Welders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

User-Defined Off-road Equipment If non-default vehicles are used, please provide information in 'Non-default Off-road Equipment' tab

Number of Vehicles	Equipment Tier	Type	ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e
			pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day
0.00	N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

		ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e
Drainage/Utilities/Sub-Grade	pounds per day	4.12	40.00	31.89	1.34	1.27	0.10	9,555.20	2.35	0.08	9,638.51
Drainage/Utilities/Sub-Grade	tons per phase	0.16	1.58	1.26	0.05	0.05	0.00	378.39	0.09	0.00	381.68

Override of Default Number of Vehicles	Default Number of Vehicles (Program-estimate)	Mitigation Option: Override of Default Equipment Tier (applicable only when "Tier 4 Mitigation" Option Selected)	Default Equipment Tier	Type	ROG pounds/day	CO pounds/day	NOx pounds/day	PM10 pounds/day	PM2.5 pounds/day	SOx pounds/day	CO2 pounds/day	CH4 pounds/day	N2O pounds/day	CO2e pounds/day
Paving														
			Model Default Tier	Aerial Lifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.00			Model Default Tier	Air Compressors	0.48	4.83	3.24	0.16	0.16	0.01	750.53	0.04	0.01	753.27
1.00			Model Default Tier	Bore/Drill Rigs	0.21	2.04	1.90	0.06	0.06	0.01	917.36	0.30	0.01	927.26
			Model Default Tier	Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.00			Model Default Tier	Concrete/Industrial Saws	0.31	3.65	2.41	0.11	0.11	0.01	592.67	0.03	0.00	594.70
			Model Default Tier	Cranes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Crawler Tractors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.00			Model Default Tier	Excavators	0.18	3.26	1.40	0.07	0.06	0.01	500.27	0.16	0.00	505.66
			Model Default Tier	Forklifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.00			Model Default Tier	Generator Sets	0.57	7.33	5.08	0.22	0.22	0.01	1,246.07	0.05	0.01	1,250.12
			Model Default Tier	Graders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3.00			Model Default Tier	Off-Highway Trucks	1.49	9.74	9.94	0.36	0.33	0.04	3,840.99	1.24	0.03	3,882.34
			Model Default Tier	Other Construction Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Other General Industrial Equipn	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Other Material Handling Equipn	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.00			Model Default Tier	Pavers	0.18	2.89	1.74	0.08	0.07	0.00	455.16	0.15	0.00	460.06
			Model Default Tier	Paving Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Plate Compactors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Pumps	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Rollers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Rubber Tired Dozers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.00			Model Default Tier	Rubber Tired Loaders	0.25	1.50	2.31	0.08	0.07	0.01	605.52	0.20	0.01	612.05
			Model Default Tier	Scrapers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.00			Model Default Tier	Signal Boards	0.11	0.60	0.72	0.03	0.03	0.00	98.63	0.01	0.00	99.13
			Model Default Tier	Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.00			Model Default Tier	Sweepers/Scrubbers	0.17	1.92	1.60	0.10	0.09	0.00	246.18	0.08	0.00	248.83
1.00			Model Default Tier	Tractors/Loaders/Backhoes	0.14	2.24	1.44	0.07	0.06	0.00	301.78	0.10	0.00	305.02
			Model Default Tier	Trenchers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Welders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

User-Defined Off-road Equipment If non-default vehicles are used, please provide information in 'Non-default Off-road Equipment' tab

Number of Vehicles	Equipment Tier	Type	ROG pounds/day	CO pounds/day	NOx pounds/day	PM10 pounds/day	PM2.5 pounds/day	SOx pounds/day	CO2 pounds/day	CH4 pounds/day	N2O pounds/day	CO2e pounds/day
0.00	N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Phase	Units	ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e
Paving	pounds per day	4.11	39.99	31.79	1.33	1.27	0.10	9,555.14	2.35	0.08	9,638.44
Paving	tons per phase	0.08	0.79	0.63	0.03	0.03	0.00	189.19	0.05	0.00	190.84
Total Emissions all Phases (tons per construction period) =>		0.54	5.28	4.21	0.18	0.17	0.01	1,261.28	0.31	0.01	1,272.28

APPENDIX B

Biological Resources Survey Report

March 27, 2024

Mr. Joseph Broadhead
Principal Water Resource Specialist
Eastern Municipal Water District
2270 Trumble Road
P.O. Box 8300
Perris, CA 92572-8300

Reference: Biological Resources Survey for the Goetz Road Backbone Sewer Extension Project, Menifee, California (RECON Number 9878-11)

Dear Mr. Broadhead:

This letter details the results of the biological resources surveys conducted for the Goetz Road Backbone Sewer Project (project). This biological letter has been prepared to provide necessary information to the Eastern Municipal Water District (District) for environmental analysis of the project.

1.0 Introduction

1.1 Project Location

The project site is a 0.54-mile segment of Goetz Road and adjacent right-of-way between Rock Canyon Drive to the south and Avenida Roble to the north, in the city of Menifee, in western Riverside County, California (Figures 1, 2, and 3). The project site is located in Section 25 of the U.S. Geological Survey Romoland quadrangle, Township 5 South, Range 4 West (U.S. Geological Survey 1979; see Figure 2). The project site comprises paved travel lanes and unpaved shoulders within existing rights-of-way along Goetz Road. It is surrounded by residential and undeveloped lots to the west, north, and south and undeveloped lots, residential and commercial development to the east. The elevation within the project site is approximately 1,535 feet above mean sea level.

1.2 Project Description

The project includes the construction of a new 15-inch diameter trunk sewer within the right-of-way of Goetz Road, from Avenida Roble to Rock Canyon Drive. The endpoint for the existing trunk sewer in Goetz Road is the manhole located at the intersection of Goetz Road and Rock Canyon Drive. The project would extend the trunk sewer, south to north, starting from the intersection of Goetz Road and Rock Canyon Drive to the intersection of Avenida Roble and Goetz Road, approximately 2,911 feet.

The project also includes a new 8-inch sewer pipeline for collection of sewer laterals from properties fronting Goetz Road. The proposed 8-inch sewer will parallel the proposed 15-inch trunk sewer from approximately Canyon Heights Drive northerly for approximately 852 feet.

To provide the necessary sanitation separation between the water and sewer systems, and for constructability purposes, the project would relocate the existing 8-inch waterline within Goetz Road. The 8-inch water line would be relocated five feet west of its current alignment starting just north of Canyon Heights Drive, then north for approximately 1,000 feet.

All sewer line segments, and work areas are proposed within Goetz Road, which is paved, and the associated unpaved rights-of-way, therefore avoiding direct impacts to sensitive biological resources. The staging area will be located in an undeveloped area near the intersection of Goetz Road and Juanita Drive. However, native wetland vegetation adjacent to Goetz Road may support sensitive species subject to indirect impacts as a result of construction activities.

2.0 Methods

RECON Environmental, Inc. (RECON) biologist Christine Beck conducted a general biological survey and burrowing owl (*Athene cunicularia*) habitat assessment on May 2, 2023. A 7.15-acre survey area, including the project site and a 50-foot buffer, was evaluated for the general biological survey to determine the current condition of the biological resources present within and adjacent to the survey area (see Figure 3). During the general biological survey, the biologist mapped vegetation communities, recorded vegetation and habitat characteristics, and noted wildlife and plant species apparent at the time of the survey. Vegetation communities were mapped in the field on a digital map of the survey area. Plants were visually identified in the field and wildlife species were identified visually with the aid of binoculars or based on identification of calls, scat, tracks, or burrows. The burrowing owl habitat assessment was conducted within the project site and a 500-foot buffer, in accordance with the guidelines developed by the Western Riverside County Regional Conservation Authority (WRCRCA; 2006). Private property was surveyed with binoculars from public rights-of-way. For further information on the presence of suitable habitat for the burrowing owl, refer to the Burrowing Owl Site Assessment prepared for the project (Attachment 1). RECON biologists Gerry Scheid and Chris Thomson conducted a wetland delineation within the project site and a 50-foot buffer on May 24, 2023, following the guidelines set forth by the U.S. Army Corps of Engineers (USACE; 1987 and 2008) to determine the presence and extent of wetlands and/or waters under the jurisdiction of USACE, California Department of Fish and Wildlife (CDFW), and Regional Water Quality Control Board (RWQCB). For further information on the presence of federal and state jurisdictional areas, refer to the Aquatic Resource Delineation Report prepared for the project (Attachment 2).

3.0 Background Research

Prior to conducting field surveys, RECON conducted a search of existing biological data for the project site, including a review of biological databases for sensitive plant and animal species reported within two miles of the project site and a review of the project site’s physical characteristics (e.g., location, elevation, soils/substrate, topography). Databases consulted included the California Natural Diversity Database (CDFW 2023a), the U.S. Fish and Wildlife Service (USFWS) All Species Occurrences Database (USFWS 2023a), and the Information for Planning and Consultation Database (USFWS 2024; Attachment 3). In addition, a review of the National Wetlands Inventory was conducted to identify any potential wetlands or water resources present in the vicinity of the project site (USFWS 2023b).

The potential for species to occur is evaluated based on the habitat within the project site and the survey area, as well as within land adjacent to the survey area. Based on the database search, there are sensitive species known to occur within two miles of the project site (CDFW 2023a); however, the project site consists entirely of urban/developed land and disturbed undeveloped land. The only exception is a small drainage that conveys flow via a culvert under Goetz Road. Thus, no sensitive plant species are expected to occur within the project site, and only coyote (*Canis latrans*), a covered species under the Multiple Species Habitat Conservation Plan (MSHCP; WRCRCA 2006), has a moderate potential to occur within and adjacent to the project site. Additional sensitive plant and wildlife species that were evaluated based on the database review but are not expected or have low potential to occur based on the records search and habitat conditions are discussed in Attachments 4 and 5, respectively.

4.0 Regulatory Setting

4.1 Federal Regulations

Federal Endangered Species Act. The Federal Endangered Species Act (FESA; 16 United States Code 1531 et seq.) is implemented by the USFWS through a program that identifies and provides for protection of various species of fish, wildlife, and plants deemed to be in danger of or threatened with extinction. As part of this regulatory act, the FESA provides for designation of critical habitat, defined in FESA Section 3(5)(A) as specific areas within the geographical range occupied by a species where physical or biological features "essential to the conservation of the species" are found and that "may require special management considerations or protection." Critical habitat may also include areas outside the current geographical area occupied by the species that are nonetheless "essential for the conservation of the species." There is no USFWS critical habitat within the project site (USFWS 2024).

Migratory Bird Treaty Act. The Migratory Bird Treaty Act (MBTA) was established to provide protection to the breeding activities of migratory birds throughout the U.S. The MBTA, which is enforced by USFWS, makes it unlawful "by any means or in any manner, to pursue, hunt, take, capture, [or] kill" any migratory bird, or attempt such actions, except as permitted by regulation. The take, possession, import, export, transport, sale, purchase, barter, or offering of these activities is prohibited, except under a valid permit or as permitted in the implementing regulations. The project is designed to comply with the MBTA which precludes direct impacts to nesting birds and raptors.

Clean Water Act. Under the Clean Water Act Section 404, the USACE is authorized to regulate Waters of the U.S. The currently accepted regulations defining Waters of the U.S. follow the September 8, 2023, publishment of the final rule: *Revised Definition of "Waters of the U.S.", Conforming*. Notably, this new rule provides a new interpretation of the term "adjacent" whereas wetlands must contain a surface hydrologic connection to other Waters of the U.S. to be considered adjacent Waters of the U.S. Additionally, this new rule eliminates the applicability of the significant nexus standard for "non-relatively permanent waters," so ephemeral features are no longer likely to be considered Waters of the U.S.

4.2 State Regulations

California Endangered Species Act. The CDFW administers the California Endangered Species Act (CESA; California Fish and Game Code [CFGC] Section 2050 et seq.), which prohibits the take of plant and animal species designated by the California Fish and Game Commission as endangered or threatened in California. Under CESA Section 86, "take" is defined as "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill." CESA Section 2053 stipulates that state agencies may not approve projects that will "jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of habitat essential to the continued existence of those species, if there are reasonable and prudent alternatives available consistent with conserving the species or its habitat which would prevent jeopardy."

California Fish and Game Code. The CFGC regulates the taking or possession of birds, mammals, fish, amphibians, and reptiles, as well as natural resources such as wetlands and Waters of the State. It includes the CESA (Sections 2050-2115) and Streambed Alteration Agreement regulations (Sections 1600–1616), as well as provisions for legal hunting and fishing, and tribal agreements for activities involving take of native wildlife. The CFGC also includes protection of birds (Sections 3500 et seq.) and the Native Plant Protection Act (Sections 1900–1913), which direct CDFW to carry out the Legislature's intent to "preserve, protect and enhance rare and endangered plants in this State."

Pursuant to Section 1602 of the CFGC, the CDFW regulates all diversions, obstructions, or changes to the natural flow or bed, channel, or bank of any river, stream, or lake that supports fish or wildlife. A Streambed Alteration Agreement (CFGC Section 1602 et seq.) is required for impacts on jurisdictional resources, including streambeds and associated riparian habitat. In addition, the CFGC affords protection over the destruction of nests or eggs of native bird species (CFGC Section 3503), and it states that no birds in the orders of Falconiformes or Strigiformes (birds of prey) can be taken, possessed, or destroyed (CFGC Section 3503.5). As discussed further in Section 6.0, the project is designed to avoid impacts to wetland and non-wetland waters subject to the jurisdiction of CDFW and comply with Sections 3503 and 3503.3, which precludes direct impacts to nesting birds and raptors.

Porter–Cologne Water Quality Control Act. The Porter–Cologne Water Quality Control Act (Porter–Cologne Act) protects water quality and the beneficial uses of water. It applies to surface water and groundwater. Under this law, the State Water Resources Control Board develops statewide water quality plans and the RWQCBs develop regional basin plans that identify beneficial uses, water quality objectives, and implementation plans. The RWQCBs have the primary responsibility to implement the provisions of statewide plans and basin plans. Waters regulated under the Porter–Cologne Act include isolated waters that are not regulated by USACE. Developments with impacts on jurisdictional waters must demonstrate compliance with the goals of the Porter–Cologne Act by developing stormwater pollution prevention plans, standard urban stormwater mitigation plans, and other measures to obtain a Clean Water Act Section 401 certification for Waters of the U.S. and Waste Discharge Requirements for Waters of the State. As discussed further in Section 6.0, the project is designed to avoid impacts to wetland and non-wetland waters subject to the jurisdiction of RWQCB.

4.3 Local Regulations

Western Riverside County MSHCP. The MSHCP is a comprehensive multi-jurisdictional habitat conservation plan focusing on the conservation of species and their associated habitats in western Riverside County. The MSHCP area encompasses 1.26 million acres (1,966 square miles), including all unincorporated Riverside County land west of the crest of the San Jacinto Mountains to the Orange County line, as well as the cities of Temecula, Murrieta, Lake Elsinore, Canyon Lake, Norco, Corona, Riverside, Moreno Valley, Banning, Beaumont, Calimesa, Perris, Hemet, Menifee, and San Jacinto. The MSHCP serves as an HCP pursuant to Section 10(a)(1)(B) of the FESA, as amended, as well as a natural community conservation plan under the Natural Community Conservation Planning Act of 2001. The MSHCP allocates responsibility for assembly and management of its Conservation Areas to local, state, and federal governments, as well as private and public entities engaged in construction that may impact MSHCP covered species.

The project site is located within the Western Riverside MSHCP area (WCRCRA 2023). As lead agency, the District is not a participant in the MSHCP; however, the project demonstrates it would not prevent implementation of the conservation goals and objectives of the MSHCP. The project is not located within a designated criteria cell, so no mitigation for impacts to vegetation communities would be required by the MSHCP. As discussed in Section 6.3 below, the project would avoid impacts to potentially jurisdictional features. A portion of the project site is located within the MSHCP survey area for burrowing owl. As discussed in Section 2.0, a habitat assessment for burrowing owl was conducted in accordance with MSHCP guidelines and no burrowing owl individuals, California ground squirrel (*Otopermophilus* [=*Spermophilus*] *beecheyi)*, or burrow or burrow surrogates were observed. No suitable habitat was observed. The project site consists primarily of Goetz Road and associated roadside, which is a major thoroughfare, and developed residential lots. The disturbed areas within the project site and surrounding area are immediately adjacent to Goetz Road and are heavily disturbed, with dense non-native vegetation and evidence of repeated disturbance from mowing and vehicles. Due to the lack of suitable habitat, focused burrowing owl surveys are not required.

Stephens' Kangaroo Rat (Dipodomys stephensi) Habitat Conservation Plan. In 1996, USFWS approved a long-term HCP for Stephens' kangaroo rat and granted an incidental take permit for Riverside County covering an estimated 30,000 acres of occupied habitat within portions of unincorporated Riverside County and 10 member cities: Perris, Temecula, Murrieta, Lake Elsinore, Corona, Riverside, Moreno Valley, Perris, Hemet, and Wildomar (Riverside County Habitat Conservation Agency [RCHCA] 1996). The Stephens' Kangaroo Rat HCP authorizes the incidental take of half of the occupied habitat remaining in the HCP area while using development fees to implement the plan, purchase private property, and create a reserve system. The Stephens' Kangaroo Rat HCP and corresponding permits are in effect for areas covered by the MSHCP; however, the Stephens' Kangaroo Rat HCP and the MSHCP remain separate. The Stephens' Kangaroo Rat Fee Areas are subject to mandatory conservation measures as outlined in the Stephens' Kangaroo Rat HCP (RCHCA 1996) and as subsequently modified.

The project site is located within the Stephens' Kangaroo Rat HCP area. As lead agency, the District is not a participant in the Stephens' Kangaroo Rat HCP; however, the project demonstrates it would not prevent implementation of the conservation goals and objectives of the HCP as the project site is not part of a Stephens' kangaroo rat core reserve (RCHCA 1996).

5.0 Existing Biological Resources

5.1 Vegetation Communities

The project site supports disturbed land and urban/developed. The buffer surrounding the project site supports disturbed wetland, disturbed land, and urban/developed. The acreages of each vegetation community/land cover type are presented in Table 1 and depicted in Figure 4.

Table 1
Vegetation Communities and Land Cover Types within Survey Area
(acres)

Vegetation Communities	Project Site	Survey Area (Project Site Plus 50-foot Buffer)
Disturbed Wetland	--	0.05
Disturbed Land	0.28	0.81
Urban/Developed	1.95	6.29
TOTAL	**2.23**	**7.15**

Disturbed wetland is present adjacent to Goetz Road along the western and eastern edges of the project site totaling 0.05 acre. This area of disturbed wetland is immediately adjacent to Goetz Road and is surrounded on either side by disturbed land . The disturbed wetland consists of an ephemeral drainage channel, connected via a culvert under Goetz Road. The disturbed wetland is characterized primarily by low-growing species such as hyssop loosestrife (*Lythrum hyssopifolia*), African umbrella plant *(Cyperus involucratus)*, mariposa rush (*Juncus dubius)*, curly dock (*Rumex crispus*), and rabbitfoot grass (*Polypogon monspeliensis*). A stand of Mexican palo verde (*Parkinsonia aculeata*) and several individual willows (*Salix* spp.) and mule fat (*Baccharis salicifolia* ssp. *salicifolia*) occur as scattered, isolated individuals along the length of the drainage channel.

Disturbed land accounts for undeveloped lots on either side of Goetz Road and consists of a variety of non-native species, including short-pod mustard (*Hirschfeldia incana*), stinknet (*Oncosiphon piluliferum*), filaree (*Erodium* sp.) ripgut grass (*Bromus diandrus*), and red brome (*Bromus rubens*). A few native species, including Coulter's lupine (*Lupinus sparsiflorus*), caterpillar phacelia (*Phacelia cicutaria* var. *hispida*), and California sand-aster (*Corethrogyne filaginifolia* var. *filaginifolia*), are present.

Urban/developed accounts for the majority of the project site and occurs mostly as paved roadway. Urban/developed also includes concrete sidewalks, a decomposed granite walkway, and residential and commercial development. Vegetation within this land cover type primarily consists of ornamental landscaping.

5.2 Wildlife

Wildlife species detected within and adjacent to the project site are those typical of developed/disturbed landscapes containing some remnant native vegetation and included northern mockingbird (*Mimus polyglottos*), black phoebe (*Sayornis nigricans*), lesser goldfinch (*Spinus psaltria*), Anna's hummingbird (*Calypte anna*), California towhee (*Melozone crissalis*), bushtit (*Psaltriparus minimus*), mourning dove (*Zenaida macroura*), European starling (*Sturnus vulgaris*), house sparrow (*Passer domesticus*), and house finch (*Haemorhous mexicanus*).

5.3 Sensitive Plant Species

No sensitive plants were observed within or adjacent to the project site during the biological survey. Sensitive plant species known to occur within two miles of the project site, based on a database review, are presented in Attachment 4.

5.4 Sensitive Wildlife Species

No special-status wildlife species, including species covered by the MHSCP, were detected within or adjacent to the project site during the biological survey. The project site consists primarily of paved roads, disturbed roadsides, and residential lots that are subject to repeated disturbance from mowing, vehicles, and other human activity. Though several connections occur within unimproved lots, these connections occur disturbed habitat and lack proximity to suitable native habitats to support special-status wildlife. Additional sensitive wildlife species known to occur within two miles of the project site, based on a database review, are presented in Attachment 5.

Migratory and Nesting Birds. The majority of the project site and survey area, including disturbed wetland, disturbed and urban/developed land, has potential to support migratory and nesting bird species protected by the MBTA or CFGC 3503.5. Urban-adapted species in particular have been known to nest within ornamental vegetation and non-native trees and shrubs and under the eaves of houses.

5.5 Jurisdictional Wetlands and Waterways

Potential jurisdictional wetlands and waterways were delineated on-site in accordance with USACE, CDFW, and RWQCB regulations. The results from the Aquatic Resource Delineation Report prepared for the project (see Attachment 2) are summarized in Table 2 and discussed in this section. Figure 5 shows the locations of the aquatic resources identified in the survey area. The wetland and non-wetland waters consist of the culverted drainage underlying Goetz Road and flowing west in the northern portion of the survey area. The wetlands and non-wetland waters would likely be considered USACE Waters of the U.S., RWQCB Waters of the State, and CDFW Waters of the State.

Table 2 Potential Jurisdictional Resources within Review Area (acres)	
Jurisdictional Resource	Acreage in Survey Area (Linear Feet)
USACE Waters of the U.S.	**0.06**
Wetland Waters of the U.S.	0.05 (89)
Non-wetland Waters of the U.S.	0.01* (41)
RWQCB Waters of the State	**0.06**
Wetland Waters of the State	0.05 (89)
Non-wetland Waters of the State	0.01* (41)
CDFW Jurisdictional Resources	**0.06**
Wetland	0.05 (89)
Streambed	0.01* (41)
*Any discrepancies in total are due to rounding.	

Potential USACE Waters of the U.S.

Potential USACE wetland Waters of the U.S. on-site and within the survey area include wetlands adjacent to Goetz Road (0.05 acre; see Figure 5). Potential USACE non-wetland Waters of the U.S. on-site and within the survey area include the culverted drainage underlying Goetz Road (0.01 acre; 41 linear feet; see Figure 5).

Potential RWQCB Waters of the State

Potential RWQCB wetland Waters of the State on site and within the survey area include wetlands adjacent to Goetz Road (0.05 acre; see Figure 5). Potential RWQCB non-wetland Waters of the State within the survey area total 0.01 acre (41 linear feet; see Figure 5). The potential wetland and non-wetland Waters of State under RWQCB jurisdiction entirely overlap the potential USACE Waters of the U.S described above.

Potential CDFW Waters of the State

Potential CDFW wetland Waters of the State on-site and within the survey area include wetlands adjacent to Goetz Road (0.05 acre; see Figure 5). Potential CDFW Streambed within the survey area total 0.01 acre (41 linear feet; see Figure 5). The areas of potential CDFW jurisdiction entirely overlaps the potential USACE Waters of the U.S and potential RWQCB Waters of the State described above.

5.6 Wildlife Movement Corridors and Nursery Sites

The project site comprises a heavily used paved road and an associated right-of-way that are primarily surrounded by residential properties and disturbed land. Though undeveloped land adjacent to the project site may provide habitat for urban-adapted species and local wildlife movement, it is not anticipated that these habitats would constitute a significant regional corridor due to the fragmented and disturbed nature of the undeveloped areas. Based on Google Earth images (Google Earth 2023), the culverted vegetated channel that runs under Goetz Road appears to be mowed on an annual basis and is therefore unlikely to support significant wildlife movement. In addition, Goetz Road is a three-lane paved road that supports a high volume of traffic, which is a deterrent for wildlife movement apart from birds. Lastly, due to the high density of residential and commercial development adjacent to the project site, these areas are unlikely to support wildlife nursery sites or large roosting or breeding colonies.

6.0 Avoidance, Minimization, and Mitigation for Project Impacts

Project impacts to urban/developed land would be less than significant and would not require mitigation. The project would not impact any sensitive vegetation communities, sensitive plant species, wildlife movement corridors, or nursery sites (see Figure 6); therefore, no mitigation would be required. Potential direct and/or indirect impacts to sensitive wildlife species and potentially jurisdictional aquatic resources would be addressed through the following avoidance, minimization, and mitigation measures below.

6.1 Vegetation Communities and Land Cover Types

The project would directly impact 1.95 acres of urban/developed land within existing roadways and 0.28 acre of disturbed land. Urban/developed land and disturbed land are not considered sensitive and thus would not require mitigation for impacts.

6.2 Sensitive Wildlife

Migratory and Nesting Birds. Direct impacts to nesting and migratory birds are not anticipated as the project is located within a developed roadway with existing vehicular traffic and no vegetation removal would result from the project. However, indirect noise impacts may occur to migratory and nesting birds if they are nesting in the adjacent habitat should construction occur during the general avian breeding season (January 15 to August 31). These species are protected by the CFGC Section 3503.5 and impacts to nesting individuals would need to be avoided. Measures to avoid impacts to nesting and migratory birds are described below.

AMM-BIO-1: Migratory and Nesting Birds

Construction should be conducted outside of the avian and raptor breeding season, which is generally defined as January 15 to August 31. If construction must take place during the nesting season, a qualified biologist shall perform a preconstruction survey for nesting birds within the project site and a 500-foot buffer. The nesting bird survey shall occur no more than seven days prior to the start of construction. If active bird nests are confirmed to be present during the preconstruction survey, a buffer zone will be established by a qualified biologist until the biologist has verified that the young have fledged or the nest has otherwise become inactive.

6.3 Aquatic Resources

The project would avoid direct impacts to potentially jurisdictional non-wetland waters by avoiding the culverts underlying the roadways. However, the project has potential to result in indirect impacts to potential jurisdictional resources occurring adjacent to the project site as a result of runoff, erosion, siltation, or chemical and particulate pollution during project construction. Measures to avoid indirect impacts to potential jurisdictional resources are described below.

AMM-BIO-2: Aquatic Resources

To avoid indirect impacts to potentially jurisdictional features, best management practices, such as the use of silt fences, fiber rolls, and/or gravel bags, should be implemented. No equipment maintenance or fueling should be performed within 100 feet of the adjacent wetlands where petroleum products or other pollutants from the equipment may enter this area.

7.0 Conclusion

Based on the list of threatened and endangered species that may occur in and/or be affected by the project obtained from USFWS on January 12, 2024, the following species were identified as potentially occurring in the survey area (Table 3). A preliminary effect determination for each species is presented in the table based on the impact analyses provided in this report. Based on the analysis presented in this document, no species are expected to occur based on lack of suitable habitat within the project site (see Attachment 3).

Table 3
Species and Critical Habitat Identified as Potentially Occurring in the Survey Area

Species	Federal Status	Critical Habitat within the Project Area	Preliminary Effect Determination
San Bernardino Merriam's Kangaroo Rat (*Dipodomys merriami parvus*)	Endangered	No	No effect
Stephen's kangaroo rat (*Dipodomys stephensi*)	Threatened	No	No effect
Coastal California Gnatcatcher (*Polioptila californica californica*)	Threatened	No	No effect
Least Bell's Vireo (*Vireo bellii pusillus*)	Endangered	No	No effect
Monarch (*Danaus plexippus* pop.1)	Endangered	No	No effect
Quino Checkerspot Butterfly (*Euphydryas editha quino*)	Endangered	No	No effect
Golden Eagle (*Aquila chrysaetos*)	BEPA	No	No effect
Bald Eagle (*Haliaeetus leucocephalus*)	BEPA	No	No effect
Riverside Fairy Shrimp (*Streptocephalus woottoni*)	Endangered	No	No effect
Vernal Pool Fairy Shrimp (*Branchinecta lynchi*)	Endangered	No	No effect
California Orcutt Gras (*Orcuttia californica*)	Endangered	No	No effect
Munz's Onion (*Allium munzii*)	Endangered	No	No effect
San Diego Ambrosia (*Ambrosia pumila*)	Endangered	No	No effect
San Jacinto Valley Crownscale (*Atriplex coronate* var. *notatior*)	Endangered	No	No effect
Slender-horned Spineflower (*Dodecagema leptoceras*)	Endangered	No	No effect
Spreading Navarretia (*Navarretia fossalis*)	Threatened	No	No effect
Thread-leaved Brodiaea (*Brodiaea filifolia*)	Threatened	No	No effect
BEPA = Bald and Golden Eagle Protection Act			

If you have any questions or concerns about this project, please email me at clyons@reconenvirornmental.com or call me at (619) 308-9333 ext. 108.

Sincerely,

Cailin Lyons
Director, Biology Group

Danelle Gadia
Assistant Biologist

CML:DBG:jg

Attachments

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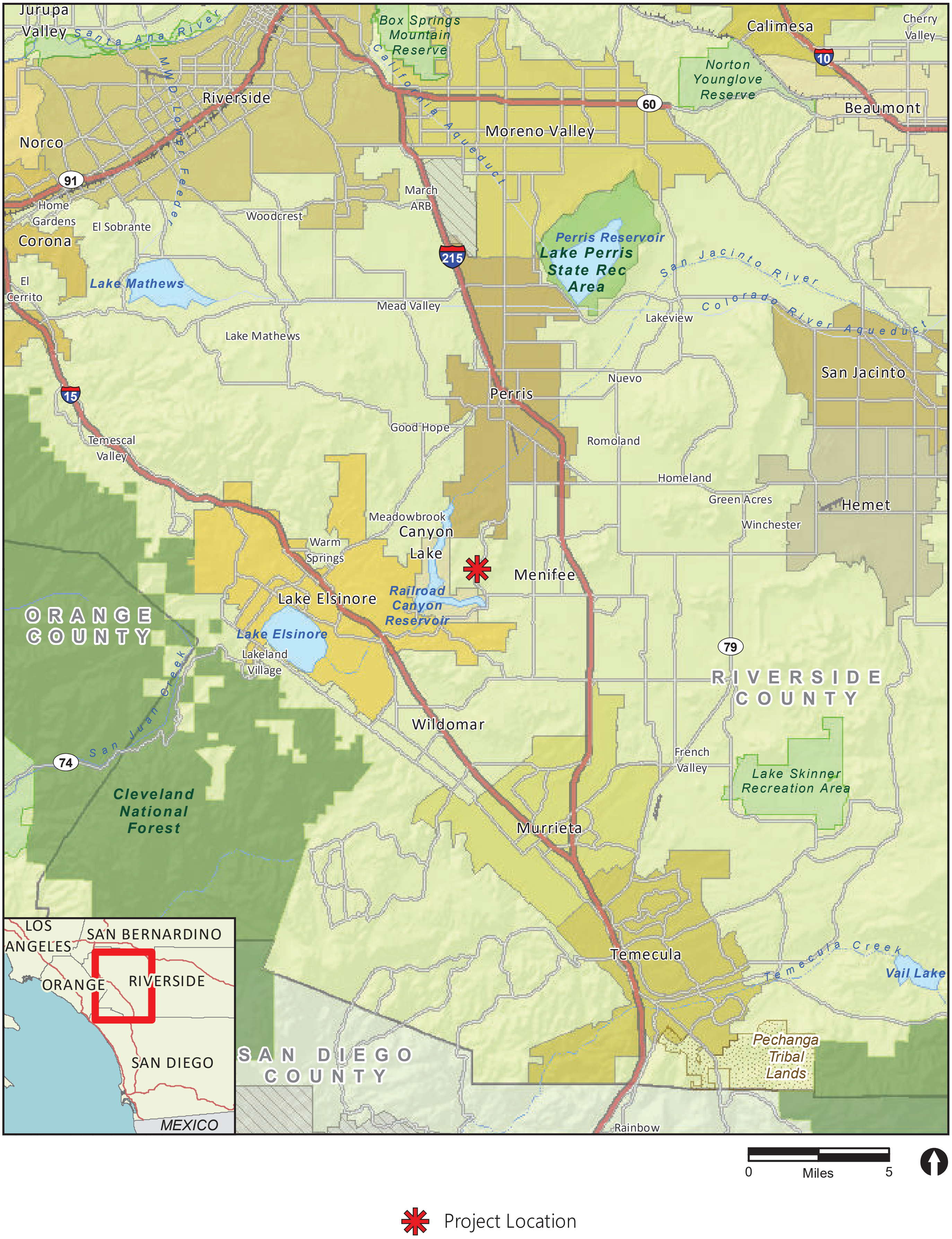

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FIGURE 1
Regional Location

Map Source: USGS 7.5 minute topographic map series, Romoland quadrangle, 1979, T05S R04W and T05S R03W

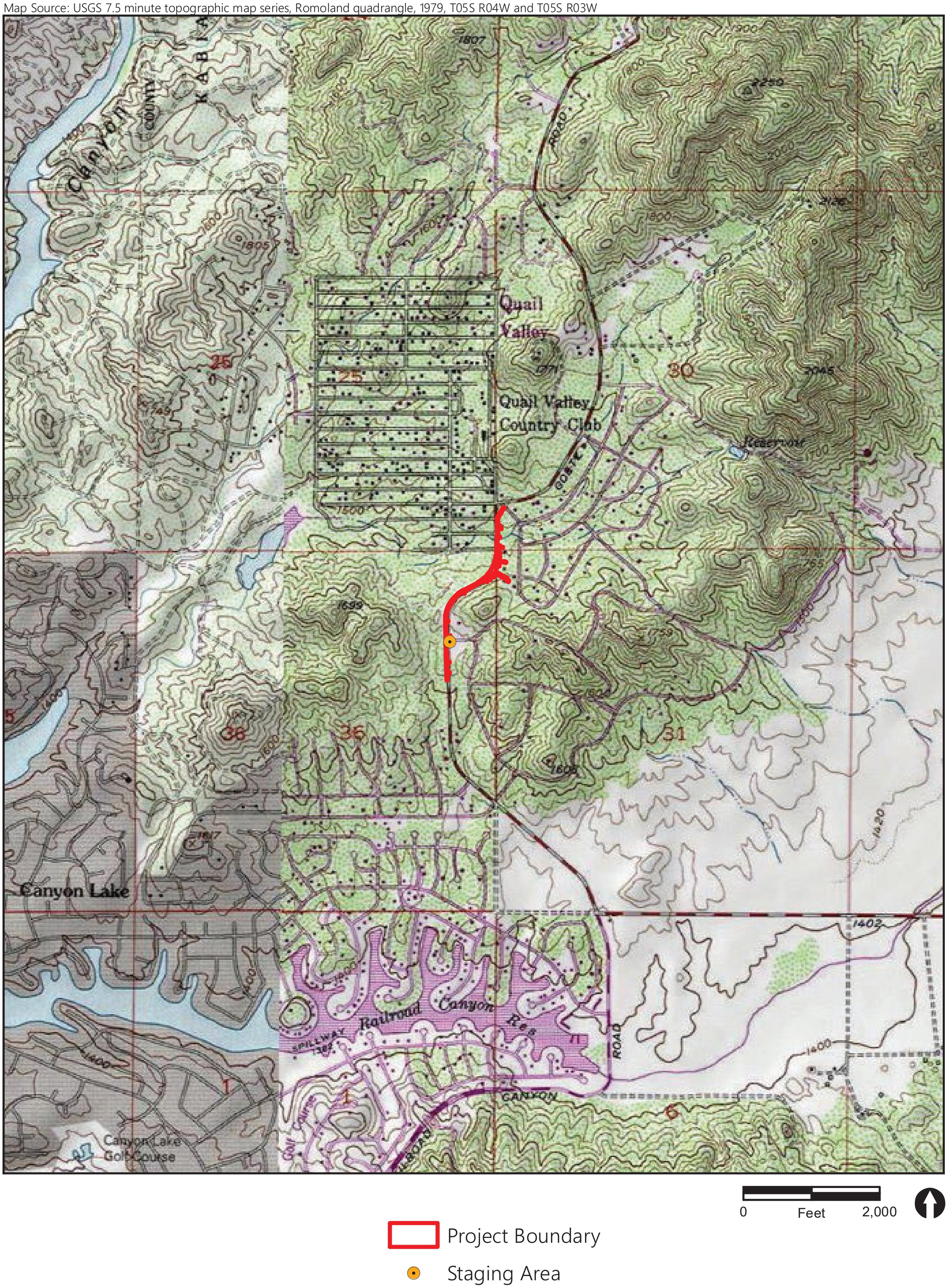

FIGURE 2
Project Location on USGS Map

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Image Source: NearMap (flown January 2023)

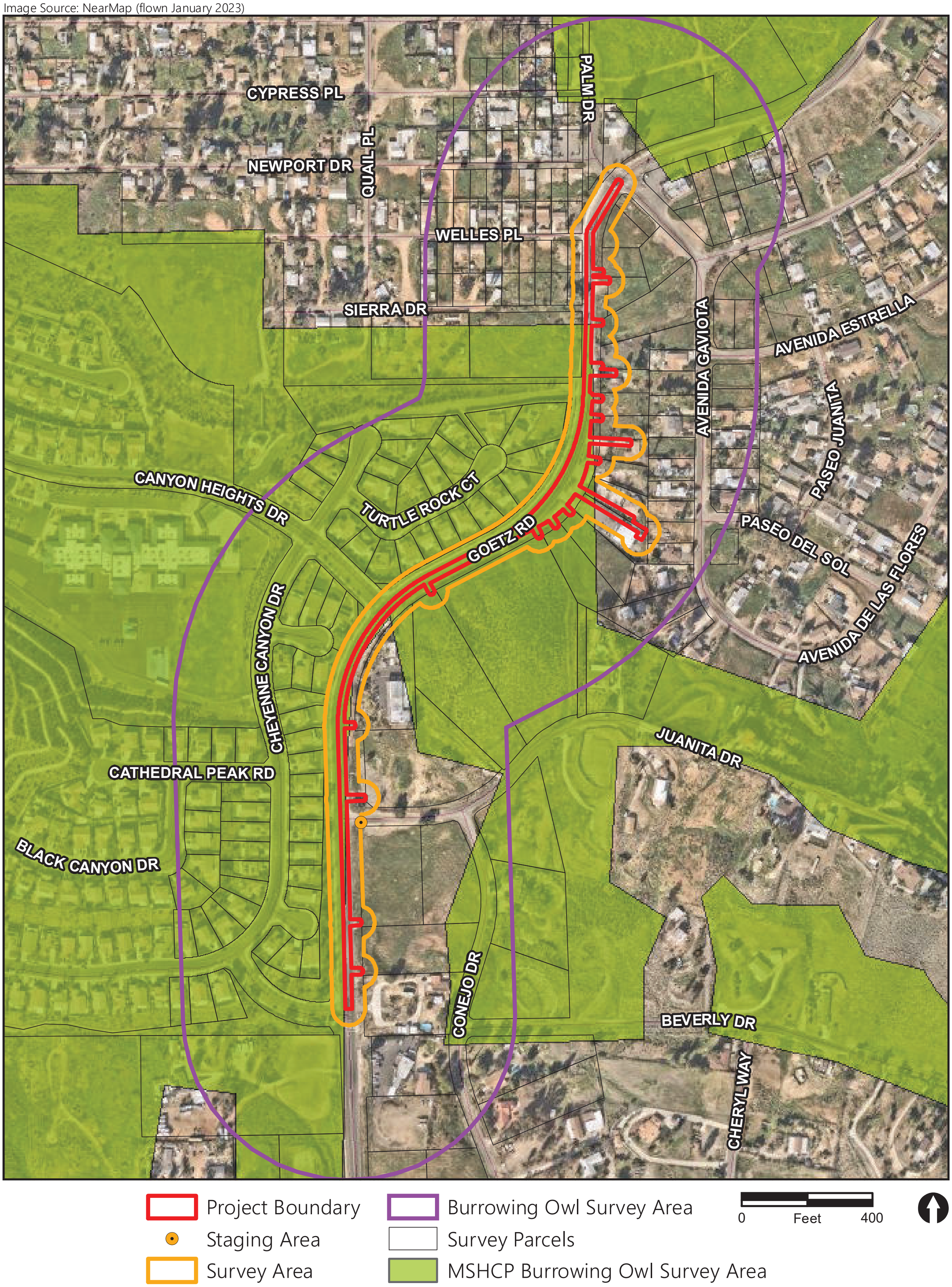

FIGURE 3
Project Location on Aerial Photograph

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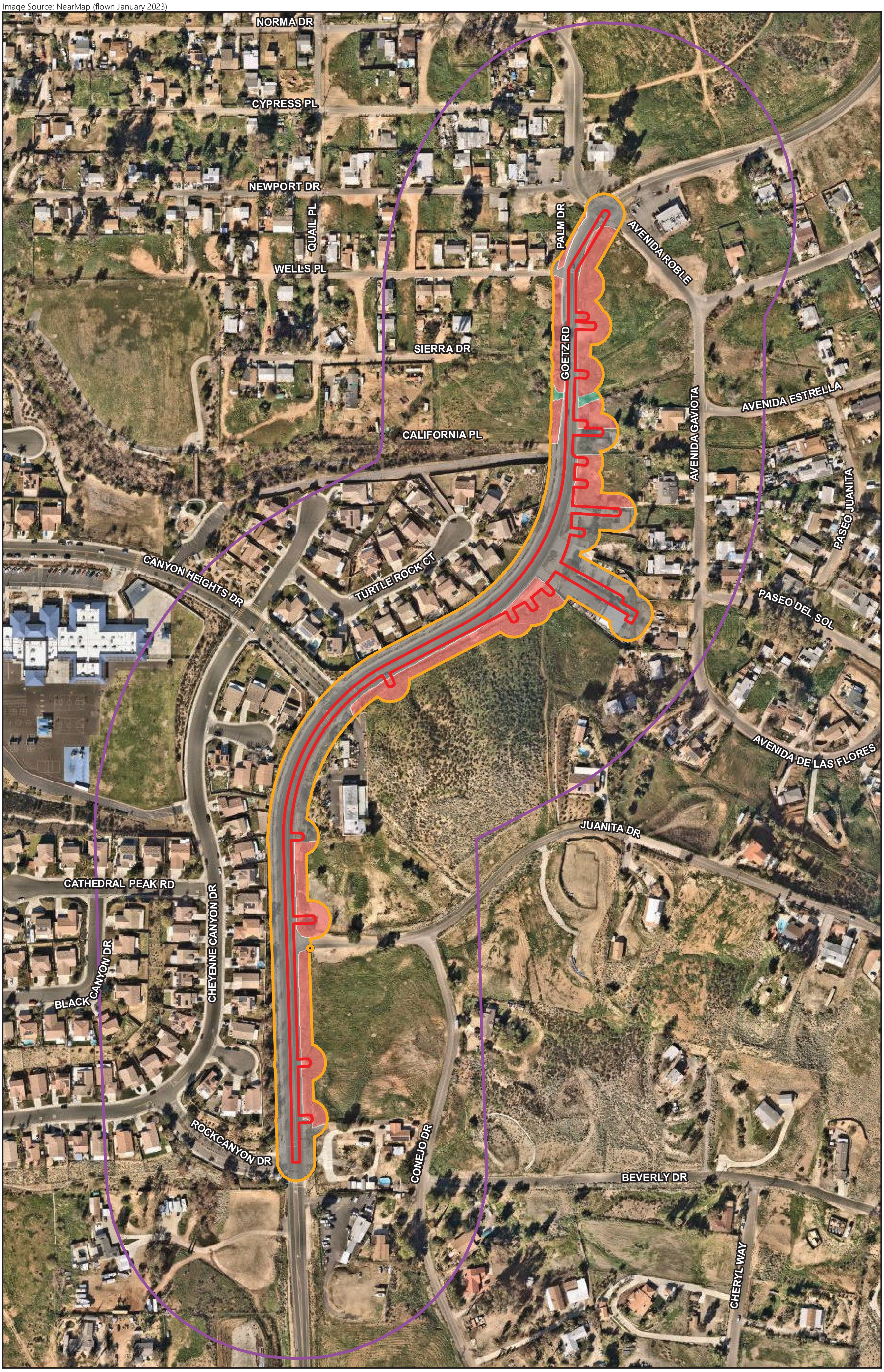
Image Source: NearMap (flown January 2023)



Project Boundary
Survey Area
Burrowing Owl Survey Area
Staging Area

Vegetation Community
Disturbed Wetland
Disturbed Land
Urban/Developed

0 Feet 250

FIGURE 4
Existing Biological Resources

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Image Source: NearMap (flown January 2023)

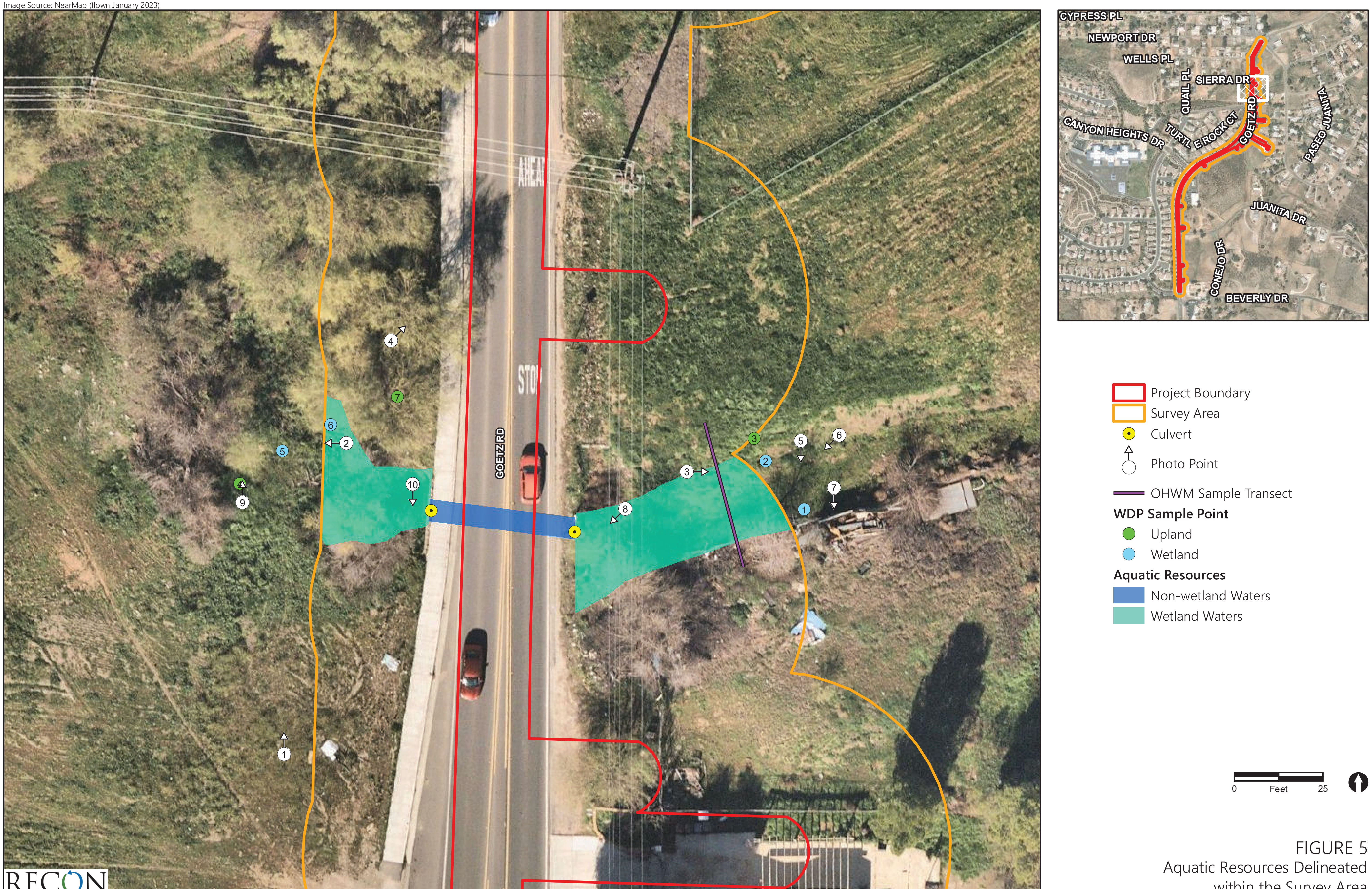

FIGURE 5
Aquatic Resources Delineated within the Survey Area

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Image Source: NearMap (flown January 2023)

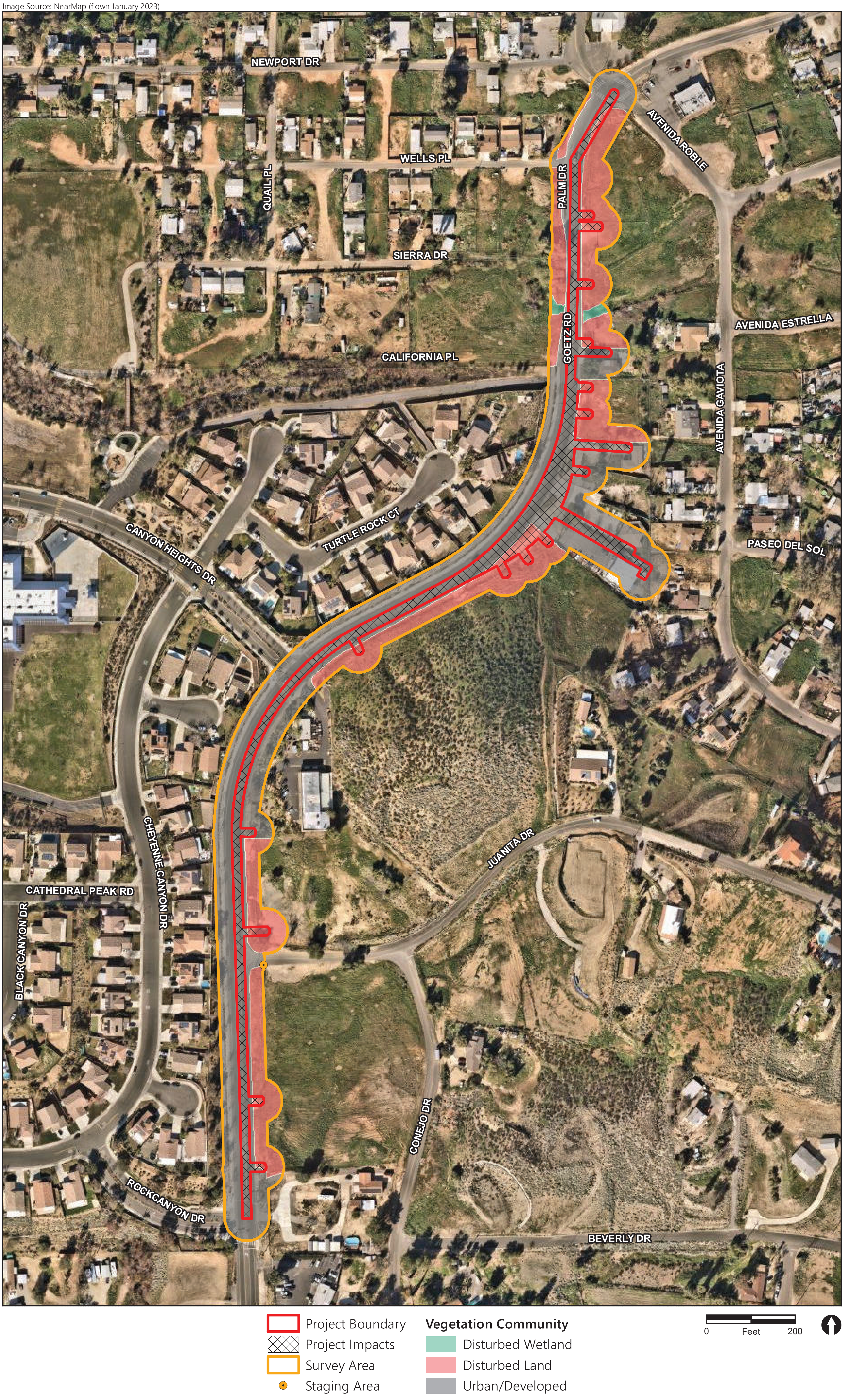

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FIGURE 6
Impacts to Biological Resources

ATTACHMENTS

ATTACHMENT 1

Burrowing Owl Site Assessment for the Goetz Road Backbone Sewer Project, Menifee, California

RECON

An Employee-Owned Company

March 15, 2024

Mr. Joseph Broadhead
Principle Water Resource Specialist
Eastern Municipal Water District
2270 Trumble Road
P.O. Box 8300
Perris, CA 92572-8300

Reference: Burrowing Owl Site Assessment for the Goetz Road Backbone Sewer Project, Menifee, California (RECON Number 9878-11)

Dear Mr. Broadhead:

This letter summarizes the results of the May 2, 2023, habitat assessment survey for burrowing owl (*Athene cunicularia*; BUOW) for the Goetz Road Backbone Sewer Project (project). The project site is located along Goetz Road between Rock Canyon Drive to the south and Avenida Roble to the north, in the city of Menifee in western Riverside County, California (Figures 1, 2, and 3). The project site is in Section 25 of the U.S. Geological Survey (USGS) Romoland quadrangle, Township 5 South, Range 4 West (USGS 1979; see Figure 2).

RECON Environmental, Inc. (RECON) biologists conducted the survey in accordance with the guidelines developed by the County of Riverside (Riverside County Transportation and Land Management Agency [RCTLMA] 2006). Step 1 of these guidelines is to determine whether suitable habitat for the species occurs within the project site. If suitable habitat occurs, then the first survey to determine presence or absence of the species can occur concurrent with the habitat assessment. No burrowing owl individuals were detected, no signs of burrowing owl activity were seen, and no suitable habitat was present within the burrowing owl survey area (project site plus 500-foot buffer). A discussion of the Step 1 survey results is provided below.

SURVEY METHODS

RECON biologist Christine Beck conducted a burrowing owl habitat assessment in accordance with the guidelines developed by the County of Riverside (RCTLMA 2006). These guidelines require the project site and a 500-foot buffer surrounding the project site (burrowing owl survey area) be surveyed for burrowing owl (Figure 4). The entire project alignment was walked, and all suitable habitat identified within the project site surveyed. Suitable habitat off-site within the 500-foot buffer was evaluated visually from the right-of-way.

Christine Beck conducted a BUOW habitat assessment on May 2, 2023, from 6:10 a.m.-7:45 a.m. The starting temperature was 50 degrees Fahrenheit, end temperature was 56 degrees Fahrenheit, cloud cover remained at 100 percent throughout the entirety of the survey, starting wind speed was 0-2 miles per hour, and end wind speed was 2-5 miles per hour at the end of the survey.

HABITAT ASSESSMENT RESULTS

Existing Conditions

The project site is a 0.54-mile segment of Goetz Road and adjacent right-of-way between Rock Canyon Drive to the south and Avenida Roble to the north (see Figure 3). Total area for the general biological survey area, which includes the project site and a 50-foot buffer surrounding the project site totals 7.15 acres. The project site is surrounded by residential to the west, north, and south, and undeveloped lots and commercial uses to the east. The 500-foot survey buffer contains residential and commercial development interspersed with undeveloped lots and native habitat areas. The elevation within the project site is approximately 1,535 feet above mean sea level.

The project site is not located inside or adjacent to any Criteria Area, Criteria Cell, or Conservation Area identified for conservation potential by the Western Riverside Multiple Species Habitat Conservation Plan (MSHCP); however, the project site is adjacent to various undeveloped parcels that are located within an MSHCP burrowing owl survey area.

Potential Burrowing Owl Habitat

The survey area supports three vegetation communities/land cover types: disturbed wetland (0.05 acre) urban/developed (6.29 acres), and disturbed land (0.81 acres; Photographs 1-4). These vegetation communities/land cover types have no potential to support burrowing owl due to the lack of suitable burrows and the dense tall vegetation growing throughout much of the undeveloped areas.

Disturbed wetland is adjacent to Goetz Road and consists of 0.05 acre of an ephemeral drainage channel, connected through a culvert under Goetz Road. Low-growing vegetation such as hyssop loosestrife (*Lythrum hyssopifolia*), African umbrella plant *(Cyperus involucratus)*, mariposa rush (*Juncus dubius)*, curly dock (*Rumex crispus*), and rabbitfoot grass (*Polypogon monspeliensis*) are present. A stand of Mexican palo verde (*Parkinsonia aculeata*) and several individual willows (*Salix* spp.) and mule fat (*Baccharis salicifolia* ssp. *salicifolia*) occur as scattered, isolated individuals along the length of the drainage channel.

The disturbed land consists of areas dominated by non-native forbs and grasses. Vegetation was dense within this land cover type and consists of short-pod mustard (*Hirschfeldia incana*), stinknet (*Oncosiphon piluliferum*), filaree (*Erodium* sp.), ripgut brome (*Bromus diandrus*), and red brome (*Bromus rubens*), with a few native species including Coulter's lupine (*Lupinus sparsiflorus*), caterpillar phacelia (*Phacelia cicutaria* var. *hispida*), and California sand-aster (*Corethrogyne filaginifolia* var. *filaginifolia*). Based on Google Earth images, the disturbed land along the project site appears to be periodically mowed.

The urban/developed land includes roads, residential development, and a few commercial businesses along the entire project alignment. Vegetation within this land cover type consists of ornamental landscaping. The 500-foot buffer contains a mosaic of undeveloped lots with mostly nonnative vegetation, native habitat, paved roads, and residential development.

No burrowing owls, suitable burrows, California ground squirrel (*Otopermophilus* [=*Spermophilus*] *beecheyi)*, or suitable habitat were observed during the survey within the project site or the 500-foot buffer. Based on the results of the habitat assessment, burrowing owl surveys in accordance with the guidelines developed by the County of Riverside are not required.

If you have any questions concerning the contents of this letter, please contact me at (619) 308-9333 or by email at asmisek@reconenvironmental.com or dgadia@reconenvironmental.com.

Sincerely,

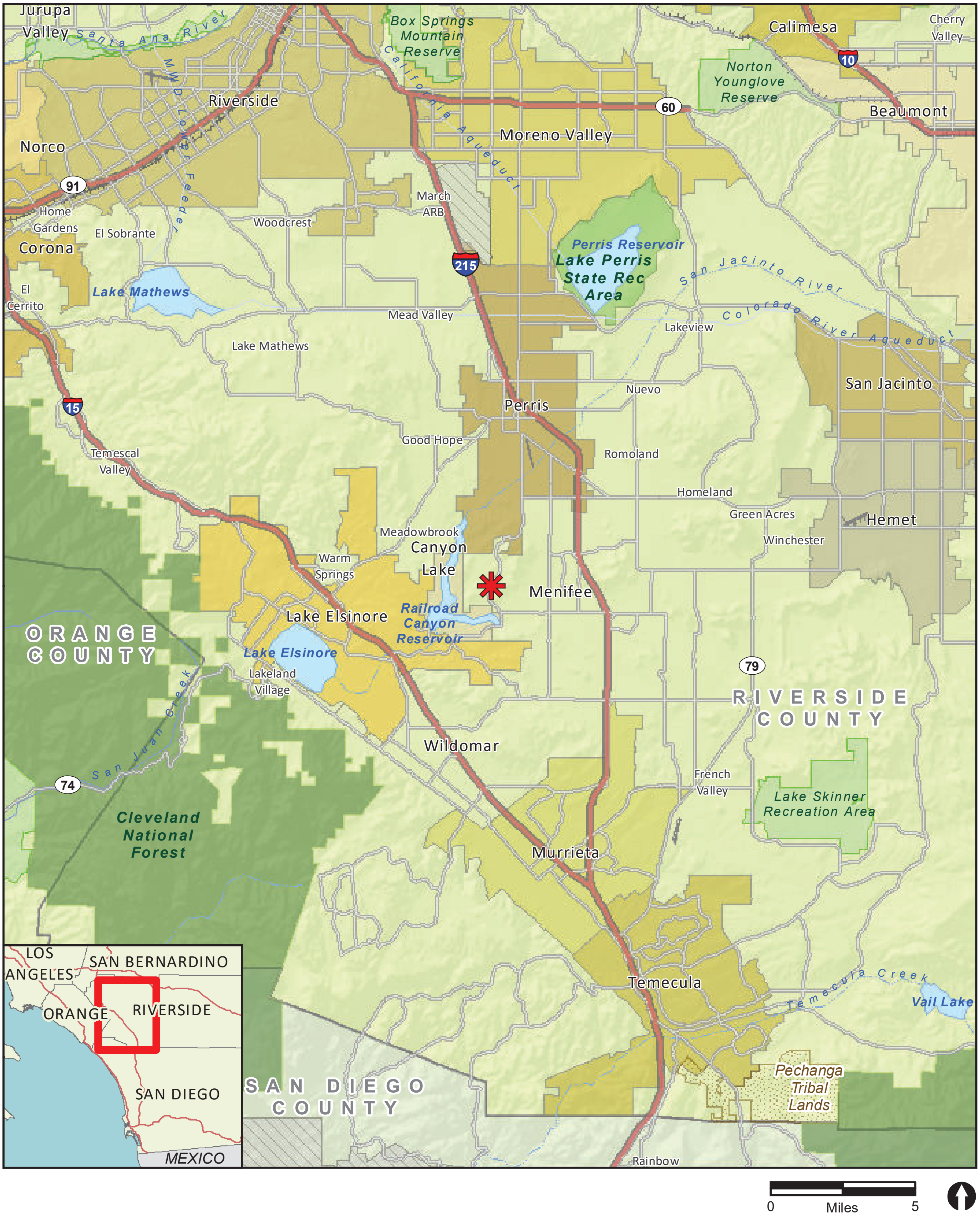
Andrew Smisek	Danelle Gadia
Senior Biologist	Assistant Biologist

AKS:DBG:jg

REFERENCES CITED

Riverside County Transportation & Land Management Agency (RCTLMA)
2006 Burrowing Owl Survey Instructions for the Western Riverside Multiple Species Habitat Conservation Plan Area. Accessed at https://www.wrc-rca.org/species/survey_protocols/burrowing_owl_survey_instructions.pdf.

U.S. Geological Survey (USGS)
1979 Romoland Quadrangle 7.5-Minute Topographic Map.



Project Location

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FIGURE 1
Regional Location

Map Source: USGS 7.5 minute topographic map series, Romoland quadrangle, 1979, T05S R04W and T05S R03W

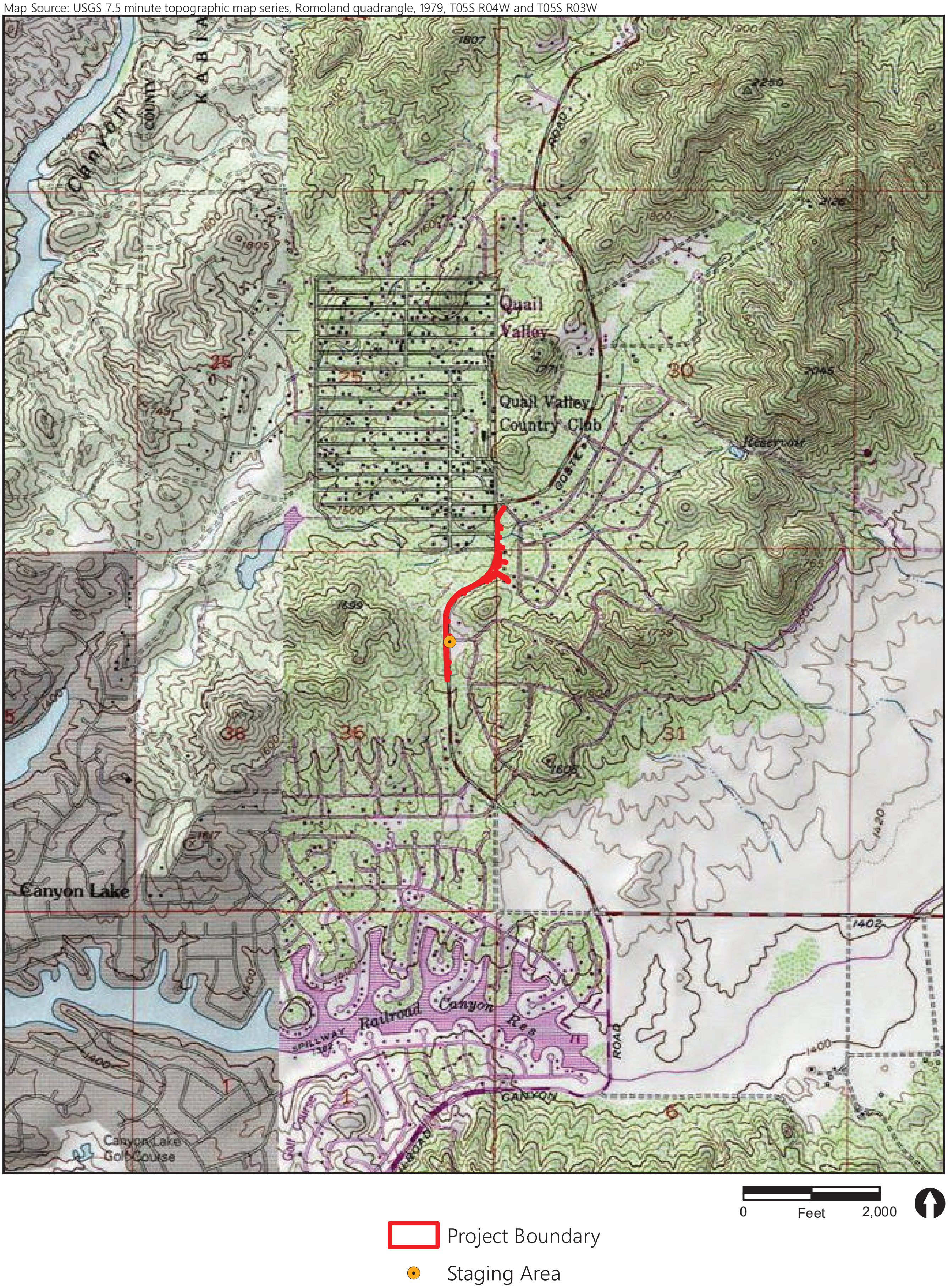

FIGURE 2
Project Location on USGS Map

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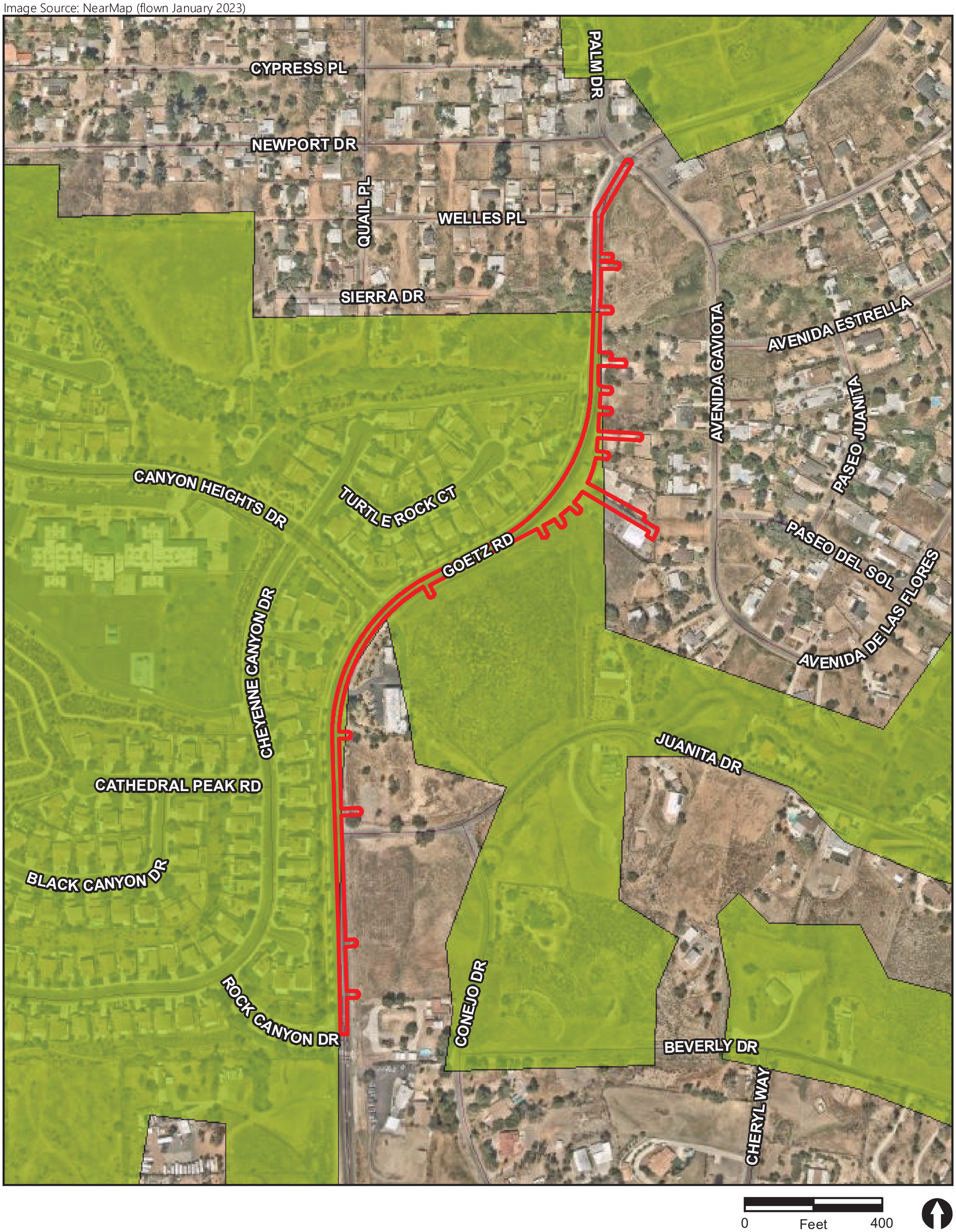
Image Source: NearMap (flown January 2023)



Project Boundary

MSHCP Burrowing Owl Survey Area

FIGURE 3
Project Location on Aerial Photograph

RECON

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Image Source: NearMap (flown January 2023)

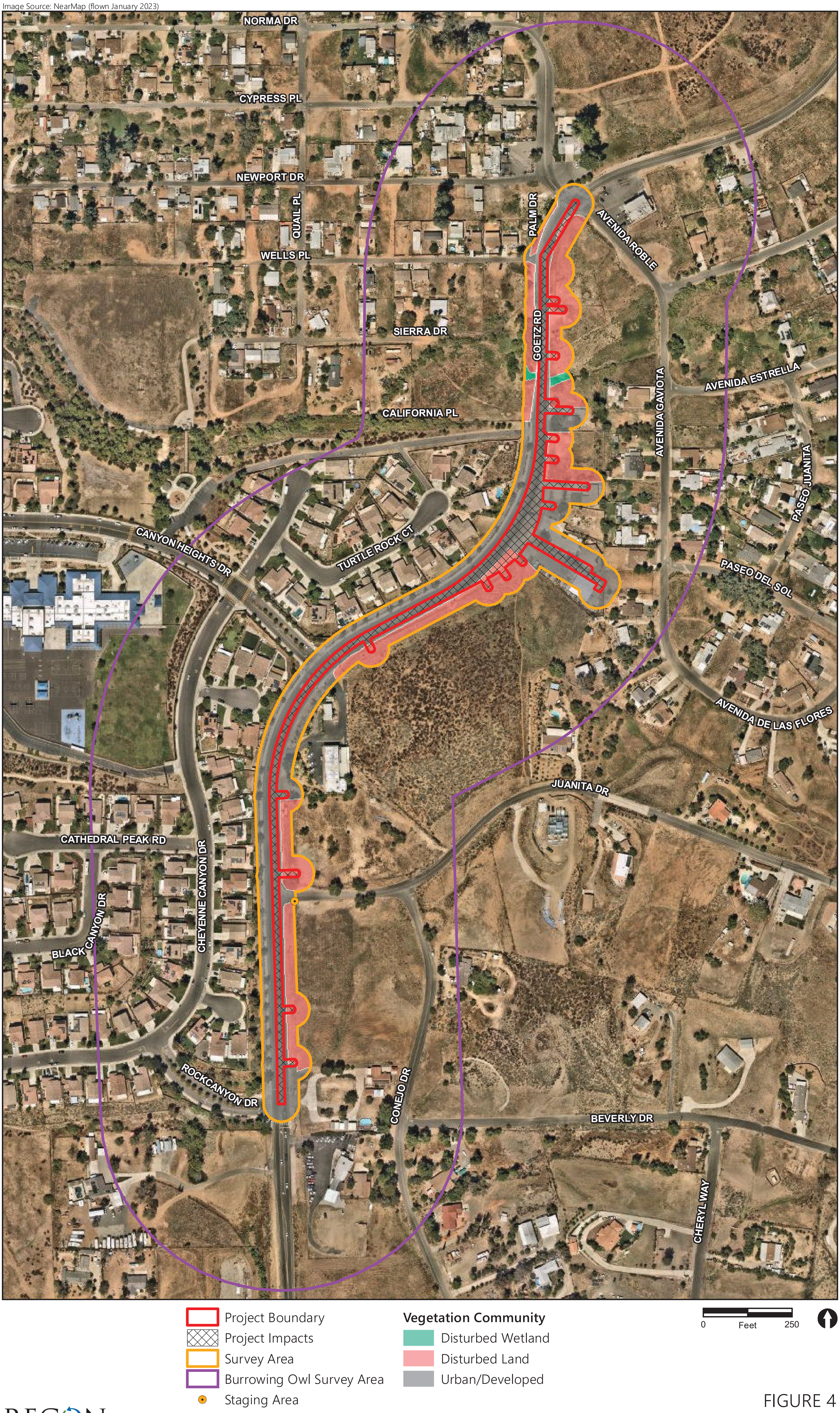

FIGURE 4

Impacts to Biological Resources

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PHOTOGRAPH 1
View of Disturbed Wetland from Goetz Road, Facing West
May 2, 2023

PHOTOGRAPH 2
View of Disturbed Wetland and Goetz Road, Facing West
May 2, 2023

PHOTOGRAPH 3
View of Urban/Developed Land from Goetz Road, Facing Southwest
May 2, 2023

PHOTOGRAPH 4
View of Disturbed Land from Goetz Road, Facing North
May 2, 2023

ATTACHMENT 2

Aquatic Resource Delineation Report for the Goetz Road Backbone Sewer Project Menifee, Riverside County, California

Aquatic Resource Delineation Report for the Goetz Road Backbone Sewer Project Menifee, Riverside County, California

Prepared for
Eastern Municipal Water District
2270 Trumble Road
P.O. Box 8300
Perris, CA 92572-8300
Contact: Mr. Joseph Broadhead

Prepared by
RECON Environmental, Inc.
3111 Camino del Rio North, Suite 600
San Diego, CA 92108
P 619.308.9333

RECON Number 9878-11
March 27, 2024

Chris Thomson

Chris Thomson, Biologist

TABLE OF CONTENTS

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ATTACHMENTS

Acronyms and Abbreviations

APT	Antecedent Precipitation Tool
CDFW	California Department of Fish and Wildlife
FAC	Facultative
FACW	Facultative-Wetland
GPS	global positioning system
NRCS	Natural Resource Conservation Service
NWI	National Wetland Inventory
OHWM	Ordinary High Water Mark
project	Goetz Road Backbone Sewer Project
RWQCB	Regional Water Quality Control Board
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USGS	U.S. Geological Survey

1.0 Site Description and Landscape Setting

The Goetz Road Sewer Backbone Project (project) is located in the Quail Valley community within the city of Menifee in Riverside County (Attachment 1: Figure 1). The project would connect properties within 200 feet of a sanitary sewer service, where a septic system is currently deployed, to the Goetz Road backbone extension, and is approximately 1.1 miles south of Railroad Canyon Road and 3.8 miles west of State Route 215 in the city of Menifee. The project site is found on U.S. Geological Survey (USGS) 7.5-minute topographic map, Romoland, California quadrangle (USGS 1979; Attachment 1: Figure 2). The project is surrounded by residential development and undeveloped open space, and the Review Area for this delineation is shown on Figure 3. Coordinates for the center of the Review Area are 33.70 dd latitude and -117.24 dd longitude. For the purposes of the aquatic resource delineation, the Review Area is equivalent to the boundary of the project site plus a 50-foot buffer, totaling 7.15 acres (see Attachment 1: Figure 3).

2.0 Site Alterations, Current and Past Land Use

Currently, land use adjacent to the project consists of residential developments and undeveloped land. Goetz Road is a two-lane paved road that provides access to the adjacent developments. An unnamed drainage flows east to west through the northern portion of the Review Area and open space areas occur along the drainage in adjacent uplands.

2.1 Soils

Information on the soil types sampled in the Review Area is summarized from the Soil Survey for Riverside County (U.S. Department of Agriculture [USDA] 1973) and the Hydric Soils of California list obtained from the USDA Natural Resource Conservation Service (NRCS; 2023).

Four soil types–Arbuckle loam, 2 to 8 percent slopes; Escondido fine sandy loam, 8 to 15 percent slopes, eroded; Lodo rocky loam, 25 to 50 percent slopes, eroded; and Lodo rocky loam, 8 to 25 percent slopes, eroded–are mapped within the Review Area (Attachment 1: Figure 4; USDA 1973). These soils are not listed on the NRCS hydric soils list (2023).

2.2 Hydrology

A drainage enters the Review Area at the northeastern boundary of the Review Area that likely receives runoff from Avenida Roble and surrounding residential development. The primary drainage travels east to west through the northern portion of the Review Area. The primary drainage exits to the west in the northern portion of the Review Area and discharges into the Railroad Reservoir (Canyon Lake). The Railroad Reservoir drains southwest into the San Jacinto River and discharges into Lake Elsinore.

2.3 Vegetation

Three vegetation communities/land cover types were mapped within the Review Area: disturbed wetland, disturbed land, and urban/developed. Attachment 1: Figure 5 provides locations of each vegetation community/land cover type within the Review Area. Attachment 2: Table 1 lists the vegetation communities/land cover types and their acreages within the Review Area.

2.3.1 Disturbed Wetland

Disturbed wetland is characterized as areas permanently or periodically inundated by water, which have been significantly modified by human activity (Oberbauer 2008). Disturbed wetland is located adjacent to Goetz Road in the northern portion of the Review Area (Attachment 3; Photograph 1 and 2. To the east of Goetz Road this vegetation community is dominated by hyssop loosestrife (*Lythrum hyssopifolia*), African umbrella plant (*Cyperus involucratus*), mariposa rush (*Juncus dubius*), curly dock (*Rumex crispus*), and rabbitfoot grass (*Polypogon monspeliensis*). To the west of the road, the disturbed wetland is characterized by scattered arroyo willow (*Salix lasiolepis*), Mexican palo verde (*Parkinsonia* aculeata), Mariposa rush, rabbitfoot grass, and curly dock (*Rumex crispus*).

2.3.2 Disturbed Land

Disturbed land is characterized by predominantly non-native species introduced through human action (Oberbauer 2008). Disturbed land consists of undeveloped lots adjacent to Goetz Road and contains of a variety of non-native species including Mexican palo verde, short-pod mustard (*Hirschfeldia incana*), stinknet (*Oncosiphon piluliferum*), filaree (*Erodium* sp.) ripgut grass, and red brome (*Bromus rubens*), with a few native species including Coulter's lupine (*Lupinus sparsiflorus*), caterpillar phacelia (*Phacelia cicutaria* var. *hispida*), and California sand-aster (Attachment 3: Photograph 4).

2.3.3 Urban/Developed

Urban/developed consists of areas that have been constructed upon or otherwise physically altered to an extent that native vegetation is no longer supported (Oberbauer et al. 2008). Urban/developed occurs throughout the majority of the Review Area as paved roadways, sidewalks, a decomposed granite walkway, and residential and commercial developments. Vegetation within urban/developed consists of ornamental landscaping.

3.0 Precipitation Data and Analysis

Climate data, including precipitation totals, for the nearest recording station to the project site was gathered from the NRCS National Water and Climate Center databases. The climate data obtained are discussed below.

3.1 Climate and Growing Season

The project is located within an inland valley of southern California, in an area generally characterized by moderate temperature fluctuations throughout the year, with hot and dry summers and cooler and wetter winters. The majority of precipitation typically falls between December and March as somewhat frequent low- to moderate-intensity rainfall. The growing season typically lasts into early summer after winter and spring rainfall and ends in mid to late summer when little to no precipitation occurs and temperatures increase. Rainfall amounts can vary substantially from year to year, with the potential for periods of extended drought.

3.2 Antecedent Precipitation Tool Summary

The Antecedent Precipitation Tool (APT) was used to analyze the 30-day rolling total and the 30-year normal range of precipitation data for the nearest recording weather stations to the project. The data presented in the APT results graphics (Attachment 4) indicate that normal conditions occurred at the time of the May 24, 2023, survey.

3.3 Wetland Hydrology and Analysis

Hydrology within the Review Area consists of one drainage channel traveling east to west through the northern portion of the Review Area. As described above, the drainage channel receives water input from urban runoff from off-site developed land as well as adjacent developed roadways. Under these conditions, the drainage appears to support an ephemeral flow regime, conveying flow only in direct response to rain events. According to the results of the APT, one substantial rain event occurred within the 30-day period prior to the survey and site conditions were considered “normal” for this time of year. These conditions were considered when analyzing the hydrology of the on-site features as discussed in Sections 4.0 and 5.0 below.

4.0 Investigation Methods

A routine waters/wetland delineation, following the guidelines set forth by the U.S. Army Corps of Engineers (USACE; 1987 and 2008), was performed by RECON Environmental, Inc. biologists Gerry Scheid and Chris Thomson on May 24, 2023, to gather field data at locations where aquatic resources occur in the Review Area. Once on-site, the aquatic resources were assessed for their potential to qualify as federal and state jurisdictional waters.

4.1 Wetland Parameters

4.1.1 Hydrophytic Vegetation

Vegetation communities comprising partially or entirely hydrophytic plant species were examined, and data for each vegetation stratum (i.e., tree, shrub, herb, and vine) were recorded on the datasheet provided in the 2008 Arid West Regional Supplement (USACE 2008). The percent absolute cover of each species present was visually estimated and recorded.

First, the wetland indicator status of each species recorded within a vegetation community was determined by using the National Wetland Plant List (USACE 2020). Dominant species with an indicator status of NI (No Indicator) or not listed in the 2020 National Wetland Plant List were evaluated as either wetland or upland indicator species based on local professional knowledge of where the species are most often observed in habitats that are characteristic in southern California.

The dominance test was then used to determine which vegetation community qualified as hydrophytic vegetation at each site. In situations where a site failed the dominance test but contained positive indicators of hydric soils and/or wetland hydrology, the prevalence index was used. The presence or absence of morphological adaptations was noted; however, none of the sampled wetland areas required an analysis of morphological adaptations to determine if the vegetation was hydrophytic.

4.1.2 Hydric Soils

Sample points were selected within potential wetland areas and where the apparent boundary between wetland and upland was inferred based on changes in the composition of the vegetation and topography (see Attachment 1: Figure 5). A total of seven soil pits were dug to a depth of at least 18 inches to determine soil color, evidence of soil saturation, depth to groundwater, and indicators of a reducing soil environment (i.e., mottling, gleying, and hydrogen sulfide odor). A Munsell Soil-Color Book (2009) was used to determine soil colors, and the 2008 Arid West Regional Supplement (USACE 2008) and the Field Indicators of Hydric Soils in the United States guide (USDA 2017) were used to determine the presence of hydric soil indicators.

4.1.3 Wetland Hydrology

Hydrologic information for the site was obtained by reviewing USGS topographic maps and by directly observing hydrology indicators in the field. All portions of any potentially occurring wetlands or non-wetland waters within the Review Area were inspected for signs of hydrology as defined in the 2008 Arid West Regional Supplement (USACE 2008).

4.2 Pre-Field Review

Prior to conducting the delineation, an aerial photograph, USGS topographic maps of the site, including the 7.5-minute Romoland, California quadrangle (USGS 1979; see Attachment 1: Figure 2), USDA soil maps of the site, and the U.S. Fish and Wildlife Service National Wetland Inventory (NWI; U.S. Fish and Wildlife Service 2023; Attachment 1: Figure 6) were examined to aid in the determination of potential Waters of the U.S. on-site.

4.3 On-site Wetland Investigation

Once on-site, the Review Area was examined to determine the presence of any indicators of wetlands, including wetland vegetation, hydric soils, and hydrology. Field data, including hand-drawn maps and recorded global positioning system (GPS) points and lines, were later digitized/downloaded into ArcGIS. Mapped jurisdictional waters created using these data were analyzed in ArcGIS to provide acreages or target jurisdictional and vegetation boundaries. USACE wetland determination data forms are included as Attachment 5 and photographs of the Review Area are provided in Attachment 3. Descriptions of the potential wetland vegetation communities sampled are provided below.

The Review Area supports hydrophytic vegetation within the disturbed wetland vegetation community, all located in the northern portion of the Review Area (see Attachment 1: Figure 5).

Disturbed land, and urban/developed within the Review Area lack hydrophytic vegetation and are dominated by upland species.

4.4 On-site Ordinary High Water Mark Investigation

The lateral extent of the ordinary high water mark (OHWM) was delineated along the on-site drainages using the observed hydrology indicators in accordance with *A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States* (Lichvar and McColley 2008). The OHWM data forms are included as Attachment 6. Indicators observed and used to determine the extent of the OHWM include change in average sediment texture, change in vegetation species and cover, and a break in bank slope (Attachment 3: Photographs 5 through 9). The distribution and abundance of observed indicators varied within the on-site drainage, with the ephemeral feature in the western portion of the Review Area containing more frequent and diverse indicators. This feature contained remnant standing water at the time of the survey (see Attachment 3: Photograph 10).

5.0 Description of Aquatic Resources

The aquatic resources delineated include wetland waters mapped along the active floodplain of the ephemeral drainage adjacent to Goetz Road in the northern portion of the Review Area, and non-wetland waters mapped in the culvert underlying Goetz Road. These aquatic resources total 0.06 acre within the Review Area. A summary of the aquatic resources and location of these resources in relation to the Review Area boundaries are provided in Attachment 2: Table 2 and on Attachment 1: Figure 7, respectively.

5.1 Wetlands

The delineated wetlands include the areas mapped as disturbed wetland located within the active floodplain of the ephemeral drainage in the northern portion of the Review Area, totaling 0.05 acre (see Attachment 1: Figure 7 and Attachment 2: Table 2). Aside from meeting the hydrophytic vegetation standard, as described in Section 4.3 above, the delineated wetlands also met the hydric soil and wetland hydrology standards (Attachment 5: Datasheets 1, 2, 5, and 6). Specifically, the wetlands met the redox dark surface or depleted matrix hydric soil indicator and contained the following wetland hydrology indicators: surface water, high water table, and saturation.

5.2 Non-wetland Waters

Non-wetland waters were delineated within the culverted portion of the on-site drainages underlying Goetz Road, totaling 0.01 acre and 41 linear feet (see Attachment 1: Figure 7 and Attachment 2: Table 2). This culvert receives flow from the ephemeral drainage channel east of Goetz Road and discharges to the west, into the drainage channel west of Goetz Road, where the drainage continues to flow west (see Attachment 1: Figure 5). The drainage appears to support an ephemeral flow regime.

5.3 Riparian

No riparian areas are present outside the extent of the wetland and non-wetland waters mentioned above (see Attachment 1: Figure 7). Disturbed wetland vegetation mapped west of Goetz Road in the northern portion of the survey area contains hydrology and hydric soil indicators to meet the USACE definition of a wetland.

6.0 Deviation from National Wetland Inventory

The results of this analysis varied slightly from those classified in the NWI (see Attachment 1: Figure 6). The on-site drainage channel is classified as intermittent riverine (R4SBC) under the NWI but now appears to exhibit an ephemeral flow regime. The location of this channel may have been altered during development of the surrounding residential areas and road construction.

7.0 Mapping Method

The maps of the delineated aquatic resources within the Review Area are based on the above analysis (see Attachment 1: Figure 7). The boundary of the majority of aquatic resources was obtained from a combination of GPS data collected in the field, aerial photography, and recent topographic survey data. Geographic information system mapping software (ArcMap) was used to produce the graphical maps contained in this report.

8.0 Results and Conclusions

Wetlands were delineated within the Review Area and include all areas mapped as disturbed wetland . These features total 0.05 acre. Non-wetland waters were mapped as the continuation of the drainage course through the culvert in Goetz Road and totals 0.01 acre.

9.0 Disclaimer Statement

This report describes the results of an aquatic resource delineation conducted within the approximately 7.15-acre Review Area. It was prepared in accordance with the Minimum Standards for Acceptance of Aquatic Resources Delineation Reports (USACE 2017). The aquatic resource delineation is used to identify and map the potential extent of the federal jurisdictional Waters of the U.S. The purpose of this study was to identify and map the limits of any aquatic resources on the property to provide necessary background information for analysis by USACE in making a jurisdictional determination. USACE will review the content of this report and ultimately make a determination of federal jurisdiction for any Waters of the U.S. that may be present in the Review Area. References used in the preparation of this report are included below in Attachment 7. A discussion about the potential jurisdictional limits of the USACE, Regional Water Quality Control Board (RWQCB), and California Department of Fish and Wildlife (CDFW) is included in Section 10 below.

10.0 Potential Jurisdictional Resources

This section provides a discussion of the potential for on-site aquatic resources to be considered waters under the jurisdiction of three agencies: USACE, RWQCB, and CDFW.

10.1 Potential USACE Waters of the U.S.

Under Section 404 of the Clean Water Act, the USACE is authorized to regulate Waters of the U.S. The areas of potential Waters of the U.S. within the Review Area may include both the wetland and non-wetland waters (Attachment 1: Figure 8 and Attachment 2: Table 3). As described in Sections 5.0 above, the wetlands and non-wetland waters occur within the active floodplain of the on-site drainage features, delineated at the extent of the OHWM. The areas mapped as wetlands contain sufficient cover of hydrophytic vegetation, being mapped as disturbed wetland containing arroyo willow, Mexican palo verde, curly dock, and rabbitfoot grass,. These areas meet the three wetland parameters for hydrophytic vegetation, hydric soils, and hydrology. Non-wetland waters include the continuation of the drainage course through the culvert within the road. Recent changes in the definition of waters of the U.S. appear to have eliminated ephemeral drainages for federal jurisdiction under the Clean Water Act. Consultation with the USACE is recommended to receive a final jurisdictional determination for the aquatic features within the survey area.

10.2 Potential RWQCB Waters of the State

All wetland waters of the U.S. and non-wetland waters of the U.S. described above fall within the Clean Waters Act Section 401 authority of the RWQCB, if it is determined that the aquatic features are waters of the U.S. In the event that it is determined that there are no waters of the U.S., the aquatic features would likely be considered waters of the state and be subject to Waste Discharge Requirements. The extent of aquatic resources associated with watercourses that would likely be considered RWQCB waters of the state within the Review Area totals 0.06 acre and 130 linear feet (Attachment 1: Figure 9 and Attachment 2: Table 3).

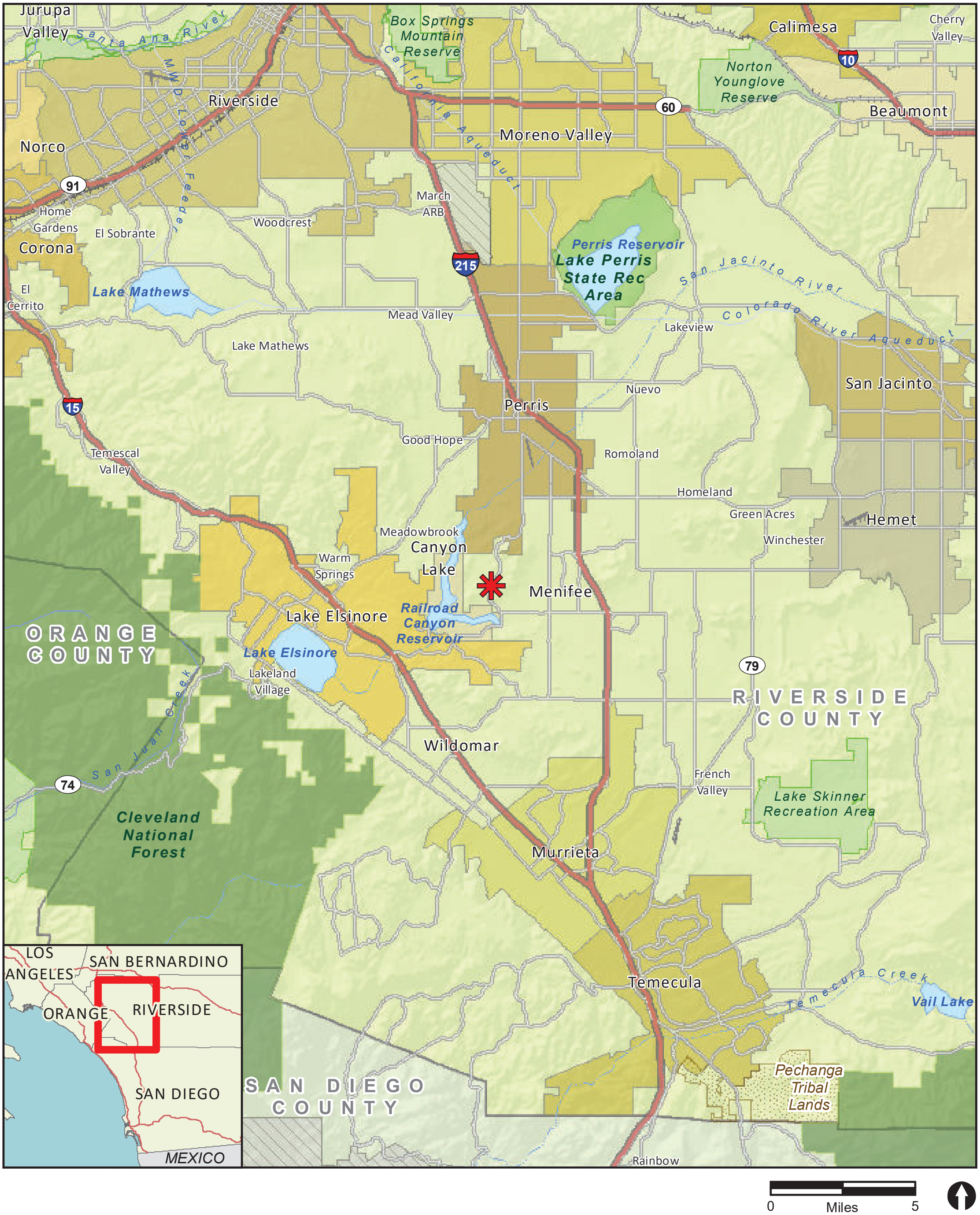
10.3 Potential CDFW Jurisdictional Resources

Under sections 1600–1607 of the California Fish and Game Code, the CDFW regulates activities that would divert or obstruct the natural flow or would substantially change the bed, channel, or bank of any river, stream, or lake that supports fish or wildlife. The CDFW has jurisdiction over riparian habitats associated with watercourses. Jurisdictional areas are delineated by the outer edge of riparian vegetation or at the top of the bank of streams or lakes, whichever is wider. Within the Review Area, areas likely under the jurisdiction of CDFW include wetland waters of the U.S. and non-wetland waters of the U.S. described above. These areas would likely be considered CDFW wetland and streambed, respectively. The extent of aquatic resources associated with watercourses that would likely be considered CDFW jurisdiction within the Review Area totals 0.05 acre disturbed wetland and 0.01 acre streambed for a total of 0.06 acre and 130 linear feet (Attachment 1: Figure 10 and Attachment 2: Table 3).

ATTACHMENTS

ATTACHMENT 1

Figures



Project Location

RECON

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FIGURE 1
Regional Location

Map Source: USGS 7.5 minute topographic map series, Romoland quadrangle, 1979, T05S R04W and T05S R03W

Project Site

Staging Area

RECON

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FIGURE 2

Project Location on USGS Map

Image Source: NearMap (flown January 2023)

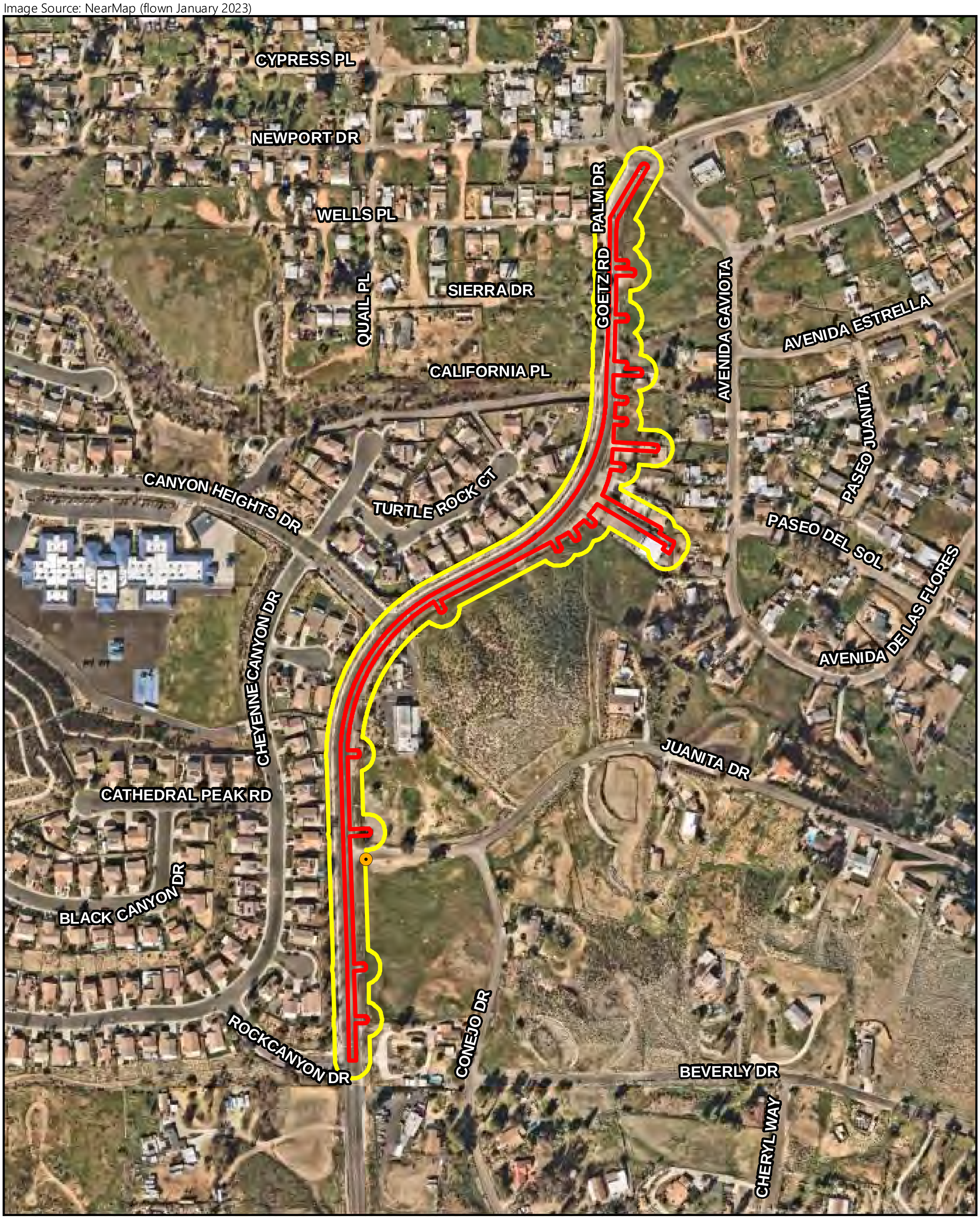

FIGURE 3
Project Location on Aerial Photograph

RECON

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Image Source: NearMap (flown January 2023)

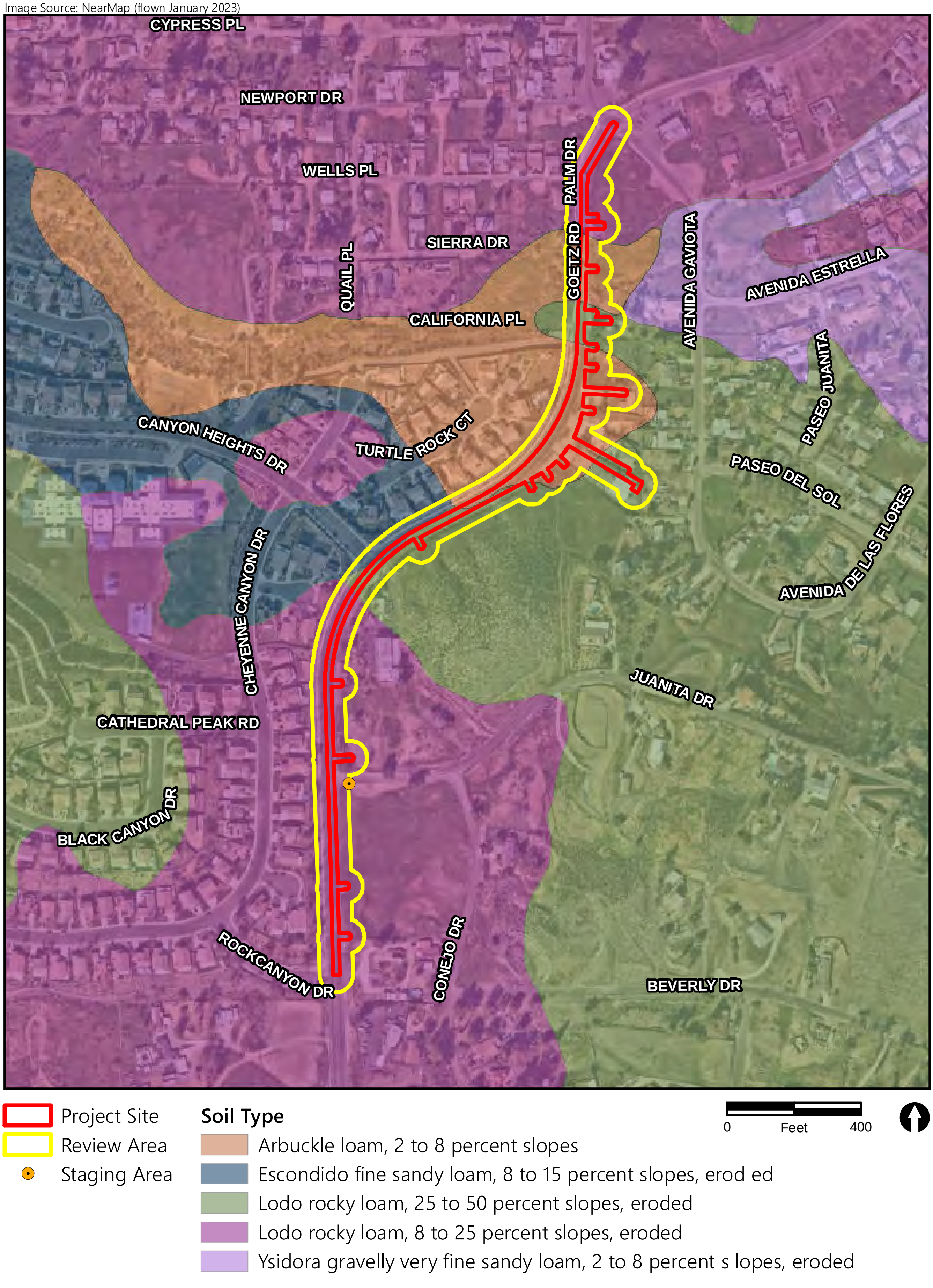

FIGURE 4
Project Location on Soils Map

RECON

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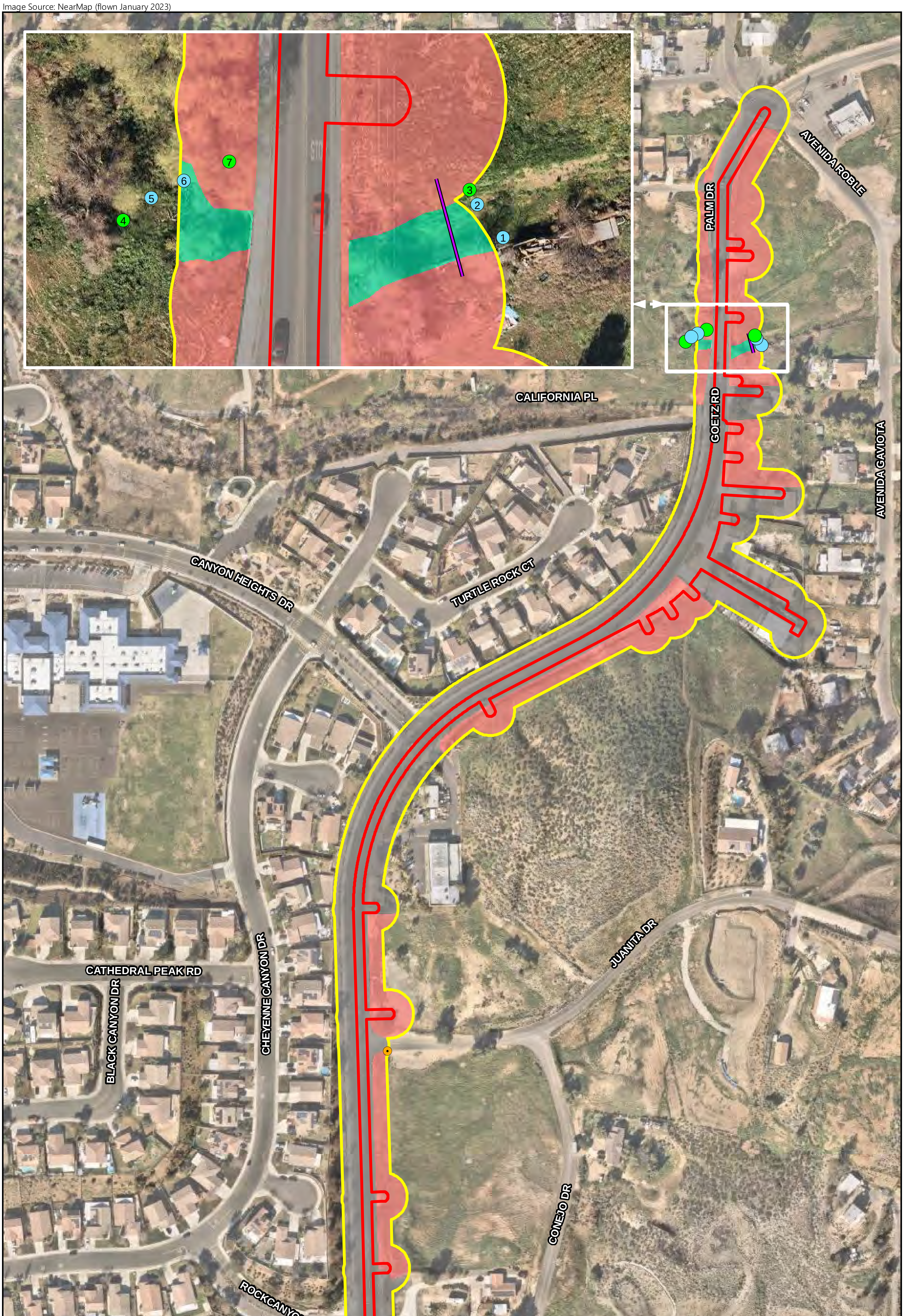
Image Source: NearMap (flown January 2023)



Project Site
Review Area
Staging Area
OHWM Sample Transect
WDP Sample Point
Upland
Wetland
Vegetation Community
Disturbed Wetland
Disturbed Land
Urban/Developed

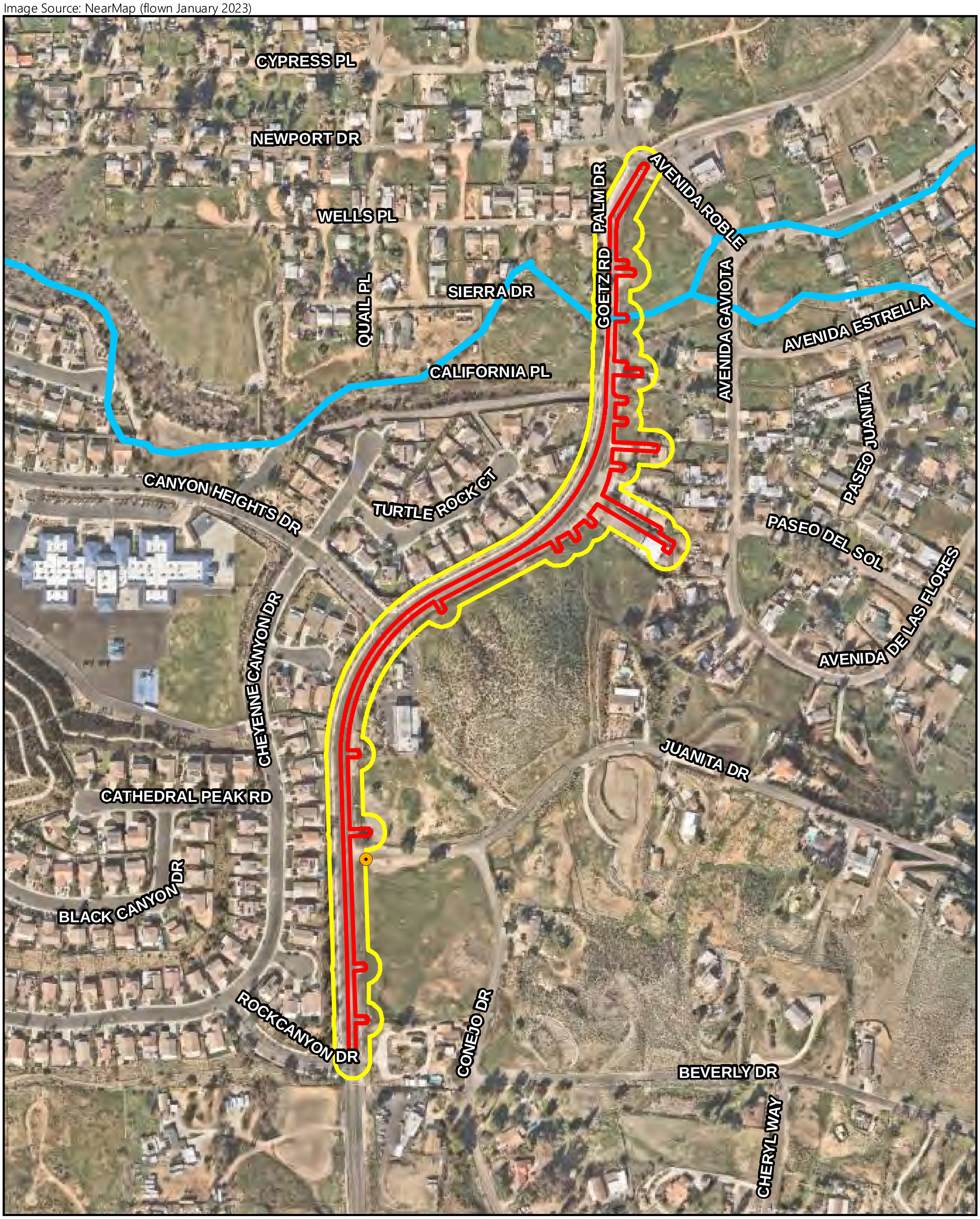
0 Feet 200

FIGURE 5
Vegetation Communities within the Review Area

RECON

M:\JOBS5\9878.11\common_gis\fig5_ARDR.mxd 03/07/2024 bma

Image Source: NearMap (flown January 2023)



Project Site
Review Area
Staging Area
National Wetland Inventory
Riverine

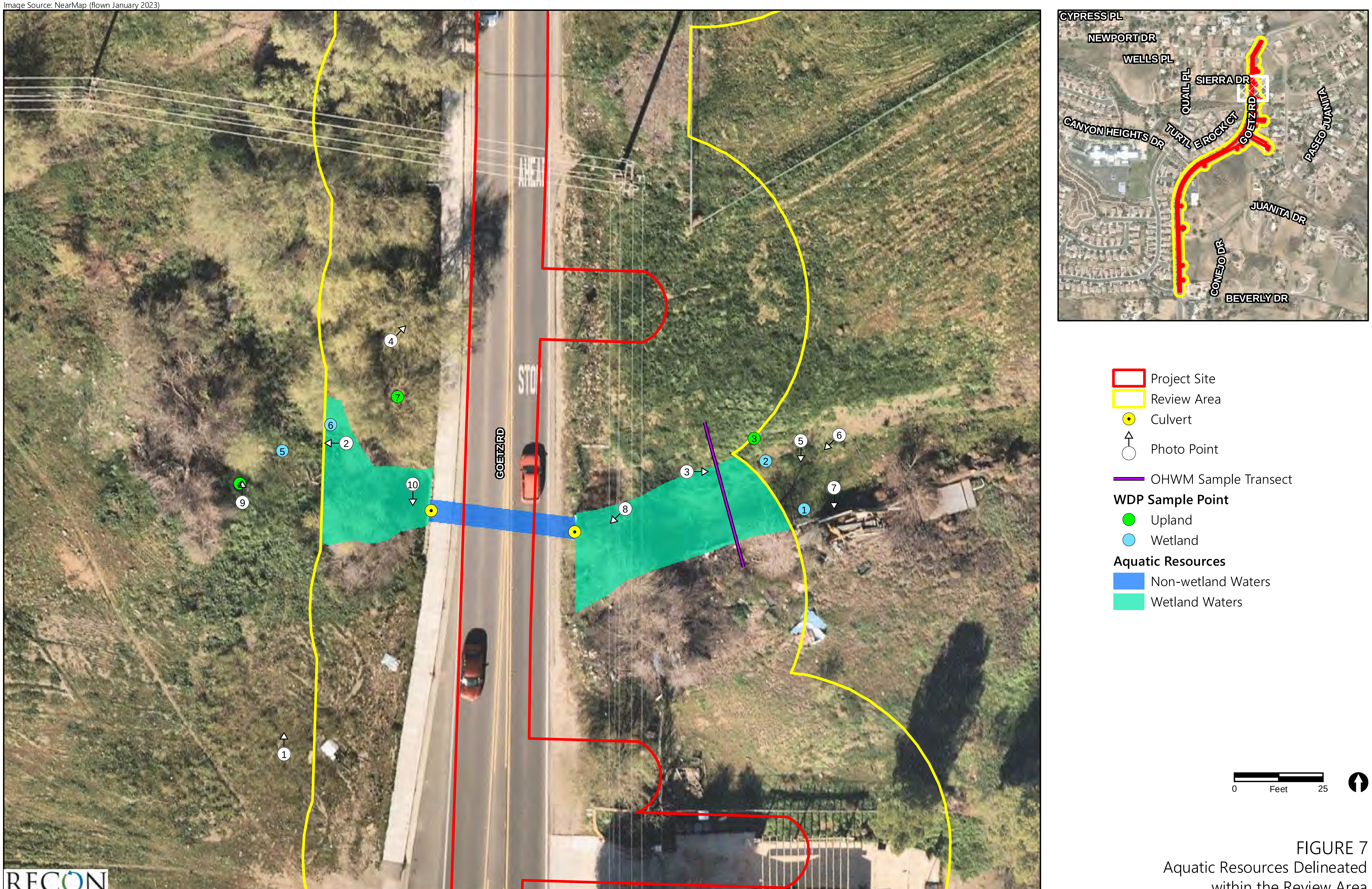
0 Feet 400

FIGURE 6
National Wetland Inventory

RECON

M:\JOBS5\9878.11\common_gis\fig6_ARDR.mxd 03/06/2024 bma

Image Source: NearMap (flown January 2023)



RECON

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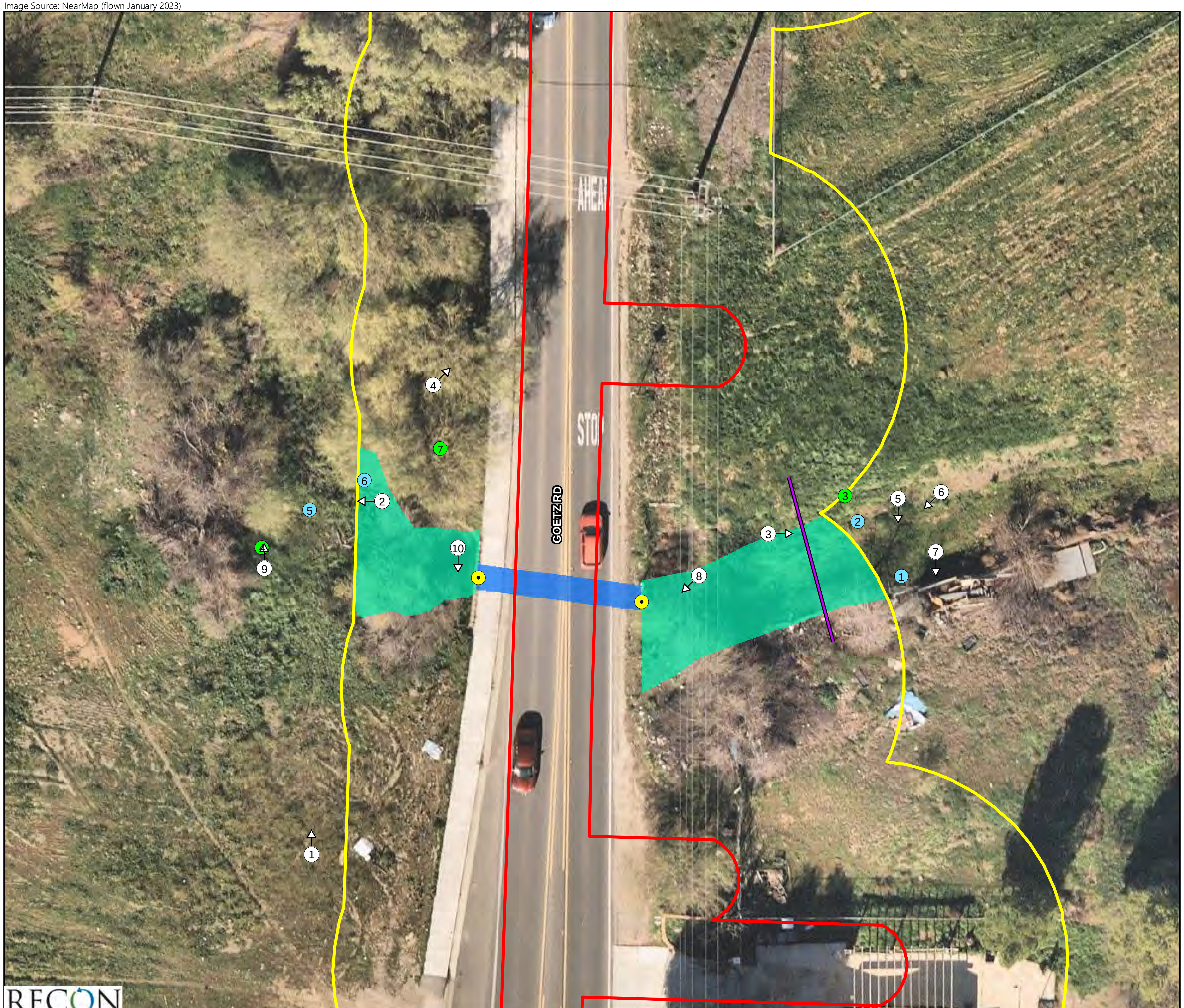
FIGURE 7
Aquatic Resources Delineated within the Review Area

Image Source: NearMap (flown January 2023)



Project Site
Review Area
Culvert
Photo Point
OHWM Sample Transect

WDP Sample Point

Upland
Wetland

USACE Jurisdictional Resources

USACE Non-wetland Waters of the US
USACE Wetland Waters of the US

0 Feet 25

RECON

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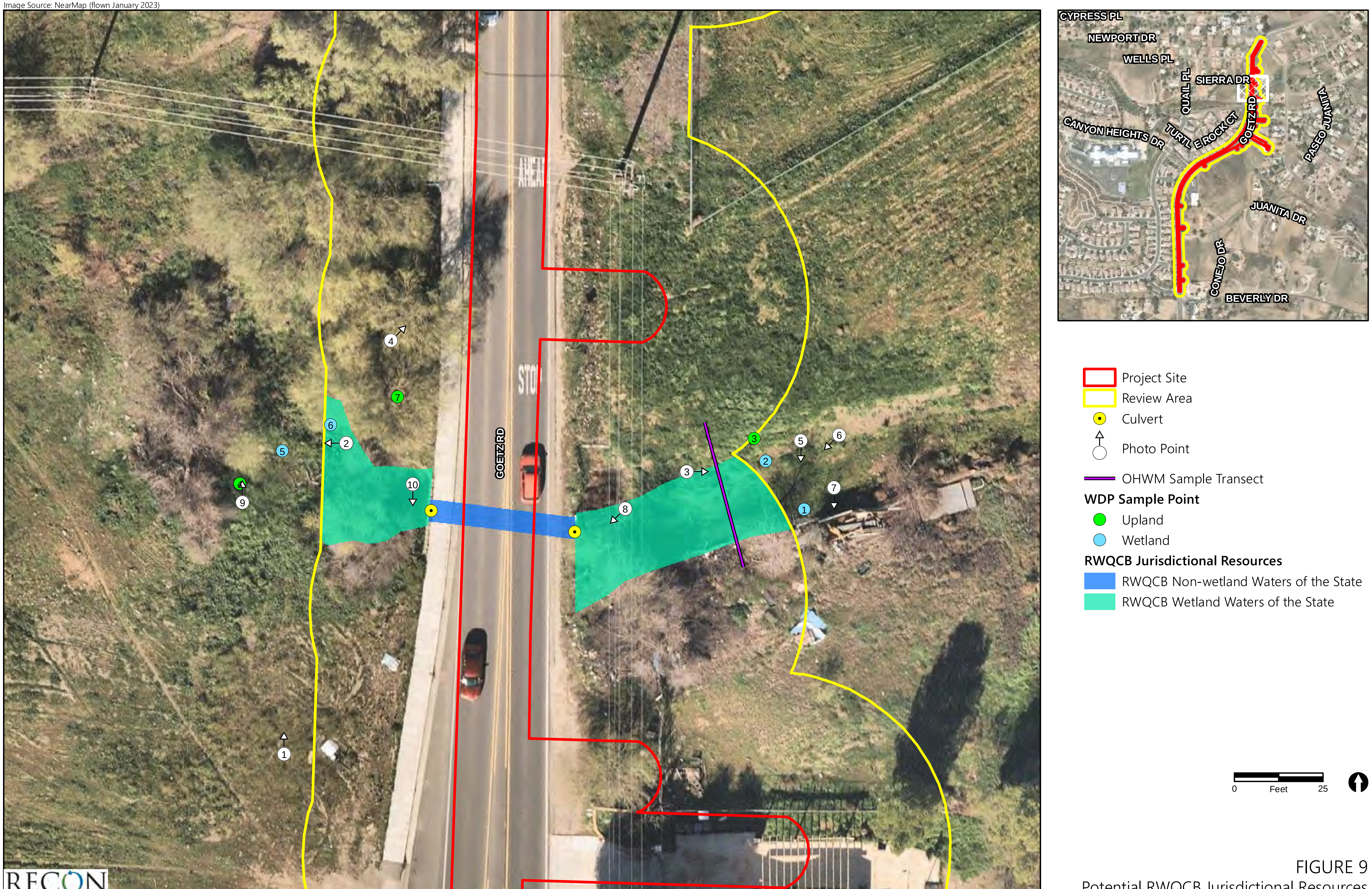
FIGURE 8
Potential USACE Jurisdictional Resources

Image Source: NearMap (flown January 2023)



RECON

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FIGURE 9
Potential RWQCB Jurisdictional Resources

Image Source: NearMap (flown January 2023)

Project Site
Review Area
Culvert
Photo Point
OHWM Sample Transect

WDP Sample Point

Upland
Wetland

CDFW Jurisdictional Resources

CDFW Streambed
CDFW Wetland

0 Feet 25

RECON

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FIGURE 10
Potential CDFW Jurisdictional Resources

ATTACHMENT 2

Tables

Attachment 2: Table 1 Vegetation Communities/Land Cover Types (acres)	
Community or Type (Holland [1986] Code as modified by Oberbauer [2008])	Area within Review Area (acres)
Disturbed Wetland	0.05
Disturbed Land	0.81
Urban/developed	6.29
TOTAL	**7.15**

Attachment 2: Table 2 List of Aquatic Resources									
Waters ID	Cowardin Code	HGM Code	Area (acre)	Linear Feet	Waters Type	Latitude (dd NAD83)	Longitude (dd NAD83)	Local Waterway	Dominant Vegetation
Wetlands	R4SBC	Riverine	0.0.05	89	NRPW	33.699978	-117.240738	Riverine	*Salix* spp., *Juncus dubius, Parkinsonia aculeata, Rumex crispus, Polypogon monspeliensis*
Non-wetland Waters	R4SBC	Riverine	0.01	41	NRPW	33.699906	-117.240555	Riverine	N/A
R4SBC = Riverine, Intermittent, Streambed, Seasonally Flooded; NRPW = Non-relatively Permanent Waters that Flow Directly or Indirectly into Traditional Navigable Waters									

Attachment 2: Table 3 Potential Jurisdictional Resources within Review Area (acres)	
Jurisdictional Resource	Acreage in Review Area (Linear Feet)
USACE Waters of the U.S.*	**0.0.06**
Wetland Waters of the U.S.	0.05 (89)
Non-wetland Waters of the U.S.	0.01** (41)
RWQCB Waters of the State	**0.06**
Wetland Waters of the State	0.05 (89)
Non-wetland Waters of the State	0.01** (41)
CDFW Jurisdictional Resources	**0.06**
Wetland	0.05 (89)
Streambed	0.01** (41)
*Jurisdictional Determination by USACE Recommended to verify **Any discrepancies in total are due to rounding.	

ATTACHMENT 3

Ground Level Color Photographs

PHOTOGRAPH 1

View of stand of disturbed wetland vegetation along drainage channel downstream of Goetz Road in the northern portion of the Review Area meeting hydrophytic vegetation standards. Facing north.

PHOTOGRAPH 2

View of disturbed wetland vegetation within drainage channel downstream of Goetz Road in the northern portion of the Review Area. Facing west.

PHOTOGRAPH 3
View of vegetation transition between upland and drainage channel upstream of Goetz Road in northern portion of Review Area. Facing east.

PHOTOGRAPH 4
View of disturbed upland vegetation north of the drainage channel downstream of Goetz Road in the northern portion of the Review Area. Facing northeast.

PHOTOGRAPH 5
View of disturbed wetland upstream of Goetz Road in northern portion of Review Area meeting hydrophytic vegetation, hydric soil, and wetland hydrology standards. Facing south.

PHOTOGRAPH 6
View of change in vegetation species between upland and OHWM upstream of Goetz Road in northern portion of Review Area; OHWM indicated by break in bank slope, change in character of soil, change in vegetation species, and change in particle size distribution. Facing southwest.

PHOTOGRAPH 7
View of rural residence south of drainage channel upstream of Goetz Road in the northern portion of the Review Area. Facing south.

PHOTOGRAPH 8
View of vegetation debris at culvert inlet upstream of Goetz Road, in the northern portion of the Review Area. Facing southwest.

PHOTOGRAPH 9

View of vegetation transition between upland and drainage channel downstream of Goetz Road in northern portion of Review Area. Facing north.

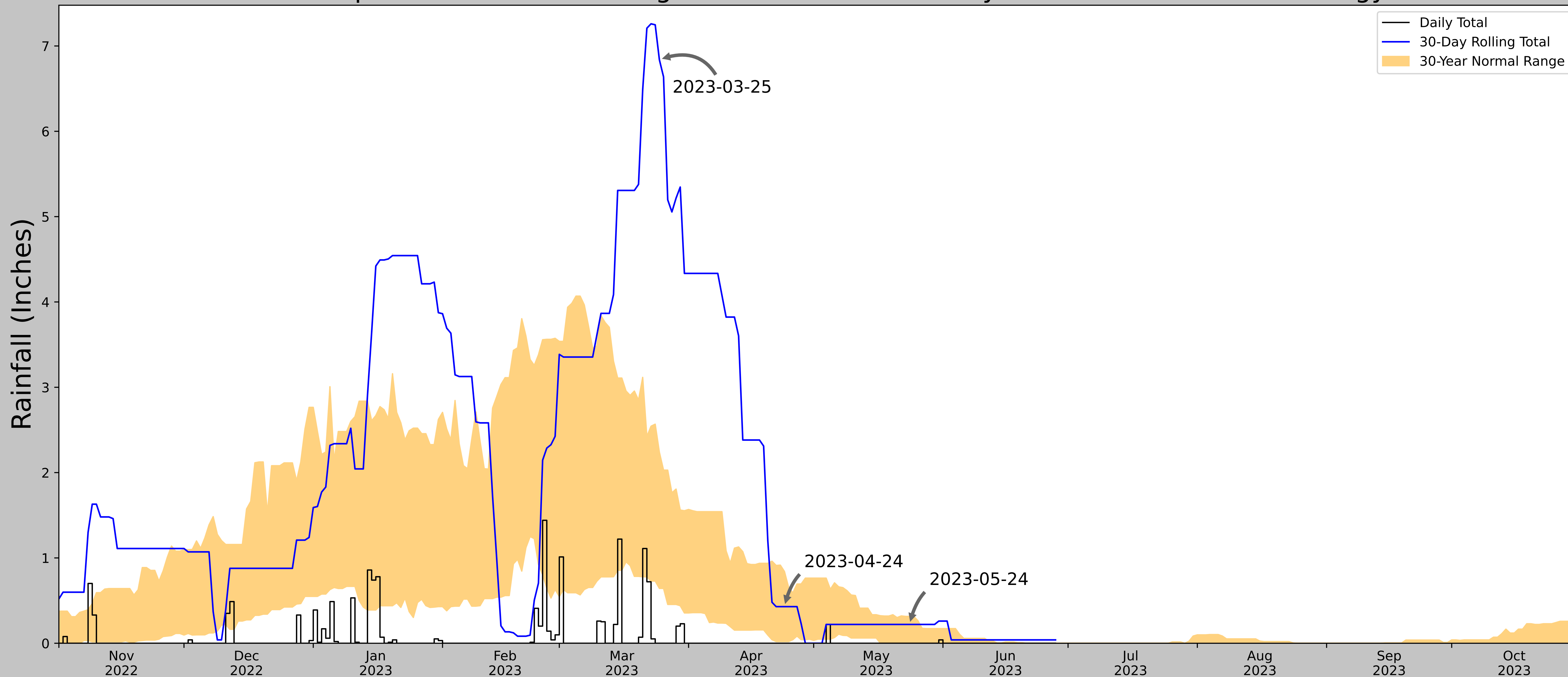
PHOTOGRAPH 10

View of standing water at culvert outlet downstream of Goetz Road in the northern portion of the Review Area. Facing south.

ATTACHMENT 4

Antecedent Precipitation Tool Results

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network



Coordinates	33.41, -117.14
Observation Date	2023-05-24
Elevation (ft)	1235.747
Drought Index (PDSI)	Severe wetness
WebWIMP H_2O Balance	Dry Season

30 Days Ending	30^{th} %ile (in)	70^{th} %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2023-05-24	0.0	0.314961	0.220472	Normal	2	3	6
2023-04-24	0.019685	0.840551	0.429134	Normal	2	2	4
2023-03-25	0.64252	2.23937	6.838583	Wet	3	1	3
Result							Normal Conditions - 13

US Army Corps of Engineers

ERDC

Figures and tables made by the
Antecedent Precipitation Tool
Version 2.0

Developed by:
U.S. Army Corps of Engineers and
U.S. Army Engineer Research and
Development Center

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
ELSINORE	33.6861, -117.3458	1268.045	22.458	32.298	10.831	10808	90
CORONA 12.5 SE	33.7346, -117.4315	1301.837	5.957	33.792	2.882	2	0
CORONA 12.8 SE	33.7307, -117.4276	1403.871	5.621	135.826	3.293	2	0
SUN CITY	33.7156, -117.19	1419.948	9.185	151.903	5.528	121	0
FALLBROOK 5 NE	33.4392, -117.1903	1140.092	19.266	127.953	11.135	9	0
SAN JACINTO	33.7964, -116.9753	1524.934	22.61	256.889	15.983	340	0
SAN JUAN CANYON	33.5319, -117.5525	375.0	15.968	893.045	21.446	59	0
HEMET	33.7381, -116.8939	1811.024	26.22	542.979	26.036	12	0

ATTACHMENT 5

Wetland Determination Data Forms

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Goetz Road Sewer Project City/County: Menifee / Riverside Sampling Date: May 24, 2023

Applicant/Owner: Eastern Municipal Water District State: CA Sampling Point: WDP1

Investigator(s): G. Scheid; C. Thomson Section, Township, Range: Sections 31, 36; T5S, R4W; Romoland 7.5 min Quad

Landform (hillslope, terrace, etc.): Low terrace Local relief (concave, convex, none): none Slope (%): 0%

Subregion (LRR): LRR-C Lat: 33.7 dd Long: -117.24 dd Datum:

Soil Map Unit Name: Arbuckle Loam NWI classification: Riverine

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? No Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? No (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?**	**Yes** X **No** ____
Hydric Soil Present?	Yes X	No ____		
Wetland Hydrology Present?	Yes X	No ____		

Remarks: Sample area in low flow area, within the bank/OHWM.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Salix laevigata*	8	Yes	FACW
2. *Salix gooddingii*	7	Yes	FACW
3.			
4.			
	15	= Total Cover	
Sapling/Shrub Stratum (Plot size: ____)			
1. *none*			
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot size: ____)			
1. *Polypogon monspeliensis*	70	Yes	FACW
2. *Lythrum hyssopifolium*	4	No	OBL
3. *Rumex crispus*	2	No	FAC
4. *Avena barbata*	2	No	FACU
5. *Festuca perrenis*	1	No	FAC
6. *Cyperus involucratus*	<1	No	FACW
7. *Melilotus indicus*	<1	No	FACU
8. *Malva parviflora*	<1	No	
	80	= Total Cover	
Woody Vine Stratum (Plot size: ____)			
1. *none*			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum 5 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%

____ Prevalence Index is ≤3.0[1]

____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks:

SOIL

Sampling Point: WDP1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features				Texture	Remarks
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]		
0-18	10YR 3/1	98%	5YR 3/4	2	C	M	clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR C**)
___ 1 cm Muck (A9) (**LRR D**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
_x_ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR C**)
___ 2 cm Muck (A10) (**LRR B**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ______________

Depth (inches): ______________

Hydric Soil Present? Yes _X_ No ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

_x_ Surface Water (A1)
_X_ High Water Table (A2)
_X_ Saturation (A3)
___ Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
___ Drift Deposits (B3) (**Nonriverine**)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Marks (B1) (**Riverine**)
___ Sediment Deposits (B2) (**Riverine**)
___ Drift Deposits (B3) (**Riverine**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Thin Muck Surface (C7)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _x_ No ___ Depth (inches): 1"
Water Table Present? Yes _X_ No ___ Depth (inches): 6"
Saturation Present? (includes capillary fringe) Yes _X_ No ___ Depth (inches): 1"

Wetland Hydrology Present? Yes _X_ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Goetz Road Sewer Project City/County: Menifee / Riverside Sampling Date: May 24, 2023

Applicant/Owner: Eastern Municipal Water District State: CA Sampling Point: WDP2

Investigator(s): G. Scheid; C. Thomson Section, Township, Range: Sections 31, 36; T5S, R4W; Romoland 7.5 min Quad

Landform (hillslope, terrace, etc.): Low terrace Local relief (concave, convex, none): none Slope (%): 0-2%

Subregion (LRR): LRR-C Lat: 33.7 dd Long: -117.24 dd Datum: NAD83

Soil Map Unit Name: Arbuckle Loam NWI classification: Riverine

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? No Are "Normal Circumstances" present? Yes X No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? No (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes X No ___	**Is the Sampled Area within a Wetland?**	**Yes** X **No** ___
Hydric Soil Present? Yes X No ___		
Wetland Hydrology Present? Yes X No ___		

Remarks: Sample area on low shelf above low flow area but within the bank/OHWM.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: ___)			
1. *none*			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: ___)			
1. *none*			
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot size: ___)			
1. *Polypogon monspeliensis*	60	Yes	FACW
2. *Lythrum hyssopifolium*	20	Yes	OBL
3. *Festuce perrene*	15	No	FAC
4. *Rumes crispus*	2	No	FAC
5.			
6.			
7.			
8.			
	97	= Total Cover	
Woody Vine Stratum (Plot size: ___)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum 3 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A = ___

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ___

Remarks:

SOIL

Sampling Point: WDP2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-18	10YR 3/1	98%	5YR 4/8	2	RM	M	clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR C**)
___ 1 cm Muck (A9) (**LRR D**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
X Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR C**)
___ 2 cm Muck (A10) (**LRR B**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):
Type: ___
Depth (inches): ___

Hydric Soil Present? Yes X No ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
X High Water Table (A2)
X Saturation (A3)
___ Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
___ Drift Deposits (B3) (**Nonriverine**)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Marks (B1) (**Riverine**)
___ Sediment Deposits (B2) (**Riverine**)
___ Drift Deposits (B3) (**Riverine**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Thin Muck Surface (C7)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches):
Water Table Present?	Yes X	No ___	Depth (inches): 8"
Saturation Present? (includes capillary fringe)	Yes X	No ___	Depth (inches): 4"

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Goetz Road Sewer Project City/County: Menifee / Riverside Sampling Date: May 24, 2023

Applicant/Owner: Eastern Municipal Water District State: CA Sampling Point: WDP3

Investigator(s): G. Scheid; C. Thomson Section, Township, Range: Sections 31, 36; T5S, R4W; Romoland 7.5 min Quad

Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): none Slope (%): 2%

Subregion (LRR): LRR-C Lat: 33.7 dd Long: -117.24 dd Datum: ____

Soil Map Unit Name: Arbuckle Loam NWI classification: Upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? No Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? No (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?**	**Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X		
Wetland Hydrology Present?	Yes ____	No X		

Remarks: Sample area on terrace above bank / OHWM and in adjacent upland area.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1. *none*			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: ____)			
1. *none*			
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot size: ____)			
1. *Hordeum murinum*	95	Yes	FACU
2. *Brassica nigra*	3	No	FACU
3. *Polypogon monspliensis*	<1	No	FACW
4. *Avena barbata*	<1	No	FACU
5. *Lactuca seriola*	<1	No	FACU
6.			
7.			
8.			
	100	= Total Cover	
Woody Vine Stratum (Plot size: ____)			
1. *none*			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum 0 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	____	x 1 = ____
FACW species	____	x 2 = ____
FAC species	____	x 3 = ____
FACU species	____	x 4 = ____
UPL species	____	x 5 = ____
Column Totals:	____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

____ Dominance Test is >50%

____ Prevalence Index is ≤3.0[1]

____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ____ No X

Remarks: Area above bank / OHWM and dominated by upland species.

SOIL

Sampling Point: WDP3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-18	10YR 3/3	100%					sandy loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR C**)
___ 1 cm Muck (A9) (**LRR D**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR C**)
___ 2 cm Muck (A10) (**LRR B**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):
Type: ______
Depth (inches): ______

Hydric Soil Present? Yes ___ No X

Remarks: No hydric soil indicators observed.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
___ Drift Deposits (B3) (**Nonriverine**)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Marks (B1) (**Riverine**)
___ Sediment Deposits (B2) (**Riverine**)
___ Drift Deposits (B3) (**Riverine**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Thin Muck Surface (C7)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ______
Water Table Present? Yes ___ No X Depth (inches): ______
Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): ______

Wetland Hydrology Present? Yes ___ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: No wetland hydrology inidcators observed.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Goetz Road Sewer Project City/County: Menifee / Riverside Sampling Date: May 24, 2023

Applicant/Owner: Eastern Municipal Water District State: CA Sampling Point: WDP4

Investigator(s): G. Scheid; C. Thomson Section, Township, Range: Sections 31, 36; T5S, R4W; Romoland 7.5 min Quad

Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): none Slope (%): 0%

Subregion (LRR): LRR-C Lat: 33.7 dd Long: -117.24 dd Datum: ______

Soil Map Unit Name: Arbuckle Loam NWI classification: Upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? No Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? No (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?		X
Hydric Soil Present?		X
Wetland Hydrology Present?		X

Is the Sampled Area within a Wetland? **Yes** ____ **No** X

Remarks: Sample area on terrace above bank / OHWM and in adjacent upland area.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: ____)			
1. *none*			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: ____)			
1. *none*			
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot size: ____)			
1. *Brassica nigra*	75	Yes	FACU
2. *Bromus diandrus*	10	No	FACU
3. *Hordeum murinum*	10	No	FACU
4. *Avena barbata*	5	No	FACU
5. *Sonchus olaraceus*	<1	No	UPL
6.			
7.			
8.			
	100	= Total Cover	
Woody Vine Stratum (Plot size: ____)			
1. *none*			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum 0 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators:

____ Dominance Test is >50%

____ Prevalence Index is ≤3.0[1]

____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ____ No X

Remarks: Area above bank / OHWM and dominated by upland species.

SOIL

Sampling Point: WDP4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-18	10YR 3/2	100%					loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR C**)
___ 1 cm Muck (A9) (**LRR D**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR C**)
___ 2 cm Muck (A10) (**LRR B**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):
Type: ______
Depth (inches): ______

Hydric Soil Present? Yes ___ No X

Remarks: No hydric soil indicators observed.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
___ Drift Deposits (B3) (**Nonriverine**)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Marks (B1) (**Riverine**)
___ Sediment Deposits (B2) (**Riverine**)
___ Drift Deposits (B3) (**Riverine**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Thin Muck Surface (C7)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ______
Water Table Present?	Yes ___	No X	Depth (inches): ______
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ______

Wetland Hydrology Present? Yes ___ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: No wetland hydrology indicators observed.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Goetz Road Sewer Project City/County: Menifee / Riverside Sampling Date: May 24, 2023

Applicant/Owner: Eastern Municipal Water District State: CA Sampling Point: WDP5

Investigator(s): G. Scheid; C. Thomson Section, Township, Range: Sections 31, 36; T5S, R4W; Romoland 7.5 min Quad

Landform (hillslope, terrace, etc.): Low terrace Local relief (concave, convex, none): none Slope (%): 0-2%

Subregion (LRR): LRR-C Lat: 33.7 dd Long: -117.24 dd Datum: NAD83

Soil Map Unit Name: Arbuckle Loam NWI classification: Riverine

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? No Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? No (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?**	**Yes** X **No** ____
Hydric Soil Present?	Yes X	No ____		
Wetland Hydrology Present?	Yes X	No ____		

Remarks: Sample area on low shelf above low flow area but within the bank / OHWM.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: ____)			
1. *none*			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: ____)			
1. *none*			
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot size: ____)			
1. *Rumes crispus*	60	Yes	FAC
2. *Juncus dubius*	30	Yes	FACW
3. *Polypogon monspeliensis*	20	Yes	FACW
4.			
5.			
6.			
7.			
8.			
	100	= Total Cover	
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum 0 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%

____ Prevalence Index is ≤3.0[1]

____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks:

SOIL

Sampling Point: WDP5

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-18	10YR 3/1	96%	5YR 4/8	4	RM	M	clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR C**)
___ 1 cm Muck (A9) (**LRR D**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
_X_ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR C**)
___ 2 cm Muck (A10) (**LRR B**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes _X_ No ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
_X_ High Water Table (A2)
_X_ Saturation (A3)
___ Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
___ Drift Deposits (B3) (**Nonriverine**)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Marks (B1) (**Riverine**)
___ Sediment Deposits (B2) (**Riverine**)
___ Drift Deposits (B3) (**Riverine**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Thin Muck Surface (C7)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ___	No _X_	Depth (inches): ___
Water Table Present?	Yes _X_	No ___	Depth (inches): 16
Saturation Present? (includes capillary fringe)	Yes _X_	No ___	Depth (inches): 8

Wetland Hydrology Present? Yes _X_ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Goetz Road Sewer Project City/County: Menifee / Riverside Sampling Date: May 24, 2023

Applicant/Owner: Eastern Municipal Water District State: CA Sampling Point: WDP6

Investigator(s): G. Scheid; C. Thomson Section, Township, Range: Sections 31, 36; T5S, R4W; Romoland 7.5 min

Landform (hillslope, terrace, etc.): Low terrace Local relief (concave, convex, none): none Slope (%): 0%

Subregion (LRR): LRR-C Lat: 33.7 dd Long: -117.24 dd Datum: ______

Soil Map Unit Name: Arbuckle Loam NWI classification: Riverine

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? No Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? No (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No ____	**Is the Sampled Area within a Wetland?** **Yes** X **No** ____
Hydric Soil Present?	Yes X No ____	
Wetland Hydrology Present?	Yes X No ____	

Remarks: Sample area in low flow area, within the bank / OHWM.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Salix lasiolepis*	45	Yes	FACW
2. *Parkinsonia aculeata*	15	Yes	FAC
3.			
4.			
	60	= Total Cover	
Sapling/Shrub Stratum (Plot size: ____)			
1. *none*			
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot size: ____)			
1. *Rumex crispus*	20	Yes	FAC
2. *Polypogon monspeliensis*	10	Yes	FACW
3. *Festuca perrenis*	3	No	FAC
4. *Juncus dubius*	2	No	FACW
5. *Sonchus olareaceus*	<1	No	UPL
6. *Avena barbata*	<1	No	FACU
7. *Ambrosia psylostachia*	<1	No	FACU
8. *Hordeum murinum*	<1	No	FACU
	35	= Total Cover	
Woody Vine Stratum (Plot size: ____)			
1. *none*			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum 5 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	____	x 1 =	____
FACW species	____	x 2 =	____
FAC species	____	x 3 =	____
FACU species	____	x 4 =	____
UPL species	____	x 5 =	____
Column Totals:	____ (A)		____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- X Dominance Test is >50%
- ____ Prevalence Index is ≤3.0[1]
- ____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks:

SOIL

Sampling Point: WDP6

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-18	10YR 3/1	97%	5YR 4/6	3	RM	M	clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR C**)
___ 1 cm Muck (A9) (**LRR D**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
_x_ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR C**)
___ 2 cm Muck (A10) (**LRR B**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):
Type: ______
Depth (inches): ______

Hydric Soil Present? Yes _X_ No ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
_X_ High Water Table (A2)
_X_ Saturation (A3)
___ Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
___ Drift Deposits (B3) (**Nonriverine**)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Marks (B1) (**Riverine**)
___ Sediment Deposits (B2) (**Riverine**)
___ Drift Deposits (B3) (**Riverine**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Thin Muck Surface (C7)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No _X_ Depth (inches): ______
Water Table Present? Yes _X_ No ___ Depth (inches): 10
Saturation Present? (includes capillary fringe) Yes _X_ No ___ Depth (inches): 6"

Wetland Hydrology Present? Yes _X_ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Goetz Road Sewer Project City/County: Menifee / Riverside Sampling Date: May 24, 2023

Applicant/Owner: Eastern Municipal Water District State: CA Sampling Point: WDP7

Investigator(s): G. Scheid; C. Thomson Section, Township, Range: Sections 31, 36; T5S, R4W; Romoland 7.5 min Quad

Landform (hillslope, terrace, etc.): High terrace Local relief (concave, convex, none): none Slope (%): 0-2%

Subregion (LRR): LRR-C Lat: 33.7 dd Long: -117.24 dd Datum: NAD83

Soil Map Unit Name: Arbuckle Loam NWI classification: Upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? No Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? No (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?		X
Hydric Soil Present?		X
Wetland Hydrology Present?		X

Is the Sampled Area within a Wetland? **Yes** ____ **No** X

Remarks: Sample area on terrace above bank / OHWM and in adjacent upland area.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: ____)			
1. *Parkinsonia aculeata*	40	Yes	FAC
2.			
3.			
4.			
	40	= Total Cover	
Sapling/Shrub Stratum (Plot size: ____)			
1. *none*			
2.			
3.			
4.			
5.			
	1	= Total Cover	
Herb Stratum (Plot size: ____)			
1. *Bromus diandrus*	58	Yes	UPL
2. *Hordeum murinum*	2	No	FACU
3.			
4.			
5.			
6.			
7.			
8.			
	100	= Total Cover	
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum 0 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species	40	x 3 =	120
FACU species	2	x 4 =	8
UPL species	58	x 5 =	290
Column Totals:	100	(A)	418 (B)

Prevalence Index = B/A = 4.1

Hydrophytic Vegetation Indicators:

____ Dominance Test is >50%

____ Prevalence Index is ≤3.0[1]

____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ____ No X

Remarks: Area above bank / OHWM and dominated by upland species.

SOIL

Sampling Point: WDP7

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-18	10YR 3/3	100%					sandy loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR C**)
___ 1 cm Muck (A9) (**LRR D**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR C**)
___ 2 cm Muck (A10) (**LRR B**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):
Type: ____________
Depth (inches): ____________

Hydric Soil Present? Yes ______ No X

Remarks: No hydric soil indicators observed.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
___ Drift Deposits (B3) (**Nonriverine**)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Marks (B1) (**Riverine**)
___ Sediment Deposits (B2) (**Riverine**)
___ Drift Deposits (B3) (**Riverine**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Thin Muck Surface (C7)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No X Depth (inches): ________
Water Table Present? Yes _____ No X Depth (inches): ________
Saturation Present? (includes capillary fringe) Yes _____ No X Depth (inches): ________

Wetland Hydrology Present? Yes ______ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: No wetland hydrology indicators observed.

ATTACHMENT 6

Ordinary High Water Mark Data Sheets

U.S. Army Corps of Engineers (USACE)

RAPID ORDINARY HIGH WATER MARK (OHWM) FIELD IDENTIFICATION DATA SHEET

The proponent agency is Headquarters USACE CECW-CO-R.

OMB Control No. 0710-XXXX

Approval Expires:

Project ID #: 9878.11	Site Name: Goetz Road - Sewer Project	Date and Time: May 24, 2023 10:00AM
Location (lat/long): 33.7 dd ; -117.24 dd	Investigator(s): G. Scheid, C. Thomson	

Step 1 Site overview from remote and online resources
Check boxes for online resources used to evaluate site:

- [ ] gage data
- [ ] LiDAR
- [ ] geologic maps
- [x] climatic data
- [ ] satellite imagery
- [ ] land use maps
- [x] aerial photos
- [x] topographic maps
- [x] Other: NWI Mapping

Describe land use and flow conditions from online resources.
Were there any recent extreme events (floods or drought)?

Subject channel in rural area. Flows via culvert under Goetz Road. Adjacent land uses may have altered hydrology. No extreme events occurred leading up to site visit.

Step 2 Site conditions during field assessment

First look for changes in channel shape, depositional and erosional features, and changes in vegetation and sediment type, size, density, and distribution. Make note of natural or man-made disturbances that would affect flow and channel form, such as bridges, riprap, landslides, rockfalls etc.

Existing culvert under Goetz Road is clogged with vegetation debris upstream which impedes flows and causes temporary overbank flooding. Channel is shallow, less than 1 foot deep. Vegetation in channel mostly herbaceous species with a couple of willow trees but no shrubs. Upland vegetation above OHWM is non-native and mowed regularly.

Step 3 Check the boxes next to the indicators used to identify the location of the OHWM.

OHWM is at a transition point, therefore some indicators that are used to determine location may be just below and above the OHWM. From the drop-down menu next to each indicator, select the appropriate location of the indicator by selecting either just below `b', at `x', or just above `a' the OHWM.

OHWM. Go to page 2 to describe overall rationale for location of OHWM, write any additional observations, and to attach a photo log.

Geomorphic indicators

- [x] **Break in slope:** x
  - [x] *on the bank:* x
  - [ ] *undercut bank:*
  - [ ] *valley bottom:*
  - [ ] Other:
- [ ] **Shelving:**
  - [ ] *shelf at top of bank:*
  - [ ] *natural levee:*
  - [ ] *man-made berms or levees:*
  - [ ] *other berms:*
- [ ] **Channel bar:**
  - [ ] *shelving (berms) on bar:*
  - [ ] *unvegetated:*
  - [ ] *vegetation transition (go to veg. indicators)*
  - [ ] *sediment transition (go to sed. indicators)*
  - [ ] *upper limit of deposition on bar:*
- [ ] **Instream bedforms and other bedload transport evidence:**
  - [ ] *deposition bedload indicators (e.g., imbricated clasts, gravel sheets, etc.)*
  - [ ] *bedforms (e.g., poofs, riffles, steps, etc.):*
  - [ ] *erosional bedload indicators (e.g., obstacle marks, scour, smoothing, etc.)*
- [ ] **Secondary channels:**

Sediment indicators

- [ ] **Soil development:**
- [x] **Changes in character of soil:** b
- [ ] **Mudcracks:**
- [x] **Changes in particle-sized distribution:** x
  - [x] *transition from* sandy to loam
  - [ ] *upper limit of sand-sized particles*
  - [ ] *silt deposits:*

Vegetation Indicators

- [x] **Change in vegetation type and/or density:** a

Check the appropriate boxes and select the general vegetation change *(e.g., graminoids to woody shrubs)*. ***Describe the vegetation transition looking from the middle of the channel, up the banks, and into the floodplain.***

- [ ] *vegetation absent to:*
- [ ] *moss to:*
- [x] *forbs to:* graminoids
- [ ] *graminoids to:*
- [ ] *woody shrubs to:*
- [ ] *deciduous trees to:*
- [ ] *coniferous trees to:*
- [ ] **Vegetation matted down and/or bent:**
- [ ] **Exposed roots below intact soil layer:**

Ancillary indicators

- [ ] **Wracking/presence of organic litter:**
- [ ] **Presence of large wood:**
- [ ] **Leaf litter disturbed or washed away:**
- [ ] **Water staining:**
- [ ] **Weathered clasts or bedrock:**

Other observed indicators?

Describe:
Hydrophtyic vegetation in channel up to bank. Upland vegetation beyond top of bank has been mowed recently.

Step 4 Is additional information needed to support this determination?

- [ ] Yes
- [x] No

If yes, describe and attach information to datasheet:

Project ID #: 9878.11

Step 5 Describe rationale for location of OHWM

There is a distinct break in slope comprised of a bed and bank between the drainage channel and the adjacent upland on either side. The vegetation changes from herbaceous hydrophytic to herbaceous upland vegetation from the channel bottom to outside the top of bank. Soil particle size is more sandy in the channel and a loam above the OHWM.

Additional observations or notes

Attach a photo log of the site. Use the table below, or attach separately.

Photo log attached? ☒ Yes ☐ No If no, explain why not: ____

List photographs and include descriptions in the table below.

Number photographs in the order that they are taken. Attach photographs and include annotations of features.

Photo Number	Photograph description
1	View of vegetation change from upland to hydrophytic vegetation in channel
2	View of change in vegetation between upland and OHWM of channel looking downstream towards Goetz Road
3	View of rural residence adjacent to the channel
4	View of vegetation debris at culvert inlet upstream of Goetz Road
5	View of vegetation transition between upland and channel looking upstream from Goetz Road

OHWM Field Identification Datasheet Instructions and Field Procedure

Step 1 **Site overview from remote and online resources** **Complete Step 1 prior to site visit.**

Online Resources: Identify what information is available for the site. Check boxes on datasheet next to the resources used to assess this site.

a. gage data
b. aerial photos
c. satellite imagery
d. LiDAR
e. topographic maps
f. geologic maps
g. land use maps
h. climatic data (precipitation and temperature)

Landscape context: Use the online resources to put the site in the context of the surrounding landscape.

a. **Note on the datasheet under Step 1:**
  i. Overall land use and change if known
  ii. Recent extreme events if known (e.g., flood, drought, landslides, debris flows, wildfires)

b. Consider the following to inform weighting of evidence observed during field visit.
  i. What physical characteristics are likely to be observed in specific environments?
  ii. Was there a recent flood or drought? Are you expecting to see recently formed or obscured indicators?
  iii. How will land use affect specific stream characteristics? How natural is the hydrologic regime? How stable has the landscape been over the last year, decade, century?

Step 2 Site conditions during the field assessment (assemble evidence)

a. Identify the assessment area.
b. Walk up and down the assessment area noting all the potential OHWM indicators.
c. Note broad trends in channel shape, vegetation, and sediment characteristics.
  i. Is this a single thread or multi-thread system? Is this a stream-wetland complex?
  ii. Are there any secondary and/or floodplain channels?
  iii. Are there obvious man-made alterations to the system?
  iv. Are there man-made (e.g., bridges, dams, culverts) or natural structures (e.g., bedrock outcrops, Large Wood jams) that will influence or control flow?
d. Look for signs of recurring fluvial action.
  i. Where does the flow converge on the landscape?
  ii. Are there signs of fluvial action (sediment sorting, bedforms, etc.) at the convergence zone?
e. Look for indicators on both banks. If the opposite bank is not accessible, then look across the channel at the bank.
f. **In Step 2 of the datasheet** describe any adjacent land use or flow conditions that may influence interpretation of each line of evidence.
  i. What land use and flow conditions may be affecting your ability to observe indicators at the site?
  ii. What recent extreme events may have caused changes to the site and affected your ability to observe indicators?

Step 3a List evidence

Assemble evidence by checking the boxes next to each line of evidence:

a. If needed, use a separate scratch datasheet to check boxes next to possible indicators, or check boxes of possible indicators in pencil and use pen for final decision.
b. If using fillable form, then follow the instructions for filling in the fillable form.

Context is important when assembling evidence. For instance, pool development may be an indicator of interest on the bed of a dry stream, but may not be a useful indicator to take note of in a flowing stream. On the other hand, if the pool is found in a secondary channel adjacent to the main channel, it could provide a line of evidence for a minimum elevation of high flows. Therefore, consider the site context when deciding which indicators provide evidence for identifying the OHWM. Explain reasoning in Step 5.

Questions to consider while making observations and listing evidence at a site:

Geomorphic indicators	**Sediment and soil indicators**	**Vegetation Indicators**	**Ancillary indicators**
Where are the breaks in slope? Are there identifiable banks? Is there an easily identifiable top of bank? Are the banks actively eroding? Are the banks undercut? Are the banks armored? Is the channel confined by the surrounding hillslopes? Are there natural or man-made berms and levees? Are there fluvial terraces? Are there channel bars?	Where does evidence of soil formation appear? Are there mudcracks present? Is there evidence of sediment sorting by grain size?	Where are the significant transitions in vegetation species, density, and age? Is there vegetation growing on the channel bed? If no, how long does it take for the non-tolerant vegetation to establish relative to how often flows occur in the channel? Where are the significant transitions in vegetation? Is the vegetation tolerant of flowing water? Has any vegetation been flattened by flowing water?	Is there organic litter present? Is there any leaf litter disturbed or washed away? Is there large wood deposition? Is there evidence of water staining?

Are the following features of fluvial transport present?
  Evidence of erosion: obstacle marks, scour, armoring
  Bedforms; riffles, pools, steps, knickpoints/headcuts
  Evidence of deposition: imbricated clasts, gravel sheets, etc.

In some cases, it may be helpful to explain why an indicator was NOT at the OHWM elevation, but found above or below. It can also be useful to note if specific indicators (e.g., vegetation) are NOT present. For instance, note if the site has no clear vegetation zonation.

Step 3b Weight each line of evidence and weigh body of evidence

Weight each indicator by considering its importance based upon:

a. Relevance:

i. Is this indicator left by low, high, or extreme flows?

Tips on how to assess the indicator relative to type of flow:

Consider the elevation of the indicator relative to the channel bed.
What is the current flow level based on season or nearby gages?
Consider the elevation of the indicator relative to the current flow.
If the stream is currently at baseflow and indicator is adjacent to that, then it is likely a low flow indicator. The difference between high and extreme flow indicators can sometimes be difficult to determine.

***Landscape context from Step 1 can help determine the relevance, strength, and reliability of the indicators observed in the field.**

***Information in Chapter 2 of the OHWM field manual provides information on specific indicators which can assist in putting these in context and determining relevance, strength, and reliability.**

ii. Did recent extreme events and/or land use affect this indicator?

1. Recent floods may have left many extreme flow indicators, or temporarily altered channel form. Other resources will likely be needed to support any OHWM identification at this site. Field evidence of the OHWM may have to wait for the site to recover from the recent flood.
2. Droughts may cause field evidence of OHWM to be obscured, because there has been an extended time since the last high flow event. There can be overgrowth of vegetation or deposition of material from surrounding landscape that can obscure indicators.
3. Both man-made (e.g., dams, construction, mining activities, urbanization, agriculture, grazing) and natural (e.g., fires, floods, debris flows, beaver dams) disturbances can all alter how indicators are expected to appear at a site. Chapter 6 and Chapter 7 of the OHWM field manual provides specific case-studies that can help in interpreting evidence at these sites.

b. Strength:

i. Is this indicator persistent across the landscape?

1. Look up and downstream and across the channel to see if you see the same indicator at multiple locations.
2. Does the indicator occur at the same elevation as other indicators?

c. Reliability:

i. Is this indicator persistent on the landscape over time? Will this indicator still persist across seasons?

1. This can be difficult to determine for some indicators and may be specific to climatic region (in terms of persistence of vegetation) and history of land use or other natural disturbances.
2. Chapter 2, Chapter 6, and Chapter 7 of the OHWM field manual describes each indicator in detail and provides examples of areas where indicators are difficult to interpret.

d. Weigh body of evidence:

i. Combine weights: integrate the weighted line of evidence (relevance, strength, reliability) of each indicator.

ii. For each of the observed indicators, which are more heavily weighted? Where do high value indicators co-occur along the stream reach? Do they co-occur at a similar elevation along the banks relative to water surface (or channel bed if there is no water).

iii. On datasheet, select the indicators used to identify the OHWM. Information in Chapter 2 of the OHWM field manual provides descriptions of specific indicators which can assist in putting these in context and determining relevance, strength, and relieability.

e. Take photographs of indicators and attach a log using either page 2 of datasheet or another method of logging photos.

i. Annotate photos with descriptions of indicators.

Step 4 Is additional information needed? Are other resources needed to support the lines of evidence observed in the field?

a. If additional resources are needed, then repeat steps 3a and 3b for the resources selected in Step 1 of assembling, weighting, and weighing evidence collected from online resources. Chapter 5 of the OHWM field manual provides information on using online resources.

b. Any data collected from online tools have strengths and weaknesses. Make sure these are clear when determining relevance, strength, and reliability of the remotely collected data. Clearly describe why other resources were needed to support the lines of evidence observed in the field, as well as the relevance, strength, and reliability of the supporting data and/or resources.

c. Attach any remote data and data analysis to the datasheet.

Step 5 Describe rationale for location of OHWM:

a. Why do the combination of indicators represent the OHWM?

b. If there are multiple possibilites for the OHWM, explain why there are two (or more) possibilities. Include any relevant discussion on why specific indicators were not included in the final decision.

c. If needed, add additional site notes on page 2 of the datasheet under Step 5.

PHOTOGRAPH 1

View of Vegetation Change from Upland to Hydrophytic Vegetation in Channel

PHOTOGRAPH 2

View of Change in Vegetation Between Upland and OHWM of Channel
Looking Downstream Towards Goetz Road

PHOTOGRAPH 3
View of Rural Residence Adjacent to the Channel

PHOTOGRAPH 4
View of Vegetation Debris at Culvert Inlet Upstream of Goetz Road

PHOTOGRAPH 5
View of Vegetation Transition Between Upland and Channel Looking Upstream from Goetz Road

ATTACHMENT 7

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ATTACHMENT 3

Information for Planning and Consultation Database (IPaC)
Resource List

IPaC **U.S. Fish & Wildlife Service**

IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

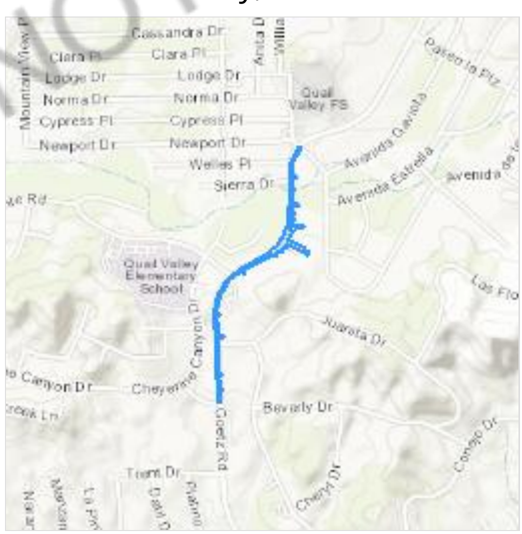
Project information

NAME

9878.11 Goetz Backbone

LOCATION

Riverside County, California



DESCRIPTION

None

Local office

Carlsbad Fish And Wildlife Office

(760) 431-9440
(760) 431-5901

2177 Salk Avenue - Suite 250
Carlsbad, CA 92008-7385

Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Log in to IPaC.
2. Go to your My Projects list.
3. Click PROJECT HOME for this project.
4. Click REQUEST SPECIES LIST.

Listed species[1] and their critical habitats are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries[2]).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact NOAA Fisheries for species under their jurisdiction.

---

1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information. IPaC only shows species that are regulated by USFWS (see FAQ).
2. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department

of Commerce.

The following species are potentially affected by activities in this location:

Mammals

NAME	STATUS
San Bernardino Merriam's Kangaroo Rat Dipodomys merriami parvus Wherever found There is **final** critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/2060	Endangered
Stephens' Kangaroo Rat Dipodomys stephensi (incl. D. cascus) Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/3495	Threatened

Birds

NAME	STATUS
Coastal California Gnatcatcher Polioptila californica californica Wherever found There is **final** critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/8178	Threatened
Least Bell's Vireo Vireo bellii pusillus Wherever found There is **final** critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/5945	Endangered

Reptiles

NAME	STATUS

Southwestern Pond Turtle Actinemys pallida Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/4768	Proposed Threatened

Insects

NAME	STATUS
Monarch Butterfly Danaus plexippus Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/9743	Candidate
Quino Checkerspot Butterfly Euphydryas editha quino (=E. e. wrighti) Wherever found There is **final** critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/5900	Endangered

Crustaceans

NAME	STATUS
Riverside Fairy Shrimp Streptocephalus woottoni Wherever found There is **final** critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/8148	Endangered
Vernal Pool Fairy Shrimp Branchinecta lynchi Wherever found There is **final** critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/498	Threatened

Flowering Plants

NAME	STATUS

California Orcutt Grass Orcuttia californica — Endangered
Wherever found

No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/4923

Munz's Onion Allium munzii — Endangered
Wherever found

There is **final** critical habitat for this species. Your location does not overlap the critical habitat.
https://ecos.fws.gov/ecp/species/2951

San Diego Ambrosia Ambrosia pumila — Endangered
Wherever found

There is **final** critical habitat for this species. Your location does not overlap the critical habitat.
https://ecos.fws.gov/ecp/species/8287

San Jacinto Valley Crownscale Atriplex coronata var. notatior — Endangered
Wherever found

There is **final** critical habitat for this species. However, no *actual* acres or miles were designated due to exemptions or exclusions. See Federal Register publication for details.
https://ecos.fws.gov/ecp/species/4353

Slender-horned Spineflower Dodecahema leptoceras — Endangered
Wherever found

No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/4007

Spreading Navarretia Navarretia fossalis — Threatened
Wherever found

There is **final** critical habitat for this species. Your location does not overlap the critical habitat.
https://ecos.fws.gov/ecp/species/1334

Thread-leaved Brodiaea Brodiaea filifolia — Threatened
Wherever found

There is **final** critical habitat for this species. Your location does not overlap the critical habitat.
https://ecos.fws.gov/ecp/species/6087

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

There are no critical habitats at this location.

You are still required to determine if your project(s) may have effects on all above listed species.

Bald & Golden Eagles

Bald and golden eagles are protected under the Bald and Golden Eagle Protection Act[1] and the Migratory Bird Treaty Act[2].

Any person or organization who plans or conducts activities that may result in impacts to bald or golden eagles, or their habitats[3], should follow appropriate regulations and consider implementing appropriate conservation measures, as described in the links below. Specifically, please review the "Supplemental Information on Migratory Birds and Eagles".

Additional information can be found using the following links:

- Eagle Management https://www.fws.gov/program/eagle-management
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide conservation measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf
- Supplemental Information for Migratory Birds and Eagles in IPaC https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action

There are bald and/or golden eagles in your project area.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, see the PROBABILITY OF PRESENCE SUMMARY below to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON

Bald Eagle Haliaeetus leucocephalus — Breeds Jan 1 to Aug 31

This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.

Golden Eagle Aquila chrysaetos — Breeds Jan 1 to Aug 31

This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.
https://ecos.fws.gov/ecp/species/1680

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read "Supplemental Information on Migratory Birds and Eagles", specifically the FAQ section titled "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.

3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

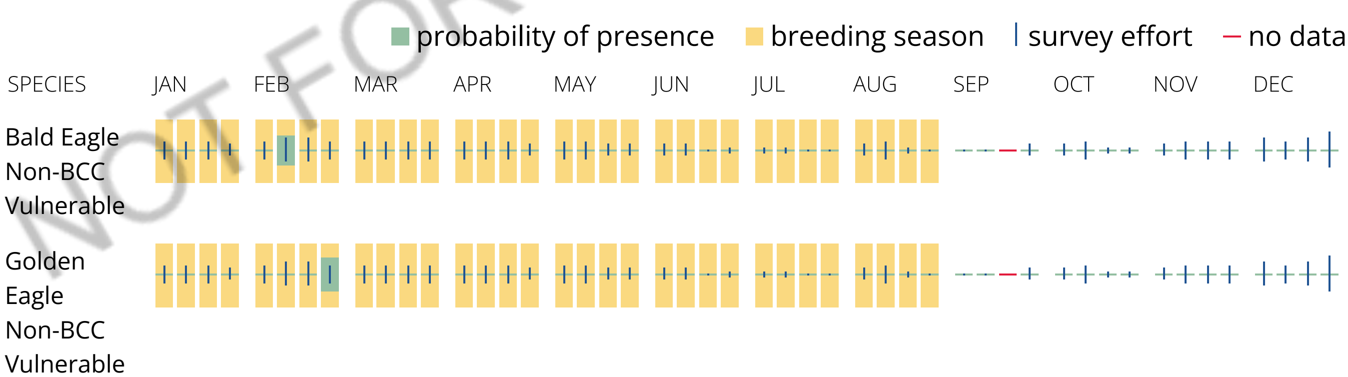
Breeding Season (■)
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

To see a bar's survey effort range, simply hover your mouse cursor over the bar.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.



What does IPaC use to generate the potential presence of bald and golden eagles in my specified location?

The potential for eagle presence is derived from data provided by the [Avian Knowledge Network (AKN)](). The AKN data is based on a growing collection of [survey, banding, and citizen science datasets]() and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle ([Eagle Act]() requirements may apply). To see a list of all birds potentially present in your project area, please visit the [Rapid Avian Information Locator (RAIL) Tool]().

What does IPaC use to generate the probability of presence graphs of bald and golden eagles in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the Rapid Avian Information Locator (RAIL) Tool.

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur. Please contact your local Fish and Wildlife Service Field Office if you have questions.

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats[3] should follow appropriate regulations and consider implementing appropriate conservation measures, as described in the links below. Specifically, please review the "Supplemental Information on Migratory Birds and Eagles".

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.

Additional information can be found using the following links:

- Eagle Management https://www.fws.gov/program/eagle-management
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide conservation measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf
- Supplemental Information for Migratory Birds and Eagles in IPaC https://www.fws.gov

/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action

The birds listed below are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ below. This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the E-bird data mapping tool (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found below.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, see the PROBABILITY OF PRESENCE SUMMARY below to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Allen's Hummingbird Selasphorus sasin This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9637	Breeds Feb 1 to Jul 15
Bald Eagle Haliaeetus leucocephalus This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.	Breeds Jan 1 to Aug 31
Belding's Savannah Sparrow Passerculus sandwichensis beldingi This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/8	Breeds Apr 1 to Aug 15
Bullock's Oriole Icterus bullockii This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA	Breeds Mar 21 to Jul 25

California Gull Larus californicus — Breeds Mar 1 to Jul 31

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

California Thrasher Toxostoma redivivum — Breeds Jan 1 to Jul 31

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Clark's Grebe Aechmophorus clarkii — Breeds Jun 1 to Aug 31

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Common Yellowthroat Geothlypis trichas sinuosa — Breeds May 20 to Jul 31

This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA
https://ecos.fws.gov/ecp/species/2084

Golden Eagle Aquila chrysaetos — Breeds Jan 1 to Aug 31

This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.
https://ecos.fws.gov/ecp/species/1680

Lawrence's Goldfinch Carduelis lawrencei — Breeds Mar 20 to Sep 20

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9464

Nuttall's Woodpecker Picoides nuttallii — Breeds Apr 1 to Jul 20

This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA
https://ecos.fws.gov/ecp/species/9410

Oak Titmouse Baeolophus inornatus — Breeds Mar 15 to Jul 15

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9656

Tricolored Blackbird Agelaius tricolor — Breeds Mar 15 to Aug 10

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/3910

Western Grebe aechmophorus occidentalis — Breeds Jun 1 to Aug 31

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/6743

Wrentit Chamaea fasciata — Breeds Mar 15 to Aug 10

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read "Supplemental Information on Migratory Birds and Eagles", specifically the FAQ section titled "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of

presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.

3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

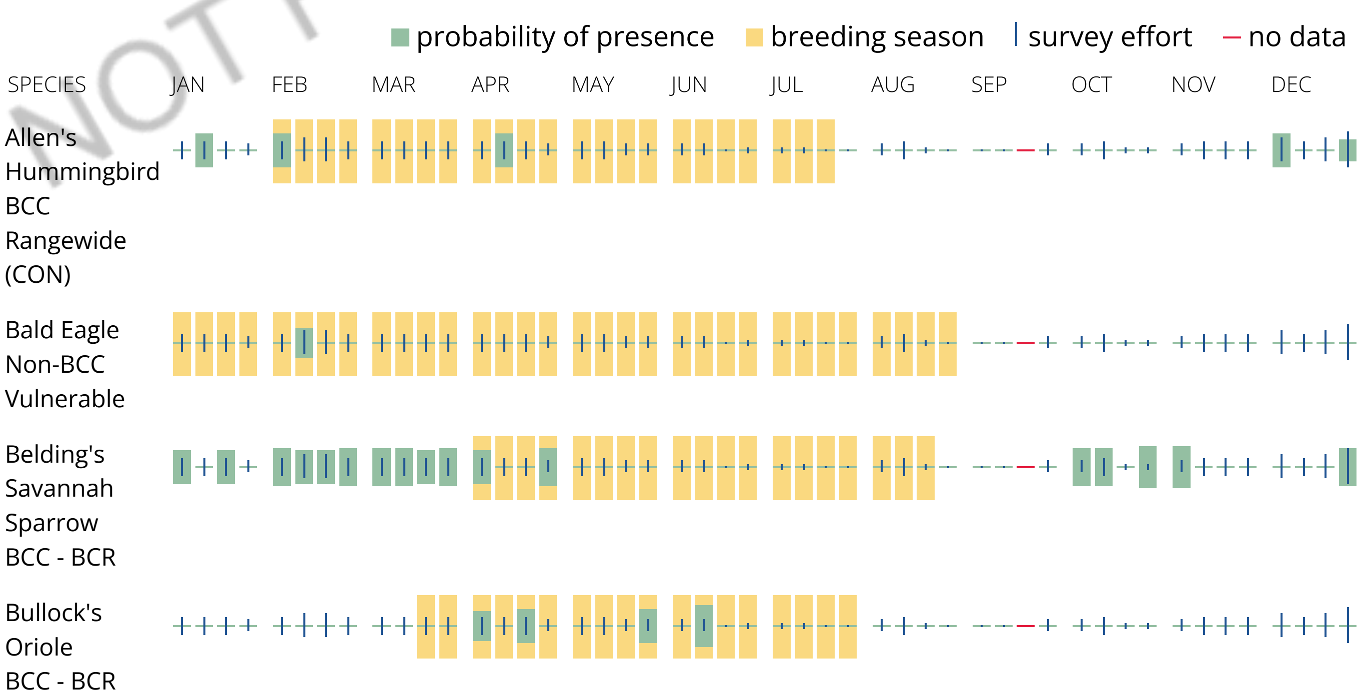
Breeding Season ( )
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

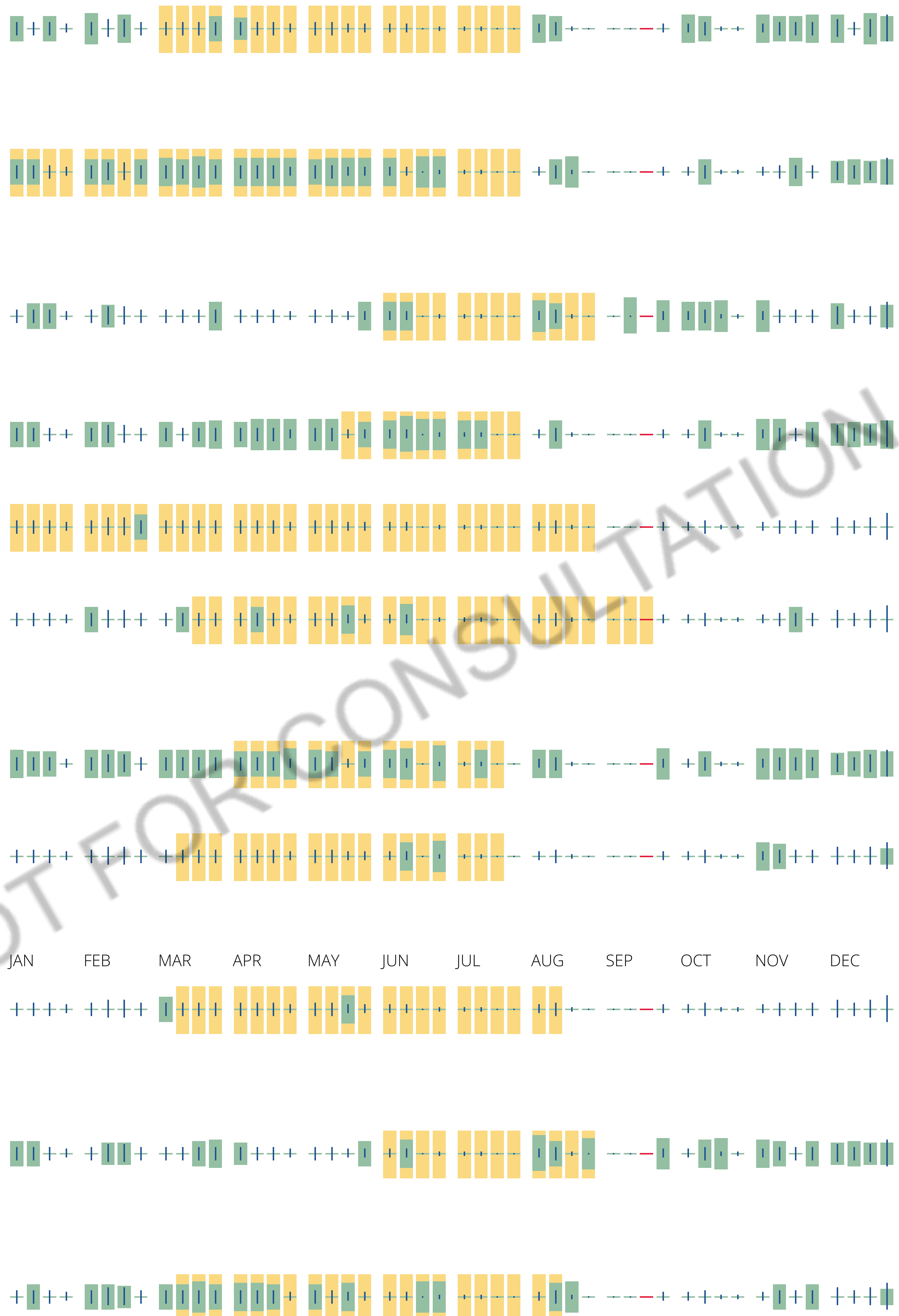
Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

To see a bar's survey effort range, simply hover your mouse cursor over the bar.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.





California Gull
BCC Rangewide (CON)

California Thrasher
BCC Rangewide (CON)

Clark's Grebe
BCC Rangewide (CON)

Common Yellowthroat
BCC - BCR

Golden Eagle
Non-BCC Vulnerable

Lawrence's Goldfinch
BCC Rangewide (CON)

Nuttall's Woodpecker
BCC - BCR

Oak Titmouse
BCC Rangewide (CON)

SPECIES JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC

Tricolored Blackbird
BCC Rangewide (CON)

Western Grebe
BCC Rangewide (CON)

Wrentit
BCC Rangewide (CON)

Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the list of migratory birds that potentially occur in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the Rapid Avian Information Locator (RAIL) Tool.

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets.

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering or migrating in my area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may query your location using the RAIL Tool and look at the range maps provided for birds in your area at the bottom of the profiles provided for each bird in your results. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

Facilities

National Wildlife Refuge lands

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

There are no refuge lands at this location.

Fish hatcheries

There are no fish hatcheries at this location.

Wetlands in the National Wetlands Inventory (NWI)

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

This location overlaps the following wetlands:

RIVERINE

R4SBC

A full description for each wetland code can be found at the National Wetlands Inventory website

NOTE: This initial screening does **not** replace an on-site delineation to determine whether wetlands occur. Additional information on the NWI data is provided below.

Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate Federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

ATTACHMENT 4

Sensitive Plant Species Observed or with the Potential to Occur

Attachment 4 Sensitive Plant Species Observed or with the Potential to Occur									
Major Plant Group	Family	Scientific Name / Common Name	Federal Status	State Status	CNPS Rare Plant Rank	Western Riverside	Habitat Preference / Requirements	Potential to Occur On-Site (Observed or L/M/H/U)	Basis for Determination of Occurrence Potential
Angiosperms: Monocots	Alliaceae / Onion Family	*Allium munzii* / Munz's onion	FE	ST	1B.1	NE, MSHCP, 6.1.3	Perennial herb (bulbiferous); chaparral, cismontane woodland, coastal scrub, pinyon and juniper woodland, valley and foothill grassland; blooms March-May; elevation between 975 and 3,500 feet.	U	This species was not observed and is not expected to occur as this perennial herb would likely have been detected during the general biological survey if present. In addition, the project site is disturbed due to its adjacency to a paved road and consists of primarily non-native weedy species. This species is known to occur within 0.5 mile of the project site (CDFW 2023a).
	Liliaceae / Lily Family	*Calochortus plummerae* / Plummer's mariposa lily			4.2	MSHCP	Perennial herb (bulbiferous); chaparral, cismontane woodland, coastal scrub, lower montane coniferous forest, valley and foothill grassland; granitic, rocky; blooms May-July; elevation between 350 and 5,600 feet.	U	This species was not observed and is not expected to occur as this perennial herb would likely have been detected during the general biological survey if present. In addition, the project site is disturbed due to its adjacency to a paved road and consists of primarily non-native weedy species. This species has not been known to occur within two miles of the survey area.

Attachment 4 Sensitive Plant Species Observed or with the Potential to Occur									
Major Plant Group	Family	Scientific Name / Common Name	Federal Status	State Status	CNPS Rare Plant Rank	Western Riverside	Habitat Preference / Requirements	Potential to Occur On-Site (Observed or L/M/H/U)	Basis for Determination of Occurrence Potential
Angiosperms: Monocots	Liliaceae / Lily Family	*Calochortus weedii* var. *intermedius* / intermediate mariposa lily			1B.2	MSHCP	Perennial herb (bulbiferous); chaparral, coastal scrub, valley and foothill grassland; calcareous; rocky; blooms May-July; elevation between 345 and 2,805 feet.	U	This species was not observed and is not expected to occur as this perennial herb would likely have been detected during the general biological survey if present. In addition, the project site is disturbed due to its adjacency with a paved road and consists of primarily non-native weedy species. This species has not been known to occur within two miles of the survey area.
	Poaceae (Gramineae) / Grass Family	*Orcuttia californica* / California Orcutt grass	FE	SE	1B.1	NE, MSHCP, 6.1.3	Annual herb; vernal pools; blooms April–August; elevation 50–2,200 feet.	U	This species was not observed and is not expected to occur as the project site lacks suitable vernal pool habitat. This species has not been known to occur within two miles of the survey area.

Attachment 4 Sensitive Plant Species Observed or with the Potential to Occur									
Major Plant Group	Family	Scientific Name / Common Name	Federal Status	State Status	CNPS Rare Plant Rank	Western Riverside	Habitat Preference / Requirements	Potential to Occur On-Site (Observed or L/M/H/U)	Basis for Determination of Occurrence Potential
Angiosperms: Monocots	Themidaceae / Brodiaea Family	*Brodiaea filifolia* / thread-leaved brodiaea	FT	SE	1B.1	MSHCP, 6.3.2	Perennial herb (bulbiferous); cismontane woodland, coastal sage scrub, playas, valley and foothill grassland, vernal pools; often clay soils; blooms March–June; elevation less than 3,675 feet.	U	This species was not observed and is not expected to occur as this perennial herb would likely have been detected during the general biological survey if present. In addition, the project site is disturbed due to its adjacency with a paved road and consists of primarily non-native weedy species. This species has not been known to occur within two miles of the survey area.
Angiosperms: Eudicots	Asteraceae / Sunflower Family	*Ambrosia pumila* / San Diego ambrosia	FE		1B.1	NE, MSHCP, 6.1.3	Perennial herb (rhizomatous); chaparral, coastal sage scrub, valley and foothill grasslands, creek beds, vernal pools, often in disturbed areas; blooms April–October; elevation less than 1,400 feet.	U	This species was not observed and is not expected to occur as this perennial herb would likely have been detected during the general biological survey if present. In addition, the project site is disturbed due to its adjacency with a paved road and consists of primarily non-native weedy species. This species has not been known to occur within two miles of the survey area.

Attachment 4 Sensitive Plant Species Observed or with the Potential to Occur									
Major Plant Group	Family	Scientific Name / Common Name	Federal Status	State Status	CNPS Rare Plant Rank	Western Riverside	Habitat Preference / Requirements	Potential to Occur On-Site (Observed or L/M/H/U)	Basis for Determination of Occurrence Potential
Angiosperms: Eudicots	Asteraceae / Sunflower Family	*Centromadia pungens* ssp. *laevis* [=*Hemizonia pungens* ssp. *laevis*] / smooth tarplant			1B.1	MSHCP, 6.3.2	Annual herb; chenopod scrub, meadow and seeps, playas, riparian woodland, valley and foothill grasslands; alkaline soils; blooms April–September; elevation less than 2,100 feet.	U	This species was not observed and is not expected to occur due to lack of suitable meadow and seep, playa, riparian woodland, and valley and foothill grassland habitat. This species is known to occur within 1.5 miles of the project site (CDFW 2023a).
		Holocarpha virgata ssp. *elongata* / graceful tarplant			4.2	MSHCP	Annual herb; coastal sage scrub, cismontane woodland, valley and foothill grasslands, chaparral; blooms May–November; elevation 200–3,600 feet.	U	This species was not observed and is not expected to occur as this annual herb would likely have been detected during the general biological survey if present. In addition, the project site is disturbed due to its adjacency with a paved road and consists of primarily non-native weedy species. This species has not been known to occur within two miles of the survey area.

Attachment 4 Sensitive Plant Species Observed or with the Potential to Occur									
Major Plant Group	Family	Scientific Name / Common Name	Federal Status	State Status	CNPS Rare Plant Rank	Western Riverside	Habitat Preference / Requirements	Potential to Occur On-Site (Observed or L/M/H/U)	Basis for Determination of Occurrence Potential
Angiosperms: Eudicots	Asteraceae / Sunflower Family	*Lasthenia glabrata* ssp. *coulteri* / Coulter's goldfields			1B.1	MSHCP, 6.3.2	Annual herb; coastal salt marsh, vernal pools, playas; blooms February–June; elevation less than 4,000 feet.	U	This species was not observed and is not expected to occur due to lack of suitable coastal salt marsh, vernal pool, and playa habitat. This species is known to occur within 1.5 miles of the project site (CDFW 2023a).
		Microseris douglasii ssp. *platycarpha* / small-flowered microseris			4.2	MSHCP	Annual herb; clay lenses on perennial grasslands, vernal pools, openings in coastal sage scrub; blooms March–May; elevation 50–3,500 feet.	U	This species was not observed and is not expected to occur as this annual herb would likely have been detected during the general biological survey if present. In addition, the project site is disturbed due to its adjacency with a paved road and consists of primarily non-native weedy species. This species has not been known to occur within two miles of the survey area.

Attachment 4 Sensitive Plant Species Observed or with the Potential to Occur									
Major Plant Group	Family	Scientific Name / Common Name	Federal Status	State Status	CNPS Rare Plant Rank	Western Riverside	Habitat Preference / Requirements	Potential to Occur On-Site (Observed or L/M/H/U)	Basis for Determination of Occurrence Potential
Angiosperms: Eudicots	Berberidaceae / Barberry Family	*Berberis nevinii* [=*Mahonia nevinii*] / Nevin's barberry	FE	SE	1B.1	MSHCP, 6.3.2	Perennial evergreen shrub; chaparral, cismontane woodland, coastal sage scrub, riparian scrub; sandy or gravelly soils; blooms February–June; elevation 900–2,700 feet.	U	This species was not observed and is not expected to occur as this conspicuous perennial shrub would have been detected during the general biological survey if present. In addition, the project site is disturbed due to its adjacency with a paved road and consists of primarily non-native weedy species. This species has not been known to occur within two miles of the survey area.
	Boraginaceae / Borage Family	*Harpagonella palmeri* / Palmer's grapplinghook			4.2	MSHCP	Annual herb; chaparral, coastal sage scrub, valley and foothill grasslands; clay soils; blooms March–May; elevation less than 3,200 feet.	U	This species was not observed and is not expected to occur as this annual herb would likely have been detected during the general biological survey if present. In addition, the project site is disturbed due to its adjacency with a paved road and consists of primarily non-native weedy species. This species has not been known to occur within two miles of the survey area.

Attachment 4 Sensitive Plant Species Observed or with the Potential to Occur									
Major Plant Group	Family	Scientific Name / Common Name	Federal Status	State Status	CNPS Rare Plant Rank	Western Riverside	Habitat Preference / Requirements	Potential to Occur On-Site (Observed or L/M/H/U)	Basis for Determination of Occurrence Potential
Angiosperms: Eudicots	Brassicaceae (Cruciferae) / Mustard Family	*Caulanthus simulans* / Payson's jewelflower			4.2	MSHCP	Annual herb; chaparral, coastal sage scrub; sandy, granitic substrate; blooms February–June; elevation between 300 and 7,300 feet.	U	This species was not observed and is not expected to occur as this annual herb would likely have been detected during the general biological survey if present. In addition, the project site is disturbed due to its adjacency with a paved road and consists of primarily non-native weedy species. This species has not been known to occur within two miles of the survey area.
	Chenopodiaceae / Goosefoot Family	*Atriplex coronata* var. *notatior* / San Jacinto Valley crownscale	FE		1B.1	MSHCP, 6.3.2	Annual herb; playas, valley and foothill grassland (mesic), vernal pools; alkaline; blooms April-August; elevation between 450 and 1,650 feet.	U	This species was not observed and is not expected to occur due to lack of suitable playa, grassland, and vernal pool habitat. This species has not been known to occur within two miles of the survey area.

Attachment 4 Sensitive Plant Species Observed or with the Potential to Occur									
Major Plant Group	Family	Scientific Name / Common Name	Federal Status	State Status	CNPS Rare Plant Rank	Western Riverside	Habitat Preference / Requirements	Potential to Occur On-Site (Observed or L/M/H/U)	Basis for Determination of Occurrence Potential
Angiosperms: Eudicots	Convolvulaceae/ Morning-Glory Family	*Convolvulus simulans* / small-flowered morning-glory			4.2	MSHCP	Annual herb; openings in chaparral, coastal sage scrub, valley and foothill grasslands; clay substrate; blooms March–July; elevation less than 2,300 feet.	U	This species was not observed and is not expected to occur as this annual herb would likely have been detected during the general biological survey if present. In addition, the project site is disturbed due to its adjacency with a paved road and consists of primarily non-native weedy species. This species has not been known to occur within two miles of the survey area.
	Crassulaceae / Stonecrop Family	*Dudleya multicaulis* / many-stemmed dudleya			1B.2	NE, MSHCP, 6.1.3	Perennial herb; chaparral, coastal sage scrub, grassland, mostly clay soils; blooms April–July; elevation 2,600 feet.	U	This species was not observed and is not expected to occur as this perennial herb would likely have been detected during the general biological survey if present. In addition, the project site is disturbed due to its adjacency with a paved road and consists of primarily non-native weedy species. This species has not been known to occur within two miles of the survey area.

Attachment 4 Sensitive Plant Species Observed or with the Potential to Occur									
Major Plant Group	Family	Scientific Name / Common Name	Federal Status	State Status	CNPS Rare Plant Rank	Western Riverside	Habitat Preference / Requirements	Potential to Occur On-Site (Observed or L/M/H/U)	Basis for Determination of Occurrence Potential
Angiosperms: Eudicots	Lamiaceae / Mint Family	*Clinopodium chandleri* [=*Satureja chandleri*] / San Miguel savory			1B.2	NE MSHCP 6.1.3	Perennial shrub; chaparral, cismontane woodland, coastal sage scrub, riparian woodland, valley and foothill grasslands; blooms March–July; elevation less than 3,500 feet.	U	This species was not observed and is not expected to occur as this perennial shrub would likely have been detected during the general biological survey if present. In addition, the project site is disturbed due to its adjacency with a paved road and consists of primarily non-native weedy species. This species has not been known to occur within two miles of the survey area.
	Polemoniaceae / Phlox Family	*Navarretia fossalis* / spreading navarretia	FT		1B.1	NE MSHCP 6.1.3	Annual herb; vernal pools, marshes and swamps, chenopod scrub; blooms April–June; elevation 100–4,300 feet.	U	This species was not observed and is not expected to occur due to lack of suitable vernal pool, marsh, swamp, and chenopod scrub habitat. This species has not been known to occur within two miles of the survey area.

Attachment 4 Sensitive Plant Species Observed or with the Potential to Occur									
Major Plant Group	Family	Scientific Name / Common Name	Federal Status	State Status	CNPS Rare Plant Rank	Western Riverside	Habitat Preference / Requirements	Potential to Occur On-Site (Observed or L/M/H/U)	Basis for Determination of Occurrence Potential
Angiosperms: Eudicots	Polygonaceae / Buckwheat Family	*Chorizanthe leptotheca* / peninsular spineflower, peninsular spine flower**			4.2	MSHCP	Annual herb; chaparral, coastal sage scrub, lower montane coniferous forest; alluvial fan or granitic substrate; blooms May–August; elevation 1,000–6,300 feet.	U	This species was not observed and is not expected to occur as this annual herb would likely have been detected during the general biological survey if present. In addition, the project site is disturbed due to its adjacency with a paved road and consists of primarily non-native weedy species. This species has not been known to occur within two miles of the survey area.
		Chorizanthe parryi var. *parryi* / Parry's spineflower, Parry's spine flower**			1B.1	MSHCP	Annual herb; chaparral, cismontane woodland, coastal scrub, valley and foothill grassland; openings, rocky (sometimes), sandy (sometimes); blooms April-June; elevation between 900 and 4,000 feet.	U	This species was not observed and is not expected to occur as this annual herb would likely have been detected during the general biological survey if present. In addition, the project site is disturbed due to its adjacency with a paved road and consists of primarily non-native weedy species. This species is known to occur within 1.25 mile of the project site (CDFW 2023a).

Attachment 4 Sensitive Plant Species Observed or with the Potential to Occur									
Major Plant Group	Family	Scientific Name / Common Name	Federal Status	State Status	CNPS Rare Plant Rank	Western Riverside	Habitat Preference / Requirements	Potential to Occur On-Site (Observed or L/M/H/U)	Basis for Determination of Occurrence Potential
Angiosperms: Eudicots	Polygonaceae / Buckwheat Family	*Chorizanthe polygonoides* var. *longispina* / long-spined spineflower, long-spined spine flower**			1B.2	MSHCP	Annual herb; clay soils; openings in chaparral, coastal sage scrub, near vernal pools and montane meadows, April–July; elevation 100–5,000 feet.	U	This species was not observed and is not expected to occur as this annual herb would likely have been detected during the general biological survey if present. In addition, the project site is disturbed due to its adjacency with a paved road and consists of primarily non-native weedy species. This species has not been known to occur within two miles of the survey area.
		Chorizanthe procumbens / prostrate spineflower, prostrate spine flower**			CBR	MSHCP	Annual herb; common; sand, gravel; blooms April-June; elevation between 30 and 4,250 feet.	U	This species was not observed and is not expected to occur as this annual herb would likely have been detected during the general biological survey if present. In addition, the project site is disturbed due to its adjacency with a paved road and consists of primarily non-native weedy species. This species has not been known to occur within two miles of the survey area.

Attachment 4 Sensitive Plant Species Observed or with the Potential to Occur									
Major Plant Group	Family	Scientific Name / Common Name	Federal Status	State Status	CNPS Rare Plant Rank	Western Riverside	Habitat Preference / Requirements	Potential to Occur On-Site (Observed or L/M/H/U)	Basis for Determination of Occurrence Potential
Angiosperms: Eudicots	Polygonaceae / Buckwheat Family	*Dodecahema leptoceras* / slender-horned spineflower, slender-horned spine flower**	FE	SE	1B.1	NE MSHCP 6.1.3	Annual herb; chaparral, cismontane woodland, coastal sage scrub, alluvial fans, and sandy areas; blooms April-June; elevation 600-2,500 feet.	U	This species was not observed and is not expected to occur as this annual herb would likely have been detected during the general biological survey if present. In addition, the project site is disturbed due to its adjacency with a paved road and consists of primarily non-native weedy species. This species has not been known to occur within two miles of the survey area.
NOTE: Scientific and common names were primarily derived from Jepson eFlora (Jepson Flora Project 2023). In instances where common names were not provided in this resource, common names were obtained from Rebman and Simpson (2014). Federal and state listing status is based on California Department of Fish and Wildlife, Natural Diversity Database (CDFW) 2023a. Covered species under the Western Riverside MSHCP are listed with the appropriate the section reference to the Western Riverside County MSHCP.									

Attachment 4
Sensitive Plant Species Observed or with the Potential to Occur

STATUS CODES

Federal Status

FE = Listed as endangered by the federal government
FT = Listed as threatened by the federal government

State Status

SE = Listed as endangered by the state of California
ST = Listed as threatened by the state of California

California Native Plant Society (CNPS): California Rare Plant Ranks (CRPR)

1A = Species presumed extinct.
1B = Species rare, threatened, or endangered in California and elsewhere. These species are eligible for state listing.
4 = A watch list of species of limited distribution. These species need to be monitored for changes in the status of their populations.
0.1 = Species seriously threatened in California (over 80% of occurrences threatened; high degree and immediacy of threat).
CBR = Considered but rejected.

Western Riverside

MSHCP = Western Riverside County Multiple Species Habitat Conservation Plan covered species.
6.1.3 = Species subject to survey requirements and avoidance measures in Section 6.1.3, Protection of Narrow Endemic Plant Species.
6.3.2 = Species subject to survey requirements and avoidance measures in Section 6.3.2, Additional Survey Needs and Procedures of the MSHCP.
NE = Plant species that are highly restricted by their habitat affinities, edaphic requirements or other ecological factors, and for which specific conservation measures have been identified in Section 6.1.3 of the MSHCP.

POTENTIAL TO OCCUR ON-SITE

L = Low
M = Medium
H = High
U = Unexpected

ATTACHMENT 5

Sensitive Wildlife Species Observed
or with the Potential to Occur

Attachment 5 Sensitive Wildlife Species Observed or with the Potential to Occur								
Major Wildlife Group	Family	Scientific Name / Common Name	Federal Status	State Status	Western Riverside MSHCP	Habitat Preference / Requirements	Potential to Occur On-Site (Observed or L/M/H/U)	Basis for Determination of Occurrence Potential
Invertebrates	Branchinectidae / Fairy Shrimp	*Branchinecta lynchi* / vernal pool fairy shrimp	FT		MSHCP, 6.1.2	Vernal pools.	U	This species is not expected to occur due to lack of suitable vernal pool habitat. This species has not been known to occur within two miles of the project site.
		Streptocephalus woottoni / Riverside fairy shrimp	FE		MSHCP, 6.1.2	Vernal pools.	U	This species is not expected to occur due to lack of suitable vernal pool habitat. This species has not been known to occur within two miles of the project site.
	Apidae / Honey Bees, Bumble Bees, and Allies	*Bombus crotchii* / Crotch's bumble bee		SCE		Coastal areas, open grasslands, shrub habitats.	U	This species is not expected to occur as the project site consists of paved roads, disturbed roadsides, residential lots, and other areas of disturbed land that lacks suitable habitat with native nectar sources for foraging. The disturbed areas within the project site are subject to repeated mowing and on-going disturbance associated with the roadway and are unsuitable for nesting. One species occurrence record is known from the Quail Valley/Menifee area; however, the record is from 1975 and the specific location is unknown (CDFW 2023a).

Attachment 5 Sensitive Wildlife Species Observed or with the Potential to Occur								
Major Wildlife Group	Family	Scientific Name / Common Name	Federal Status	State Status	Western Riverside MSHCP	Habitat Preference / Requirements	Potential to Occur On-Site (Observed or L/M/H/U)	Basis for Determination of Occurrence Potential
Invertebrates	Nymphalidae / Brush-footed Butterflies	*Danaus plexippus* pop.1 / monarch	FC			Wide variety of habitats, including urban areas. Host plant is milkweed *(Asclepias* sp.).	U	This species is not expected to occur as the project site consists of paved roads, disturbed roadsides, residential lots, and other areas of disturbed land lack suitable overwintering habitat (e.g., stands of gum trees) or host plant (e.g., milkweed). This species has not been known to occur within two miles of the project site.
		Euphydryas editha quino / Quino checkerspot	FE		MSHCP	Open, dry areas in foothills, mesas, lake margins. Larval host plant *Plantago erecta.* Adult emergence mid-January through April.	U	This species is not expected to occur as the project site consists of paved roads, disturbed roadsides, residential lots, and other areas of disturbed land are subject to repeated mowing and on-going disturbance and lack host plants for this species. This species has not been known to occur within two miles of the project site.

Attachment 5 Sensitive Wildlife Species Observed or with the Potential to Occur								
Major Wildlife Group	Family	Scientific Name / Common Name	Federal Status	State Status	Western Riverside MSHCP	Habitat Preference / Requirements	Potential to Occur On-Site (Observed or L/M/H/U)	Basis for Determination of Occurrence Potential
Amphibians	Pelobatidae / Spadefoot Toads	*Spea hammondii* / western spadefoot		SSC	MSHCP	Vernal pools, floodplains, and alkali flats within areas of open vegetation.	U	This species is not expected to occur due to lack of suitable vernal pool, alkali flat or floodplain habitat with open vegetation. This species has been known to occur within two miles of the project site (CDFW 2023a); however, the records are within different habitat associated with gravel ponds, which are not present in the project site.
Reptiles	Emydidae / Box & Water Turtles	*Actinemys pallida [=Clemmys marmorata pallida]* / southwestern pond turtle		SSC	MSHCP	Ponds, small lakes, marshes, slow-moving, sometimes brackish water.	U	This species is not expected to occur due to lack of suitable ponds, small lakes, marshes, and brackish water habitat. This species has not been known to occur within two miles of the project site.
	Teiidae / Whiptail Lizards	*Aspidoscelis hyperythra beldingi* [=*Cnemidophorus hyperythrus*] / Belding's orange-throated whiptail		WL	MSHCP	Chaparral, coastal sage scrub with coarse sandy soils and scattered brush.	U	This species is not expected to occur due to lack of suitable chaparral and coastal sage scrub habitat. This species has been known to occur within two miles of the project site (CDFW 2023a); however, project site is surrounded by development and disturbed areas that are low-quality due to the presence of invasive species and edge effects from surrounding roadways and development.

Attachment 5 Sensitive Wildlife Species Observed or with the Potential to Occur								
Major Wildlife Group	Family	Scientific Name / Common Name	Federal Status	State Status	Western Riverside MSHCP	Habitat Preference / Requirements	Potential to Occur On-Site (Observed or L/M/H/U)	Basis for Determination of Occurrence Potential
Reptiles	Colubridae / Colubrid Snakes	*Arizona elegans occidentalis* / California glossy snake		SSC		Scrub and grassland habitats, often with loose or sandy soils.	U	This species is not expected to occur due to lack of suitable scrub and grassland habitat. This species has been known to occur within two miles of the project site (CDFW 2023a); however, the project site is surrounded by development and disturbed areas that are low-quality due to the presence of dense invasive species and edge effects from surrounding roadways and development.
	Crotalidae / Rattlesnakes	*Crotalus ruber* / red diamond rattlesnake		SSC	MSHCP	Desert scrub and riparian, coastal sage scrub, open chaparral, grassland, and agricultural fields.	L	This species has a low potential to occur as the project site consists of paved roads, disturbed roadsides, residential lots, and other areas of disturbed land that lacks proximity to larger expanses of open or native habitat. This species has been known to occur within two miles of the project site (CDFW 2023a); however, the project site is surrounded by development and disturbed areas that are low-quality due to the presence of dense invasive species and edge effects from surrounding roadways and development.

Attachment 5 Sensitive Wildlife Species Observed or with the Potential to Occur								
Major Wildlife Group	Family	Scientific Name / Common Name	Federal Status	State Status	Western Riverside MSHCP	Habitat Preference / Requirements	Potential to Occur On-Site (Observed or L/M/H/U)	Basis for Determination of Occurrence Potential
Birds	Accipitridae / Hawks, Kites, & Eagles	*Aquila chrysaetos* / golden eagle	BEPA	WL, CFP	MSHCP	Require vast foraging areas in grassland, broken chaparral, or sage scrub. Nest in cliffs and boulders. Uncommon resident.	U	This species is not expected to occur due to lack of suitable nesting habitat (e.g., cliffs and boulders) and lack of foraging areas within grassland, chaparral, and sage scrub habitat within or adjacent to the project site. In addition, this species has not been known to occur within two miles of the project site.
		Haliaeetus leucocephalus / bald eagle	BEPA, (Fed. Delisted)	CE, CFP	MSHCP	Rivers, lakes. Rare winter visitor, rare fall migrant. Feed mainly on fish.	U	This species is not expected to occur due to lack of suitable river and lake habitat. The ephemeral drainage adjacent to the project site lacks adequate hydrology and continuity for fish, their main feeding source. In addition, this species has not been known to occur within two miles of the project site.

Attachment 5 Sensitive Wildlife Species Observed or with the Potential to Occur								
Major Wildlife Group	Family	Scientific Name / Common Name	Federal Status	State Status	Western Riverside MSHCP	Habitat Preference / Requirements	Potential to Occur On-Site (Observed or L/M/H/U)	Basis for Determination of Occurrence Potential
Birds	Strigidae / Typical Owls	*Athene cunicularia* / burrowing owl		SSC	MSHCP, 6.3.2	Grassland, agricultural land, coastal dunes. Require rodent burrows. Declining resident.	U	This species is not expected to occur as the project site consists of paved roads, disturbed roadsides, residential lots, and other areas of disturbed land immediately adjacent to Goetz Road. The disturbed areas are comprised of dense non-native vegetation subject to repeated and on-going disturbance from the roadway that lack suitable burrows or burrow surrogates, and no California ground squirrel activity was noted in the surrounding area. This species has been known to occur within two miles of the project site (CDFW 2023a).

Attachment 5 Sensitive Wildlife Species Observed or with the Potential to Occur								
Major Wildlife Group	Family	Scientific Name / Common Name	Federal Status	State Status	Western Riverside MSHCP	Habitat Preference / Requirements	Potential to Occur On-Site (Observed or L/M/H/U)	Basis for Determination of Occurrence Potential
Birds	Vireonidae / Vireos	*Vireo bellii pusillus* / least Bell's vireo	FE	SE	MSHCP, 6.1.2	Willow riparian woodlands. Summer resident.	U	This species is not expected to occur within the project site due to lack of suitable willow riparian woodland habitat. This species has been known to occur within large riparian corridors associated within Canyon Lake within two miles of the project site (CDFW 2023a); however, the disturbed wetland adjacent to the project site consists primarily of a small stand of Mexican palo verde and low-growing wetland vegetation and lacks suitable willow stands with scrubby understory to support this species.

Attachment 5 Sensitive Wildlife Species Observed or with the Potential to Occur								
Major Wildlife Group	Family	Scientific Name / Common Name	Federal Status	State Status	Western Riverside MSHCP	Habitat Preference / Requirements	Potential to Occur On-Site (Observed or L/M/H/U)	Basis for Determination of Occurrence Potential
Birds	Alaudidae / Larks	*Eremophila alpestris actia* / California horned lark		WL	MSHCP	Sandy shores, mesas, disturbed areas, grasslands, agricultural lands, sparse creosote bush scrub.	L	This species has a low potential to occur as the project site consists of paved roads, disturbed roadsides, and residential lots subject to repeated disturbance. This species has been known to occur within two miles of the project site (CDFW 2023a); however, the project site is surrounded by development and the disturbed areas are low-quality due to the presence of dense invasive species and edge effects from surrounding roadways and development.
	Polioptilidae / Gnatcatchers	*Polioptila californica californica* / coastal California gnatcatcher	FT	SSC	MSHCP	Coastal sage scrub, maritime succulent scrub. Resident.	U	This species is not expected to occur due to lack of suitable coastal sage scrub and maritime succulent scrub habitat within or adjacent to the project site. This species has been known to occur within two miles of the project site (CDFW 2023a); however, the project site is surrounded by development and the disturbed areas are low-quality due to the presence of dense invasive species and edge effects from surrounding roadways and development.

Attachment 5 Sensitive Wildlife Species Observed or with the Potential to Occur								
Major Wildlife Group	Family	Scientific Name / Common Name	Federal Status	State Status	Western Riverside MSHCP	Habitat Preference / Requirements	Potential to Occur On-Site (Observed or L/M/H/U)	Basis for Determination of Occurrence Potential
Birds	Passerellidae / New World Passerines	*Aimophila ruficeps canescens* / southern California rufous-crowned sparrow		WL	MSHCP	Coastal sage scrub, chaparral, grassland. Resident.	U	This species is not expected to occur due to lack of suitable coastal sage scrub, chaparral, and grassland habitat. This species has been known to occur within two miles of the project site (CDFW 2023a); however, the project site is surrounded by development and the disturbed areas are low-quality due to the presence of dense invasive species and edge effects from surrounding roadways and development.
		Artemisiospiza [=*Amphispiza*] *belli belli* / Bell's sage sparrow		WL	MSHCP	Chaparral, coastal sage scrub. Localized resident.	U	This species is not expected to occur due to lack of suitable chaparral and coastal sage scrub habitat. This species has been known to occur within two miles of the project site (CDFW 2023a); however, the project site is surrounded by development and the disturbed areas are low-quality due to the presence of dense invasive species and edge effects from surrounding roadways and development.

Attachment 5 Sensitive Wildlife Species Observed or with the Potential to Occur								
Major Wildlife Group	Family	Scientific Name / Common Name	Federal Status	State Status	Western Riverside MSHCP	Habitat Preference / Requirements	Potential to Occur On-Site (Observed or L/M/H/U)	Basis for Determination of Occurrence Potential
Mammals	Vespertilionidae / Vesper Bats	*Lasiurus xanthinus* / western yellow bat		SSC		Active year-round. Roosts in the foliage of trees in arid habitats, particularly in native and exotic palm trees. Forage for a variety of flying insects over streams and ponds. Ranges from southern California and Arizona into western Mexico.	U	This species is not expected to occur within the project site due to lack of suitable palms or other large tree stands with nearby perennial water sources. This species has been known to occur within two miles of the project site (CDFW 2023a); however, the ephemeral drainage adjacent to the project site lacks adequate hydrology and is surrounded by development and the disturbed areas are low-quality due to the presence of dense invasive species and edge effects from surrounding roadways and development.
	Heteromyidae / Pocket Mice & Kangaroo Rats	*Dipodomys merriami parvus* / San Bernardino Merriam's kangaroo rat, San Bernardino kangaroo rat	FE	SCE, SSC	MSHCP, 6.3.2	Open scrub vegetation (coastal sage scrub, chaparral, & desert) in sandy loam substrates of alluvial fans and floodplains.	U	This species is not expected to occur due to lack of suitable open scrub vegetation and sandy loam substrate among alluvial fans and floodplains. This species has not been known to occur within two miles of the project site.

Attachment 5 Sensitive Wildlife Species Observed or with the Potential to Occur								
Major Wildlife Group	Family	Scientific Name / Common Name	Federal Status	State Status	Western Riverside MSHCP	Habitat Preference / Requirements	Potential to Occur On-Site (Observed or L/M/H/U)	Basis for Determination of Occurrence Potential
Mammals	Heteromyidae / Pocket Mice & Kangaroo Rats	*Dipodomys stephensi* / Stephens' kangaroo rat	FT	ST	SKR HCP	Grassland, open areas.	U	This species is not expected to occur due lack of suitable grassland habitat with open areas. This species has been known to occur within two miles of the project site (CDFW 2023a); however, the project site is surrounded by development and the disturbed areas are low-quality due to the presence of dense invasive species and edge effects from surrounding roadways and development.
NOTE: Zoological nomenclature for invertebrates is in accordance with the NatureServe 2023 and Evans 2008; for fish with NatureServe 2023; for reptiles and amphibians with Crother et. al (2017); for birds with Chesser et al. 2022; for mammals with Bradley et al. (2014), American Society of Mammalogists 2021. Determination of the potential occurrence for listed, sensitive, or noteworthy species is based upon known ranges and habitat preferences for species follows Evans 2008, Jennings and Hayes 1994, Western Bat Working Group 2017, and Harvey et. al 2011. Federal and state listing status is based on California Department of Fish and Wildlife, Natural Diversity Database (CDFW) 2023a. Covered species under the Western Riverside MSHCP are listed with the appropriate the section reference to the Western Riverside County MSHCP.								

Attachment 5
Sensitive Wildlife Species Observed or with the Potential to Occur

STATUS CODES

Federal Status

FE = Listed as endangered by the federal government
FT = Listed as threatened by the federal government
FC = Federal candidate for listing (taxa for which the U.S. Fish and Wildlife Service has on file sufficient information on biological vulnerability and threat(s) to support proposals to list as endangered or threatened; development and publication of proposed rules for these taxa are anticipated)
BEPA = Bald and Golden Eagle Protection Act

State Status

CFP = California fully protected species
SE = Listed as endangered by the state of California
ST = Listed as threatened by the state of California
SCE = State candidate for listing as Endangered
SSC = California Department of Fish and Wildlife species of special concern
WL = California Department of Fish and Wildlife watch list species

Western Riverside

MSHCP = Western Riverside County Multiple Species Habitat Conservation Plan covered species
6.1.2 = Species subject to survey requirements and avoidance and minimization measures in Section 6.1.2, Protection of Species Associated with Riparian/Riverine Areas and Vernal Pools of the MSHCP
6.3.2 = Species subject to survey requirements and avoidance measures in Section 6.3.2, Additional Survey Needs and Procedures of the MSHCP

POTENTIAL TO OCCUR ON-SITE

L = Low
M = Medium
H = High
U = Unexpected

Equipment default values for horsepower and hours/day can be overridden in cells D403 through D436 and F403 through F436.

Equipment	User Override of Horsepower	Default Values Horsepower	User Override of Hours/day	Default Values Hours/day
Aerial Lifts		63		8
Air Compressors		78		8
Bore/Drill Rigs		221		8
Cement and Mortar Mixers		9		8
Concrete/Industrial Saws		81		8
Cranes		231		8
Crawler Tractors		212		8
Crushing/Proc. Equipment		85		8
Excavators		158		8
Forklifts		89		8
Generator Sets		84		8
Graders		187		8
Off-Highway Tractors		124		8
Off-Highway Trucks		402		8
Other Construction Equipment		172		8
Other General Industrial Equipment		88		8
Other Material Handling Equipment		168		8
Pavers		130		8
Paving Equipment		132		8
Plate Compactors		8		8
Pressure Washers		13		8
Pumps		84		8
Rollers		80		8
Rough Terrain Forklifts		100		8
Rubber Tired Dozers		247		8
Rubber Tired Loaders		203		8
Scrapers		367		8
Signal Boards		6		8
Skid Steer Loaders		65		8
Surfacing Equipment		263		8
Sweepers/Scrubbers		64		8
Tractors/Loaders/Backhoes		97		8
Trenchers		78		8
Welders		46		8

END OF DATA ENTRY SHEET

APPENDIX C

Cultural Resources Constraints for the Quail Valley Subarea 4 Project

(Confidential – Not for Public Review)

APPENDIX D

Geotechnical Investigation Report

INLAND FOUNDATION ENGINEERING, INC.
Consulting Geotechnical Engineers and Geologists
www.inlandfoundation.com
P. O. Box 937, San Jacinto, CA 92581-0937

November 20, 2020
Project No. E080-058

ENGINEERING RESOURCES OF SOUTHERN CALIFORNIA, INC.
1861 West Redlands Boulevard
Redlands, California 92373

Attention: Erik T. Howard, PE, PLS

Re: Geotechnical Investigation Report
EMWD Quail Valley Sub-Area 4 Sewerage Feasibility Study and
Sewer System Backbone Preliminary Design Project

Dear Mr. Howard:

We are pleased to submit this geotechnical investigation report for the referenced project. The investigation indicates the proposed sewer project is feasible from a geotechnical engineering standpoint. The primary geotechnical issues that will require mitigation are related to near-surface bedrock and groundwater.

We appreciate being of service to you on this project. If you have any questions, please contact our office.

Respectfully,

INLAND FOUNDATION ENGINEERING, INC.

PROFESSIONAL GEOLOGIST
DANIEL R. LIND
NO. 2451
CERTIFIED
ENGINEERING

Daniel R. Lind, Project Geologist
P.G. 7681/C.E.G. 2451

REGISTERED PROFESSIONAL ENGINEER
ALLEN D. EVANS
No. 2060
GEOTECHNICAL
STATE OF CALIFORNIA

Allen D. Evans, President
R.C.E. 38104/G.E. 2060

DRL:ADE:es
Distribution: Addressee

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INTRODUCTION

This report presents the results of geotechnical exploration and testing conducted to provide geotechnical design support for the Eastern Municipal Water District (EMWD) Quail Valley Sub-Area 4 Sewerage Feasibility Study and Sewer System Backbone Preliminary Design project. The following references were used during our study.

- Request for Proposals, Quail Valley Sub-Area 4 Sewerage Feasibility Study and Sewer System Backbone Preliminary Design, dated November 14, 2019, prepared by EMWD.

- A report entitled "Geotechnical Feasibility Investigation, Quail Valley Sewer Project, Quail Valley Area, Riverside County, California", dated August 11, 2005 and prepared by Inland Foundation Engineering, Inc.

- A report entitled "Preliminary Geotechnical Report, Quail Valley Sewer Improvements Project – Subarea 9, Quail Valley Area, Riverside County, California", dated October 28, 2009 and prepared by Inland Foundation Engineering, Inc.

- A report entitled "Supplemental Geotechnical Exploration, EMWD Subarea 9(A) Quail Valley Sewer Improvements Project, Menifee, California", dated November 6, 2014 and prepared by Inland Foundation Engineering, Inc.

- A report entitled "Supplemental Geotechnical Exploration, Final Design Engineering Services, EMWD Quail Valley Sewer Improvements, Subarea 9, Phase 1 Project, Menifee, California", dated June 30, 2014 and prepared by Inland Foundation Engineering, Inc.

SCOPE OF SERVICE

The purpose of this geotechnical investigation was to provide geotechnical design recommendations for the proposed project. The scope of our services included:

- Information review of our previous studies (referenced above).

- Field reconnaissance to locate proposed borings for utility clearance and to coordinate with Underground Service Alert for underground utility location.

- Subsurface geotechnical exploration, including twenty four (24) eight-inch diameter borings and four seismic refraction traverses.

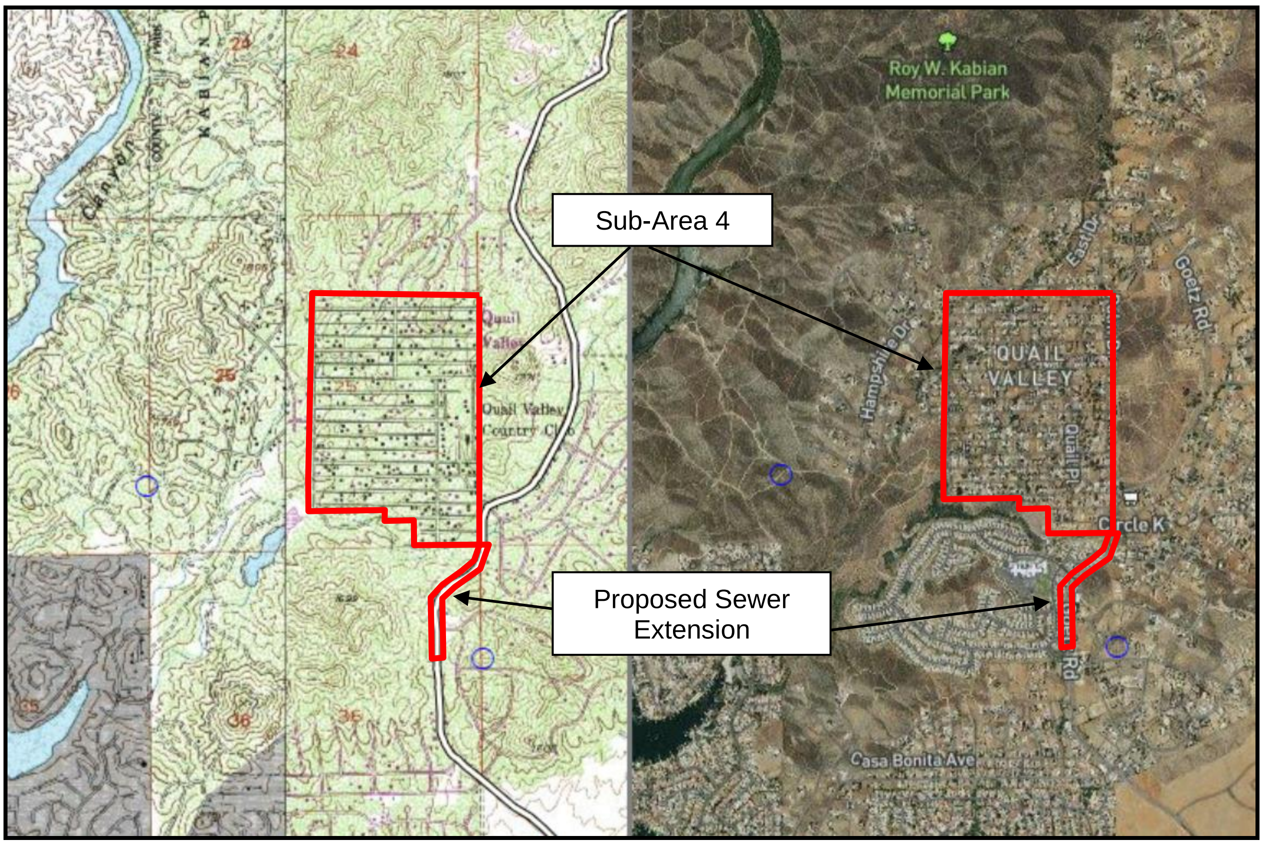
- Geotechnical laboratory testing as described.
- Data analysis and report preparation as described.

Evaluation of hazardous waste was not within the scope of services provided. The evaluation of seismic hazards was based on field mapping, literature review and subsurface exploration. Because the site is not located in a defined active fault zone, a detailed review in this regard was not conducted.

SITE AND PROJECT DESCRIPTION

The site is located in the easterly portion of Section 25, Township 5 South, Range 4 West, S.B.B.&M. The project is located within the City of Menifee, California. The location of Sub-Area 4 and proposed sewer extension along Goetz Road is shown on Figure 1 below.

<u>Figure 1</u>: USGS Topographic Map, Romoland & Elsinore 7.5' Quadrangles, and Aerial Photograph (2018)



Sub-Area 4 is the most densely populated sub-area within Quail Valley with approximately 1,200 lots that currently rely on individual septic systems for wastewater disposal. EMWD is considering alternatives for a new sewage system to service this area.

The EMWD Quail Valley Sub-Area 4 project includes the planned installation of 8-inch diameter PVC sewer pipeline within San Jacinto Road, Johnson Lane, Lucas Drive, Elsinore Lane, Clark Place, Lake Drive, Mt. Vernon Place, Goetz Drive, Kennedy Lane, Shreeder Place, La Bertha Lane, Cassandra Drive, Clara Place, Lodge Drive, Quail Place, Anita Drive, Williams Drive, Norma Drive, Cypress Place, Newport Drive, Sierra Drive, Goetz Drive, and Palm Drive. Construction will require the replacement of existing pavement and aggregate base in paved streets. We understand that the planned sewer invert depths along the interior Sub-Area 4 streets range from approximately 5.0 to 9.0 feet below existing grades.

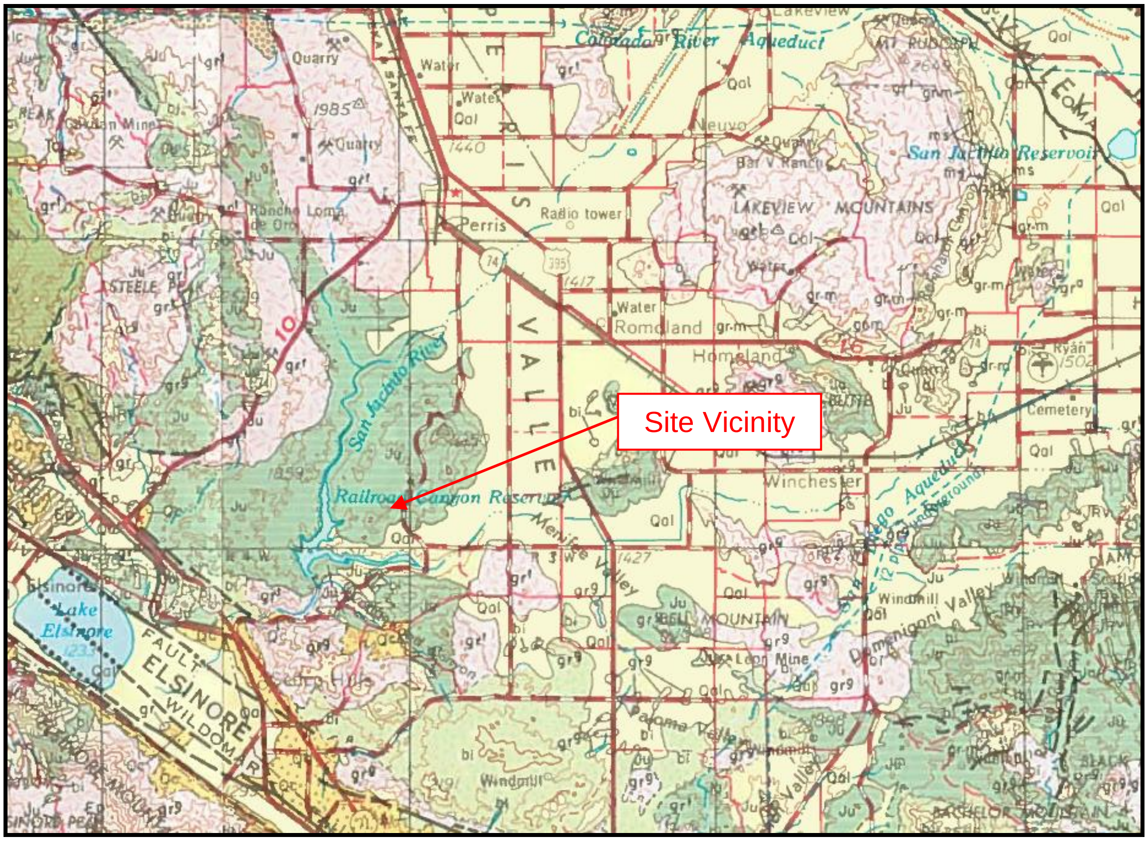
Quail Valley sewer system backbone improvements will include the construction of a new PVC sewer main in Goetz Road, from Vista Way to Rock Canyon Drive, with an invert depth of approximately 11 to 14 feet.

GEOLOGIC SETTING

Regional Geology: The subject site is situated within a natural geomorphic province in southwestern California known as the Peninsular Ranges, which is characterized by steep, elongated ranges and valleys that trend northwesterly. This geomorphic province encompasses an area that extends 125 miles, from the Transverse Ranges and the Los Angeles Basin, south to the Mexican border, and beyond another 795 miles to the tip of Baja California (Norris & Webb, 1990; Harden, 1998). This province is believed to have originated as a thick accumulation of predominantly marine sedimentary and volcanic rocks during the late Paleozoic and early Mesozoic. Following this accumulation, in mid-Cretaceous time, the province underwent a pronounced episode of mountain building. The accumulated rocks were then complexly metamorphosed and intruded by igneous rocks, known locally as the Southern California Batholith. A period of erosion followed the mountain building, and during the late Cretaceous and Cenozoic time, sedimentary and subordinate volcanic rocks were deposited upon the eroded surfaces of the batholithic and pre-batholithic rocks.

Figure 2 shows a portion of the CDMG Geologic Map of California, Santa Ana Sheet, (Scale 1:250,000), Southern California (Rogers, 1965) depicting the approximate location of the project site:

Figure 2: **CDMG Geologic Map of California, Santa Ana Sheet (Rogers, 1965)**

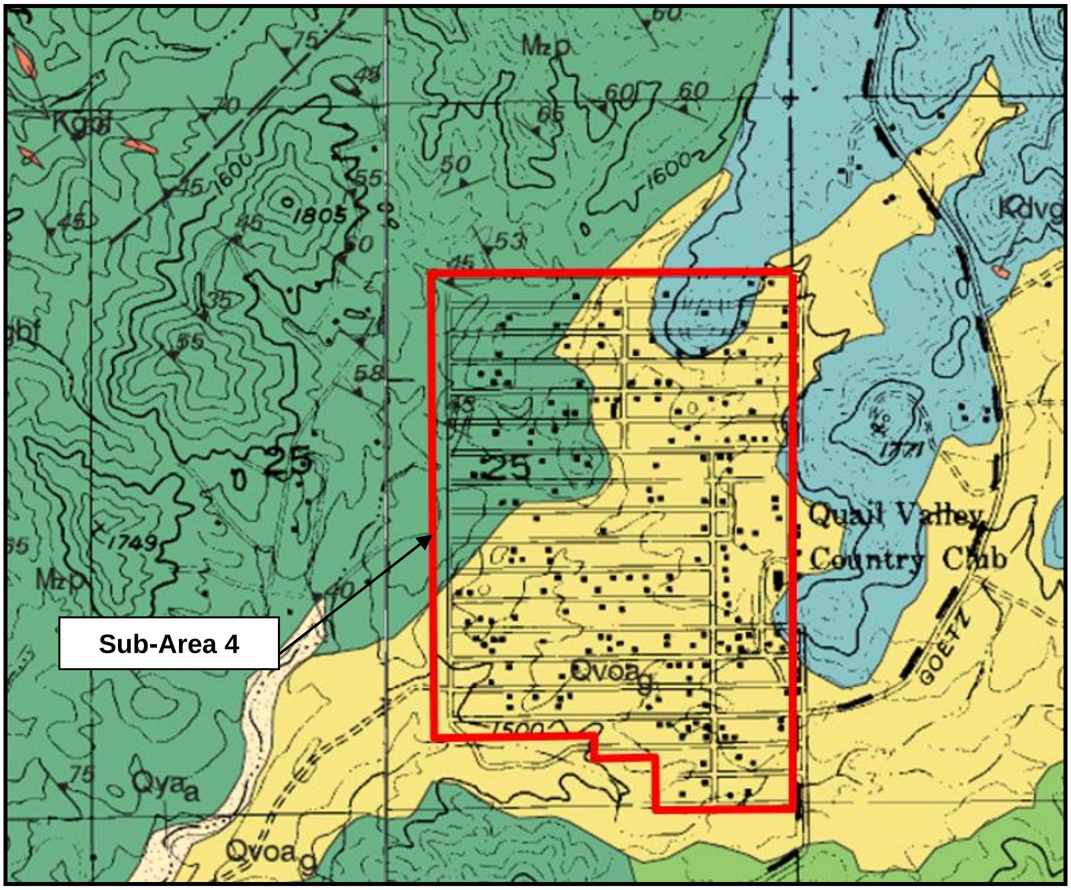


More specifically, the project area is situated within the Perris Block, an eroded mass of Cretaceous and older crystalline rock. Thin sedimentary and volcanic units mantle the bedrock in a few places with alluvial deposits filling in the lower valley areas. The Perris Block is a structurally stable, internally unfaulted mass of crustal rocks bounded on the west by the Elsinore-Chino fault zones, on the east by the San Jacinto fault zone, and on the north by the Cucamonga fault zone (Woodford, et al., 1971). On the south, the Perris Block is bounded by a series of sedimentary basins that lie between Temecula and Anza (Morton and Matti, 1989).

Local Geology: Locally, as mapped by Morton and Weber (2003), the northwesterly portion of the study area is underlain by fissile black phyllite, a metamorphic bedrock formation (map symbol Mzp). The far northeasterly and portions of the easterly fringe of the study area are underlain by mapped quartz-rich metasandstone (map symbol MzQ). The remaining portion of the study area is shown to be mantled by very old (middle to early Pleistocene-age) alluvial channel deposits (map symbol Qvoa) generally described as consisting of moderately- to well-indurated reddish-brown gravel, sand, silt and clay-bearing alluvium.

Figure 3 shows combined portions of the USGS Geologic Maps of the Romoland 7.5' Quadrangle (Morton, 2003) and Elsinore 7.5' Quadrangle (Morton and Weber, 2003) depicting the mapped geologic units in the project area.

Figure 3: USGS Geologic Maps of the Elsinore 7.5' and Romoland 7.5' Quadrangle



Mzp	**Phyllite (Mesozoic)**—Fissile black phyllite. Commonly with sheen produced by very fine-grained white mica on s-surface; locally contains small elongate prisms of fine-grained white mica, which maybe pseudomorphs after chiastolite
Mzq	**Quartz-rich rocks (Mesozoic)**—Quartzite and quartz-rich metasandstone
Qvoa	**Very old alluvial-channel deposits (middle to early Pleistocene)**—Fluvial sediments deposited on canyon floors. Consists of moderately to well-indurated, reddish-brown, mostly very dissected gravel, sand, silt, and clay-bearing alluvium. In places, includes thin, discontinuous alluvial deposits of Holocene age. Deposits in Quail Valley and Railroad Canyon area contain rounded cobbles
Qyv	**Young alluvial-channel deposits (Holocene and late Pleistocene)**—Fluvial deposits along canyon floors. Consists of unconsolidated sand, silt, and clay-bearing alluvium

Soil Survey Review: The USDA Soil Survey of Western Riverside Area, California and the NRCS Soilweb website were reviewed and reveal several agricultural soil types (series) within the project area. The predominant mapped soil series in the study area are:

- *Lodo Series* (LpE2, LpF2)
- *Arbuckle Series* (AkC)
- *Ysidora Series* (YsC2)

These are further described as Lodo rocky loam, 8-25 percent slopes (LpE2), Lodo rocky loam, 25-50 percent slopes (LpF2), Arbuckle loam (AkC), and Ysidora gravelly fine sandy loam (YsC2). The Lodo Series is the most predominant series mapped in the project area and consists of somewhat excessively drained upland soils on slopes that vary from 8 to 50 percent and is present over most of the study area. These soils developed on metamorphosed fine-grained sandstone.

The predominant soil series is the **Lodo rocky loam** (LpE2) with slopes of 8 to 25 percent. This sub-soil has a depth to bedrock that is less than 2 feet. Lessor areas of **Lodo rocky loam** (LpF2) with slopes of 25 to 50 percent are mapped on the northeast portion of the site and along the easterly fringe of the study area. This sub-soil presents an erosion hazard in that it has both steep slopes and a shallow depth to bedrock which is less than 2 feet.

A small area of Ysidora Series soils (YsC2) is mapped on the northeasterly portion of the project site. The far southeasterly most portion of the project area is underlain by Arbuckle loam (AkC).

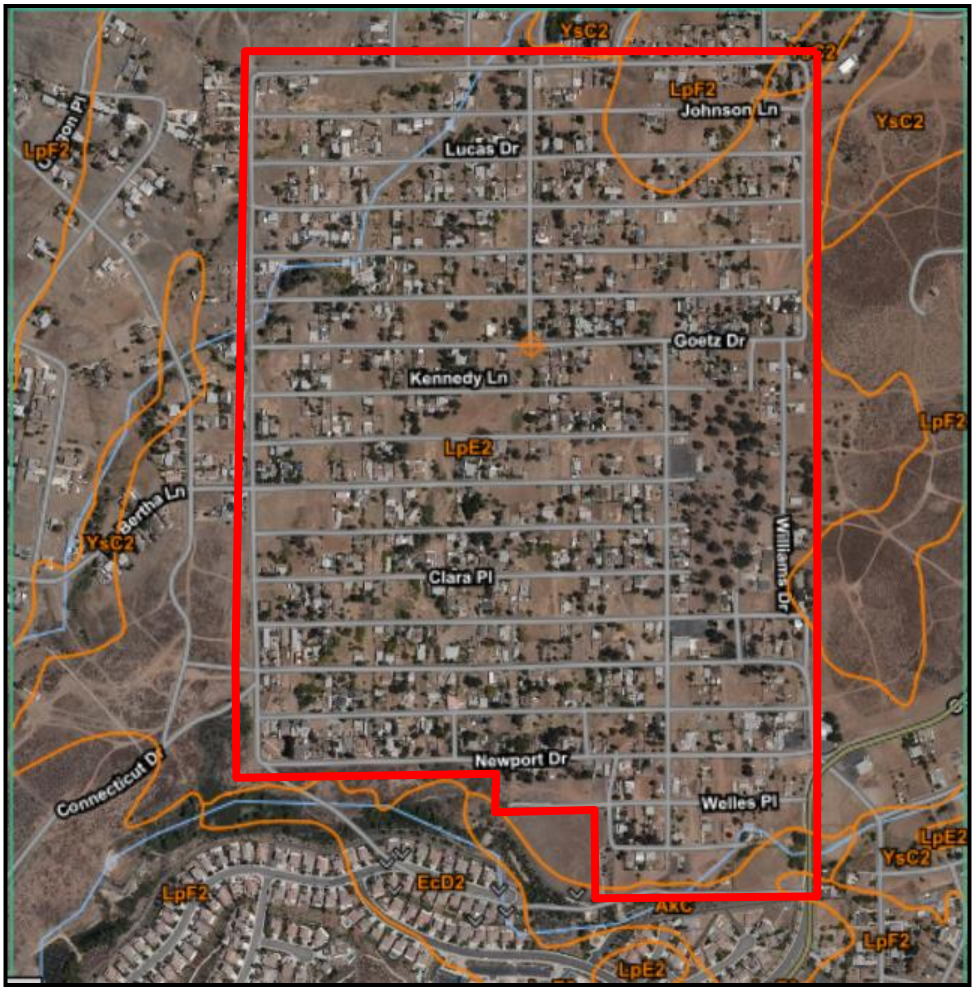
Table 1 below summarizes the generalized classification and properties of the mapped soil series within the project area.

Table 1: Soil Survey Classification and Properties

Mapped Soil Series	Unified Soil Classification	% Pass #200 (0.074 mm)	Erodibility (top 5 feet)	Shrink/Swell Potential
Lodo Series (LpE2, LpF2)	SM, GM	35-50	High	High
Arbuckle Series (AkC)	GM, SM	45-60	Slight to High	Moderate
Ysidora Series (YsC2)	ML, CL	50-65	Moderate	Moderate

Figure 4 is a portion of a NRCS soil survey map (NRCS, 2020) depicting the mapped agricultural soil types in the vicinity of the project.

Figure 4: **NRCS Soil Survey Map (NRCS, 2020)**



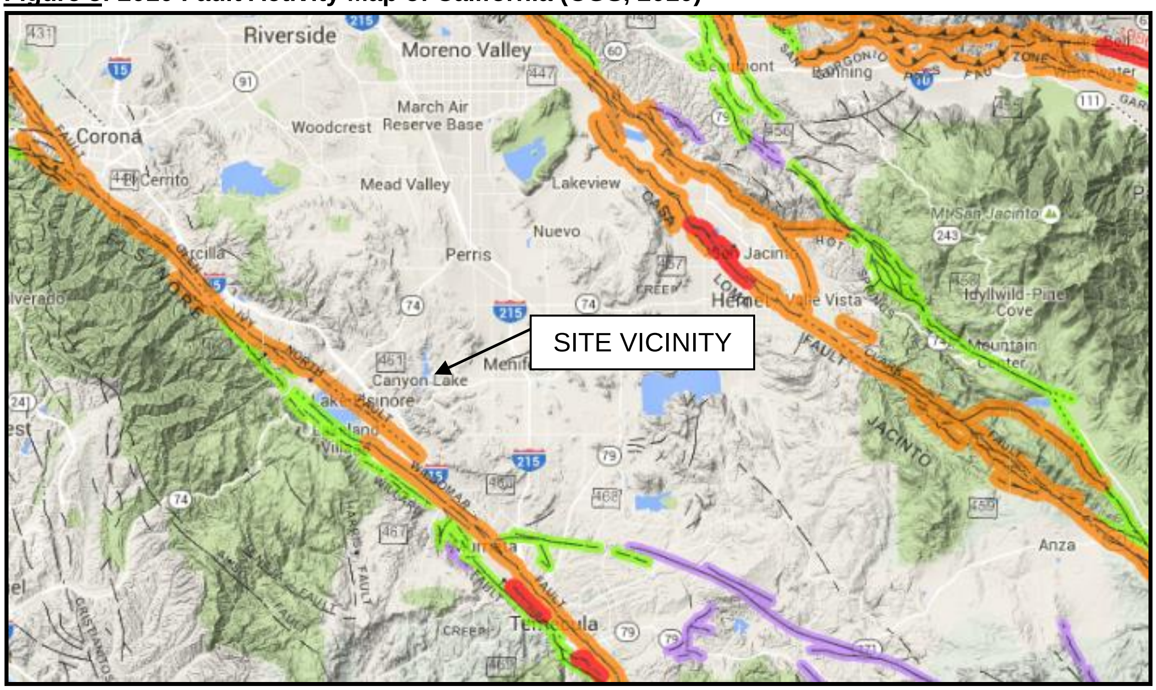
Faulting: There are at least 37 major late Quaternary active/potentially active faults that are within a 100-kilometer radius of the site (Blake, 2000). Of these, there are no faults known to traverse the site, based on published literature, nor any photogeologic or surficial geomorphic evidence suggestive of faulting on the site. In addition, the site is not located within a State of California Earthquake Fault Zone for fault rupture hazard (CGS, 2018) or within a mapped County of Riverside fault zone.

The nearest known active fault is the Glen Ivy North fault, which is a segment of the Elsinore Fault Zone System that extends from the Los Angeles Basin to the north into Mexico to the south. The Glen Ivy North fault, which is approximately 43 kilometers in length, is located approximately 8.5 kilometers to the southwest of the project site. This fault is right-lateral, strike-slip fault capable of producing an earthquake with an estimated maximum moment magnitude of M_W 6.8, and has an associated slip-rate of 5 mm/year. The Temecula segment of the Elsinore Fault Zone System, located approximately 10.4 kilometers to the southwest of the project site, is also a right-lateral, strike-slip fault capable of producing an earthquake with an estimated maximum moment magnitude of M_W 7.0, and has an associated slip-rate of 5 mm/yr. (U.S.G.S., 2008).

The Elsinore fault zone is a major dextral shear system, parallel to the southern San Andreas fault that accommodates about 5 mm/yr. of the Pacific-North American Plate boundary slip. The northern elements of the fault zone, the Chino and Whittier faults, bound the Puente Hills, an uplifted block of Tertiary sediments. The Glen Ivy section forms the northeast boundary of the Santa Ana Mountains, and, together with the Temecula section, forms the Elsinore trough (Treiman, 1998).

Other known regional active faults that could affect the site include the San Jacinto fault (San Jacinto, Anza, and San Bernardino segments), and the San Andreas fault. Figure 5 shows a portion of the 2010 Fault Activity Map of California (CGS, 2010) depicting the site location and mapped faults in the vicinity. This map indicates that no active faults are present on, or trend toward, the project area.

Figure 5: 2010 Fault Activity Map of California (CGS, 2010)



Fault along which historic (last 200 years) displacement has occurred

Holocene fault displacement (during past 11,700 years) without historic record.

Late Quaternary fault displacement (during past 700,000 years).

Pre-Quaternary fault (older that 1.6 million years) or fault without recognized Quaternary displacement.

According to the Fault Activity Map of California (CGS, 2010) and the USGS 2014 National Seismic Hazard Maps - Source Parameters (USGS, 2015), the major faults influencing the site, distances and maximum earthquake magnitudes are presented in Table 2.

<u>Table 2</u>: Fault Zone, Distances and Maximum Earthquake Magnitudes

Fault Zone	Approximate Distance (km)	Earthquake Magnitude (m_w)
Elsinore-Glen Ivy	8.5	6.8
Elsinore-Temecula	10.4	7.0
San Jacinto-San Jacinto Valley	13.9	7.2
San Jacinto-Anza	19.5	7.2

For seismic design purposes, based on published parameters for faults in California from the *Working Group on Earthquake Probabilities* (Field and others, 2014), we are considering that a cascading effect of rupture will occur along the entire length of the Elsinore Fault Zone (which includes several fault segments collectively). Based on the recently published rupture-model data (Petersen et al., 2008), the total rupture area of these combined faults is 3,842 square kilometers with an associated Maximum Moment Magnitude (M_W) of 7.78.

Our review indicates that no documented active faults traverse toward the subject site, based on published literature. No surficial indications or geomorphic features were observed within the aerial photographs or field reconnaissance that are suggestive of active faulting.

Seismic Parameters: The site coordinates (WGS 84) are 33.7057°N / -117.2454°W. The website application U.S. Design Maps (OSHPD, 2020) was used to evaluate the seismic parameters for this project. Based on subsurface conditions and penetration blow counts for on-site borings, the Site Class is D. Table 3 summarizes design criteria from the 2019 California Building Code (CBC), which is based on ASCE 7-16.

Table 3: 2019 CBC Seismic Design Parameters

Seismic Parameter	Value
S_s - MCE_R Ground Motion for 0.2-sec Period	1.48
S_1 - MCE_R Ground Motion for 1-sec Period	0.541
SD_S - Numeric Seismic Design Value at 0.2-sec period	0.987
SD_1 - Numeric Seismic Design Value at 1.0-sec period	null
PGA - MCE_g Peak Ground Acceleration	0.617
F_{PGA} - Site Amplification Factor at PGA	1.1
PGA_M - Site Modified Peak Ground Acceleration	0.679
SITE CLASS	D

A site-specific ground motion analysis may result in less conservative seismic design parameters than reported above.

Secondary Seismic Hazards: The primary geologic hazard affecting the project is that of ground shaking. Secondary permanent or transient seismic hazards generally associated with severe ground shaking during an earthquake include, but are not necessarily limited to; ground rupture, liquefaction, seiches or tsunamis, landsliding, rockfalls, and seismically-induced settlement. These are discussed below:

Ground Rupture: Ground rupture is generally considered most likely to occur along pre-existing faults. Since there are no faults that are known to traverse the site, the potential for ground rupture is considered to be low.

Liquefaction and Seismically-Induced Settlement: In general, liquefaction is a phenomenon that occurs where there is a loss of strength or stiffness in the soils that can result in the settlement of buildings, ground failures, or other hazards. The main factors contributing to this phenomenon are: 1) cohesionless, granular soils having relatively low density (usually of Holocene age); 2) shallow ground water (generally less than 50 feet); and 3) moderate to high seismic ground shaking.

The project alignment is not located within a state or county-designated liquefaction hazard zone. In addition, the alignment is generally underlain by medium dense older alluvial soils and relatively shallow bedrock. As such, the potential for liquefaction and seismically induced settlement is negligible.

Seiches/Tsunamis: A seiche is a standing wave in an enclosed or partially enclosed body of water. In order for a seiche to form, the body of water needs to be at least partially bounded, allowing the formation of the standing wave.

Tsunamis are very large ocean waves that are caused by an underwater earthquake or volcanic eruption, often causing extreme destruction when they strike land.

There are no bodies of water on or adjacent to the project area. Based on the distance to large, open bodies of water and the elevation of the site with respect to sea level, it is our opinion that the potential for seiches/tsunamis does not present a hazard to this project.

<u>Landsliding</u>: Due to the relatively low-lying relief of the site and adjacent areas, the potential for landsliding due to seismic shaking is considered very low.

<u>Rockfalls</u>: Since no large rock outcrops are present at or adjacent to the site, the possibility of rockfalls during seismic shaking is nil.

<u>Erosion</u>: No indication of wind or water surface erosion was observed on the site or adjacent properties at the time of our study. It is our opinion that the hazard of erosion at this site should be considered low.

Other Geologic Hazards: There are other geologic hazards not necessarily associated with seismic activity that occur statewide. These hazards include; natural hazardous materials (methane gas, hydrogen-sulfide gas, tar seeps); Radon-222 Gas; regional subsidence, and naturally occurring asbestos. Of these hazards, there are none that appear to impact the site.

SUBSURFACE CONDITIONS

The field and laboratory exploration and testing indicate that the Sub-Area 4 project area is underlain by variable subsurface conditions. As encountered in our exploratory borings B-01 through B-06, the portion of Sub-Area 4 south of Norma Drive is underlain by deeper alluvial sediments generally consisting of sandy clay (CL), clayey sand (SC), gravel (GW, GW-GC, GW-GM), silty sand (SM), and gravelly sand (GW-GM). Bedrock consisting of metasedimentary sandstone and phyllite was encountered within borings B-01, B-02, and B-06 at approximate depths of 19.0, 20.5, and 15.0 feet, respectively.

Shallower bedrock conditions were generally encountered within our exploratory borings B-07 through B-22, located generally north of Norma Drive. Within these borings, the encountered depth to metasedimentary bedrock and phyllite bedrock ranged from approximately 0.5 to 9.5 feet bgs. These materials are typically fine- to medium-grained, gray-brown, and highly to moderately weathered. When broken down into soil-size particles, these materials are typically classified as silty sand (SM), clayey sand (SC) and gravel (GW). Above the bedrock at these locations, the surficial deposits generally consist of medium dense silty sand (SM), silty clayey sands (SC-SM), and clayey sand (SC).

The underlying metasedimentary sandstone and phyllite bedrock is generally dense to very dense. Logs of materials encountered during drilling were made on the site and are presented in Appendix A.

Within the limits of the Sub-Area 4 study area, sand equivalent values ranged from 9 to 31. Sand equivalent values of representative samples obtained from the borings are summarized in Appendix B.

A supplemental corrosion evaluation report for this project has been prepared by HDR Engineering, Inc. and is appended.

Groundwater: Groundwater was encountered within five of the exploratory borings. Approximate groundwater depths, locations, and the dates encountered are shown in Table 4.

Table 4: Approximate Locations, Dates Drilled, and Depths to Groundwater Encountered

Boring No.	Date Boring Drilled	Depth to Encountered Groundwater (ft.)
B-02	7/27/20	12.0
B-04	7/27/20	15.0
B-05	7/27/20	19.0
B-07	7/27/20	19.0
B-22	7/30/20	9.8

Groundwater records compiled by Watermaster Support Services (Fall 2019) indicate shallow groundwater levels in the vicinity of the project site. State Well No. 05S/03W-31R001S, located about one mile east of the site, was monitored on March 4, 2004. At that time, the depth to groundwater was 14.6 feet beneath the existing ground surface. No additional monitoring records for this well since 2004 are available.

Groundwater data obtained from the California State Water Resources Control Board *Geotracker* website (2020) was reviewed for a Circle K Store, located at 28968 Goetz Road. This property is located just beyond the southeasterly portion of the study area. On January 23, 2003, groundwater was measured at this site at depths ranging from approximately 13.7 to 16.9 feet below the existing ground surface.

Seasonal variation in groundwater depths is expected. Depending on seasonal precipitation and the potential rise in groundwater levels regionally, groundwater may be encountered during construction excavation, where it may cause instability within the alluvial soils exposed in the excavation sidewalls. Groundwater may also be encountered during excavation within the upper portions of the bedrock. Groundwater conditions observed during drilling may not accurately reflect conditions during or following periods of precipitation, or conditions that will be encountered during construction excavation.

Rippability: Drill rig auger refusal in dense bedrock conditions was encountered above the planned boring depths within several borings. The locations and depths where auger refusal was encountered are shown in Table 5.

Table 5: Depth to Auger Refusal Encountered

Boring No.	Depth to Auger Refusal (ft.)
B-09	13
B-12	18
B-15	3.5
B-18	6
B-21	15
B-22	13
B-24	22

A seismic refraction survey was performed by Terra Geosciences to evaluate the subsurface excavation and rippability characteristics at four locations within the project area. The approximate locations of the seismic refraction lines are shown on the attached site plan (Figure No. A-27). Table 6 below summarizes the results of the seismic refraction lines with respect to the "weighted average" seismic velocities for each layer.

Table 6: Seismic Refraction Summary

	V1 layer		V2 layer		V3 layer	
Seismic Line	Velocity (fps)	Depth to Bottom (ft)	Velocity (fps)	Depth to Bottom (ft)	Velocity (fps)	Depth to Bottom (ft)
S-1	1,325	1 – 4	4,112	19 +	----	----
S-2	1,989	1 – 7	3,855	7 – 12	6,557	24 +
S-3	1,949	1 – 3	4,425	19 +	----	----
S-4	1,482	1 – 3	2,979	25 – 40	6,650	25 +

Following is a generalized discussion of the velocity layers described in the seismic refraction report. The Terra Geosciences report is appended and should be reviewed for further understanding of the methodology and limitations of this study.

Velocity Layer V1: The uppermost V1 layer yielded a seismic velocity range of 1,325 to 1,989 fps and is likely composed of localized artificial fill, topsoil, colluvium, and/or highly weathered metasedimentary bedrock. Shallow residual soils are also present within this layer. The relatively low velocity ranges encountered within this layer indicate that no excavating difficulties should be expected.

Velocity Layer V2: This layer yielded seismic velocities of 2,979 to 4,425 fps, which is believed to be moderately weathered metasedimentary bedrock materials. These rocks may be generally homogenous with a relatively wide spaced joint/fracture system and/or may include relatively fresher boulders within a completely decomposed bedrock matrix. With the assumed use of large excavator-type equipment, these materials should excavate with minor to significant difficulty, depending on hardness. Additionally, deep trenching typically results in a loss of mechanical and weight advantage for excavators, resulting in the need for some breaking and/or light blasting to obtain desired grade. The possibility of encountering isolated floaters (i.e. boulders, corestones, lithologic variations, etc.) could also produce somewhat difficult conditions locally and may require blasting and/or breaking.

Velocity Layer V3: This layer indicates the presence of slightly to moderately weathered metasedimentary bedrock, with a seismic velocity range of 6,557 to 6,650 fps. Based on the Terra Geosciences report, these higher velocities signify the decreasing effect of weathering as a function of depth and could indicate a moderately weather bedrock matrix that has a wide-spaced fracture system, or possibly the presence of abundant widely scattered buried fresh large crystalline boulders in a relatively less-weathered matrix. Difficult excavation within this deeper velocity layer should be anticipated if encountered during trenching. Continuous blasting/breaking will likely be necessary within this velocity layer to achieve desired invert grades.

There are no currently published rippability performance charts available that compare the performance of conventional trenching equipment with seismic velocity. Rippability comparison charts published by Caterpillar (2000 and 2018) are for conventional bulldozer equipment and cannot be directly correlated. However, our experience is that trenching operations (using large excavators) within bedrock materials having seismic velocities higher than 4,000 - to 4,500± fps typically encounter very difficult to non-productive conditions.

CONCLUSIONS AND RECOMMENDATIONS

On the basis of our field and laboratory exploration and testing, construction of the proposed Quail Valley Sub-Area 4 sewer project is feasible from a geotechnical engineering standpoint. The primary geotechnical issues that will require mitigation are near surface bedrock and groundwater.

All work should be performed in accordance with EMWD requirements. The following sections present recommendations and conclusions for project design and construction.

1. **Excavation and Shoring:** Soil within the Quail Valley Sub-Area 4 project area generally consists of shallow alluvial and residual soil underlain by moderately weathered metasedimentary bedrock. Based on the Terra Geosciences seismic refraction report, increasing hardness with depth and lateral variations due to varying lithologic bedding layers should be anticipated. At the locations of seismic lines S-1 and S-3, generally located near the east boundary of Sub-Area 4, the seismic refraction data indicates that difficult excavation could be encountered at depths within five (5) feet of the ground surface. At the location of seismic line S-2, located near the west Sub-Area 4 boundary, moderately difficult excavation should be expected to a depth of seven (7) to 10 feet. Blasting will likely be required below 10 feet. At the location of seismic line S-4, located along the proposed sewer main extension in Goetz Road, moderately difficult excavation should be expected. Blasting at this location is not anticipated Excavation characteristics and the need for blasting will vary significantly. The contractor should make his own evaluation regarding excavation difficulty and the need for blasting.

   All trenches and other excavations should be configured and shored in accordance with Cal/OSHA requirements. Preliminarily, the soil within Sub-Area 4 and along the Goetz Road sewer main extension is classified as Type C, according to Cal/OSHA criteria. The contractor should have a "competent person" on-site for the purpose of assuring safety within and about all construction excavations. For Type C soil, unshored excavations should have a maximum slope of 1.5:1 (H:V) and should not exceed twenty feet in height.

   The soil will be subject to caving when exposed in unshored excavations. If a trench shield is used, diligent monitoring will be necessary to ensure that all caved and loose soil is removed or compacted. The potential for caving associated with existing backfill of other utilities should also be considered during excavation and construction for the sewer.

Shoring, shields, or other protective systems should be used in accordance with all specifications, recommendations, and limitations provided by the manufacturer. Braced shoring should be designed using an at-rest earth pressure of 65 pounds per cubic foot. Cantilever shoring should be designed using an active earth pressure of 43 pounds per cubic foot. A registered professional engineer should design shoring or benching for excavations deeper than twenty feet.

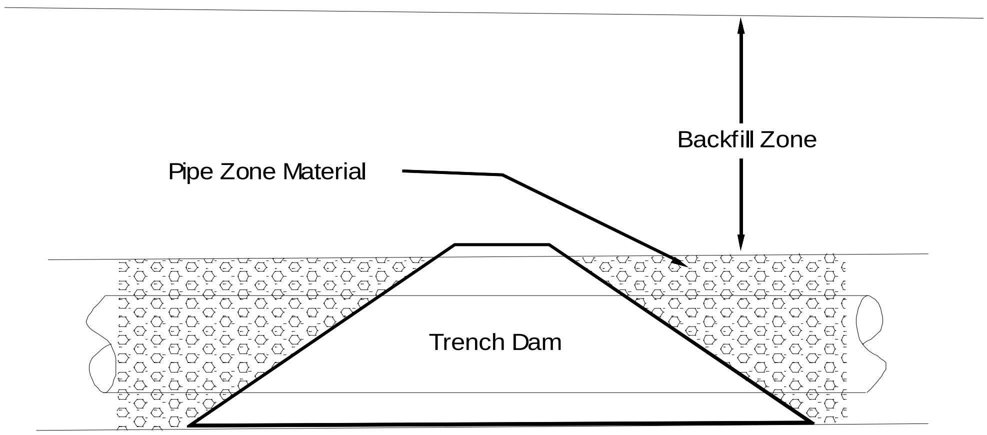
The pipe trench should be excavated to the line and grade shown on the drawings. The pipe trench should provide at least 12 inches of clearance between the edge of the pipe and the wall of the trench. The sides of the trench should be parallel to the pipe and maintained a uniform distance from the pipe.
If excavation for the pipe extends below the design invert grade, the bottom of the excavation should be refilled with approved material. Where soft or otherwise unstable materials are encountered, the excavation should be deepened and stabilized with gravel or other approved bedding material. All excavations should be free of trash, debris, or other unsuitable material prior to the placement of backfill.

2. **Groundwater:** Groundwater was encountered within five of the exploratory borings. Groundwater was encountered at depths ranging from 12 to 19 feet in borings B-02, B-04, B-05 and B-07 in the southwest portion of Sub-Area 4. Groundwater was encountered at a depth of about 10 feet in boring B-22 near the north boundary of Sub-Area 4.

   Where groundwater is encountered during excavation above the pipe invert grade, it will destabilize excavation sidewalls and should be removed from outside the trench. If groundwater enters the excavations from the bottom, the excavation process should be discontinued to reduce the potential for base heave. Groundwater level should be kept at least five feet below the base of excavations within alluvial soil before proceeding.

   Groundwater conditions should be expected to fluctuate seasonally and from year-to-year, depending upon the weather and rainfall. The groundwater data in this report is representative of the conditions at the time of our exploration and may not reflect the conditions during construction. Therefore, the local groundwater conditions should be assessed by the contractor prior to the commencement of trenching to determine if groundwater will adversely affect the construction process. The contractor should be solely responsible for dewatering system design and operation.

   In the constructed condition, groundwater may cause future difficulties if imported granular material placed in the pipe zone acts as a conduit or drain. This may be mitigated by the placement of clay trench dams. Trench dams are recommended at maximum 500-foot intervals where groundwater may encroach within the pipe zone. Elsewhere, dams should be placed as directed in the field by the engineer. Dams should be constructed using material having a coefficient of permeability of less than 10^{-6} cm/sec and should be placed within and extending at least six inches outside of the pipe zone for a distance of at least 2 feet at the top and five feet at the base as indicated in the following diagram:



The contractor should submit plans for any alternative trench dams for review and approval.

3. **Pipe Bedding:** The native soil within the project area is generally <u>not</u> suitable for use as pipe bedding. Pipe bedding material should comply with the pipe manufacturer's recommendations or EMWD Std. Dwg. SB-157, Pipe Zone Bedding for Sewer Pipe. A minimum bedding thickness of 6 inches should be placed to provide uniform and adequate longitudinal support under the pipe. The bedding material should not be compacted within 6 inches of the bottom of the pipe. Blocking should not be used to bring the pipe to grade. Bell holes at each joint should be provided to permit the joint to be assembled properly while maintaining uniform pipe support.

4. **Excavation Backfill and Compaction**: All excavation backfill and compaction should be in accordance with EMWD Std. Dwg. SB-158, Trench Backfill for Sewer Pipe, and the following recommendations.

   <u>Pipe Zone Backfill:</u> Pipe zone backfill, extending from the top of pipe bedding to at least 12 inches over the top of pipe, should be free of organic matter and deleterious substances, contain no rocks larger than three (3) inches and no more than 15 percent rocks larger than two (2) inches. In general, the native soil within the project area is <u>not</u> suitable for use as pipe zone backfill.

Imported pipe zone backfill should consist of clean, cohesionless soil having a sand equivalent greater than 30 and fewer than 10% particles finer than the No. 200 Sieve. To provide protection from particle migration, imported pipe zone material should also meet the following criteria:

$$D_{15} > 0.15 \text{ and } D_{50} < 5 \text{ mm},$$

where D_{15} and D_{50} represent bedding material particle sizes corresponding to 15 and 50 percent passing by weight, respectively. Concrete sand conforming to the requirements of ASTM C 33 will meet the piping criteria for this project. If this criteria cannot be met, a filter fabric should be used.

Pipe zone material should be placed and compacted in a manner that will assure firm continuous encasement for the pipe. The minimum relative compaction within the pipe zone should be 90 percent unless otherwise specified. Flooding or jetting and vibratory compaction may be carefully used with imported pipe zone material meeting the above requirements.

Trench Backfill: Trench backfill material over the pipe zone should be native or approved granular soil free of organic and deleterious materials, rocks or lumps greater than 3 inches in greatest dimension and other unsuitable material. In general, the native soil is suitable for use as trench backfill. Trench backfill may be compacted at near optimum moisture content by mechanical means as necessary for the achievement of satisfactory compaction. Flooding or jetting is not recommended. Unless otherwise specified by the drawings, specifications or encroachment permits, the minimum acceptable degree of compaction should be 90 percent of the maximum dry density. The upper 12 inches of trench backfill in pavement areas which should be compacted to a minimum of 95 percent relative compaction.

5. **Lateral Earth Pressure / Friction Coefficient:** Cantilever walls supporting native or compacted on-site fill soils should be designed using an equivalent active earth pressure of 43 pounds per cubic foot (pcf) for level backfill. Braced walls should be designed for at-rest earth pressure of 65 pcf, with the resultant applied at mid-height.

   A passive equivalent fluid pressure of 260 pcf can be used for resistance to lateral loads against compacted fill or dense native soil. A coefficient of friction of 0.40 between soil and concrete is suitable for use with dead load forces only.

6. **Pavement:** The following Table 7 summarizes the asphalt pavement sections encountered in the borings.

Table 7: **Existing Pavement Sections**

Boring	Asphalt Concrete Thickness (in.)	Aggregate Base Thickness (in.)
B-01	4.5	N/A
B-02	7.5	N/A
B-03	4.0	N/A
B-04	5.0	N/A
B-05	4.0	N/A
B-06	7.0	N/A
B-07	7.0	N/A
B-08	4.0	N/A
B-09	7.0	N/A
B-10	6.0	N/A
B-11	7.0	N/A
B-12	9.0	N/A
B-13	5.0	N/A
B-14	5.5	N/A
B-15	7.5	N/A
B-16	6.5	N/A
B-17	6.0	N/A
B-18	6.0	N/A
B-19	4.5	N/A
B-20	5.0	N/A
B-21	3.0	N/A
B-22	8.0	N/A
B-23	6.5	13.0
B-24	5.5	12.0

Where existing pavement is not replaced in kind, new pavement should be constructed in accordance with the recommendations in Table 8 below.

Table 8: Tentative Structural Pavement Design Recommendations

Service	Estimated Traffic Index (T.I.)	Asphalt Concrete Thickness (ft.)	Base Course Thickness (ft.)
Existing Residential Streets	5.5	0.25	0.75
Goetz Road	7.0	0.30	1.00

The structural sections recommended above were calculated using an assumed soil R-value of 20, based on the soil types and conditions encountered in the borings. At the completion of backfilling, when the actual pavement subgrade soils are known, the pavement subgrade should be evaluated to confirm the above recommended pavement sections are appropriate. All work within the roadway areas should be done in accordance with City of Menifee requirements.

All surfaces to receive asphalt concrete paving should be underlain by a minimum compacted fill thickness of 12 inches (excluding aggregate base), compacted to a minimum relative compaction of 95 percent.

7. **Corrosion:** A corrosion evaluation report for this project has been prepared by HDR Engineering, Inc. and is appended.

8. **Protection of Existing Utilities and Storm Drains:** Where the pipeline is constructed below existing utility crossings and storm drains, care should be taken to assure adequate compaction of the backfill beneath the existing utilities. If the existing utilities are rigid or encased in concrete, we recommend that the backfill consist of compacted soil to a depth of not less than one foot beneath the existing utility invert. The remaining backfill should consist of sand-cement slurry poured around the existing utility line to assure adequate contact at the base. Protection of flexible pipes may also require the placement of sand-cement slurry.

9. **Observation and Compaction Testing**: During backfilling, continuous observation and compaction testing should be conducted to verify satisfactory compaction. The maximum dry density-optimum moisture content relationship should be determined in accordance with ASTM D1557. Field density testing should be performed in accordance with ASTM D1556 or ASTM D6938. Compaction should be verified at maximum intervals of 250 feet for each 2-foot vertical lift or as otherwise deemed necessary by the inspector in the field during backfilling. Some backfill and compaction methodologies will dictate shorter test intervals.

LIMITATIONS

The preliminary findings and recommendations presented in this report are based upon an interpolation of the soil conditions between boring and seismic refraction survey locations. Should conditions be encountered during construction that appear to be different than those indicated by this report, this office should be notified.

This report was prepared for Engineering Resources of Southern California, Inc. for their use in the design of the EMWD Quail Valley Sewer Improvements, Sub-Area 4 project. This report may only be used by Engineering Resources of Southern California, Inc. for this purpose. The use of this report by parties or for other purposes is not authorized without written permission by Inland Foundation Engineering, Inc. Inland Foundation Engineering, Inc. will not be liable for any projects connected with the unauthorized use of this report.

The information in this report represents professional opinions that have been developed using that degree of care and skill ordinarily exercised, under similar circumstances, by reputable geotechnical consultants practicing in this or similar localities. No warranty, express or implied, is made.

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APPENDIX A – Field Exploration

APPENDIX A

FIELD EXPLORATION

Twenty-four (24) exploratory borings were drilled with a truck mounted hollow-stem auger drill rig at the approximate locations shown on Figure A-27. Logs of the materials encountered were made on the site by a staff geologist and included as Figures A-3 through A-26.

Representative soil samples were obtained within the borings by driving a thin-walled steel penetration sampler with successive 30-inch drops of a 140-pound hammer. The numbers of blows required to achieve each six inches of penetration were recorded on the boring logs. For this project, a modified California sampler with brass sample rings was used. Representative bulk soil samples were also obtained from the auger cuttings. Samples were placed in moisture sealed containers and transported to our laboratory for further testing and evaluation. Laboratory tests results are discussed and included in Appendix B.

UNIFIED SOIL CLASSIFICATION SYSTEM (ASTM D2487)

PRIMARY DIVISIONS			GROUP SYMBOLS	SECONDARY DIVISIONS
COARSE GRAINED SOILS MORE THAN HALF OF MATERIALS IS LARGER THAN #200 SIEVE SIZE	GRAVELS MORE THAN HALF OF COARSE FRACTION IS LARGER THAN #4 SIEVE	CLEAN GRAVELS (LESS THAN) 5% FINES	GW	WELL GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
			GP	POORLY GRADED GRAVELS OR GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
		GRAVEL WITH FINES	GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES
			GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES
	SANDS MORE THAN HALF OF COARSE FRACTION IS SMALLER THAN #4 SIEVE	CLEAN SANDS (LESS THAN) 5% FINES	SW	WELL GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
			SP	POORLY GRADED SANDS OR GRAVELLY SANDS, LITTLE OR NO FINES
		SANDS WITH FINES	SM	SILTY SANDS, SAND-SILT MIXTURES
			SC	CLAYEY SANDS, SAND-CLAY MIXTURES
FINE GRAINED SOILS MORE THAN HALF OF MATERIALS IS SMALLER THAN #200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMIT IS LESS THAN 50	ML	INORGANIC SILTS, VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS
			CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
			OL	ORGANIC SILTS AND ORGANIC SILT-CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS	LIQUID LIMIT IS GREATER THAN 50	MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SANDS OR SILTS, ELASTIC SILTS
			CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
			OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
	HIGHLY ORGANIC SOILS		PT	PEAT, MUCK AND OTHER HIGHLY ORGANIC SOILS
TYPICAL FORMATIONAL MATERIALS	SANDSTONES		SS	
	SILTSTONES		SH	
	CLAYSTONES		CS	
	LIMESTONES		LS	
	SHALE		SL	

CONSISTENCY CRITERIA BASES ON FIELD TESTS

RELATIVE DENSITY – COARSE – GRAIN SOIL

RELATIVE DENSITY	SPT * (# BLOWS/FT)	RELATIVE DENSITY (%)
VERY LOOSE	<4	0-15
LOOSE	4-10	15-35
MEDIUM DENSE	10-30	35-65
DENSE	30-50	65-85
VERY DENSE	>50	85-100

CONSISTENCY – FINE-GRAIN SOIL

CONSISTENCY	SPT* (# BLOWS/FT)	TORVANE UNDRAINED SHEAR STRENGTH (tsf)	POCKET ** PENETROMETER UNCONFINED COMPRESSIVE STRENGTH (tsf)
Very Soft	<2	<0.13	<0.25
Soft	2-4	0.13-0.25	0.25-0.5
Medium Stiff	4-8	0.25-0.5	0.5-1.0
Stiff	8-15	0.5-1.0	1.0-2.0
Very Stiff	15-30	1.0-2.0	2.0-4.0
Hard	>30	>2.0	>4.0

* NUMBER OF BLOWS OF 140 POUND HAMMER FALLING 30 INCHES TO DRIVE A 2 INCH O.D. (1 3/8 INCH I.D.) SPLIT BARREL SAMPLER (ASTM -1586 STANDARD PENETRATION TEST)

** UNCONFINED COMPRESSIVE STRENGTH IN TONS/SQ.FT. READ FROM POCKET PENETROMETER

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

CEMENTATION

DESCRIPTION	FIELD TEST
Weakly	Crumbled 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

EXPLANATION OF LOGS

LOG OF BORING B-01

DRILLING RIG	CME-75	DATE DRILLED	7/27/20	HAMMER TYPE	Auto-Trip
DRILLING METHOD	Rotary Auger			HAMMER WEIGHT	140-lb.
LOGGED BY	KC			HAMMER DROP	30-inches
GROUND ELEVATION	+/-			BORING DIAMETER	8-inches

SUMMARY OF SUBSURFACE CONDITIONS

This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered and is representative of interpretations made during drilling. Contrasting data derived from laboratory analysis may not be reflected in these representations.

DEPTH (ft)	U.S.C.S.	GRAPHIC LOG	SUMMARY OF SUBSURFACE CONDITIONS	BULK SAMPLE	DRIVE SAMPLE	SAMPLE TYPE	BLOW COUNTS /6"	MOISTURE (%)	DRY UNIT WT. (pcf)
0			**ASPHALT CONCRETE,** (4-1/2 inches)			AU			
1	CL		**SANDY CLAY,** dark red-brown, moist, stiff.						
2	CL		**SANDY CLAY,** yellowish-brown (11YR 5/6), moist, very hard, moderately cemented.			AU			
5						SS	30 50	12	123
6	SC		**CLAYEY SAND,** with trace gravel, very fine- to fine, brown (7.5YR 4/2), moist, dense.			AU			
10	SC		**CLAYEY SAND with GRAVEL,** very fine- to medium, dark yellowish-brown (10YR 4/4), slightly moist, very dense.			SPT AU	42 50	13	118
14	CL		**SANDY CLAY,** dark yellowish-brown (10YR 4/4), moist, very dense.						
15						SS	36 50	16	115
19.5			**PHYLLITE,** moderately weathered, dark yellowish-brown (10YR 4/4), slightly moist, moderately fractured, very dense.			SS	50/5"	16	115
20			End of boring at 20 feet. No groundwater encountered. Backfilled with native soils.						

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CLIENT	ERSC	FIGURE NO.
PROJECT NAME	EMWD Sub Area 4	
PROJECT LOCATION	Quail Valley Area Menifee, CA	
PROJECT NUMBER	E080-058	A-3

LOG OF BORING B-02

DRILLING RIG	CME-75	DATE DRILLED	7/27/20	HAMMER TYPE	Auto-Trip
DRILLING METHOD	Rotary Auger			HAMMER WEIGHT	140-lb.
LOGGED BY	FWC			HAMMER DROP	30-inches
GROUND ELEVATION	+/-			BORING DIAMETER	8-inches

SUMMARY OF SUBSURFACE CONDITIONS

This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered and is representative of interpretations made during drilling. Contrasting data derived from laboratory analysis may not be reflected in these representations.

DEPTH (ft)	U.S.C.S.	DESCRIPTION	SAMPLE TYPE	BLOW COUNTS /6"	MOISTURE (%)	DRY UNIT WT. (pcf)
0–0.6		**ASPHALT CONCRETE,** (7-1/2 inches)				
0.6–2	SC	**CLAYEY SAND,** very fine- to fine, black, moist, medium dense, organics.	AU (1)			
2–5	CL	**SANDY CLAY,** fine- to medium, light olive-brown, very moist, loose to medium dense.	AU (2.3)			
5–9	CL	**SANDY CLAY,** yellowish-brown (10 YR 5/6), moist, stiff.	AU (5); SS (6)	7 10	17	112
9–13	GW-GC	**SANDY GRAVEL with CLAY,** fine- to coarse-grained, brown (7.5YR 4/2), moist to wet, very dense. ▽ (12)	AU (9); SS (11)	37 50/3"	13	123
13–18	SC	**CLAYEY SAND,** fine- to medium, dark yellowish-brown (10YR 4/6), wet, very dense.	SS (15.5)	50/5"		
18–20.5	SM	**SILTY SAND with GRAVEL,** fine- to medium, strong brown (7.5YR 4/6), wet, very dense.				
20.5–21		**METASEDIMENTARY SANDSTONE,** moderately weathered, strong brown (7.5YR 4/6), wet, slightly fractured, very dense.	SS (21)	38 50	12	130

End of boring at 21 feet. Groundwater encountered at 12 feet. Backfilled with bentonite and native soils.

Inland Foundation Engineering, Inc.

CLIENT	ERSC
PROJECT NAME	EMWD Sub Area 4
PROJECT LOCATION	Quail Valley Area Menifee, CA
PROJECT NUMBER	E080-058

FIGURE NO. A-4

IFE BORING - GINT STD US LAB.GDT - 11/23/20 10:22 - P:\E080\E080-058 QUAIL VALLEY SEWER\GINT.GPJ

LOG OF BORING B-03

DRILLING RIG	CME-75	DATE DRILLED	7/27/20	HAMMER TYPE	Auto-Trip
DRILLING METHOD	Rotary Auger			HAMMER WEIGHT	140-lb.
LOGGED BY	FWC			HAMMER DROP	30-inches
GROUND ELEVATION	+/-			BORING DIAMETER	8-inches

SUMMARY OF SUBSURFACE CONDITIONS

This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered and is representative of interpretations made during drilling. Contrasting data derived from laboratory analysis may not be reflected in these representations.

DEPTH (ft)	U.S.C.S.	DESCRIPTION	SAMPLE TYPE	BLOW COUNTS /6"	MOISTURE (%)	DRY UNIT WT. (pcf)
0		**ASPHALT CONCRETE,** (4 inches)	AU			
1–2	SC-SM	**SILTY, CLAYEY SAND,** very fine- to fine-grained, strong brown, slightly moist, medium dense.				
2–4	SC	**CLAYEY SAND,** with trace gravel, fine- to medium, gray-brown, slightly moist, medium dense.	AU			
4–7	GW	**GRAVEL with SAND,** with trace clay, strong brown (7.5YR 4/6), moist, dense.	AU SS	38 50/2"	5	136
7–20	GW-GM	**SANDY GRAVEL with SILT,** fine- to coarse-grained, grayish-brown (10YR 5/2), moist, very dense.	AU			
			SS	50/2"		
			SS	50/3"	6	117
			SS	26 50/3"	4	122

End of boring at 20 feet. No groundwater encountered. Backfilled with native soils.

LOG OF BORING B-04

DRILLING RIG: **CME-75** | DATE DRILLED: **7/27/20** | HAMMER TYPE: **Auto-Trip**
DRILLING METHOD: **Rotary Auger** | HAMMER WEIGHT: **140-lb.**
LOGGED BY: **KC** | HAMMER DROP: **30-inches**
GROUND ELEVATION: **+/-** | BORING DIAMETER: **8-inches**

SUMMARY OF SUBSURFACE CONDITIONS

This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered and is representative of interpretations made during drilling. Contrasting data derived from laboratory analysis may not be reflected in these representations.

DEPTH (ft)	U.S.C.S.	DESCRIPTION	SAMPLE TYPE	BLOW COUNTS /6"	MOISTURE (%)	DRY UNIT WT. (pcf)
0		**ASPHALT CONCRETE,** (5 inches)				
1	SM	**SILTY SAND,** very fine- to fine, brown, slightly moist, medium dense.				
2–3	SC	**CLAYEY SAND,** very fine- to fine, dark brown, moist, medium dense.				
4	GW-GM	**SILTY GRAVEL WITH SAND,** fine- to coarse-grained, brown (10YR 4/3), wet, dense.	AU			
6			SS	27 50	7	133
9	SC	**CLAYEY SAND with GRAVEL,** fine- to coarse, dark grayish-brown (2.5Y 4/2), moist to wet, dense.	AU			
10			SS	50/5"		
15		▽				
16			SS	37 50	10	133
20	GW-GC	**CLAYEY GRAVEL with SAND,** fine- to coarse-grained, light olive-brown (2.5Y 5/3), wet, very dense.	SS	50/4"	13	

End of boring at 20.3 feet. Groundwater encountered at 15 feet. Backfilled with bentonite and native soils.

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CLIENT: **ERSC**
PROJECT NAME: **EMWD Sub Area 4**
PROJECT LOCATION: **Quail Valley Area**
Menifee, CA
PROJECT NUMBER: **E080-058**

FIGURE NO. A-6

LOG OF BORING B-05

DRILLING RIG	CME-75	DATE DRILLED	7/27/20	HAMMER TYPE	Auto-Trip
DRILLING METHOD	Rotary Auger			HAMMER WEIGHT	140-lb.
LOGGED BY	FWC			HAMMER DROP	30-inches
GROUND ELEVATION	+/-			BORING DIAMETER	8-inches

SUMMARY OF SUBSURFACE CONDITIONS

This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered and is representative of interpretations made during drilling. Contrasting data derived from laboratory analysis may not be reflected in these representations.

DEPTH (ft)	U.S.C.S.	GRAPHIC LOG	SUMMARY OF SUBSURFACE CONDITIONS	BULK SAMPLE	DRIVE SAMPLE	SAMPLE TYPE	BLOW COUNTS /6"	MOISTURE (%)	DRY UNIT WT. (pcf)
0–1			**ASPHALT CONCRETE,** (4 inches)						
1	SM		**ARTIFICIAL FILL,** SILTY SAND, fine- to medium, gray-brown, moist, medium dense.						
1–3.5	SC		**CLAYEY SAND,** fine- to medium, dark gray-brown, moist, medium dense.						
3.5–7	SM		**SILTY SAND with GRAVEL,** very fine- to fine, strong-brown (10YR 4/6), moist, very dense.			AU			
5					X	SS	40 50	10	124
7–13	CL		**SANDY CLAY with GRAVEL,** dark yellowish-brown (10YR 4/6), moist, very dense.			AU			
10					X	SS	45 50	14	123
13–15	SC		**CLAYEY SAND with GRAVEL,** very fine- to fine, dark yellowish-brown (10YR 4/6), moist, very dense, moderately cemented.						
15					X	SS	33 50	15	126
15–20	GC		**GRAVEL with CLAY and SAND,** dark gray-brown, moist to wet, very dense.						
19			∇		X	SS	50/5"		
20			End of boring at 20 feet. Groundwater encountered at 19 feet. Backfilled with bentonite and native soils.						

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CLIENT	ERSC
PROJECT NAME	EMWD Sub Area 4
PROJECT LOCATION	Quail Valley Area Menifee, CA
PROJECT NUMBER	E080-058

FIGURE NO. A-7

LOG OF BORING B-06

DRILLING RIG	CME-75	HAMMER TYPE	Auto-Trip
DRILLING METHOD	Rotary Auger	HAMMER WEIGHT	140-lb.
LOGGED BY	KC	HAMMER DROP	30-inches
GROUND ELEVATION	+/-	BORING DIAMETER	8-inches

DATE DRILLED 7/27/20

SUMMARY OF SUBSURFACE CONDITIONS

This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered and is representative of interpretations made during drilling. Contrasting data derived from laboratory analysis may not be reflected in these representations.

DEPTH (ft)	U.S.C.S.	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLE TYPE	BLOW COUNTS /6"	MOISTURE (%)	DRY UNIT WT. (pcf)
0		**ASPHALT CONCRETE,** (7 inches)				
1	SM	**SILTY SAND,** fine- to coarse, olive, slightly moist, loose to medium dense.	AU			
5	SM	**SILTY SAND with GRAVEL,** fine- to coarse, olive (5Y 4/4), slightly moist, very dense.	AU SS	50/5"	4	
10			SS	50/4"	5	119
15		**METASEDIMENTARY SANDSTONE,** highly to moderately weathered, dark olive-gray (5Y 3/2), moist, slightly fractured, very dense.	SS	27 50/5"	7	129
20			SS	50/1"		

End of boring at 20.1 feet. No groundwater encountered. Backfilled with native soils.

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CLIENT	ERSC
PROJECT NAME	EMWD Sub Area 4
PROJECT LOCATION	Quail Valley Area Menifee, CA
PROJECT NUMBER	E080-058

FIGURE NO. A-8

LOG OF BORING B-07

DRILLING RIG	CME-75	DATE DRILLED	7/27/20	HAMMER TYPE	Auto-Trip
DRILLING METHOD	Rotary Auger			HAMMER WEIGHT	140-lb.
LOGGED BY	KC			HAMMER DROP	30-inches
GROUND ELEVATION	+/-			BORING DIAMETER	8-inches

SUMMARY OF SUBSURFACE CONDITIONS

This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered and is representative of interpretations made during drilling. Contrasting data derived from laboratory analysis may not be reflected in these representations.

DEPTH (ft)	U.S.C.S.	GRAPHIC LOG	SUMMARY OF SUBSURFACE CONDITIONS	BULK SAMPLE	DRIVE SAMPLE	SAMPLE TYPE	BLOW COUNTS /6"	MOISTURE (%)	DRY UNIT WT. (pcf)
0–0.6			**ASPHALT CONCRETE,** (7 inches)						
0.6–2	SM		**SILTY SAND with GRAVEL,** fine- to medium, light olive-brown, slightly moist, medium dense.						
2–20	SM		**METASEDIMENTARY SANDSTONE,** (SILTY SAND with GRAVEL), highly to slightly weathered, gray (5Y 5/1), dry to slightly moist, moderately fractured, very dense, very rocky.	X		AU			
4.5					X	SS	26 50/3"	2	130
9.5					X	SS	50/1"		
10.5			- very hard drilling, slightly weathered -						
14.5					X	SS	50/2"		
19			▽						
19.5					X	SS	50/2"	2	

End of boring at 20 feet. Groundwater encountered at 19 feet.
Backfilled with bentonite and native soils.

Inland Foundation Engineering, Inc.

CLIENT	ERSC
PROJECT NAME	EMWD Sub Area 4
PROJECT LOCATION	Quail Valley Area Menifee, CA
PROJECT NUMBER	E080-058

FIGURE NO. A-9

LOG OF BORING B-08

DRILLING RIG	CME-75	HAMMER TYPE	Auto-Trip
DRILLING METHOD	Rotary Auger	HAMMER WEIGHT	140-lb.
LOGGED BY	FWC	HAMMER DROP	30-inches
GROUND ELEVATION	+/-	BORING DIAMETER	8-inches

DATE DRILLED 7/28/20

SUMMARY OF SUBSURFACE CONDITIONS

This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered and is representative of interpretations made during drilling. Contrasting data derived from laboratory analysis may not be reflected in these representations.

DEPTH (ft)	U.S.C.S.	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLE TYPE	BLOW COUNTS /6"	MOISTURE (%)	DRY UNIT WT. (pcf)
0		**ASPHALT CONCRETE,** (4 inches)				
1	SC	**CLAYEY SAND,** fine- to medium, olive, moist, medium dense.				
2	SM	**SILTY SAND with GRAVEL,** very fine- to fine, olive (5Y 4/4), moist, medium dense.	AU			
5		**METASEDIMENTARY SANDSTONE,** moderately to slightly weathered, olive to dark olive-gray (5Y 4/4 to 5Y 3/2), slightly moist, moderately fractured, very dense, slightly to very rocky.	SS AU	50/5"	10	112
10			SS	50/5"	2	117
15		- very hard drilling to depth -	SS	50/3"		
20			SS	50/2"	3	
		End of boring at 20.2 feet. No groundwater encountered. Backfilled with native soils.				

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CLIENT	ERSC
PROJECT NAME	EMWD Sub Area 4
PROJECT LOCATION	Quail Valley Area Menifee, CA
PROJECT NUMBER	E080-058

FIGURE NO. A-10

LOG OF BORING B-09

DRILLING RIG	CME-75	DATE DRILLED	7/28/20	HAMMER TYPE	Auto-Trip
DRILLING METHOD	Rotary Auger			HAMMER WEIGHT	140-lb.
LOGGED BY	FWC			HAMMER DROP	30-inches
GROUND ELEVATION	+/-			BORING DIAMETER	8-inches

SUMMARY OF SUBSURFACE CONDITIONS

This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered and is representative of interpretations made during drilling. Contrasting data derived from laboratory analysis may not be reflected in these representations.

DEPTH (ft)	U.S.C.S.	GRAPHIC LOG	SUMMARY OF SUBSURFACE CONDITIONS	BULK SAMPLE	DRIVE SAMPLE	SAMPLE TYPE	BLOW COUNTS /6"	MOISTURE (%)	DRY UNIT WT. (pcf)
0			**ASPHALT CONCRETE,** (7 inches)						
1	SC		**ARTIFICIAL FILL,** CLAYEY SAND, fine- to medium, strong brown, moist, medium dense.						
2	GC		**METASEDIMENTARY SANDSTONE,** (SILTY CLAYEY GRAVEL with SAND), moderately to slightly weathered, olive (5Y4/3), slightly moist, moderately to highly fractured, very dense, very rocky.	X		AU			
4.5					X	SS	50/5"	5	146
6.5			- very hard drilling to depth -						
9.5					X	SS	50/5"	2	
13			End of boring at 13 feet. Auger refusal. No groundwater encountered. Backfilled with native soils.						

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CLIENT	ERSC
PROJECT NAME	EMWD Sub Area 4
PROJECT LOCATION	Quail Valley Area Menifee, CA
PROJECT NUMBER	E080-058
FIGURE NO.	A-11

LOG OF BORING B-10

DRILLING RIG	CME-75	DATE DRILLED	7/28/20	HAMMER TYPE	Auto-Trip
DRILLING METHOD	Rotary Auger			HAMMER WEIGHT	140-lb.
LOGGED BY	FWC			HAMMER DROP	30-inches
GROUND ELEVATION	+/-			BORING DIAMETER	8-inches

SUMMARY OF SUBSURFACE CONDITIONS

This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered and is representative of interpretations made during drilling. Contrasting data derived from laboratory analysis may not be reflected in these representations.

DEPTH (ft)	U.S.C.S.	GRAPHIC LOG	SUMMARY OF SUBSURFACE CONDITIONS	BULK SAMPLE	DRIVE SAMPLE	SAMPLE TYPE	BLOW COUNTS /6"	MOISTURE (%)	DRY UNIT WT. (pcf)
0			**ASPHALT CONCRETE,** (6 inches)						
1–3	SC		**CLAYEY SAND,** fine- to medium, gray-brown, moist, medium dense.						
3						AU			
3–5	SC		**PHYLLITE,**(CLAYEY SAND with GRAVEL), moderately to slightly weathered, dark greenish-gray (10Y 4/1)moist, moderately to highly fractured, hard.						
6						SS	47 50	9	120
10						SS	50/5"	4	128
15			- very rocky, moderately fractured -			SS	25 50/1"	2	
20						SS	50/2"	3	

End of boring at 20.2 feet. No groundwater encountered. Backfilled with native soils.

CLIENT	ERSC
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PROJECT NUMBER	E080-058

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FIGURE NO.
A-12

LOG OF BORING B-11

DRILLING RIG CME-75
DATE DRILLED 7/28/20
HAMMER TYPE Auto-Trip
DRILLING METHOD Rotary Auger
HAMMER WEIGHT 140-lb.
LOGGED BY FWC
HAMMER DROP 30-inches
GROUND ELEVATION +/-
BORING DIAMETER 8-inches

DEPTH (ft)	U.S.C.S.	GRAPHIC LOG	SUMMARY OF SUBSURFACE CONDITIONS This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered and is representative of interpretations made during drilling. Contrasting data derived from laboratory analysis may not be reflected in these representations.	BULK SAMPLE	DRIVE SAMPLE	SAMPLE TYPE	BLOW COUNTS /6"	MOISTURE (%)	DRY UNIT WT. (pcf)
0			**ASPHALT CONCRETE,** (7 inches)						
1–2	SC		**ARTIFICIAL FILL,** CLAYEY SAND, very fine- to fine, dark brown, moist, medium dense.						
2–3			**PHYLLITE,** (CLAYEY SAND with GRAVEL), moderately to slightly weathered, dark olive-brown (2.5Y 3/3), slightly moist, moderately fractured, very dense.			AU			
4–5			- very hard drilling to 7 feet, slightly weathered -			SS	16 50/3"	1	
9–10						SS	50/5"	1	
10–11	SC		- very rocky -						
14–15						SS	50/4"	3	125
15–16			- very rocky - - easy drilling to depth -						
19–20						SS	50/2"		
20			End of boring at 20 feet. No groundwater encountered. Backfilled with native soils.						

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CLIENT ERSC
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PROJECT LOCATION Quail Valley Area
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PROJECT NUMBER E080-058

FIGURE NO. A-13

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LOG OF BORING B-12

DRILLING RIG	CME-75	DATE DRILLED	7/28/20
DRILLING METHOD	Rotary Auger	HAMMER TYPE	Auto-Trip
LOGGED BY	FWC	HAMMER WEIGHT	140-lb.
GROUND ELEVATION	+/-	HAMMER DROP	30-inches
		BORING DIAMETER	8-inches

SUMMARY OF SUBSURFACE CONDITIONS

This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered and is representative of interpretations made during drilling. Contrasting data derived from laboratory analysis may not be reflected in these representations.

DEPTH (ft)	U.S.C.S.	GRAPHIC LOG	SUMMARY OF SUBSURFACE CONDITIONS	BULK SAMPLE	DRIVE SAMPLE	SAMPLE TYPE	BLOW COUNTS /6"	MOISTURE (%)	DRY UNIT WT. (pcf)
0–0.75			**ASPHALT CONCRETE,** (9 inches)						
0.75–10	SC-SM		**SILTY CLAYEY SAND with GRAVEL,** very fine- to fine, dark yellowish-brown (10YR 3/4), moist, medium dense.			AU			
6						SS	9 10	9	125
10–18			**PHYLLITE,** moderately to slightly weathered, olive-brown (2.5Y 4/3), slightly moist, moderately fractured, very dense.			AU			
10.5						SS	50/4"	6	109
15.5						SS	50/5"	2	
16.5			- very rocky to depth, very hard drilling -						
18			End of boring at 18 feet. Auger refusal. No groundwater encountered. Backfilled with native soils.						

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CLIENT	ERSC
PROJECT NAME	EMWD Sub Area 4
PROJECT LOCATION	Quail Valley Area Menifee, CA
PROJECT NUMBER	E080-058

FIGURE NO. A-14

LOG OF BORING B-13

DRILLING RIG	CME-75	DATE DRILLED	7/28/20	HAMMER TYPE	Auto-Trip
DRILLING METHOD	Rotary Auger			HAMMER WEIGHT	140-lb.
LOGGED BY	FWC			HAMMER DROP	30-inches
GROUND ELEVATION	+/-			BORING DIAMETER	8-inches

SUMMARY OF SUBSURFACE CONDITIONS

This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered and is representative of interpretations made during drilling. Contrasting data derived from laboratory analysis may not be reflected in these representations.

DEPTH (ft)	U.S.C.S.	GRAPHIC LOG	DESCRIPTION	BULK SAMPLE	DRIVE SAMPLE	SAMPLE TYPE	BLOW COUNTS /6"	MOISTURE (%)	DRY UNIT WT. (pcf)
0			**ASPHALT CONCRETE,** (5 inches)						
1–2	SC		**CLAYEY SAND,** with trace gravel, fine- to medium, gray-brown, moist, medium dense.						
3	SM		**PHYLLITE,** (SILTY SAND with GRAVEL), highly to slightly weathered, dark grayish-brown (2.5Y 4/2), slightly moist, slightly to highly fractured, very dense.			AU			
5						SS	23 50/5"	16	121
10						SS	34 45	10	123
15						SS	30 50/4"	7	130
16			- highly weathered, slightly fractured -						
17			- slightly weathered, highly fractured to depth -						
20						SS	50/5"	6	111

End of boring at 20 feet. No groundwater encountered. Backfilled with native soils.

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CLIENT	ERSC
PROJECT NAME	EMWD Sub Area 4
PROJECT LOCATION	Quail Valley Area Menifee, CA
PROJECT NUMBER	E080-058

FIGURE NO. A-15

LOG OF BORING B-14

DRILLING RIG CME-75
DATE DRILLED 7/28/20
HAMMER TYPE Auto-Trip
DRILLING METHOD Rotary Auger
HAMMER WEIGHT 140-lb.
LOGGED BY FWC
HAMMER DROP 30-inches
GROUND ELEVATION +/-
BORING DIAMETER 8-inches

SUMMARY OF SUBSURFACE CONDITIONS

This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered and is representative of interpretations made during drilling. Contrasting data derived from laboratory analysis may not be reflected in these representations.

DEPTH (ft)	U.S.C.S.	GRAPHIC LOG	DESCRIPTION	BULK SAMPLE	DRIVE SAMPLE	SAMPLE TYPE	BLOW COUNTS /6"	MOISTURE (%)	DRY UNIT WT. (pcf)
0			**ASPHALT CONCRETE,** (5-1/2 inches)						
1	SC-SM		**SILTY, CLAYEY SAND,** fine- to medium, gray-brown, moist, medium dense.						
2–5	GC		**PHYLLITE,** (CLAYEY GRAVEL with SAND) highly to slightly weathered, olive-brown (2.5Y 4/4), slightly moist, slightly to moderately fractured, very dense.	X		AU			
5			- easy drilling to depth -		X	SS	44 50/3"	8	124
10			- moderately weathered, highly fractured, olive-brown (2.5Y4/3) to depth -		X	SS	50/5"	5	122
15					X	SS	50/3"	4	
20					X	SS	50/4"	4	

End of boring at 20.3 feet. No groundwater encountered. Backfilled with native soils.

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PROJECT LOCATION Quail Valley Area
Menifee, CA
PROJECT NUMBER E080-058

FIGURE NO. A-16

LOG OF BORING B-15

DRILLING RIG	CME-75	DATE DRILLED	7/29/20	HAMMER TYPE	Auto-Trip
DRILLING METHOD	Rotary Auger			HAMMER WEIGHT	140-lb.
LOGGED BY	FWC			HAMMER DROP	30-inches
GROUND ELEVATION	+/-			BORING DIAMETER	8-inches

DEPTH (ft)	U.S.C.S.	GRAPHIC LOG	SUMMARY OF SUBSURFACE CONDITIONS This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered and is representative of interpretations made during drilling. Contrasting data derived from laboratory analysis may not be reflected in these representations.	BULK SAMPLE	DRIVE SAMPLE	SAMPLE TYPE	BLOW COUNTS /6"	MOISTURE (%)	DRY UNIT WT. (pcf)
0			**ASPHALT CONCRETE,** (7-1/2 inches)						
1 2 3	GC		**PHYLLITE,** (CLAYEY GRAVEL with SAND), very slightly weathered, gray-brown, slightly moist, moderately fractured, very dense.			AU			
			End of boring at 3.5 feet. Auger refusal. No groundwater encountered. Backfilled with native soils.						

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FIGURE NO.

A-17

LOG OF BORING B-16

DRILLING RIG	CME-75	DATE DRILLED	7/29/20	HAMMER TYPE	Auto-Trip
DRILLING METHOD	Rotary Auger			HAMMER WEIGHT	140-lb.
LOGGED BY	FWC			HAMMER DROP	30-inches
GROUND ELEVATION	+/-			BORING DIAMETER	8-inches

SUMMARY OF SUBSURFACE CONDITIONS

This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered and is representative of interpretations made during drilling. Contrasting data derived from laboratory analysis may not be reflected in these representations.

DEPTH (ft)	U.S.C.S.	GRAPHIC LOG	SUMMARY OF SUBSURFACE CONDITIONS	BULK SAMPLE	DRIVE SAMPLE	SAMPLE TYPE	BLOW COUNTS /6"	MOISTURE (%)	DRY UNIT WT. (pcf)
0–0.5			**ASPHALT CONCRETE,** (6-1/2 inches)						
0.5–2	SC		**ARTIFICIAL FILL,** CLAYEY SAND, very fine- to fine, gray-brown, moist, medium dense.						
2–3.5	SM		**ARTIFICIAL FILL,** SILTY SAND, fine- to medium, dark brown, moist, medium dense.						
3.5	GC		**METASEDIMENTARY SANDSTONE,** (CLAYEY GRAVEL with SAND), slightly to moderately weathered, dark gray (2.5Y 4/1), slightly moist, highly fractured, very dense.	X		AU			
5			- rocky -		X	SS	40 50/2"	2	
10			- rocky -		X	SS	20 50/3"	1	
15			- rocky -		X	SS	26 50/2"	1	136
20					X	SS	35 50/2"	4	121

End of boring at 20.7 feet. No groundwater encountered. Backfilled with native soils.

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CLIENT	ERSC
PROJECT NAME	EMWD Sub Area 4
PROJECT LOCATION	Quail Valley Area Menifee, CA
PROJECT NUMBER	E080-058
FIGURE NO.	A-18

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LOG OF BORING B-17

DRILLING RIG	CME-75	DATE DRILLED	7/30/20
DRILLING METHOD	Rotary Auger	HAMMER TYPE	Auto-Trip
LOGGED BY	FWC	HAMMER WEIGHT	140-lb.
GROUND ELEVATION	+/-	HAMMER DROP	30-inches
		BORING DIAMETER	8-inches

SUMMARY OF SUBSURFACE CONDITIONS

This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered and is representative of interpretations made during drilling. Contrasting data derived from laboratory analysis may not be reflected in these representations.

DEPTH (ft)	U.S.C.S.	GRAPHIC LOG	DESCRIPTION	BULK SAMPLE	DRIVE SAMPLE	SAMPLE TYPE	BLOW COUNTS /6"	MOISTURE (%)	DRY UNIT WT. (pcf)
0			**ASPHALT CONCRETE,** (6 inches)						
1–2	SM		**ARTIFICIAL FILL,** SILTY SAND, with trace clay, fine- to medium, olive, moist, medium dense.						
2–4	GP-GC		**PHYLLITE,** (POORLY GRADED GRAVEL with CLAY and SAND), highly to slightly weathered, gray-brown, slightly moist, slightly to moderately fractured, very dense.						
5					X	SS	32 50/5"	12	147
10			- rocky, slightly weathered -	X	X	SS AU	50/5"	8	124
15			- rocky, slightly weathered -	X	X	SS	50/5"		
20			- rocky, slightly weathered -	X	X	SS	50/5"	3	119
			End of boring at 20 feet. No groundwater encountered. Backfilled with native soils.						

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CLIENT	ERSC
PROJECT NAME	EMWD Sub Area 4
PROJECT LOCATION	Quail Valley Area Menifee, CA
PROJECT NUMBER	E080-058

FIGURE NO. A-19

LOG OF BORING B-18

DRILLING RIG CME-75 | DATE DRILLED 7/30/20 | HAMMER TYPE Auto-Trip
DRILLING METHOD Rotary Auger | HAMMER WEIGHT 140-lb.
LOGGED BY FWC | HAMMER DROP 30-inches
GROUND ELEVATION +/- | BORING DIAMETER 8-inches

DEPTH (ft)	U.S.C.S.	GRAPHIC LOG	SUMMARY OF SUBSURFACE CONDITIONS This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered and is representative of interpretations made during drilling. Contrasting data derived from laboratory analysis may not be reflected in these representations.	BULK SAMPLE	DRIVE SAMPLE	SAMPLE TYPE	BLOW COUNTS /6"	MOISTURE (%)	DRY UNIT WT. (pcf)
0			**ASPHALT CONCRETE,** (6 inches)						
1	SM		**ARTIFICIAL FILL,** SILTY SAND, fine- to coarse, dark yellowish-brown, moist, medium dense.			AU			
2–6	GM		**METASEDIMENTARY SANDSTONE,** (SILTY GRAVEL) slightly weathered, dark gray, (2.5Y 4/1), dry to slightly moist, highly fractured, very dense, very rocky.						
5–6						SS	12 50/4"	0	
			End of boring at 6 feet. Auger refusal. No groundwater encountered. Backfilled with native soils.						

LOG OF BORING B-19

DRILLING RIG	CME-75	DATE DRILLED	7/29/20	HAMMER TYPE	Auto-Trip
DRILLING METHOD	Rotary Auger			HAMMER WEIGHT	140-lb.
LOGGED BY	FWC			HAMMER DROP	30-inches
GROUND ELEVATION	+/-			BORING DIAMETER	8-inches

SUMMARY OF SUBSURFACE CONDITIONS

This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered and is representative of interpretations made during drilling. Contrasting data derived from laboratory analysis may not be reflected in these representations.

DEPTH (ft)	U.S.C.S.	GRAPHIC LOG	SUMMARY OF SUBSURFACE CONDITIONS	BULK SAMPLE	DRIVE SAMPLE	SAMPLE TYPE	BLOW COUNTS /6"	MOISTURE (%)	DRY UNIT WT. (pcf)
0			**ASPHALT CONCRETE,** (4-1/2 inches)						
1			**ARTIFICIAL FILL,** SILTY SAND, with trace clay, fine- to medium, olive, moist, medium dense.			AU			
2–20	SM		**METASEDIMENTARY SANDSTONE,** (SILTY SAND with GRAVEL), highly to moderately weathered, olive-brown (2.5Y 4/4), slightly moist, moderately to slightly fractured, very dense.						
4.5					X	SS	50/5"	8	112
9.5					X	SS	50/5"	6	118
14.5			- rocky, with clay, highly weathered -		X	SS	50/5"	11	122
19.5			- severely weathered -		X	SS	50/3"	7	114
20			End of boring at 20 feet. No groundwater encountered. Backfilled with native soils.						

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CLIENT	ERSC
PROJECT NAME	EMWD Sub Area 4
PROJECT LOCATION	Quail Valley Area Menifee, CA
PROJECT NUMBER	E080-058

FIGURE NO. A-21

IFE BORING - GINT STD US LAB.GDT - 11/23/20 10:23 - P:\E080\E080-058 QUAIL VALLEY SEWER\GINT.GPJ

LOG OF BORING B-20

DRILLING RIG: CME-75
DATE DRILLED: 7/29/20
HAMMER TYPE: Auto-Trip
DRILLING METHOD: Rotary Auger
HAMMER WEIGHT: 140-lb.
LOGGED BY: FWC
HAMMER DROP: 30-inches
GROUND ELEVATION: +/-
BORING DIAMETER: 8-inches

SUMMARY OF SUBSURFACE CONDITIONS

This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered and is representative of interpretations made during drilling. Contrasting data derived from laboratory analysis may not be reflected in these representations.

DEPTH (ft)	U.S.C.S.	DESCRIPTION	SAMPLE TYPE	BLOW COUNTS /6"	MOISTURE (%)	DRY UNIT WT. (pcf)
0		**ASPHALT CONCRETE,** (5 inches)				
1–2	SM	**ARTIFICIAL FILL,** SILTY SAND, fine- to coarse, olive, slightly moist, medium dense.	AU			
2–20	SC-SM	**METASEDIMENTARY SANDSTONE,** (SILTY CLAYEY SAND with GRAVEL), slightly to highly weathered, olive-brown (2.5Y 4/3), slightly moist, highly fractured, very dense.				
5		- rocky -	SS	40 50/2"	5	
10		- highly weathered -	SS	21 50/2"	7	120
15		- slightly weathered -	SS	50/1"		
20			SS	50/1"		

End of boring at 20.1 feet. No groundwater encountered. Backfilled with native soils.

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CLIENT: ERSC
PROJECT NAME: EMWD Sub Area 4
PROJECT LOCATION: Quail Valley Area, Menifee, CA
PROJECT NUMBER: E080-058

FIGURE NO. A-22

LOG OF BORING B-21

DRILLING RIG	**CME-75**	DATE DRILLED	**7/29/20**	HAMMER TYPE	**Auto-Trip**
DRILLING METHOD	**Rotary Auger**			HAMMER WEIGHT	**140-lb.**
LOGGED BY	**FWC**			HAMMER DROP	**30-inches**
GROUND ELEVATION	**+/-**			BORING DIAMETER	**8-inches**

SUMMARY OF SUBSURFACE CONDITIONS

This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered and is representative of interpretations made during drilling. Contrasting data derived from laboratory analysis may not be reflected in these representations.

DEPTH (ft)	U.S.C.S.	GRAPHIC LOG	SUMMARY OF SUBSURFACE CONDITIONS	BULK SAMPLE	DRIVE SAMPLE	SAMPLE TYPE	BLOW COUNTS /6"	MOISTURE (%)	DRY UNIT WT. (pcf)
0			**ASPHALT CONCRETE,** (3 inches)			AU			
1–4	GM		**METASEDIMENTARY SANDSTONE,** (SILTY GRAVEL with SAND), highly to moderately weathered, olive-brown (2.5Y 4/4), slightly moist, highly to weakly fractured, very dense, rocky.						
4						SS	50/5"	7	106
10			- clayey gravel with sand -			SS	24 50/4"	11	111
14.5			- weakly weathered -			SS	50/1"	4	
15			End of boring at 15 feet. Auger refusal. No groundwater encountered. Backfilled with native soils.						

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CLIENT	**ERSC**	FIGURE NO.
PROJECT NAME	**EMWD Sub Area 4**	
PROJECT LOCATION	**Quail Valley Area**	
	Menifee, CA	
PROJECT NUMBER	**E080-058**	A-23

LOG OF BORING B-22

DRILLING RIG	CME-75	DATE DRILLED	7/30/20	HAMMER TYPE	Auto-Trip
DRILLING METHOD	Rotary Auger			HAMMER WEIGHT	140-lb.
LOGGED BY	FWC			HAMMER DROP	30-inches
GROUND ELEVATION	+/-			BORING DIAMETER	8-inches

SUMMARY OF SUBSURFACE CONDITIONS

This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered and is representative of interpretations made during drilling. Contrasting data derived from laboratory analysis may not be reflected in these representations.

DEPTH (ft)	U.S.C.S.	SUMMARY OF SUBSURFACE CONDITIONS	BULK SAMPLE	DRIVE SAMPLE	SAMPLE TYPE	BLOW COUNTS /6"	MOISTURE (%)	DRY UNIT WT. (pcf)
0		**ASPHALT CONCRETE,** (8 inches)						
1–3	SM	**SILTY SAND with GRAVEL,** with trace clay, fine- to coarse, gray, moist, medium dense. - very hard drilling to depth -	X		AU			
3–13	GC	**PHYLLITE,** (SILTY CLAYEY GRAVEL with SAND) highly to weakly weathered, very dark gray (5Y 3/1), moist to wet, moderately fractured, hard.	X		AU			
6				X	SS	32 50	8	117
10		∇		X	SS	50/1"		
13		End of boring at 13 feet. Auger refusal. Groundwater encountered at 9.8 feet. Backfilled with bentonite and native soils.						

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Est. 1978

CLIENT	ERSC
PROJECT NAME	EMWD Sub Area 4
PROJECT LOCATION	Quail Valley Area Menifee, CA
PROJECT NUMBER	E080-058

FIGURE NO. A-24

LOG OF BORING B-23

DRILLING RIG	CME-75	DATE DRILLED	7/29/20
DRILLING METHOD	Rotary Auger	HAMMER TYPE	Auto-Trip
LOGGED BY	FWC	HAMMER WEIGHT	140-lb.
GROUND ELEVATION	+/-	HAMMER DROP	30-inches
		BORING DIAMETER	8-inches

SUMMARY OF SUBSURFACE CONDITIONS

This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered and is representative of interpretations made during drilling. Contrasting data derived from laboratory analysis may not be reflected in these representations.

DEPTH (ft)	U.S.C.S.	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLE TYPE	BLOW COUNTS /6"	MOISTURE (%)	DRY UNIT WT. (pcf)
0–1.6		**ASPHALT CONCRETE over AGGREGATE BASE,** (6-1/2 inches over 13 inches)				
2			AU			
1.6–4	SM	**ARTIFICIAL FILL,** SILTY SAND with GRAVEL, fine- to medium, olive, moist, medium dense.				
4–6	SC	**CLAYEY SAND,** very fine- to fine, dark yellowish-brown (10YR 3/6), moist, medium dense to dense.				
6			SS	35 50	11	123
6–40	SM	**PHYLLITE,** (SILTY SAND with GRAVEL), moderately to slightly weathered, very dark gray (2.5Y 3/1), slightly moist to moist, highly fractured, very dense.	AU			
11		- rocky, slightly weathered -	SS	50/4"	2	
16		- rocky to depth, hard drilling -	AU SS	50/4"	5	
21			SS	50/3"	1	
26			SS	50/2"	2	
31			SS	50/2"	3	
36			SS	50/2"		
37		- very hard drilling -				
40			SS	50/1"		

End of boring at 40.1 feet. No groundwater encountered. Backfilled with native soils.

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CLIENT	ERSC
PROJECT NAME	EMWD Sub Area 4
PROJECT LOCATION	Quail Valley Area Menifee, CA
PROJECT NUMBER	E080-058
FIGURE NO.	A-25

LOG OF BORING B-24

DRILLING RIG	CME-75	DATE DRILLED	7/30/20	HAMMER TYPE	Auto-Trip
DRILLING METHOD	Rotary Auger			HAMMER WEIGHT	140-lb.
LOGGED BY	FWC			HAMMER DROP	30-inches
GROUND ELEVATION	+/-			BORING DIAMETER	8-inches

SUMMARY OF SUBSURFACE CONDITIONS

This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered and is representative of interpretations made during drilling. Contrasting data derived from laboratory analysis may not be reflected in these representations.

DEPTH (ft)	U.S.C.S.	DESCRIPTION	SAMPLE TYPE	BLOW COUNTS /6"	MOISTURE (%)	DRY UNIT WT. (pcf)
0–1.5		**ASPHALT CONCRETE over AGGREGATE BASE,** (5-1/2 inches over 12 inches)				
1.5–4	SM	**SILTY SAND with GRAVEL,** fine- to medium, dark yellowish-brown, moist, medium dense to dense.	AU (2)			
4–22	SM	**PHYLLITE,** (SILTY SAND with GRAVEL) highly to slightly weathered, dark gray (2.5Y 4/1), slightly moist, highly fractured, very dense.	AU (4)			
5			SS	40 50/4"	5	126
10		- rocky, slightly weathered -	SS	50/5"	5	121
13		- hard drilling -				
15			SS	36 50/2"	2	
17		- very hard drilling -				
20			SS	50/3"	1	

End of boring at 22 feet. Auger refusal. No groundwater encountered. Backfilled with native soils.

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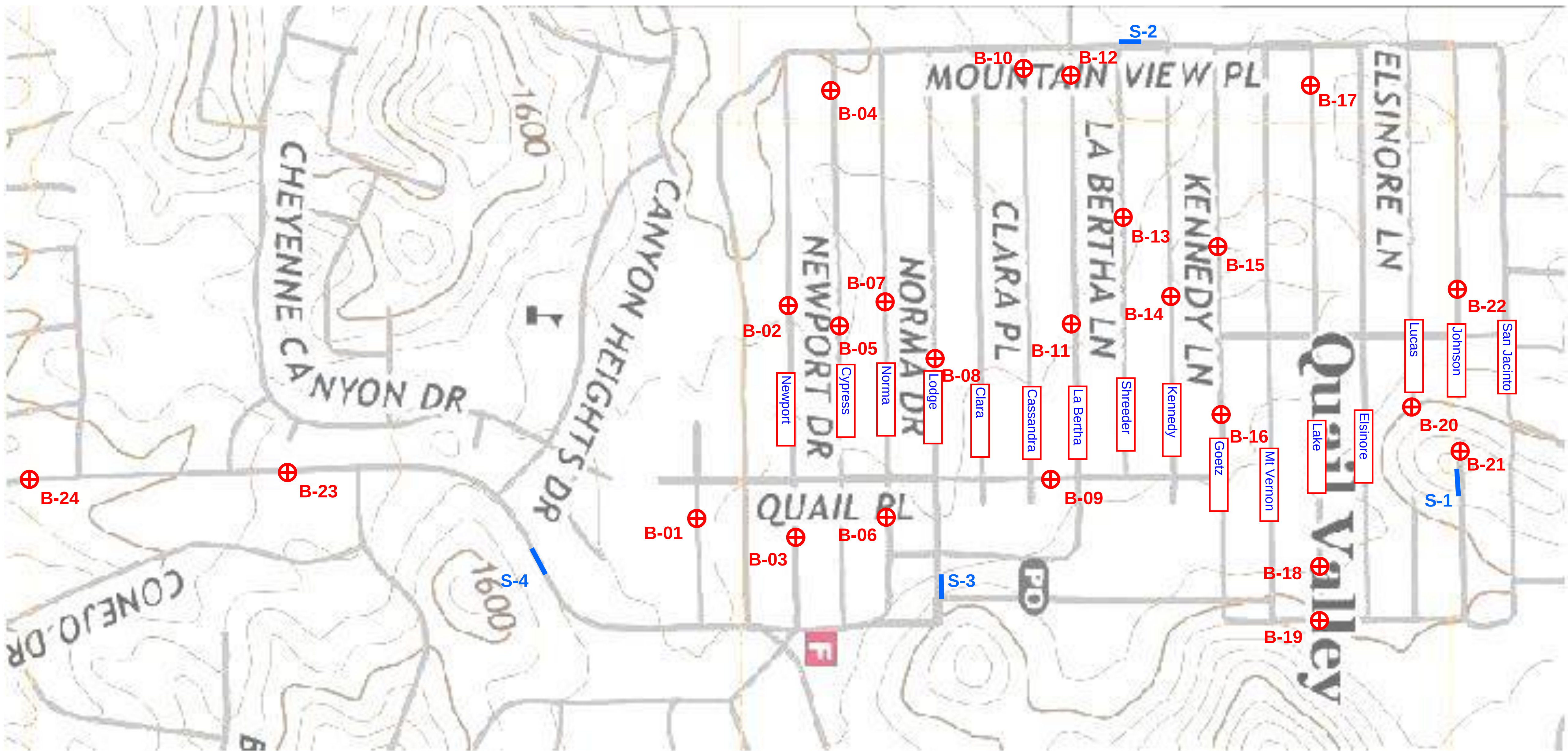
CLIENT	ERSC
PROJECT NAME	EMWD Sub Area 4
PROJECT LOCATION	Quail Valley Area Menifee, CA
PROJECT NUMBER	E080-058

FIGURE NO. A-26

SITE PLAN



⊕ Approximate Location of Exploratory Boring

Approximate Location of Seismic Refraction Traverse

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A-27	Geotechnical Investigation EMWD Quail Valley Sub Area 4 Menifee, California	
	Drawn By: KC	Project No. E080-058
	Scale: 1" = 490' ±	Date: November 2020

APPENDIX B –
Laboratory Testing

APPENDIX B

LABORATORY TESTING

Representative soil samples obtained from our borings were returned to our laboratory for additional observations and testing. Descriptions of the tests performed are provided below.

Unit Weight and Moisture Content: Ring samples were weighed and measured to evaluate their unit weight. A small portion of each sample was then tested for moisture content. The testing was performed per ASTM D2937 and D2216. The results of the testing are shown on the boring logs (Figure Nos. A-3 through A-26).

Sieve Analysis: Twenty-six (26) soil samples were selected for sieve analysis testing in accordance with ASTM D6913. These tests provide information for classifying the soil in accordance with the Unified Classification System. This classification system categorizes the soil into groups having similar engineering characteristics. The results of this testing are shown on Figure Nos. B-3 and B-8.

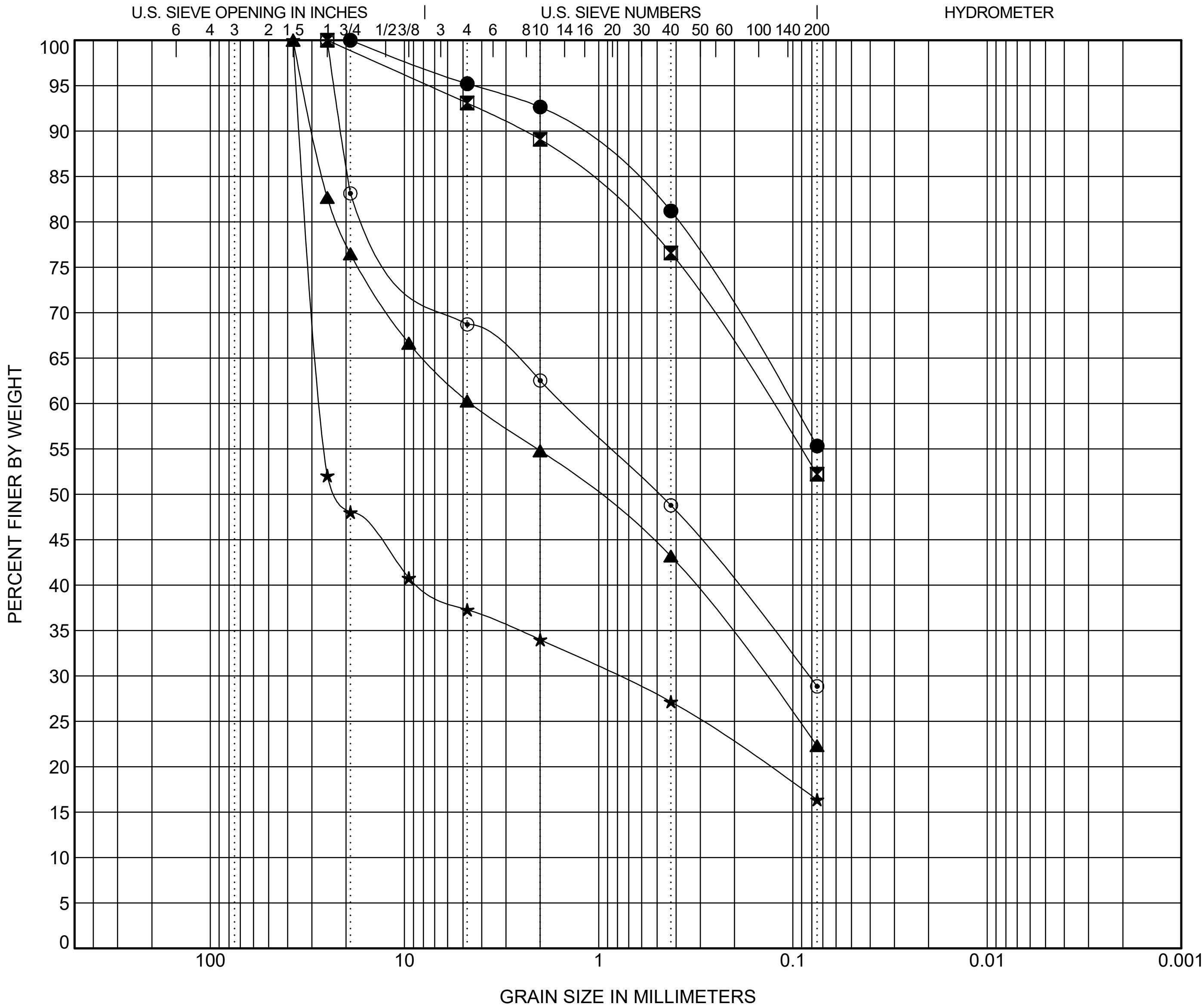
Atterberg Limits: Twelve (12) samples were selected for Atterberg limits testing in accordance with ASTM D4318. These tests provide information regarding soil plasticity and are also used for classifying the soil in accordance with the Unified Classification System. The results are shown on Figure Nos. B-3 and B-8.

Sand Equivalent: Twenty-four samples were selected for sand equivalent testing in accordance with ASTM D2419. This test is used to indicate the relative proportions of clay-size or plastic fines and dust in granular soil and fine aggregate. Sand equivalent test results are shown in the following table.

Boring No.	Depth (ft.)	SE
B-01	2.0 - 6.0	9
B-02	2.0 - 5.0	9
B-03	4.0 - 7.0	18
B-04	3.5 - 9.0	14
B-05	3.5 - 7.0	15
B-05	7.0 - 13.0	10
B-06	5.0 - 15.5	31
B-07	2.0 - 20.0	20
B-08	1.8 - 5.3	18

Boring No.	Depth (ft.)	SE
B-09	1.3 - 13.0	14
B-10	3.0 - 20.0	25
B-11	2.0 - 19.1	19
B-12	0.8 - 9.5	13
B-13	2.5 - 20.0	26
B-14	1.3 - 20.3	24
B-16	3.5 - 20.6	18
B-17	9.3 - 20.0	22
B-19	1.3 - 20.0	20
B-20	2.0 - 20.0	19
B-21	0.3 - 15.0	27
B-22	3.0 - 13	18
B-23	1.6 - 4.0	15
B-24	1.4 - 4.0	25
B-24	4.0 - 22.0	29

Direct Shear Strength: Five (5) samples were selected for direct shear strength testing in accordance with ASTM D3080. This testing measures the shear strength of the soil under various normal pressures and is used to develop parameters for foundation bearing capacity and lateral earth pressure. Test results are shown on Figure No. B-9.



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
●	B-01	2.0	SANDY CLAY(CL)	41	18	23		
⧗	B-02	2.0	SANDY CLAY(CL)					
▲	B-03	4.0	GRAVEL with SAND(GW)					
★	B-04	3.5	SILTY GRAVEL with SAND(GW-GM)					
⊙	B-05	3.5	SILTY, CLAYEY SAND with GRAVEL(SC-SM)	25	18	7		

	BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-01	2.0	19	0.103			4.8	39.9	55.3	
⧗	B-02	2.0	25	0.131			6.9	40.9	52.2	
▲	B-03	4.0	37.5	4.546	0.142		39.7	38.0	22.3	
★	B-04	3.5	37.5	26.737	0.809		62.7	20.9	16.4	
⊙	B-05	3.5	25	1.504	0.083		31.3	39.9	28.8	

GRADATION CURVES (ASTM D6913, ASTM D4318)

Inland Foundation Engineering, Inc.

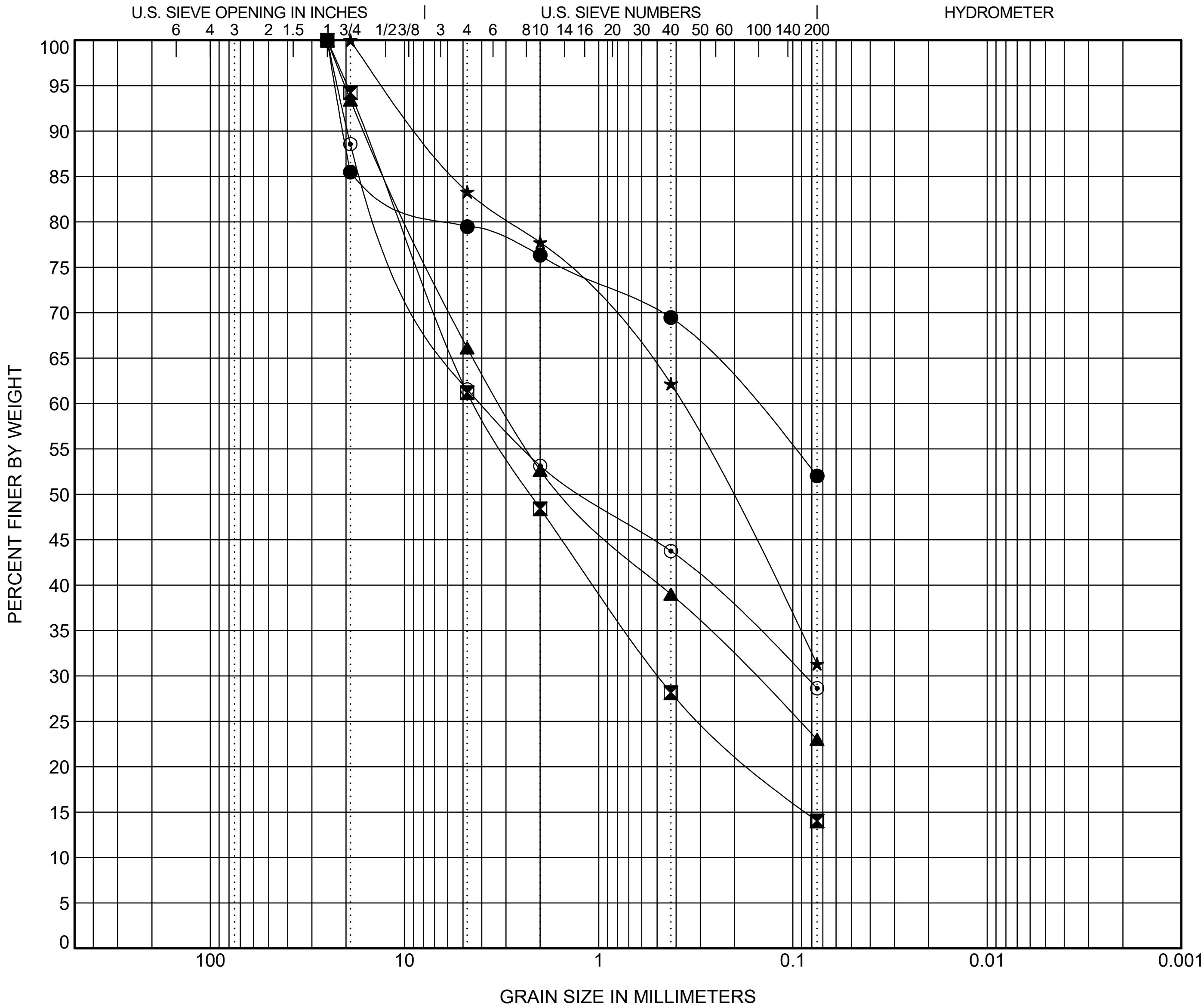
FIGURE NO. B-3

CLIENT ERSC

PROJECT NAME EMWD Sub Area 4

PROJECT NUMBER E080-058

PROJECT LOCATION Quail Valley Area
Menifee, CA



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
●	**B-05**	**7.0**	**SANDY CLAY with GRAVEL(CL)**	**27**	**14**	**13**		
⧗	**B-06**	**5.0**	**SILTY SAND with GRAVEL(SM)**					
▲	**B-07**	**2.0**	**SILTY SAND with GRAVEL(SM)**	**25**	**23**	**2**		
★	**B-08**	**1.8**	**SILTY SAND with GRAVEL(SM)**	**NP**	**NP**	**NP**		
⊙	**B-09**	**1.3**	**CLAYEY SAND(SC)**					

	BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**B-05**	**7.0**	**25**	**0.166**			**20.5**	**27.5**	**52.0**	
⧗	**B-06**	**5.0**	**25**	**4.385**	**0.489**		**38.8**	**47.2**	**14.0**	
▲	**B-07**	**2.0**	**25**	**3.208**	**0.16**		**33.9**	**43.1**	**23.0**	
★	**B-08**	**1.8**	**19**	**0.376**			**16.7**	**52.0**	**31.3**	
⊙	**B-09**	**1.3**	**25**	**4.054**	**0.088**		**38.5**	**32.9**	**28.6**	

GRADATION CURVES (ASTM D6913, ASTM D4318)

Inland Foundation Engineering, Inc.

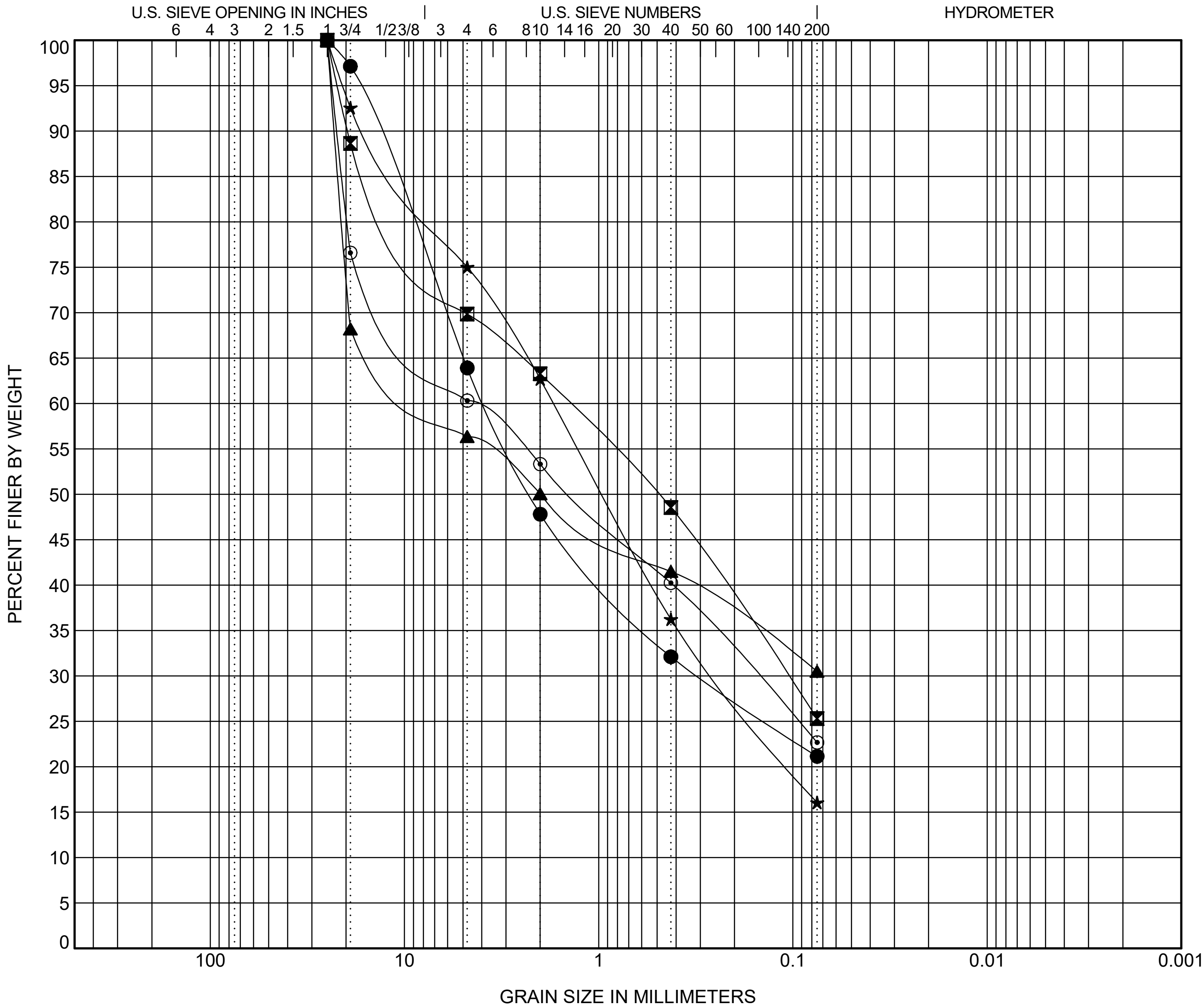
FIGURE NO. B-4

CLIENT ERSC

PROJECT NUMBER E080-058

PROJECT NAME EMWD Sub Area 4

PROJECT LOCATION Quail Valley Area
Menifee, CA



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
●	**B-10**	**3.0**	**CLAYEY SAND with GRAVEL(SC)**					
⧗	**B-11**	**2.0**	**CLAYEY SAND with GRAVEL(SC)**					
▲	**B-12**	**0.8**	**SILTY CLAYEY SAND with GRAVEL(GC)**	**22**	**17**	**5**		
★	**B-13**	**3.5**	**SILTY SAND with GRAVEL(SM)**					
⊙	**B-14**	**1.3**	**CLAYEY GRAVEL with SAND(GC)**					

	BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**B-10**	**3.0**	**25**	**3.85**	**0.304**		**36.1**	**42.8**	**21.1**	
⧗	**B-11**	**2.0**	**25**	**1.418**	**0.106**		**30.1**	**44.5**	**25.3**	
▲	**B-12**	**0.8**	**25**	**7.276**			**43.6**	**25.9**	**30.5**	
★	**B-13**	**3.5**	**25**	**1.709**	**0.249**		**25.0**	**59.0**	**16.1**	
⊙	**B-14**	**1.3**	**25**	**4.568**	**0.155**		**39.7**	**37.6**	**22.7**	

GRADATION CURVES (ASTM D6913, ASTM D4318)

Inland Foundation Engineering, Inc.

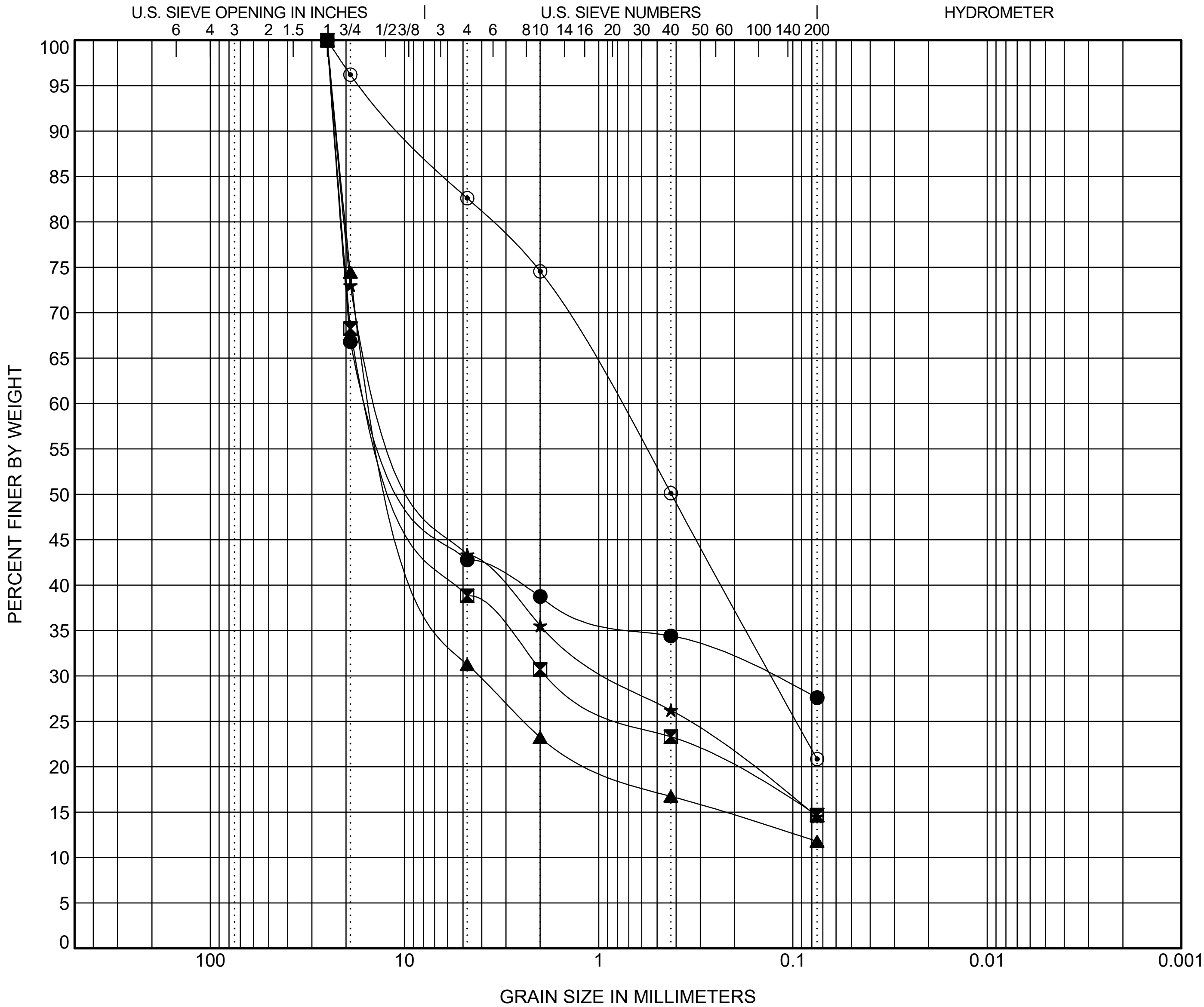
FIGURE NO. B-5

CLIENT ERSC

PROJECT NUMBER E080-058

PROJECT NAME EMWD Sub Area 4

PROJECT LOCATION Quail Valley Area
Menifee, CA



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
●	**B-15**	**0.6**	**CLAYEY GRAVEL with SAND(GC)**					
⧗	**B-16**	**3.5**	**CLAYEY GRAVEL with SAND(GC)**					
▲	**B-17**	**9.3**	**POORLY GRADED GRAVEL with CLAY and SAND(GP-GC)**	**51**	**32**	**19**	**35.81**	**296.42**
★	**B-18**	**1.3**	**SILTY GRAVEL(SM)**					
⊙	**B-19**	**1.3**	**SILTY SAND with GRAVEL(SM)**					

	BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**B-15**	**0.6**	**25**	**12.833**	**0.138**		**57.2**	**15.2**	**27.6**	
⧗	**B-16**	**3.5**	**25**	**12.884**	**1.729**		**61.2**	**24.2**	**14.7**	
▲	**B-17**	**9.3**	**25**	**11.952**	**4.154**		**68.8**	**19.5**	**11.8**	
★	**B-18**	**1.3**	**25**	**10.342**	**0.796**		**56.6**	**28.9**	**14.5**	
⊙	**B-19**	**1.3**	**25**	**0.795**	**0.129**		**17.4**	**61.8**	**20.8**	

GRADATION CURVES (ASTM D6913, ASTM D4318)

Inland Foundation Engineering, Inc.

FIGURE NO. B-6

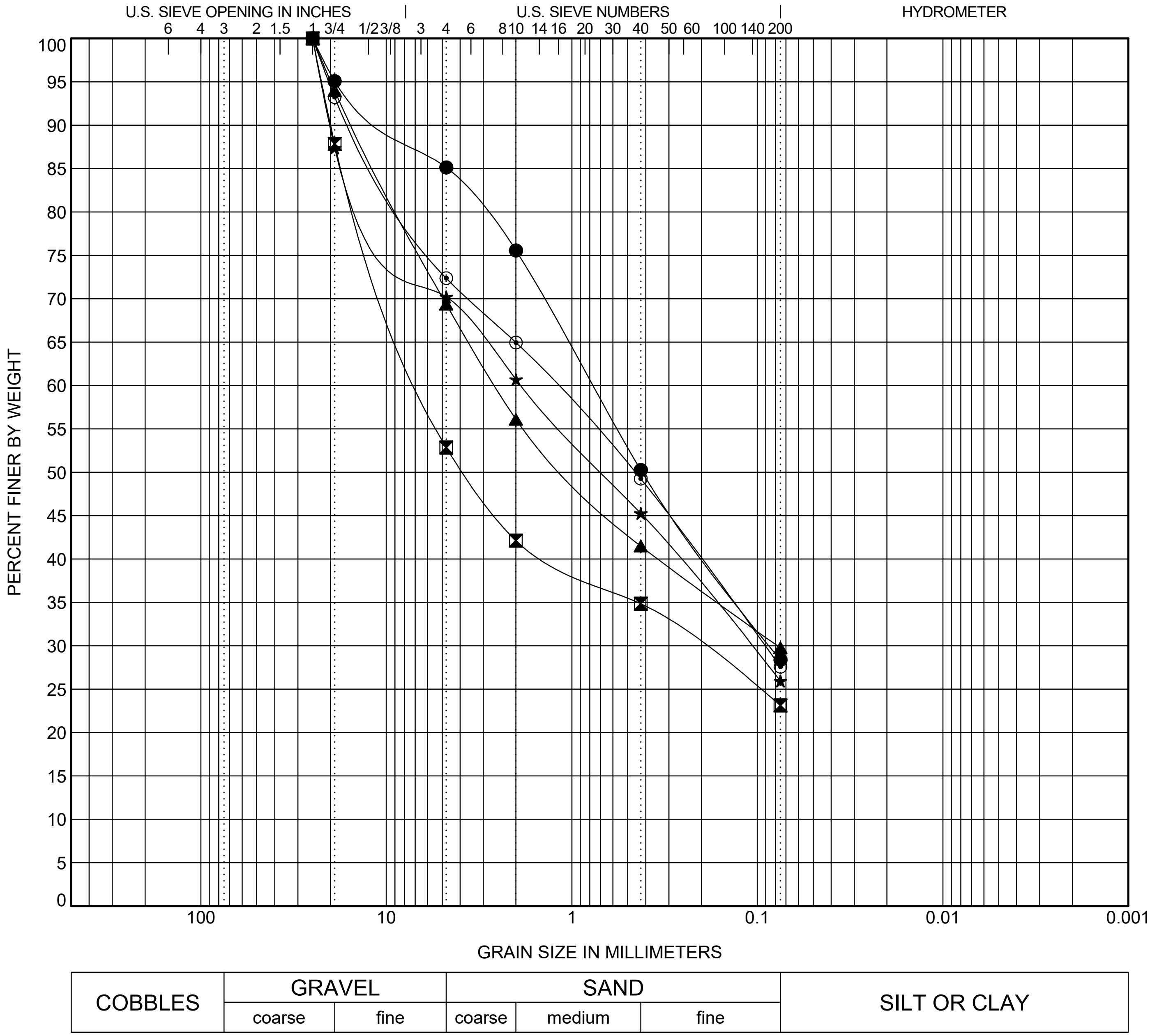
CLIENT ERSC

PROJECT NAME EMWD Sub Area 4

PROJECT NUMBER E080-058

PROJECT LOCATION Quail Valley Area
Menifee, CA

IFE SIEVE ANALYSIS - GINT STD US LAB.GDT - 11/23/20 11:11 - P:\E080\E080-058 QUAIL VALLEY SEWER\GINT.GPJ



	BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
●	**B-20**	**2.0**	**SILTY, CLAYEY SAND(SC-SM)**	**25**	**21**	**4**		
⧗	**B-21**	**0.3**	**SILTY SAND(SM)**					
▲	**B-22**	**3.0**	**SILTY, CLAYEY SAND with GRAVEL(SC-SM)**	**25**	**18**	**7**		
★	**B-23**	**1.6**	**SILTY SAND with GRAVEL(SM)**	**22**	**19**	**3**		
⊙	**B-24**	**1.5**	**SILTY SAND with GRAVEL(SM)**	**NP**	**NP**	**NP**		

	BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**B-20**	**2.0**	**25**	**0.772**	**0.085**		**14.9**	**56.8**	**28.4**	
⧗	**B-21**	**0.3**	**25**	**6.305**	**0.208**		**47.1**	**29.7**	**23.1**	
▲	**B-22**	**3.0**	**25**	**2.582**	**0.078**		**30.6**	**39.6**	**29.8**	
★	**B-23**	**1.6**	**25**	**1.868**	**0.108**		**29.8**	**44.3**	**25.9**	
⊙	**B-24**	**1.5**	**25**	**1.228**	**0.091**		**27.6**	**44.8**	**27.6**	

GRADATION CURVES (ASTM D6913, ASTM D4318)

Inland Foundation Engineering, Inc.

FIGURE NO. B-7

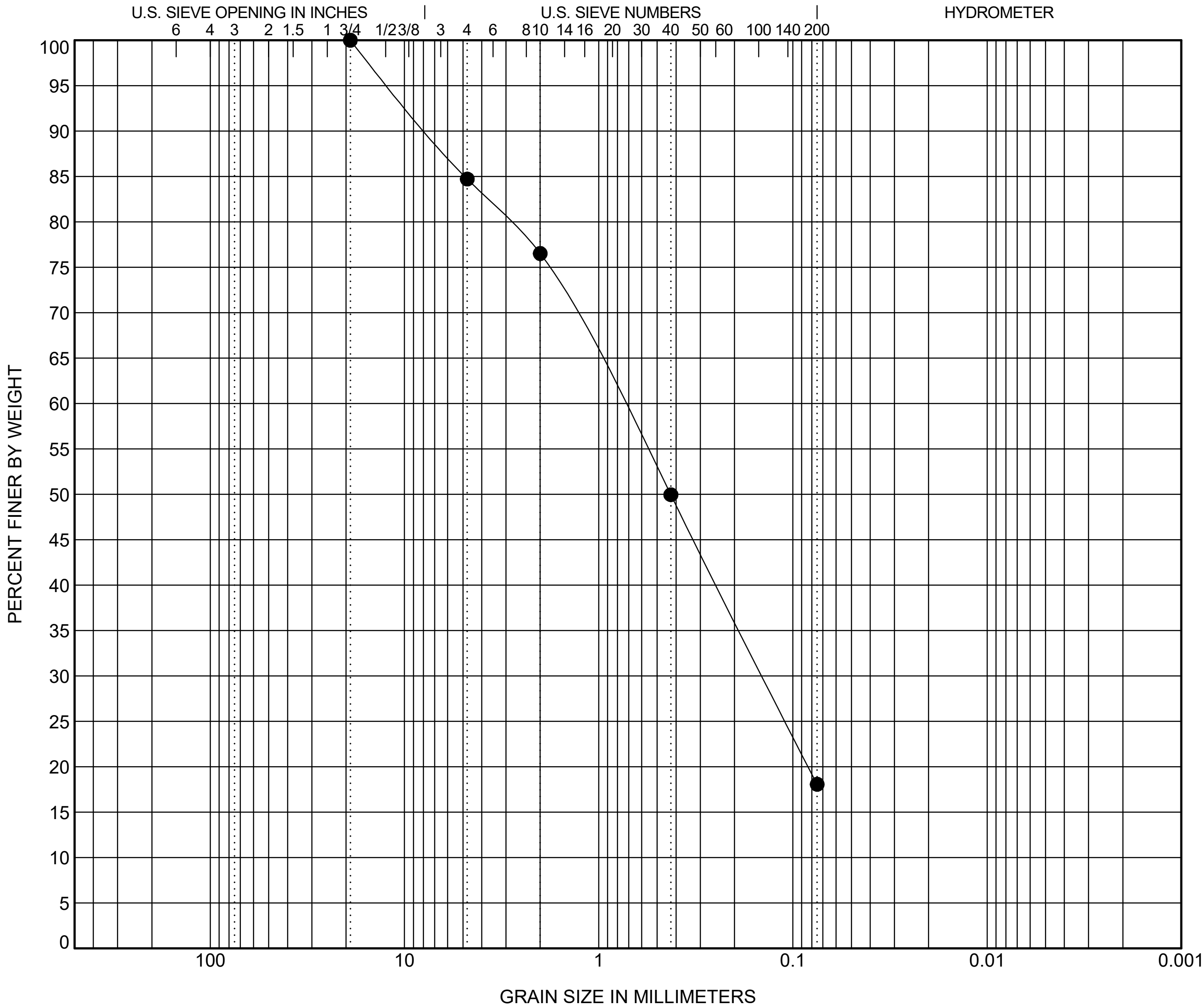
CLIENT ERSC

PROJECT NAME EMWD Sub Area 4

PROJECT NUMBER E080-058

PROJECT LOCATION Quail Valley Area
Menifee, CA

IFE SIEVE ANALYSIS - GINT STD US LAB.GDT - 11/23/20 11:11 - P:\E080\E080-058 QUAIL VALLEY SEWER\GINT.GPJ



BOREHOLE		DEPTH	Classification	LL	PL	PI	Cc	Cu
●	**B-24**	**4.0**	**SILTY SAND with GRAVEL(SM)**	**22**	**21**	**1**		

BOREHOLE		DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**B-24**	**4.0**	**19**	**0.764**	**0.144**		**15.3**	**66.6**	**18.1**	

GRADATION CURVES (ASTM D6913, ASTM D4318)

Inland Foundation Engineering, Inc.

FIGURE NO. B-8

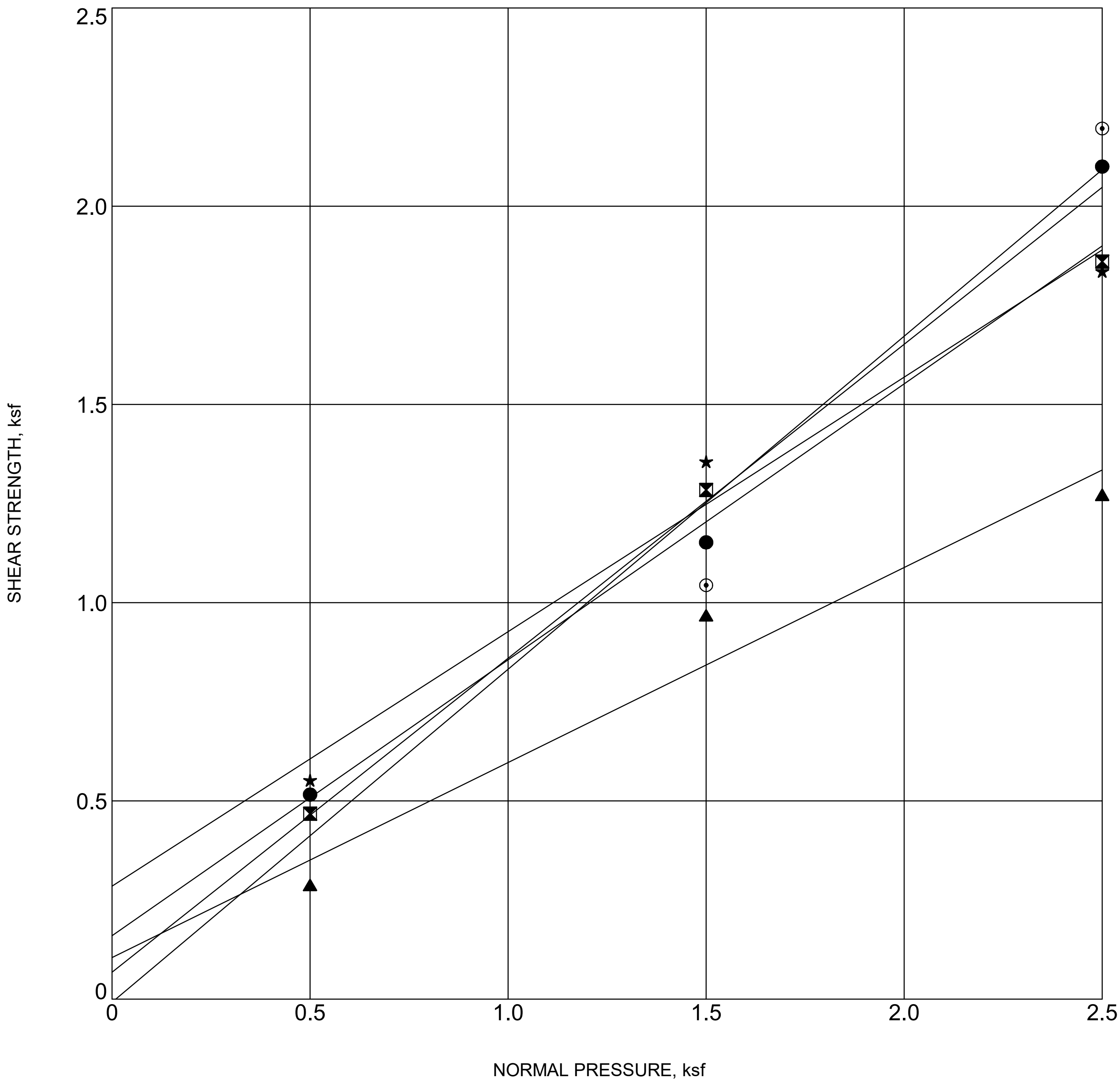
CLIENT ERSC

PROJECT NUMBER E080-058

PROJECT NAME EMWD Sub Area 4

PROJECT LOCATION Quail Valley Area
Menifee, CA

IFE SIEVE ANALYSIS - GINT STD US LAB.GDT - 11/23/20 11:11 - P:\E080\E080-058 QUAIL VALLEY SEWER\GINT.GPJ



	BOREHOLE	DEPTH	Classification	γ_d	MC%	c	ϕ
●	**B-08**	**5.0**	**SILTY SAND with GRAVEL(SM)**	**110**	**4**	**0.1**	**38**
⧗	**B-12**	**5.5**	**SILTY CLAYEY SAND with GRAVEL(GC)**	**121**	**8**	**0.2**	**35**
▲	**B-22**	**5.5**	**SILTY CLAYEY GRAVEL with SAND(GC)**	**118**	**3**	**0.1**	**26**
★	**B-23**	**5.5**	**CLAYEY SAND(SC)**	**115**	**9**	**0.1**	**40**
⊙	**B-24**	**10.0**	**SILTY SAND with GRAVEL(SM)**	**107**	**3**	**0.0**	**40**

DIRECT SHEAR TEST (ASTM D3080)

Inland Foundation Engineering, Inc.

FIGURE NO. B-9

CLIENT ERSC

PROJECT NAME EMWD Sub Area 4

PROJECT NUMBER E080-058

PROJECT LOCATION Quail Valley Area
Menifee, CA

APPENDIX C –
Seismic Refraction Survey

TERRA GEOSCIENCES

SEISMIC REFRACTION SURVEY

EMWD QUAIL VALLEY SUB-AREA 4 PROJECT

QUAIL VALLEY, RIVERSIDE COUNTY, CALIFORNIA

Project No. 203463-1

July 31, 2020

Prepared for:

Inland Foundation Engineering, Inc.
1310 South Santa Fe Avenue
San Jacinto, CA 92583

Consulting Engineering Geology & Geophysics

P.O. Box 1090, Loma Linda, CA 92354 • 909 796-4667

Inland Foundation Engineering, Inc.
1310 South Santa Fe Avenue
San Jacinto, CA 92583

July 31, 2020
Project No. 203463-1

Attention: Mr. Allen Evans, G.E.

Regarding: Seismic Refraction Survey
EMWD Quail Valley Sub-Area 4 Project
Quail Valley, Riverside County, California
IFE Project No. E080-058

EXECUTIVE SUMMARY

As requested, this firm has performed a geophysical survey using the seismic refraction method for the above-referenced site. The purpose of this investigation was to assess the general seismic velocity characteristics of the underlying earth materials and to evaluate whether high velocity bedrock materials (non-rippable) may be present. Additionally, the structure and seismic velocity distribution of the subsurface earth materials was also assessed. This report will describe in further detail the procedures used and the results of our findings, along with presentation of representative seismic models for the survey traverses.

For this study, as selected by your office, four survey traverses (Seismic Lines S-1 though S-4) were performed along the dirt shoulders of Johnson Lane, Mountain View Place, Lodge Drive, and Goetz Road, in the Quail Valley area of Riverside County, California. These traverses were located in the field by use of Google™ Earth imagery (2020), along with GPS coordinates. The approximate locations of these traverses have been approximated on a captured Google™ Earth image (2020), as presented on the Seismic Line Location Map, Plate 1.

This opportunity to be of service is sincerely appreciated. If you should have questions regarding this report or do not understand the limitations of this study or the data and results that are presented, please do not hesitate to contact our office.

Respectfully submitted,
TERRA GEOSCIENCES

Donn C. Schwartzkopf
Principal Geophysicist
PGP 1002

TABLE OF CONTENTS

GEOLOGIC EARTH MATERIALS

Locally, as shown on Figure 1 below, surficial mapping by Morton (2003) indicates the subject study area to be underlain by Mesozoic age metasedimentary rocks, comprised of quartz-rich rocks (map symbol Mzq), intermixed graywacke and phyllite (map symbol Mzgp), and phyllite (map symbol Mzp). Local deposits of very old alluvial deposits (map symbol Qvoa) mantle the region, along with probable topsoil and colluvium locally. For reference, the approximate locations of the seismic traverses are indicated as the circled red lines in Figure 1 below.

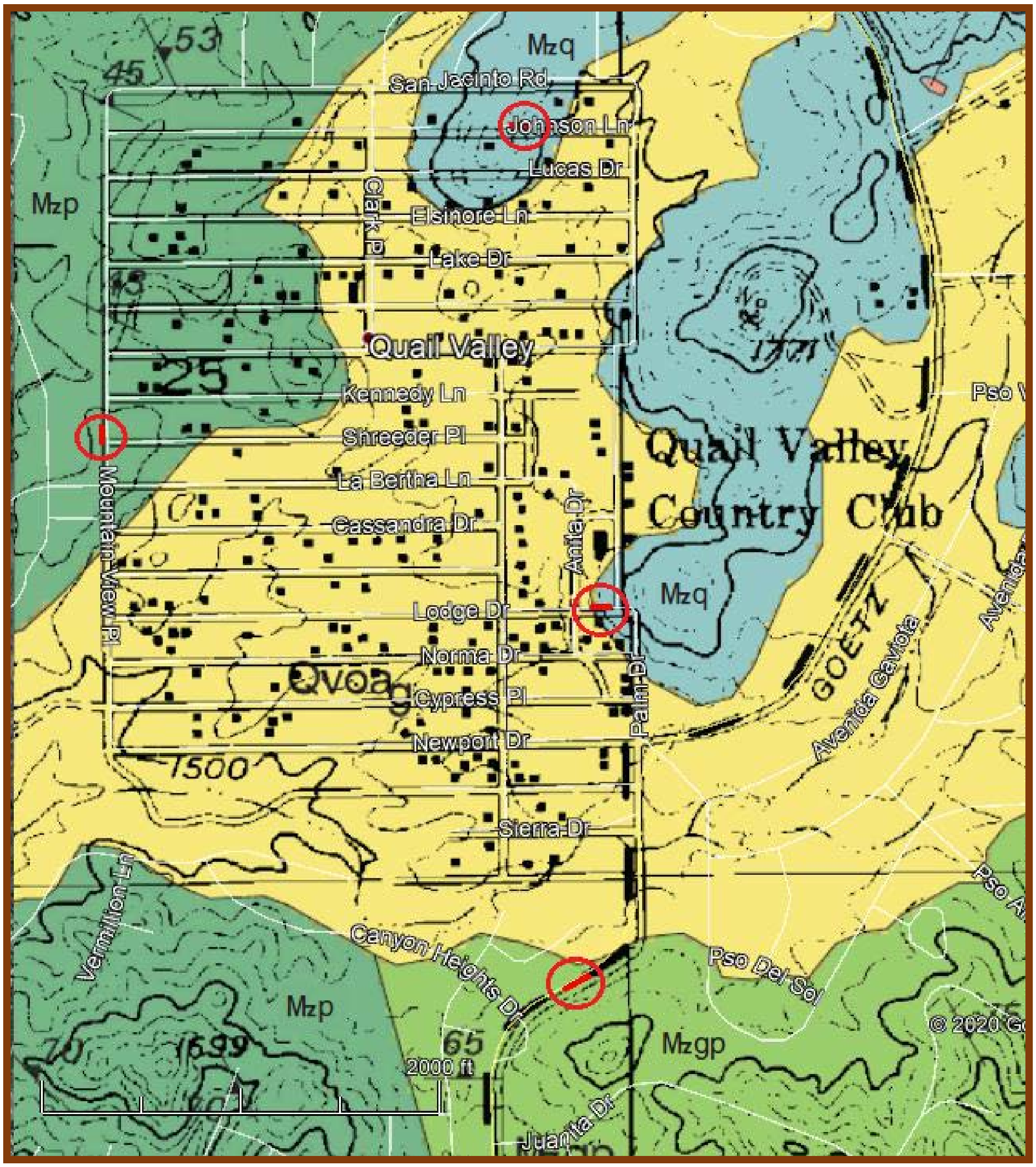


FIGURE 1- Geologic Map (Morton, 2003); Seismic traverses shown as circled red lines.

SEISMIC REFRACTION SURVEY

Methodology

The seismic refraction method consists of measuring (at known points along the surface of the ground) the travel times of compressional waves generated by an impulsive energy source and can be used to estimate the layering, structure, and seismic acoustic velocities of subsurface horizons. Seismic waves travel down and through the soils and rocks, and when the wave encounters a contact between two earth materials having different velocities, some of the wave's energy travels along the contact at the velocity of the lower layer. The fundamental assumption is that each successively deeper layer has a velocity greater than the layer immediately above it. As the wave travels along the contact, some of the wave's energy is refracted toward the surface where it is detected by a series of motion-sensitive transducers (geophones). The arrival time of the seismic wave at the geophone locations can be related to the relative seismic velocities of the subsurface layers in feet per second (fps), which can then be used to aid in interpreting both the depth and type of materials encountered.

Field Procedures

Four seismic refraction survey lines (Seismic Lines S-1 through S-4) have been performed across the locations as selected by you. The traverses were located in the field by use of Google™ Earth imagery (2020), along with GPS coordinates, and have been delineated on the Seismic Line Location Map, as presented on Plate 1. These traverses ranged from 100 to 150 feet in length, which consisted of a total of twenty-four 14-Hertz geophones, spaced at regular four- to six-foot intervals, in order to detect both the direct and refracted waves. A 16-pound sledge-hammer was used as the energy source to produce the seismic waves.

Seven shot points were utilized along each spread using forward, reverse, and several intermediate locations in order to obtain high resolution survey data for velocity analysis and depth modeling purposes. Multiple hammer impacts were utilized at each shot point location in order to increase the signal to noise ratio, which enhanced the primary seismic "P"-waves. The seismic wave arrivals were digitally recorded in SEG-2 format on a Geometrics StrataVisor™ NZXP model signal enhancement refraction seismograph. The data was acquired using a sampling rate of 0.0625 milliseconds having a record length of 0.064 seconds. No acquisition filters were used during data collection.

During acquisition, the seismograph displays the seismic wave arrivals on the computer screen which were used to analyze the arrival time of the primary seismic "P"-waves at each geophone station, in the form of a wiggle trace for quality control purposes in the field. If spurious "noise" was observed, the shot location was resampled during relatively quieter periods. Each geophone and seismic shot location were surveyed using a hand level and ruler for topographic correction, with "0" being the lowest point along each survey line.

Data Processing

The recorded seismic data was subsequently transferred to our office computer for processing and analyzing purposes, using the computer programs **SIPwin** (**S**eismic Refraction **I**nterpretation **P**rogram for **Win**dows) developed by Rimrock Geophysics, Inc. (2004); **Refractor** (Geogiga, 2001-2019); and **Rayfract™** (Intelligent Resources, Inc., 1996-2020). All of the computer programs perform their individual analyses using exactly the same input data, which includes the first-arrival times of the "P"-waves and the survey line geometry.

- **SIPwin** is a ray-trace modeling program that evaluates the subsurface using layer assignments based on time-distance curves and is better suited for layered media, using the "Seismic Refraction Modeling by Computer" method (Scott, 1973). The first step in the modeling procedure is to compute layer velocities by least-squares techniques. Then the program uses the delay-time method to estimate depths to the top of layer-2. A forward modeling routine traces rays from the shot points to each geophone that received a first-arrival ray refracted along the top of layer-2. The travel time of each such ray is compared with the travel time recorded in the field by the seismic system. The program then adjusts the layer-2 depths so as to minimize discrepancies between the computed ray-trace travel times and the first arrival times picked from the seismic waveform record. The process of ray tracing and model adjustment is repeated a total of six times to improve the accuracy of depths to the top of layer-2. This first-arrival picks were then used to generate the Layer Velocity Model using the **SIPwin** computer program, which presents the subsurface velocities as individual layers and is presented within Appendix A for reference. In addition, the associated Time-Distance Plot, which shows the individual data picks of the first "P-wave" arrival times, also appears in Appendix A.

- **Refractor** is seismic refraction software that also evaluates the subsurface using layer assignments utilizing interactive and interchangeable analytical methods that include the Delay-Time method, the ABC method, and the Generalized Reciprocal Method (GRM). These methods are used for defining irregular non-planar refractors and are briefly described below. The Delay-Time method will measure the delay time depth to a refractor beneath each geophone rather than at shot points. Delay-time is the time spent by a wave to travel up or down through the layer (slant path) compared to the time the wave would spend if traveling along the projection of the slant path on the refractor. The ABC (intercept time) method makes use of critically refracted rays converging on a common surface position. This method involves using three surface to surface travel times between three geophones and the velocity of the first layer in an equation to calculate depth under the central geophone and is applied to all other geophones on the survey line. The GRM method is a technique for delineating undulating refractors at any depth from in-line seismic refraction data consisting of forward and reverse travel-times and is capable of resolving dips of up to 20% and does not over-smooth or average the subsurface refracting layers. In addition, the technique provides an approach for recognizing and compensating for hidden layer conditions.

- **Rayfract™** is seismic refraction tomography software that model's subsurface refraction, transmission, and diffraction of acoustic waves which generally indicates the relative structure and velocity distribution of the subsurface using first break energy propagation modeling. An initial 1D gradient model is created using the DeltatV method (Gebrande and Miller, 1985) which gives a good initial fit between modeled and picked first breaks. The DeltatV method is a turning-ray inversion method which delivers continuous depth vs. velocity profiles for all profile stations. These profiles consist of horizontal inline offset, depth, and velocity triples. The method handles real-life geological conditions such as velocity gradients, linear increasing of velocity with depth, velocity inversions, pinched-out layers and outcrops, and faults and local velocity anomalies. This initial model is then refined automatically with a true 2D WET (Wavepath Eikonal Traveltime) tomographic inversion (Schuster and Quintus-Bosz, 1993).

  WET tomography models multiple signal propagation paths contributing to one first break, whereas conventional ray tracing tomography is limited to the modeling of just one ray per first break. This computer program performs the analysis by using the same first-arrival P-wave times and survey line geometry that were generated during the layer velocity model analyses. The associated Refraction Tomographic Models which display the subsurface earth material velocity structure, is represented by the velocity contours (isolines displayed in feet/second), supplemented with the color-coded velocity shading for visual reference, and are presented within Appendix B.

The combined use of these seismic refraction computer programs provided a more thorough and comprehensive analysis of the subsurface structure and velocity characteristics. Each computer program has a specific purpose based on the objective of the analysis being performed. **SIPwin** and **Refractor** were primarily used for detecting generalized subsurface velocity layers providing “weighted average velocities.” The processed seismic data of these two programs were compared and averaged to provide a final composite layer velocity model which provided a more thorough representation of the subsurface (see Appendix A).

Rayfract™ provided tomographic velocity and structural imaging that is very conducive to detecting strong lateral velocity characteristics such as imaging corestones, dikes, and other subsurface structural characteristics (see Appendix B).

SUMMARY OF GEOPHYSICAL INTERPRETATION

It is important to consider that the seismic velocities obtained within bedrock materials are influenced by the nature and character of the localized major structural discontinuities (foliation, fracturing, relic bedding, etc.), creating anisotropic conditions. Anisotropy (direction-dependent properties of materials) can be caused by “micro-cracks,” jointing, foliation, layered or inter-bedded rocks with unequal layer stiffness, small-scale lithologic changes, etc. (Barton, 2007). Velocity anisotropy complicates interpretation and it should be noted that the seismic velocities obtained during this survey may have been influenced by the nature and character of any localized structural discontinuities within the bedrock underlying the subject site. Generally, it is expected that higher (truer) velocities will be obtained when the seismic waves propagate along direction (strike) of the dominant structure, with a damping effect when the seismic waves travel in a perpendicular direction. Such variable directions can result in velocity differentials of between 2% to 40% depending upon the degree of the structural fabric (i.e., weakly-moderately-strongly foliated, respectively).

The first computer analytical method described below that was used for data analysis is the traditional layer method (**SIPwin** and **Refractor**). Using this method, it should be understood that the data obtained represents an average of seismic velocities within any given layer. For example, high seismic velocity boulders, dikes, or other local lithologic inconsistencies, may be isolated within a low velocity matrix, thus yielding an average medium velocity for that layer. Therefore, in any given layer, a range of velocities could be anticipated, which can also result in a wide range of excavation characteristics.

In general, the site where locally surveyed, was noted to be characterized by two to three major subsurface layers (Layers V1, V2, and V3, see Appendix A) with respect to seismic velocities. The following velocity layer summaries have been prepared with respect to the **SIPwin** and **Refractor** analysis, with the representative Layer Velocity Models being presented within Appendix A, along with the respective Time-Distance Plots for reference.

- **Velocity Layer V1**:

  The surficial layer (V1) yielded a seismic velocity range of 1,325 to 1,949 fps, which may be comprised of localized artificial fill, topsoil, colluvium, and/or completely-weathered metasedimentary bedrock, which is typical for these types of unconsolidated surficial earth materials.

- **Velocity Layer V2**:

  The second layer (V2) has a seismic velocity range of 2,979 to 4,425 fps, which is believed to be highly-weathered bedrock materials. These rocks may be generally homogeneous with a relatively wide spaced joint/fracture system and/or may include buried relatively-fresher boulders within a completely decomposed bedrock matrix.

- **Velocity Layer V3:**

  The third layer (V3) indicates the presence of moderately-weathered meta-sedimentary bedrock, having a seismic velocity range of 6,557 to 6,650 fps. These higher velocities signify the decreasing effect of weathering as a function of depth and could indicate a moderately-weathered bedrock matrix that has a wide-spaced fracture system, or possibly the presence of abundant widely-scattered buried fresh large crystalline boulders in a relatively less-weathered matrix.

Table 1 below summarizes the results of the survey lines with respect to the "weighted average" seismic velocities for each layer, as discussed above.

TABLE 1- VELOCITY SUMMARY OF SEISMIC SURVEY LINES

Seismic Line	V1 Layer (fps)	V2 Layer (fps)	V3 Layer (fps)
S-1	**1,325**	**4,112**	**------**
S-2	**1,989**	**3,855**	**6,557**
S-3	**1,949**	**4,425**	**------**
S-4	**1,482**	**2,979**	**6,650**

Using **Rayfract™**, tomographic refraction models were also prepared for comparative purposes. The tomographic method better illustrates the general structure and velocity distribution of the subsurface, using velocity contour isolines, as presented within Appendix B. Although no discrete velocity layers or boundaries are created such as in the layer models, these models generally resemble the corresponding overall average layer velocities as presented within Appendix A. Contact boundaries for the variable earth materials cannot be discerned using tomography. The colors representing the velocity gradients have been standardized on all of the models for comparative purposes.

GENERALIZED RIPPABILITY CHARACTERISTICS OF BEDROCK

Although the proposed pipeline project will be most likely be using excavator/trenching equipment, the rippability performance chart prepared by Caterpillar, Inc. (2018) has been provided as Figure 2 below for reference. This chart has been prepared for conventional bulldozer equipment (based on a D9R/D9T dozer) and cannot be directly correlated with excavator-type trenching equipment, which will most likely be used for the subject construction project.

Currently, there are no published performance charts that are available which compare rippability potentials versus seismic velocity for excavator-type equipment. Trenching operations, of which this project will most likely utilize, that utilize large excavator-type equipment, typically encounter very difficult to non-productable conditions where seismic velocities are generally greater than 4,000± fps, with lower velocities for smaller backhoe-type equipment.

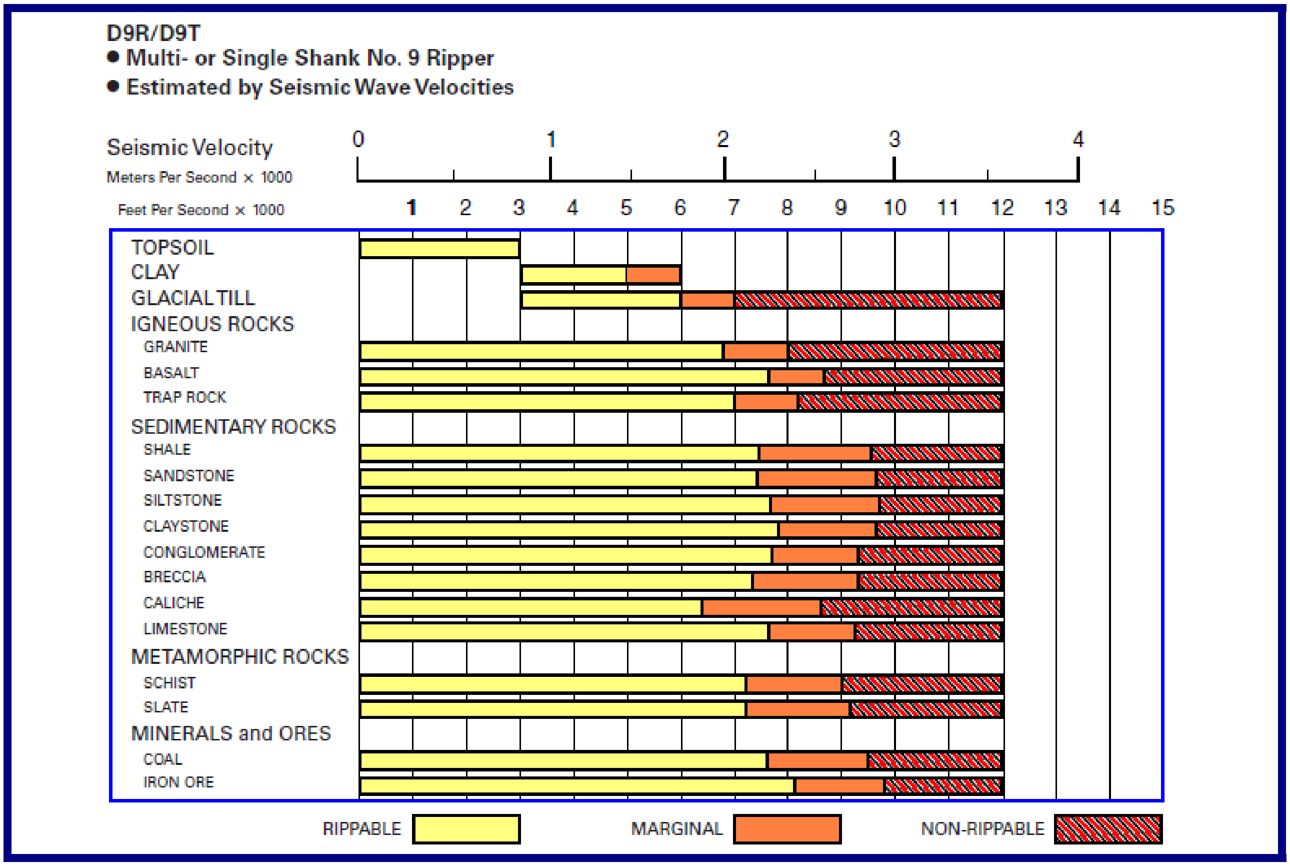


FIGURE 2- Caterpillar D9R Ripper Performance Chart (2018).

SUMMARY OF FINDINGS AND CONCLUSIONS

The raw field data was considered to be of good quality with very minor amounts of ambient “noise” that was introduced during our survey, predominantly from vehicular traffic originating along the adjacent and nearby roadways, and to a lesser degree, some overhead powerline/voltage interference. Analysis of the data and picking of the primary “P”-wave arrivals was therefore performed with little difficulty, with very minor interpolation of some data points being necessary. Every effort was made to obtain seismic records with the least amount of background noise. This was accomplished by waiting for periods where there were breaks in the traffic during our seismic shots, but the ground vibrations could not be completely eliminated.

Based on the results of our comparative seismic analyses of the computer programs **SIPwin**, **Refractor**, and **Rayfract™**, the seismic refraction survey line models appear to generally coincide with one another, with some minor variances due to the methods that these programs process, integrate, and display the input data.

The anticipated excavation potentials of the velocity layers encountered locally during our survey are as follows:

- **Velocity Layer V1**:

  The upper V1 layer (average weighted velocity of 1,325 to 1,949 fps) may be comprised of a variety of materials that consist of localized artificial fill, topsoil, colluvium, and/or completely-weathered metasedimentary bedrock. No excavation difficulties are expected within this velocity layer.

- **Velocity Layer V2**:

  The second V2 layer (average weighted velocity of 2,979 to 4,425 fps) is expected to consist of highly-weathered bedrock materials. With the assumed use of large excavator-type equipment, these materials should excavate with minor to moderate difficulty, however, deep trenching typically results in a loss of mechanical and weight advantage for the excavators, resulting in the need for some breaking and/or light blasting to obtain desired grade, in addition to encountering velocities that are generally greater than 4,000± fps. The possibility of encountering isolated floaters (i.e., boulders, corestones, lithologic variations, etc.) could be expected, which could also produce somewhat difficult conditions locally and may require some light blasting and/or breaking.

- **Velocity Layer V3**:

  The third V3 layer is believed to consist of moderately-weathered metasedimentary bedrock. Very hard excavation difficulties within this deeper velocity layer (average weighted velocity range of 6,557 to 6,650 fps) should be anticipated if encountered during the excavation operations. This layer may consist of relatively homogeneous bedrock, or could possibly contain higher velocity scattered corestones, dikes, and other lithologic variables, within a relatively lower velocity bedrock matrix. Continuous blasting/breaking will most likely be necessary within this velocity layer to achieve desired grade.

Where a third velocity layer (V3) was not encountered within Seismic Lines S-1 & S-3 presented within Appendix A, this indicates that the V2 layer most likely extends to a depth of at least 25 feet.

The ray sampling coverage of the subsurface seismic waves that were acquired during the processing of the tomographic models using **Rayfract™**, appeared to be of good quality which was verified by having a Root Mean Square Error (RMS) of 2.1 to 4.6 percent (see lower right-hand corner of each model). The RMS error (misfit between picked and modeled first break times) is automatically calculated during the processing routine, with a value of less than 5.0% being preferred, of which most of the models obtained.

It should be noted that since the proposed construction project (i.e. utility infrastructure) will most likely be using conventional trenching equipment, there are no currently published rippability performance charts available that compare rippability potentials versus seismic velocity for excavator-type equipment, as previously discussed. The rippability comparison charts such as prepared by Caterpillar (2000 and 2018) are tailored for conventional bulldozer equipment and cannot be directly correlated. However, we understand from many excavation contractors that trenching operations (using large excavators) which have seismic velocities generally greater than 4,000- to 4,500±-feet per second typically encounter very difficult to non-productable conditions, depending upon the type and size of equipment being used.

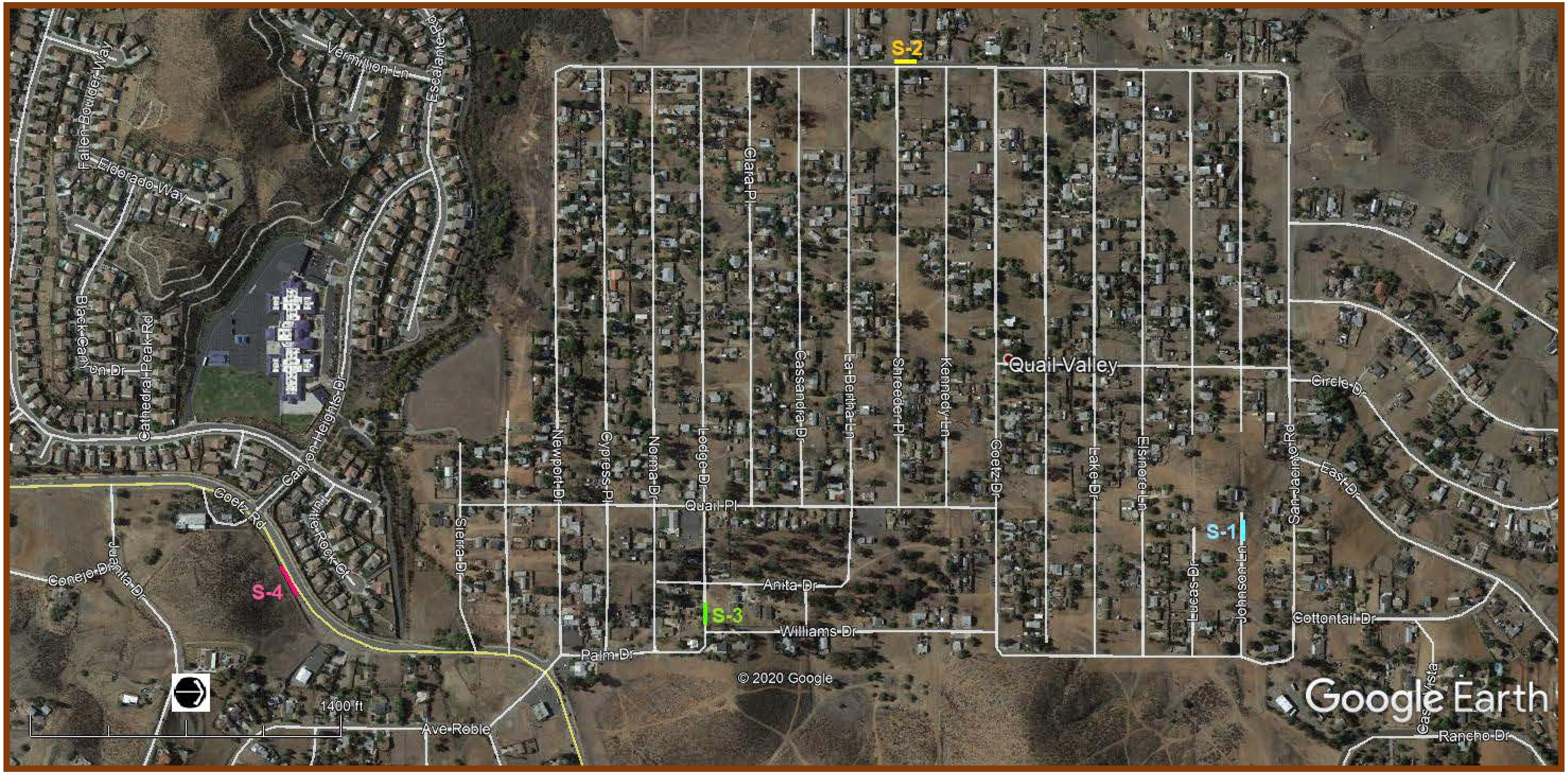
CLOSURE

The field geophysical survey was performed on February 25, 2020 by the undersigned using "state of the art" geophysical equipment and techniques along the selected traverse locations. The seismic data was further evaluated using recently developed computerized tomographic inversion techniques to provide a more thorough analysis and understanding of the subsurface velocity and structural conditions. It should be noted that our data presented within this report was obtained along four specific locations therefore other areas in the local vicinity may contain different velocity layers and depths not encountered during our field survey. It should be noted that our survey lines were performed within the landscaped shoulder of the roads. Due to any variable distances of the survey lines to the proposed pipeline location from the actual survey locations, there may be local velocity differentials encountered during excavation of the pipeline with respect to the data presented within this report.

It is important to understand that the fundamental limitation for seismic refraction surveys is known as nonuniqueness, wherein a specific seismic refraction data set does not provide sufficient information to determine a single “true” earth model. Therefore, the interpretation of any seismic data set uses “best-fit” approximations along with the geologic models that appear to be most reasonable for the local area being surveyed. Estimates of layer velocity boundaries as presented in this report are generally considered to be within 10± percent of the total depth of the contact.

Client should also understand that when using the theoretical geophysical principles and techniques discussed in this report, sources of error are possible in both the data obtained, and in the interpretation, and that the results of this survey may not represent actual subsurface conditions. These are all factors beyond **Terra Geosciences** control and no guarantees as to the results of this survey can be made. We make no warranty, either expressed or implied.

SEISMIC LINE LOCATION MAP



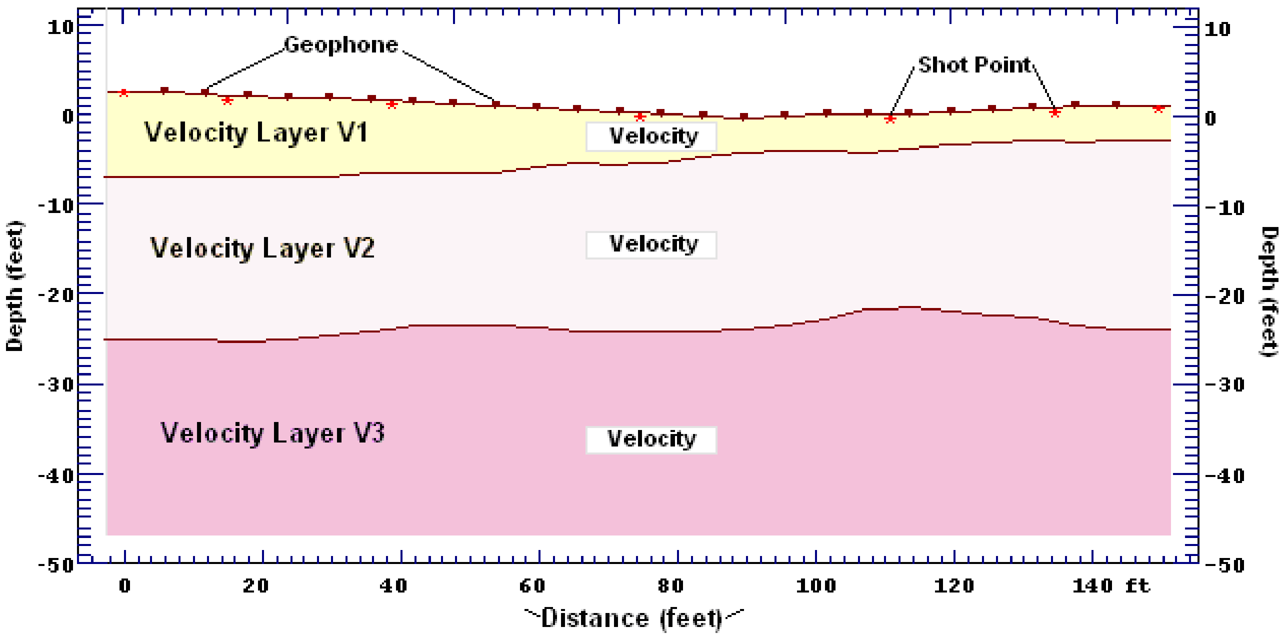
Base Map: Google™ Earth imagery (2020); Seismic traverses S-1 through S-4 shown as colored lines.

APPENDIX A

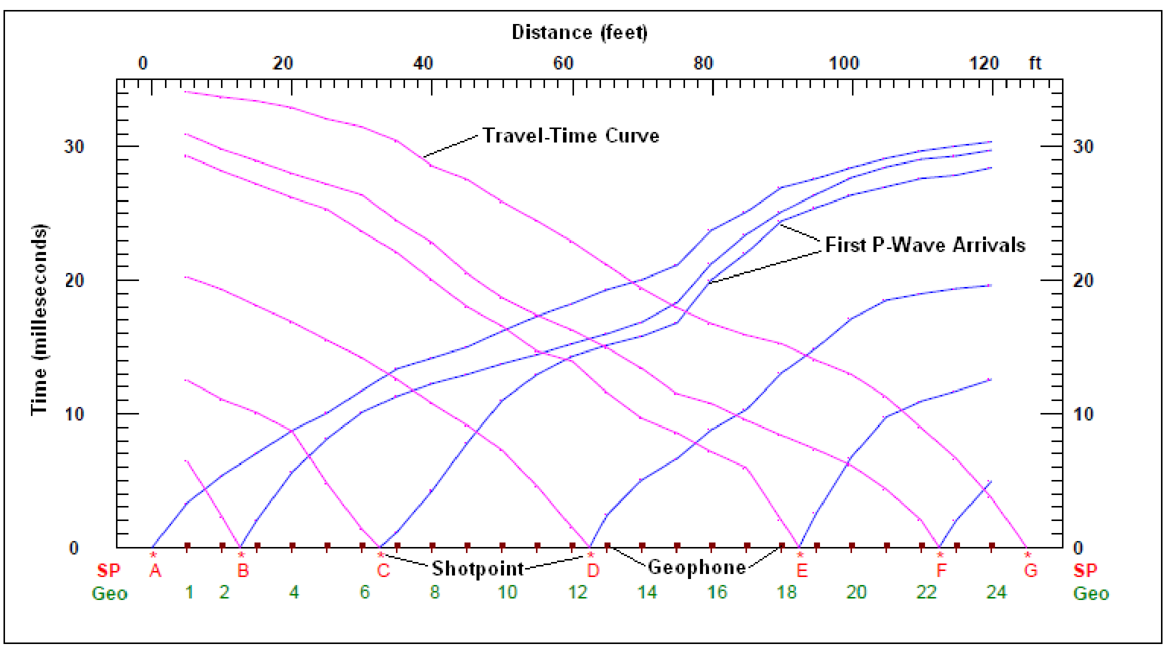
LAYER VELOCITY MODELS

LAYER VELOCITY MODEL LEGEND

LAYER VELOCITY MODEL



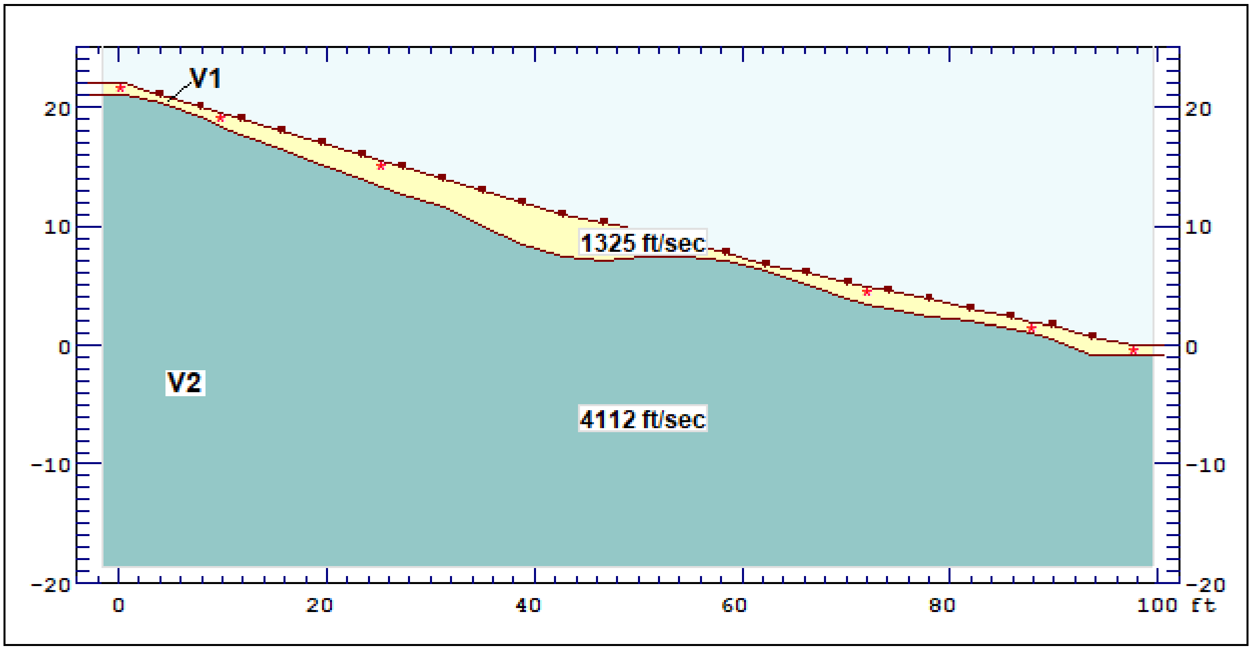
TIME-DISTANCE PLOT



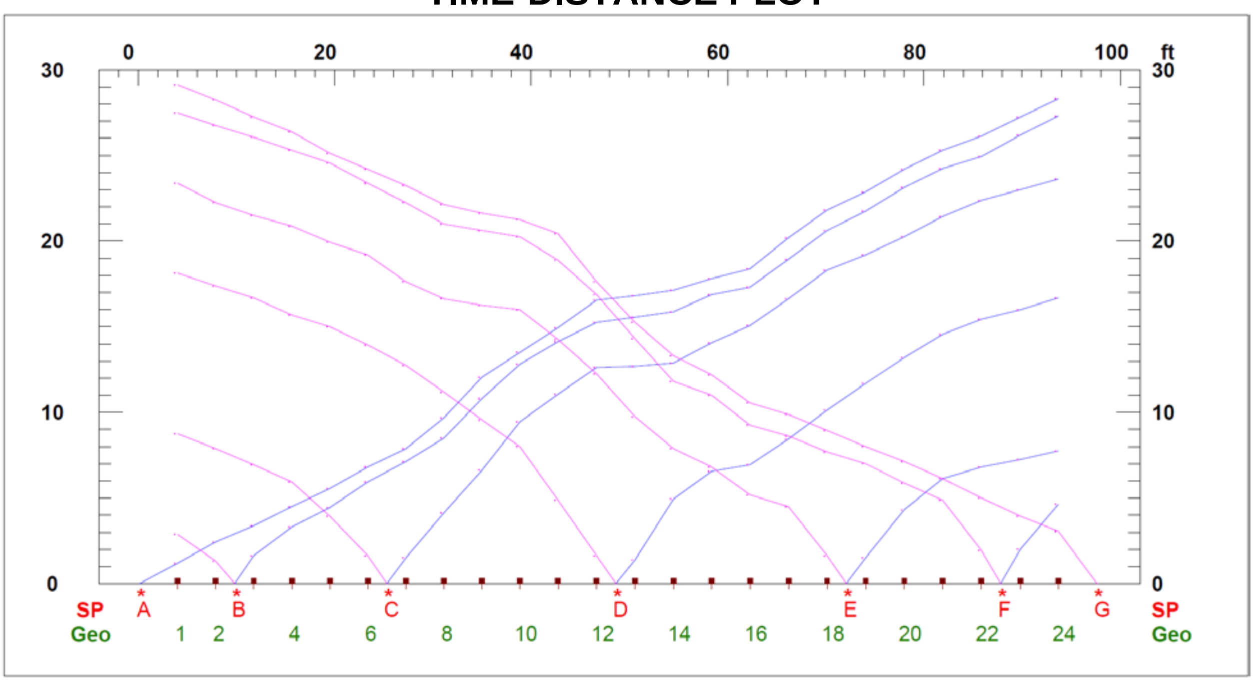
SEISMIC LINE S-1

< West - East >

LAYER VELOCITY MODEL



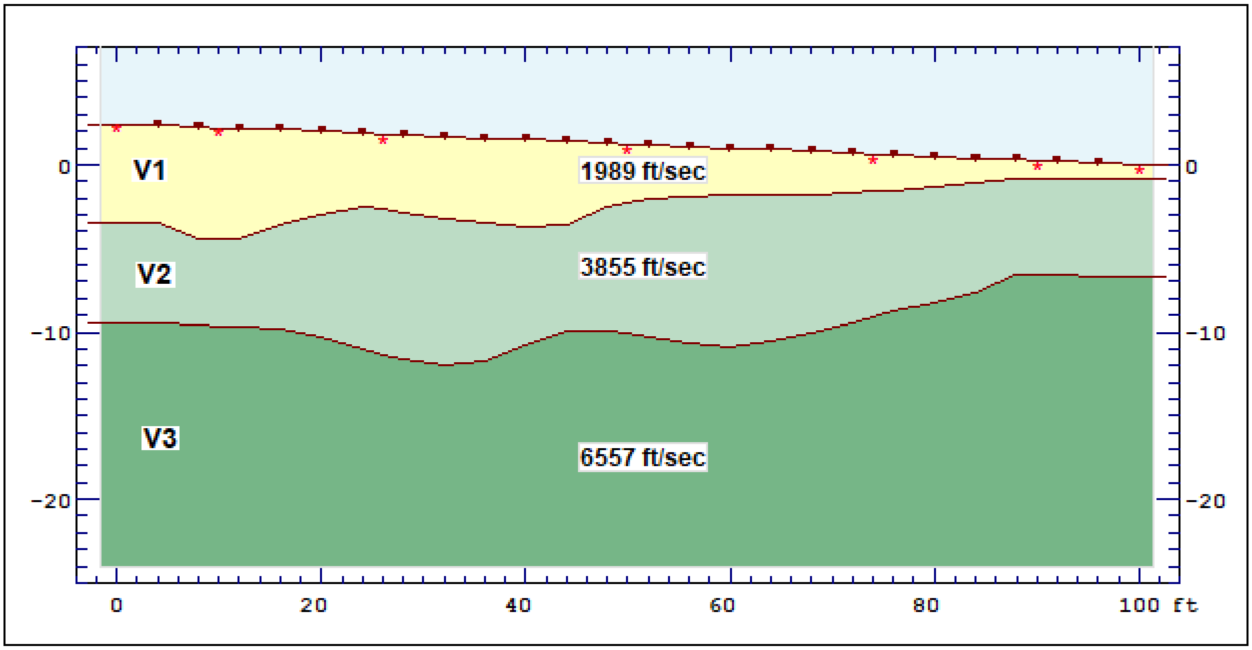
TIME-DISTANCE PLOT



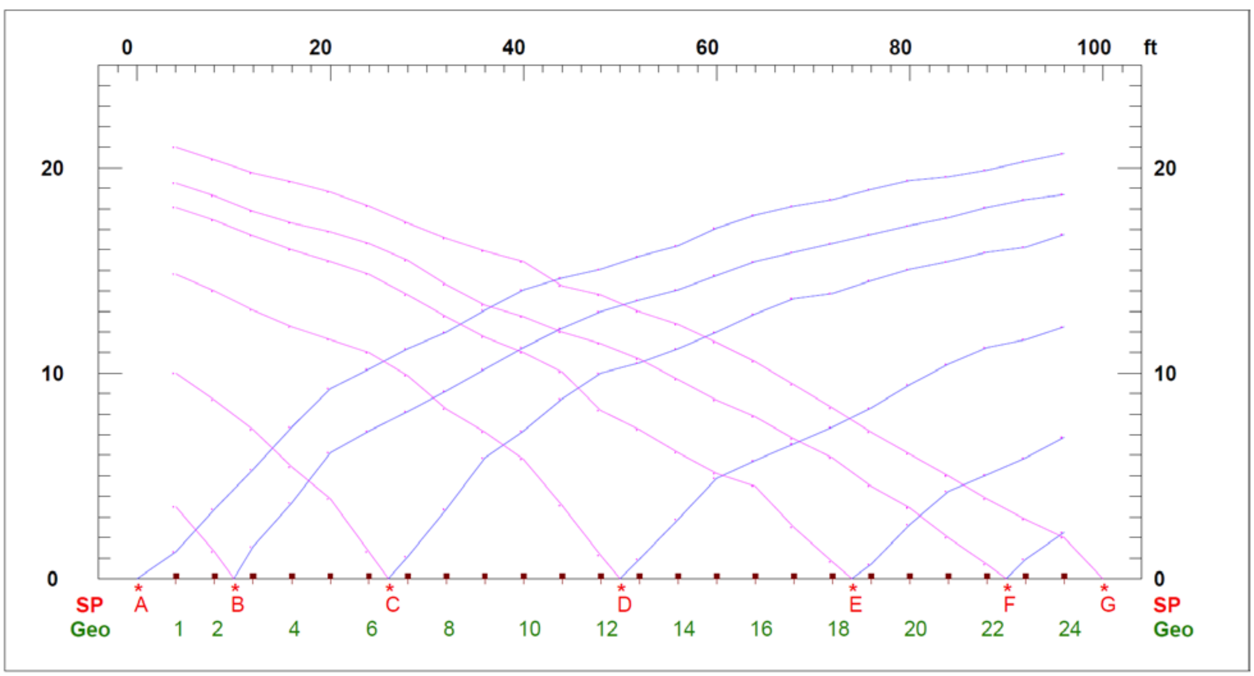
SEISMIC LINE S-2

< South - North >

LAYER VELOCITY MODEL



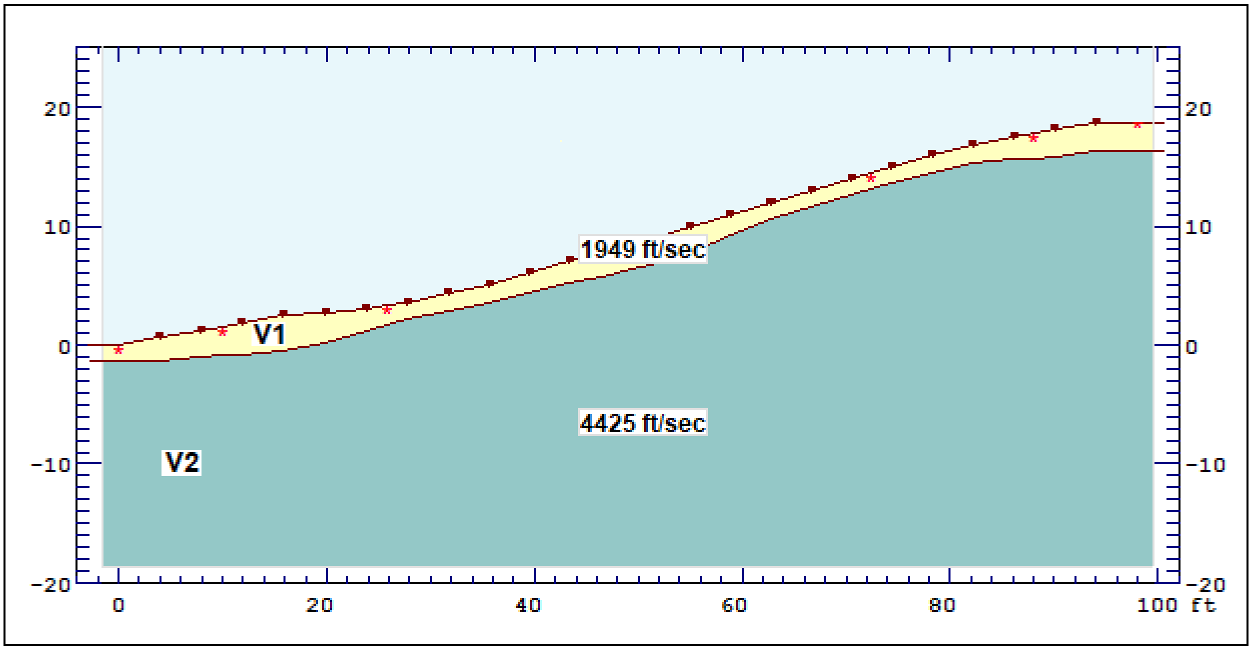
TIME-DISTANCE PLOT



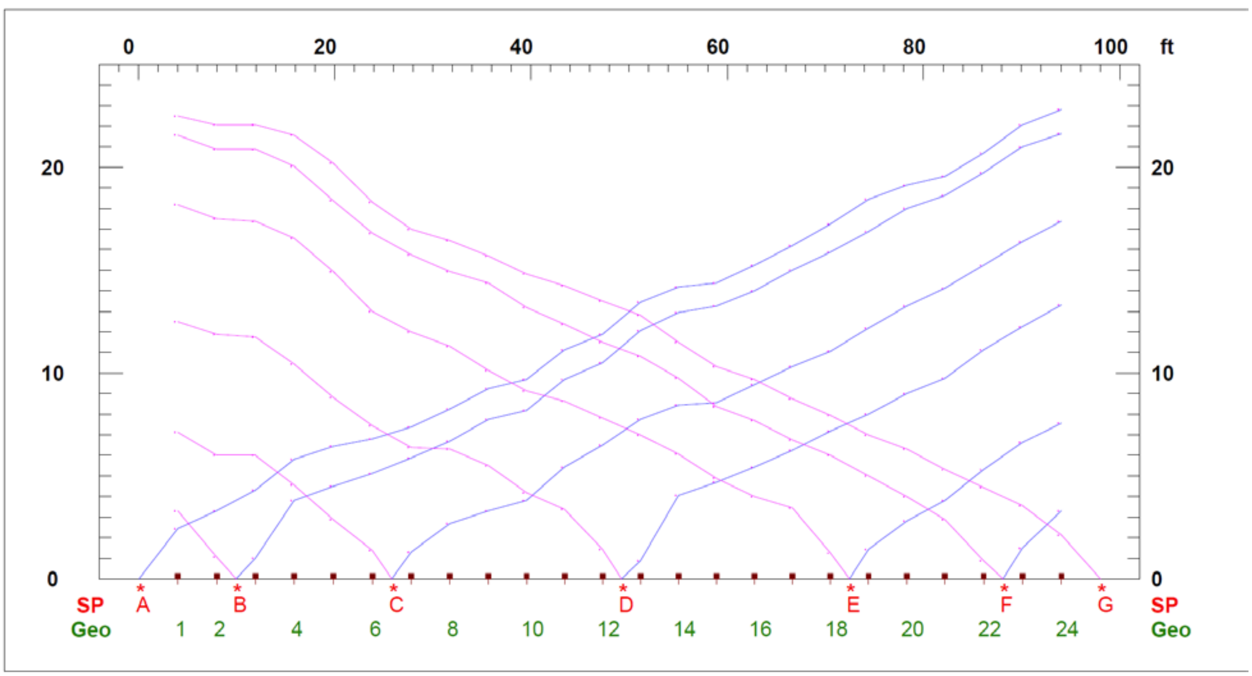
SEISMIC LINE S-3

< West - East >

LAYER VELOCITY MODEL



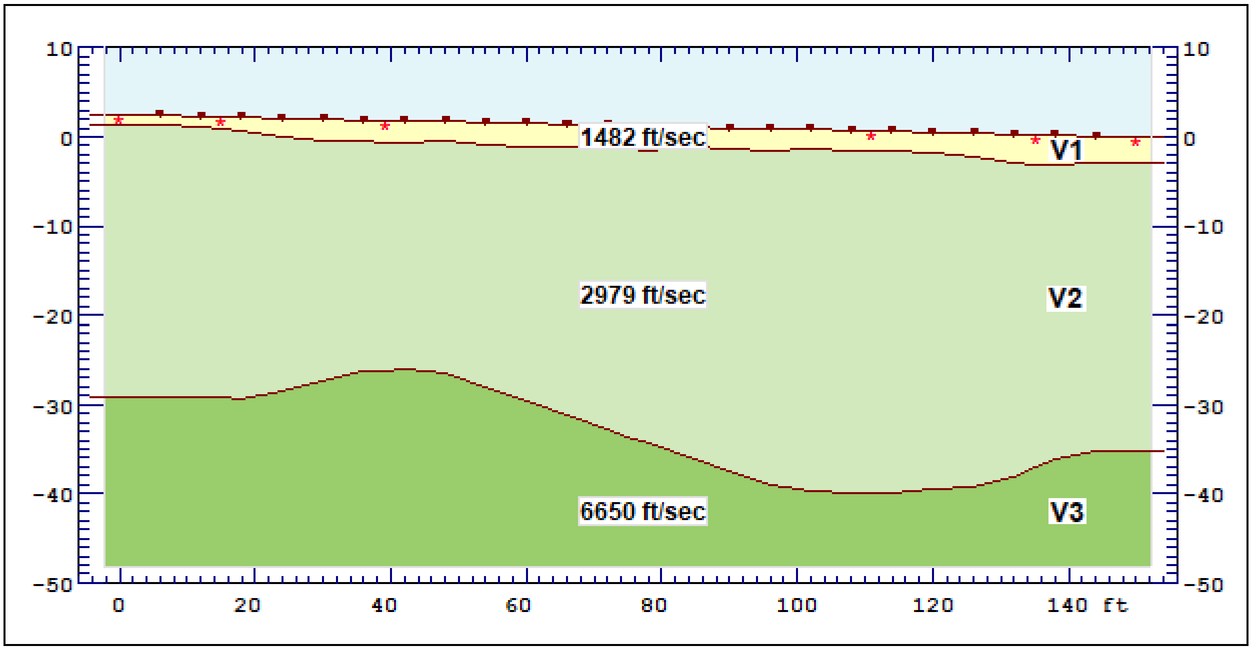
TIME-DISTANCE PLOT



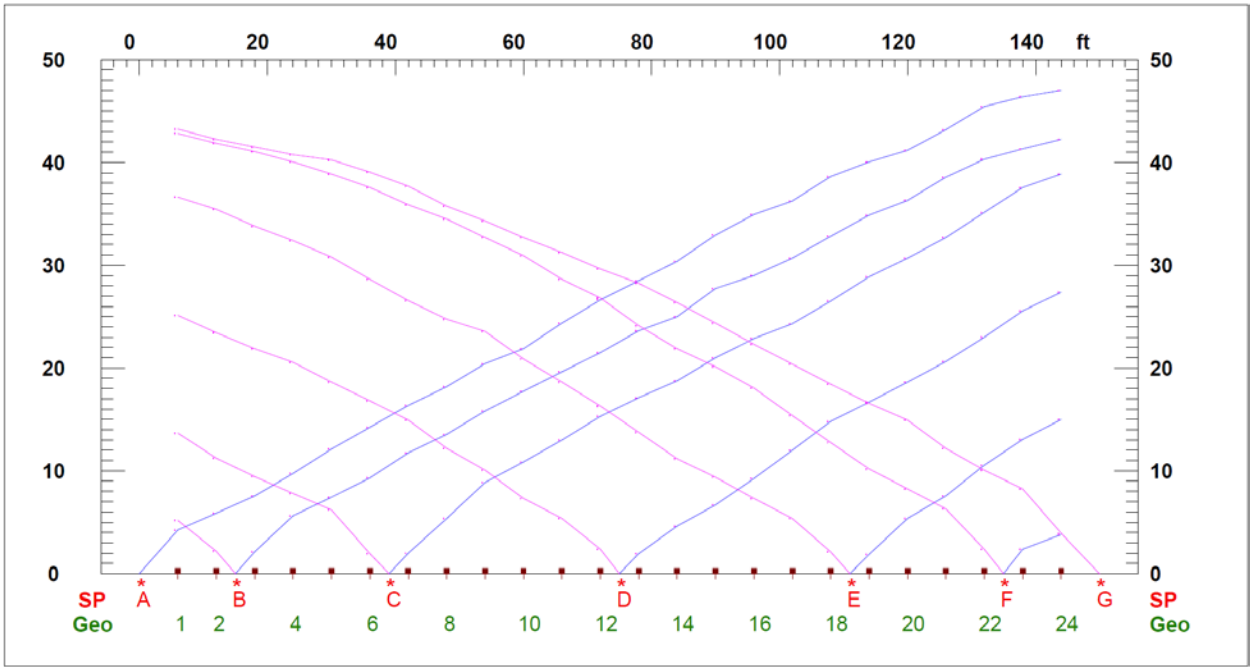
SEISMIC LINE S-4

< North 61° East >

LAYER VELOCITY MODEL



TIME-DISTANCE PLOT



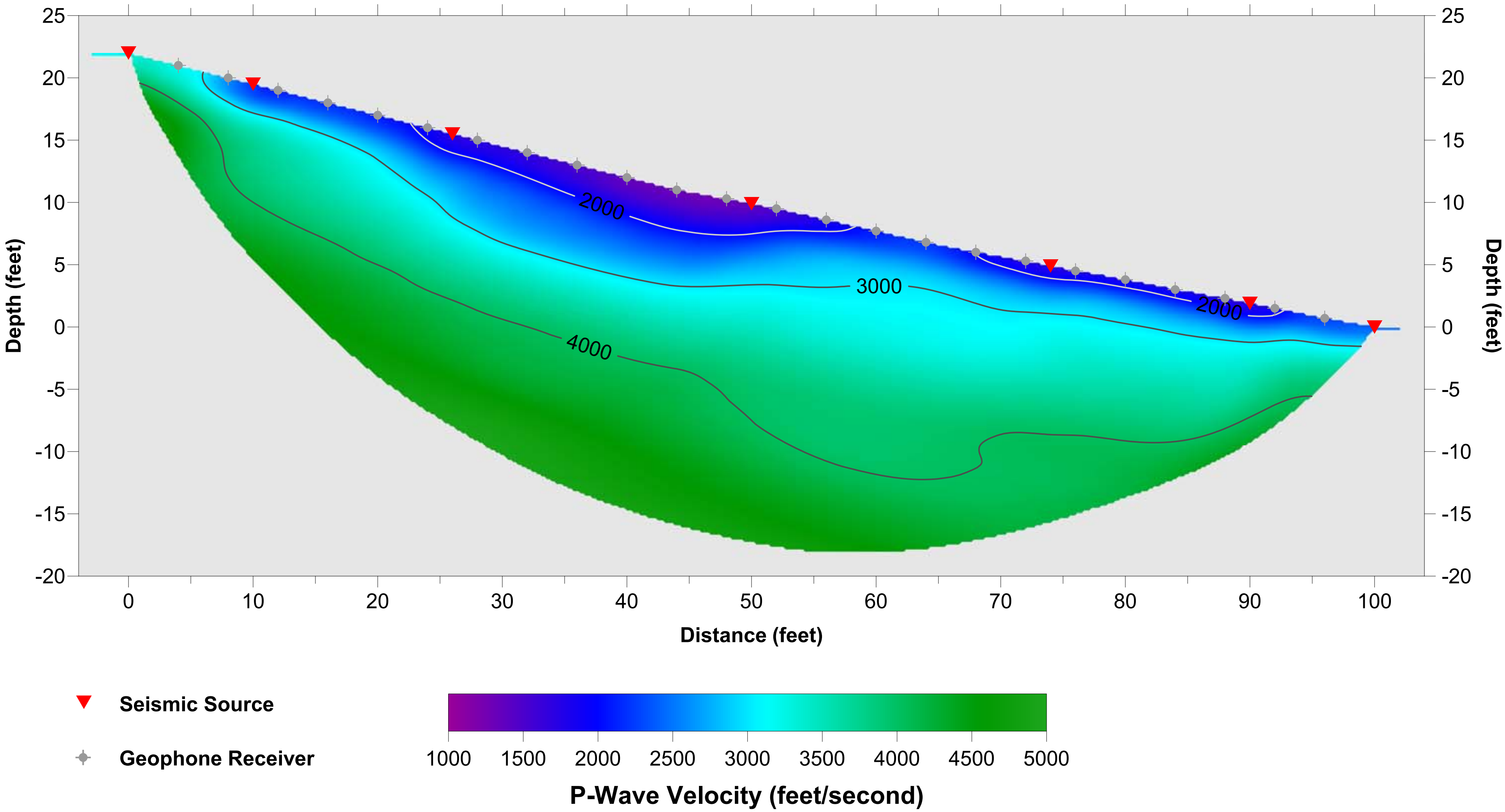
APPENDIX B

REFRACTION TOMOGRAPHIC MODELS

SEISMIC LINE S-1

< West - East >

REFRACTION TOMOGRAPHIC MODEL



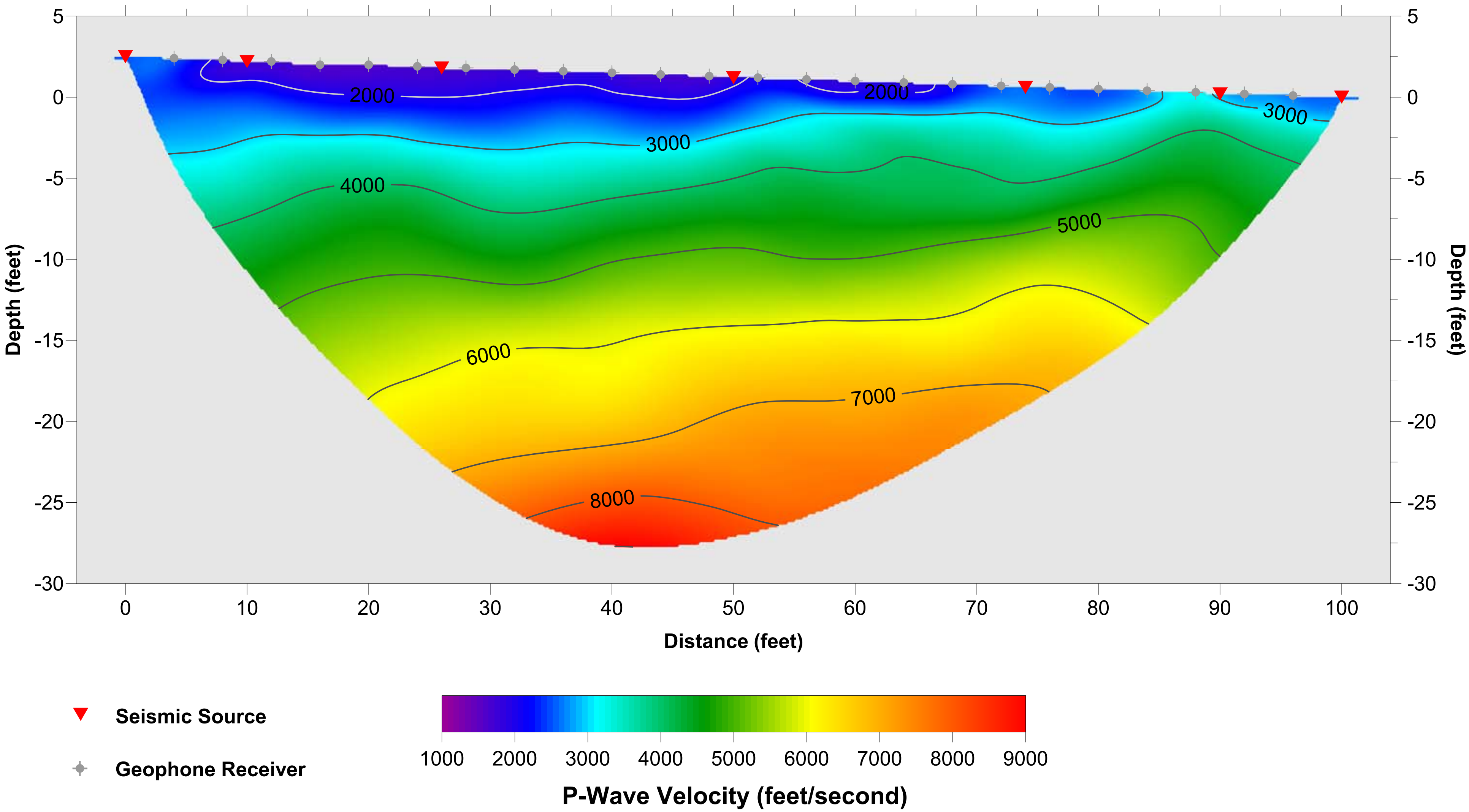
SCALE: 1:1 (Horizontal = Vertical)

RMS error 4.6%; Rayfract Version 4.01

SEISMIC LINE S-2

< South - North >

REFRACTION TOMOGRAPHIC MODEL



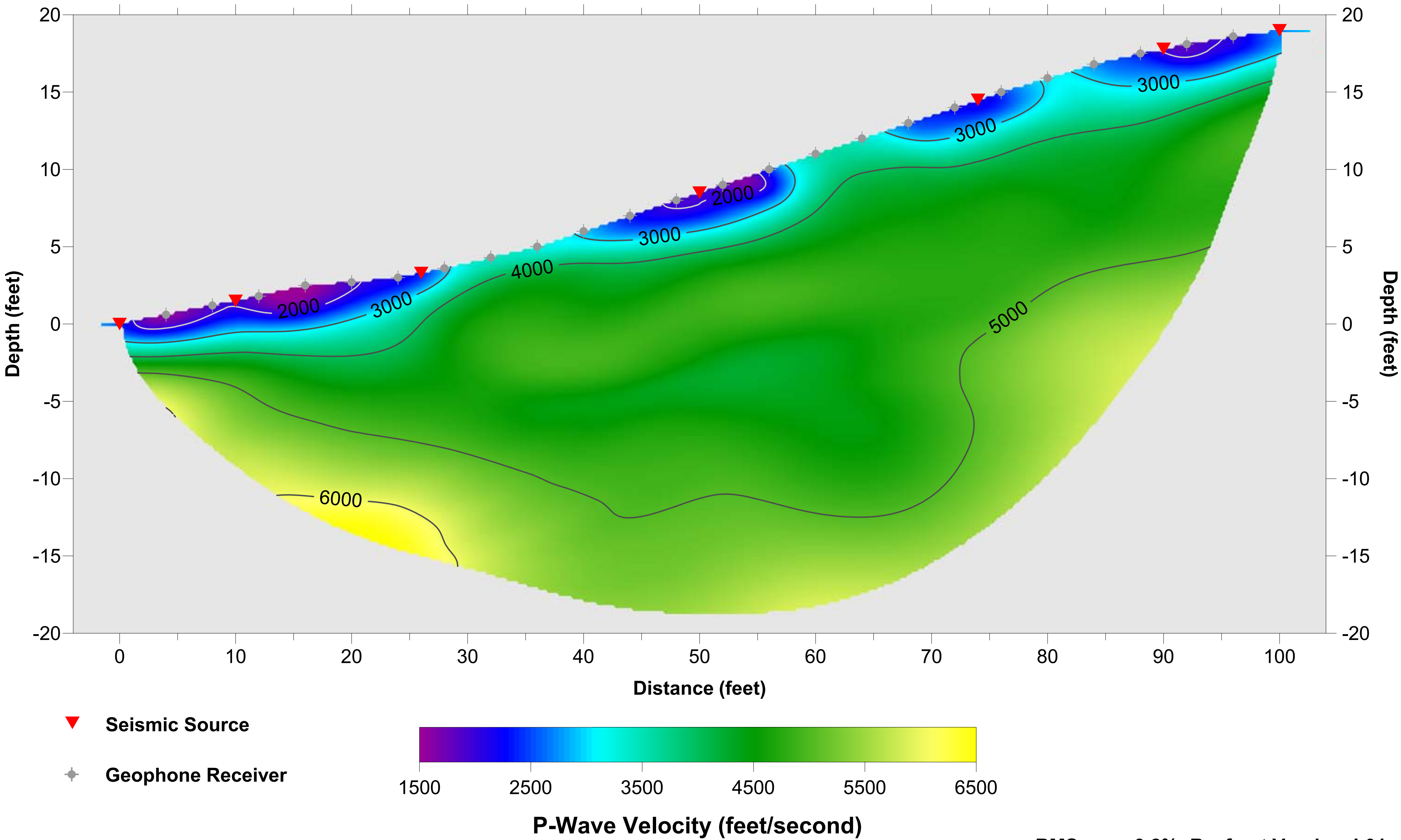
SCALE: Vertical Exaggeration 1.33X

RMS error 2.1%; Rayfract Version 4.01

SEISMIC LINE S-3

< East - West >

REFRACTION TOMOGRAPHIC MODEL



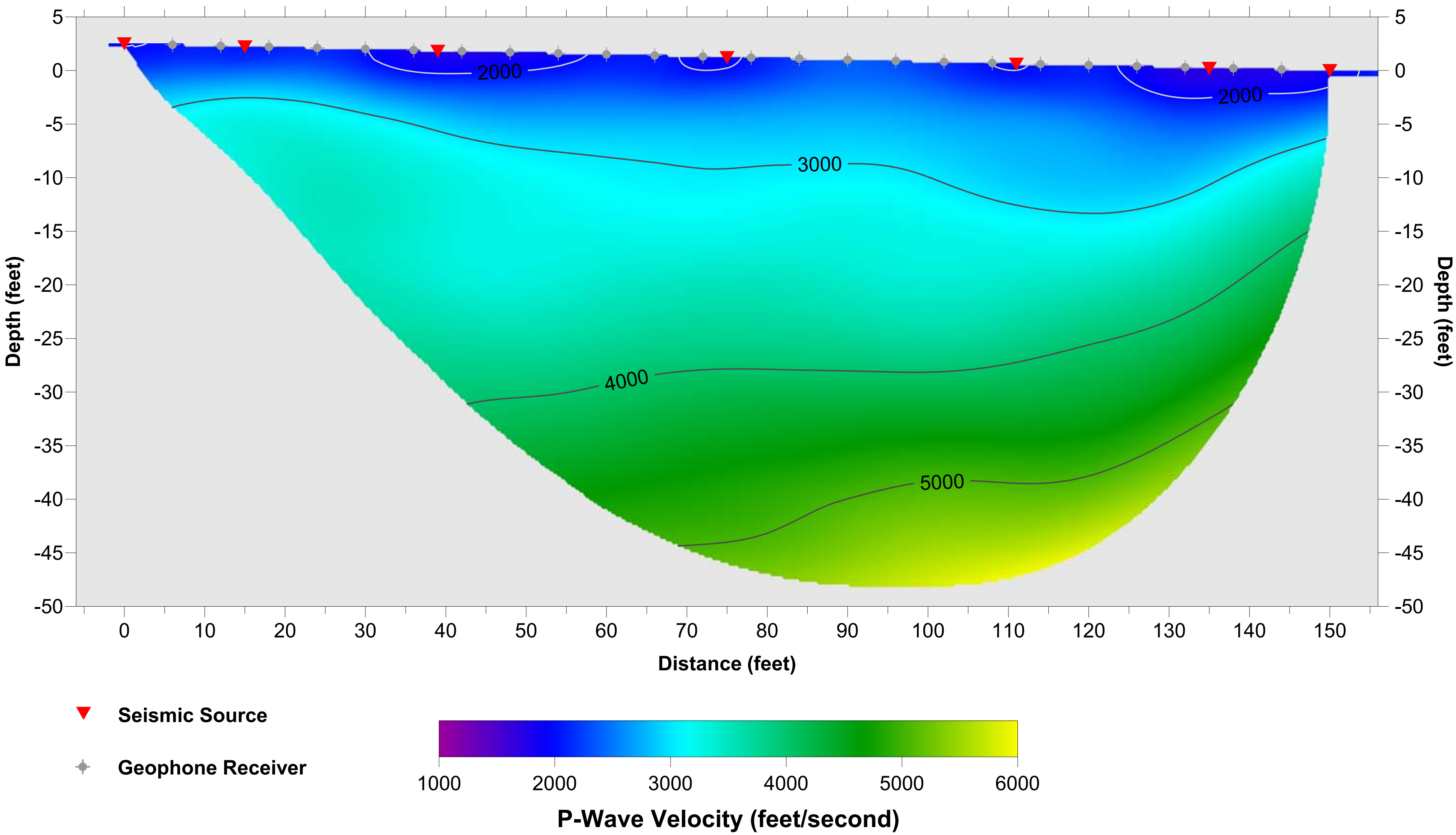
SCALE: Vertical Exaggeration 1.33X

RMS error 3.2%; Rayfract Version 4.01

SEISMIC LINE S-4

North 61° East >

REFRACTION TOMOGRAPHIC MODEL



SCALE: Vertical Exaggeration 1.33X

RMS error 2.4%; Rayfract Version 4.01

APPENDIX C

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REFERENCES

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APPENDIX D –
Soil Corrosivity Evaluation

October 7, 2020 via email: dlind@inlandfoundation.com

INLAND FOUNDATION ENGINEERING
1310 South Santa Fe Ave.
San Jacinto, CA 92583

Attention: Mr. Dan Lind

Re: Soil Corrosivity Study
Quail Valley
Menifee, CA
HDR #20-0551SCS, IFE #E080-058

Introduction

Laboratory tests have been completed on five soil samples selected by HDR from boring logs provided for the referenced project. The purpose of these tests was to determine if the soils might have deleterious effects on underground utility piping and concrete structures. HDR assumes that the samples provided are representative of the most corrosive soils at the site.

The proposed project consists of a new sewage system and multiple construction materials are being considered. The site is located in the Quail Valley area of Menifee, California, and groundwater was encountered as shallow as four feet deep.

The scope of this study is limited to a determination of soil corrosivity and general corrosion control recommendations for materials likely to be used for construction. HDR's recommendations do not constitute, and are not meant as a substitute for, design documents for the purpose of construction. If the architects and/or engineers desire more specific information, designs, specifications, or review of design, HDR will be happy to work with them as a separate phase of this project.

Laboratory Soil Corrosivity Tests

The electrical resistivity of each sample was measured in a soil box per ASTM G187 in its as-received condition and again after saturation with distilled water. Resistivities are at about their lowest value when the soil is saturated. The pH of the saturated samples was measured per ASTM G51. A 5:1 water:soil extract from each sample was chemically analyzed for the major soluble salts commonly found in soil per ASTM D4327, ASTM D6919, and Standard Method 2320-B[1]. Laboratory test results are shown in the attached Table 1.

Soil Corrosivity

A major factor in determining soil corrosivity is electrical resistivity. The electrical resistivity of a soil is a measure of its resistance to the flow of electrical current. Corrosion of buried metal is an electrochemical process in which the amount of metal loss due to corrosion is directly proportional to the flow of electrical current (DC) from the metal into the soil. Corrosion currents, following Ohm's Law, are inversely proportional to soil resistivity. Lower electrical resistivities result from higher moisture and soluble salt contents and indicate corrosive soil. A correlation between electrical resistivity and corrosivity toward ferrous metals is as follows:[2]

Soil Resistivity in ohm-centimeters	Corrosivity Category
Greater than 10,000	Mildly Corrosive
2,001 to 10,000	Moderately Corrosive
1,001 to 2,000	Corrosive
0 to 1,000	Severely Corrosive

Other soil characteristics that may influence corrosivity towards metals are pH, soluble salt content, soil types, aeration, anaerobic conditions, and site drainage.

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[1] *American Public Health Association (APHA). 2012. Standard Methods of Water and Wastewater. 22nd ed. American Public Health Association, American Water Works Association, Water Environment Federation publication. APHA, Washington D.C.*

[2] *Romanoff, Melvin. Underground Corrosion, NBS Circular 579. Reprinted by NACE. Houston, TX, 1989, pp. 166–167.*

Electrical resistivities were in the mildly and moderately corrosive categories with as-received moisture. When saturated, the resistivities were in the moderately to severely corrosive categories. The resistivities dropped considerably with added moisture because the samples were dry as-received.

Soil pH values varied from 6.8 to 7.6. This range is neutral to mildly alkaline.[3] These values do not particularly increase soil corrosivity

The soluble salt content of the samples ranged from low to moderate. Chloride and sulfate were found at low concentrations.

The nitrate concentration in the sample from B-23 was high enough to be aggressive to copper. Ammonium was not detected.

Tests were not made for sulfide and oxidation-reduction (redox) potential because these samples did not exhibit characteristics typically associated with anaerobic conditions.

This soil is classified as severely corrosive to ferrous metals and aggressive to copper.

Corrosion Control Recommendations

The life of buried materials depends on thickness, strength, loads, construction details, soil moisture, etc., in addition to soil corrosivity, and is, therefore, difficult to predict. Of more practical value are corrosion control methods that will increase the life of materials that would be subject to significant corrosion.

The following recommendations are based on the soil conditions discussed in the Soil Corrosivity section above. Unless otherwise indicated, these recommendations apply to the entire site or alignment.

Ductile Iron Pipe

1. To prevent dissimilar metal corrosion cells and to facilitate the application of cathodic protection, electrically insulate underground iron pipe from dissimilar metals and from above ground iron pipe with insulating joints per NACE SP0286.

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[3] Romanoff, Melvin. Underground Corrosion, NBS Circular 579. Reprinted by NACE. Houston, TX, 1989, p. 8.

2. Bond all nonconductive type joints for electrical continuity. Electrical continuity is necessary for corrosion monitoring and cathodic protection.

3. Install corrosion monitoring test stations to facilitate corrosion monitoring and the application of cathodic protection:

   a. At each end of the pipeline.

   b. At each end of any casings.

   c. Other locations as necessary so the interval between test stations does not exceed 1,200 feet.

4. Choose one of the following corrosion control options:

   OPTION 1

   a. Apply a suitable coating intended for underground use such as:

      i. Polyethylene encasement per AWWA C105; *or*

      ii. Epoxy coating; *or*

      iii. Polyurethane; *or*

      iv. Wax tape.

      NOTE: The thin factory-applied asphaltic coating applied to ductile iron pipe for transportation and aesthetic purposes does not constitute a corrosion control coating.

   b. Apply cathodic protection to cast and ductile iron piping as per NACE SP0169.

   OPTION 2

   As an alternative to the coating systems described in Option 1 and cathodic protection, concrete encase all buried portions of metallic piping so that there is a minimum of three inches of concrete cover provided over and around surfaces of pipe, fittings, and valves using any type of ASTM C150 cement.

NOTE: Some iron piping systems, such as for fire water piping, have special corrosion and cathodic protection requirements that must be evaluated for each specific application.

Cast Iron Soil Pipe

1. Protect cast iron soil pipe with either a double wrap 4-mil or single wrap 8-mil polyethylene encasement per AWWA C105.

2. It is not necessary to bond the pipe joints or apply cathodic protection.

3. Provide six inches of clean sand backfill all around the pipe. HDR recommends the following parameters for clean sand backfill:

    a. Minimum saturated resistivity of no less than 3,000 ohm-cm; *and*

    b. pH between 6.0 and 8.0.

    c. All backfill testing should be performed by a corrosion engineering laboratory.

Plastic and Vitrified Clay Pipe

1. No special corrosion control measures are required for plastic and vitrified clay piping placed underground.

2. Protect all metallic fittings and valves with wax tape per AWWA C217, or with epoxy and appropriately sized cathodic protection per NACE SP0169.

All Pipe

1. On all pipes, appurtenances, and fittings not protected by cathodic protection, coat bare metal such as valves, bolts, flange joints, joint harnesses, and flexible couplings with wax tape per AWWA C217 after assembly.

2. Where metallic pipelines penetrate concrete structures such as building floors, vault walls, and thrust blocks use plastic sleeves, rubber seals, or other dielectric material to prevent pipe contact with the concrete and reinforcing steel.

Concrete Structures and Pipe

1. From a corrosion standpoint, any type of ASTM C150 cement may be used for concrete structures and pipe because the sulfate concentration is negligible, from 0 to 0.10 percent.[4,5,6]

2. Standard concrete cover over reinforcing steel may be used for concrete structures and pipe in contact with these soils due to the low chloride concentrations[7] found onsite. Limit the water-soluble chloride ion content in the concrete mix design to less than 0.3 percent by weight of cement.

3. Due to the high groundwater table encountered at this site, cyclical or continual wetting may be an issue. Any contact between concrete structures and groundwater should be prevented.

    a. For structures that extend below the water table, contact can be prevented with an impermeable waterproofing system. Options include a membrane such as Grace PrePrufe® products, a liquid applied barrier coating, or a waterproofing admixture such as Xypex® Admix, Visqueen, similar rolled barriers, or bentonite-based membranes are not viable waterproofing systems for corrosion protection.

    b. For structures above the water table, contact can be prevented with a gravel capillary break under the concrete and a vapor retarding membrane. Note that per ASTM E1643, "vapor retarders are not intended to provide a waterproofing function." [8] Alternatively, an impermeable waterproofing system may be used.

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[4] 2015 International Building Code (IBC) which refers to American Concrete Institute (ACI) 318-14 Table 19.3.2.1

[5] 2015 International Residential Code (IRC) which refers to American Concrete Institute (ACI) 318-14 Table 19.3.2.1

[6] 2016 California Building Code (CBC) which refers to American Concrete Institute (ACI) 318-14 Table 19.3.2.1

[7] Design Manual 303: Concrete Cylinder Pipe. Ameron. p.65

[8] ASTM E1643-11 (2017): Standard Practice for Selection, Design, Installation, and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs. ASTM International, 2017.

Closure

The analysis and recommendations presented in this report are based upon data obtained from the laboratory samples. This report does not reflect variations that may occur across the site or due to the modifying effects of construction. If variations appear, HDR should be notified immediately so that further evaluation and supplemental recommendations can be provided.

HDR's services have been performed with the usual thoroughness and competence of the engineering profession. No other warranty or representation, either expressed or implied, is included or intended.

Please call if you have any questions.

Respectfully Submitted,
HDR Engineering, Inc.

REGISTERED PROFESSIONAL ENGINEER
MARC E. N. WEGNER
No. C73862
Exp. 06/30/21
CIVIL
STATE OF CALIFORNIA

James Keegan
Corrosion and Lab Services Section Manager

Marc E N Wegner, PE
Senior Corrosion Project Manager

Enc: Table 1

Table 1 - Laboratory Tests on Soil Samples

Inland Foundation Engineering
Quail Valley
Your #E080-058, HDR Lab #20-0551SCS
5-Oct-20

Sample ID		Units	B-2 @ 2.5'	B-5 @ 9.5-10.5'	B-13 @ 0.5'-2.5'	B-16	B-23 @ 2-6'
Resistivity		**Units**					
as-received		ohm-cm	2,160,000	3,040	168,000	112,000	128,000
saturated		ohm-cm	1,000	920	2,880	3,480	2,600
pH			7.6	6.9	6.9	7.6	6.8
Electrical Conductivity		mS/cm	0.32	0.16	0.09	0.09	0.10
Chemical Analyses							
Cations							
calcium	Ca^{2+}	mg/kg	45	18	19	12	12
magnesium	Mg^{2+}	mg/kg	14	8.7	9.9	5.6	5.7
sodium	Na^{1+}	mg/kg	226	103	25	50	47
potassium	K^{1+}	mg/kg	18	22	13	13	11
Anions							
carbonate	CO_3^{2-}	mg/kg	72	ND	ND	ND	ND
bicarbonate	HCO_3^{1-}	mg/kg	619	198	171	189	159
fluoride	F^{1-}	mg/kg	9.3	14	9.6	2.8	5.0
chloride	Cl^{1-}	mg/kg	120	90	33	15	12
sulfate	SO_4^{2-}	mg/kg	160	72	19	42	31
phosphate	PO_4^{3-}	mg/kg	ND	ND	ND	ND	ND
Other Tests							
ammonium	NH_4^{1+}	mg/kg	ND	ND	ND	ND	ND
nitrate	NO_3^{1-}	mg/kg	6.0	8.0	35	8.6	113
sulfide	S^{2-}	qual	na	na	na	na	na
Redox		mV	na	na	na	na	na

Resistivity per ASTM G187, Cations per ASTM D6919, Anions per ASTM D4327, and Alkalinity per APHA 2320-B.
Electrical conductivity in millisiemens/cm and chemical analyses were made on a 1:5 soil-to-water extract.
mg/kg = milligrams per kilogram (parts per million) of dry soil.
Redox = oxidation-reduction potential in millivolts
ND = not detected
na = not analyzed

431 West Baseline Road · Claremont, CA 91711
Phone: 909.962.5485 · Fax: 909.626.3316

APPENDIX E

Supplemental Geotechnical Investigation Report

INLAND FOUNDATION ENGINEERING, INC.
Consulting Geotechnical Engineers and Geologists
www.inlandfoundation.com

February 15, 2022
Project No. E080-062

ENGINEERING RESOURCES OF SOUTHERN CALIFORNIA, INC.
1861 West Redlands Boulevard
Redlands, California 92373

Attention: Erik T. Howard, PE, PLS

Subject: Geotechnical Investigation Report
EMWD Quail Valley Goetz Road Sewer Extension Project

Dear Mr. Howard:

We are pleased to submit this geotechnical investigation report for the subject project. The investigation indicates the proposed sewer project is feasible from a geotechnical engineering standpoint. The primary geotechnical issue that will require mitigation will be difficult excavation related to near-surface bedrock.

We appreciate being of service to you on this project. If you have any questions, please contact our office.

Respectfully,

INLAND FOUNDATION ENGINEERING, INC.

Daniel R. Lind, Project Geologist
P.G. 7681/C.E.G. 2451

Allen D. Evans, President
R.C.E. 38104/G.E. 2060

DRL:ADE:es
Distribution: Addressee

TABLE OF CONTENTS

INTRODUCTION

This report presents the results of the geotechnical investigation conducted for the Eastern Municipal Water District (EMWD) Quail Valley Goetz Road Sewer Extension project. The following references were used for this study.

- Geotechnical Feasibility Investigation, Quail Valley Sewer Project, Quail Valley Area, Riverside County, California, dated August 23, 2005, prepared by Inland Foundation Engineering, Inc.

- Geotechnical Investigation Report, EMWD Quail Valley Sub-Area 4 Sewerage Feasibility Study and Sewer System Backbone Preliminary Design Project, dated November 20, 2020, prepared by Inland Foundation Engineering, Inc.

- Plan entitled "Quail Valley Goetz Road Sewer Extension Design Alternatives Exhibit, undated, prepared by Engineering Resources of Southern California.

SCOPE OF SERVICE

The purpose of this geotechnical investigation was to provide supplemental geotechnical design and construction recommendations for the proposed project. The scope of service included:

- Information review of previous studies (referenced above).

- Site reconnaissance to locate proposed borings for utility clearance and to coordinate with Underground Service Alert for underground utility location.

- Subsurface geotechnical exploration consisting of four (4) eight-inch diameter borings and two seismic refraction traverses.

- Geotechnical laboratory testing.

- Data analysis and report preparation.

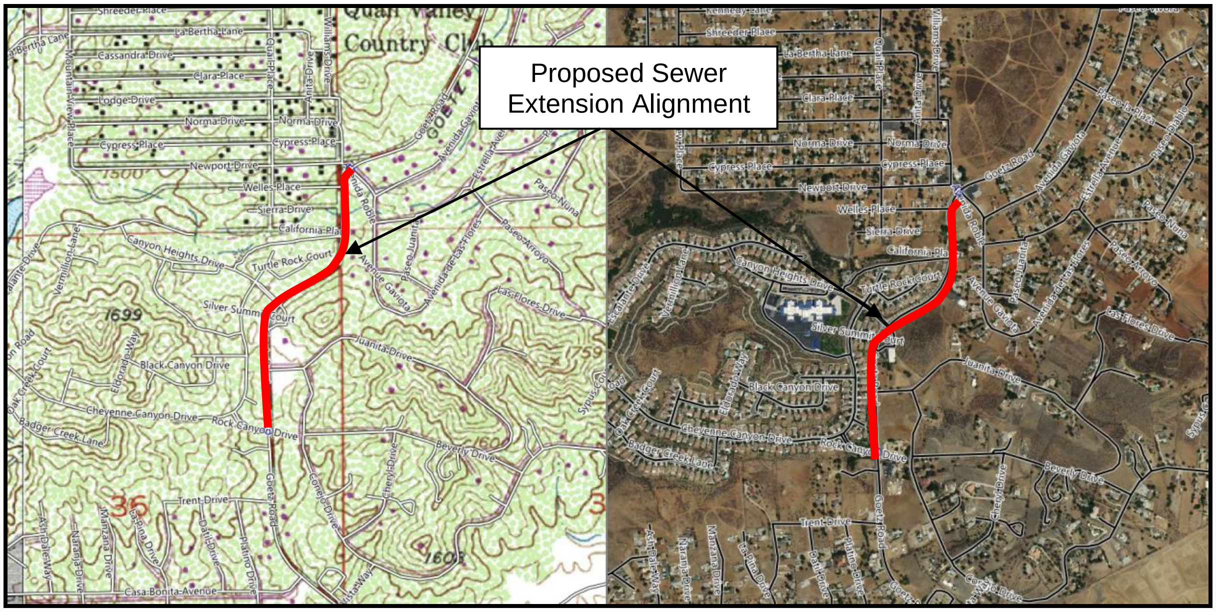
Evaluation of hazardous waste was not within the scope of service provided. Evaluation of seismic hazards was based on field mapping, literature review and subsurface exploration.

SITE AND PROJECT DESCRIPTION

The sewer extension project will be located in Goetz Road in the City of Menifee, California. The project will have a total length of about 2,900 feet, commencing near

Rock Canyon Drive and ending at Avenida Robles. The location of the proposed sewer extension along Goetz Road is shown on Figure 1 below.

<u>Figure 1</u>: USGS Topographic Map, Romoland 7.5' Quadrangle, and Aerial Photograph (2018)



The proposed sewer extension will consist of 12 and 15-inch diameter gravity sewer main. Cover depths over the pipe will range from approximately 10 to 28 feet.

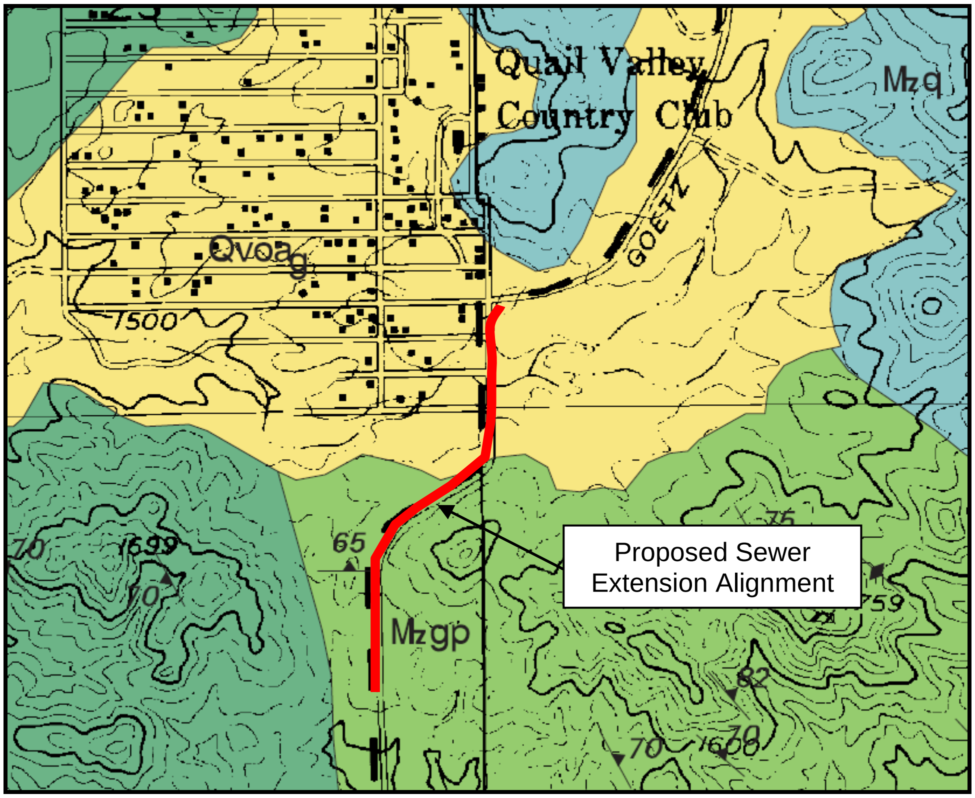
GEOLOGIC SETTING

The project area is situated within the Perris Block, an eroded mass of Cretaceous and older crystalline rock. Thin sedimentary and volcanic units mantle the bedrock in a few places with alluvial deposits filling in the lower valley areas. The Perris Block is a structurally stable, internally unfaulted mass of crustal rocks bounded on the west by the Elsinore-Chino fault zones, on the east by the San Jacinto fault zone, and on the north by the Cucamonga fault zone (Woodford, et al., 1971). On the south, the Perris Block is bounded by a series of sedimentary basins that lie between Temecula and Anza (Morton and Matti, 1989).

Locally, as mapped by Morton (2003), the southerly portion of the sewer extension alignment is underlain by metasedimentary rock including intermixed greywacke and phyllite bedrock (map symbol Mzgp). The northerly portion of the sewer extension alignment is mapped as being mantled by very old (middle to early Pleistocene-age) alluvial fan deposits (map symbol Qvoa) generally described as consisting of well-dissected, well-indurated, reddish-brown sands and gravels.

Figure 2 below is a portion of the USGS Geologic Map of the Romoland 7.5' Quadrangle (Morton, 2003) depicting the mapped geologic units in the vicinity of the project.

Figure 2: **USGS Geologic Map of the Romoland 7.5' Quadrangle**



Mzgp — **Intermixed graywacke and phyllite (Mesozoic)**—Intermixed lithic graywacke and phyllite. Other metasedimentary rocks may be present in small amounts

Qvoa — **Very old alluvial channel deposits (middle to early Pleistocene)**—Fluvial sediments deposited on canyon floors. Consists of moderately to well-indurated, reddish-brown, mostly very dissected gravel, sand, silt, and clay-bearing alluvium. In places, includes thin, discontinuous alluvial deposits of Holocene age. Deposits in Quail Valley area contain rounded cobbles

SUBSURFACE CONDITIONS

Subsurface exploration for the proposed sewer extension consisted of four (4) exploratory borings to depths ranging from approximately 4 to 37 feet below existing ground surface (bgs). The site exploration is described in Appendix A. Boring locations are shown on Figure A-7.

As encountered in the exploratory borings, the alignment is underlain by near surface metasedimentary bedrock at depth of approximately 1 to 6.5 feet bgs. Bedrock was encountered immediately below the pavement in borings B-01 and B-03, and at a depth of 3 feet in boring B-02. Within boring B-04, a mantle of alluvial soil consisting of clayey sand (SC) and sandy clay (CL) was encountered to a depth of 6.5 feet, underlain by bedrock.

The bedrock materials encountered are typically gray-brown to olive-brown, moderately to slightly fractured, highly to slightly weathered and very hard and dense. When broken down into soil-size particles, the bedrock classifies as clayey sand (SC) and silty clayey sand (SC-SM) with gravel.

Groundwater: Groundwater was not encountered within our exploratory borings, which extended from shallow refusal to approximately 37 feet below the existing ground surface. Possible groundwater soil mottling was observed at a depth of approximately 31.5 feet in boring B-02, evidence of higher and likely seasonal groundwater levels at this location.

Seasonal variation in groundwater depths is expected. Depending on seasonal precipitation and the potential rise in groundwater levels regionally, groundwater may be encountered during construction excavation, where it may cause instability within the alluvial soils exposed in the excavation sidewalls. Groundwater may also be encountered during excavation within the upper portions of the bedrock. Groundwater conditions observed during drilling may not accurately reflect conditions during or following periods of precipitation, or conditions that will be encountered during construction excavation.

Excavation and Rippability: Drill rig auger refusal in dense bedrock conditions was encountered above the planned pipe bottom elevation within borings B-01 and B-03. The locations and depths where auger refusal was encountered are shown in Table 1.

Table 1: Depth to Auger Refusal Encountered

Boring No.	Approx. Station.	Depth to Auger Refusal (ft)	Depth to Bottom of Pipe (ft)
B-01	62+00	16	18
B-02	68+50	37	30
B-03	75+00	4	16
B-04	81+00	11	10

A seismic refraction survey was performed by Terra Geosciences to evaluate the subsurface excavation and rippability characteristics at two locations along the proposed sewer alignment. Terra Geosciences also performed a seismic refraction survey for the referenced 2020 geotechnical investigation report. The approximate locations of the seismic refraction lines are shown on the attached site plan (Figure A-7). Table 2 below summarizes the results of the seismic refraction surveys with respect to the “weighted average” seismic velocities for each layer.

Table 2: Seismic Refraction Summary

	V1 layer	V2 layer	V3 layer
Seismic Line	**Velocity (fps)**	**Velocity (fps)**	**Velocity (fps)**
S-1	1,182	2,856	5,024
S-2	1,488	4,484	10,456
S-4 (2020)	1,482	2,979	6,650

Following is a generalized discussion of the velocity layers described in the seismic refraction report. The Terra Geosciences report is appended and should be reviewed for further understanding of the methodology and limitations of this study.

Velocity Layer V1: The uppermost V1 layer yielded a seismic velocity range of 1,182 to 1,488 fps and is likely composed of localized artificial fill, topsoil, colluvium, and/or highly weathered metasedimentary bedrock. The relatively low velocity ranges encountered within this layer indicate that no excavating difficulties should be expected.

Velocity Layer V2: This layer yielded seismic velocities of 2,856 to 4,484 fps, which is believed to be moderately weathered metasedimentary bedrock materials. These rocks may be generally homogenous with a relatively wide spaced joint/fracture system and/or may include relatively fresher boulders within a completely decomposed bedrock matrix.

With the assumed use of large excavator-type equipment, these materials should excavate with minor to significant difficulty, depending on hardness. Additionally, deep trenching typically results in a loss of mechanical and weight advantage for excavators, resulting in the need for some breaking and/or light blasting to obtain desired grade, in addition to encountering velocities generally greater than 4,000± fps. The possibility of encountering isolated floaters (i.e. boulders, corestones, lithologic variations, etc.) could also produce somewhat difficult conditions locally and may require blasting and/or breaking.

Velocity Layer V3: This layer indicates the presence of slightly to moderately weathered metasedimentary bedrock, with a seismic velocity range of 5,024 to 10,456 fps. Based on the Terra Geosciences report, these higher velocities signify the decreasing effect of weathering as a function of depth and could indicate a moderately weathered bedrock matrix that has a wide-spaced fracture system, or possibly the presence of abundant widely scattered buried fresh large crystalline boulders in a relatively less-weathered matrix. Difficult excavation within this deeper velocity layer should be anticipated. Continuous blasting/breaking will likely be necessary within this velocity layer to achieve desired invert grades.

To our knowledge, there is no currently published rippability data that compares the performance of conventional trenching equipment with seismic velocity. Rippability comparison charts published by Caterpillar (2000 and 2019) are for conventional bulldozer equipment and cannot be directly correlated. However, our experience is that trenching operations (using large excavators) within bedrock materials having seismic velocities higher than 4,000 - to 4,500± fps typically encounter very difficult to non-productive conditions, depending on the type and size of the equipment being used.

CONCLUSIONS AND RECOMMENDATIONS

On the basis of the subsurface exploration and laboratory testing, construction of the proposed sewer extension project is feasible from a geotechnical engineering standpoint. The primary geotechnical issue that will require mitigation is the presence of near surface bedrock within the limits of the proposed pipeline excavation. Blasting or other means will likely be necessary to achieve pipe invert grades.

All work should be performed in accordance with EMWD requirements. The following sections present recommendations and conclusions for project design and construction.

1. **Excavation and Shoring:** Soil within the project area generally consists of a shallow alluvial and residual soil mantle, underlain by moderately to slightly weathered metasedimentary bedrock. Based on the Terra Geosciences seismic refraction report, increasing hardness with depth and lateral variations due to varying lithologic bedding layers should be anticipated.

   At the locations of seismic lines S-1 and S-4 (2020), moderately difficult excavation should be expected. Blasting at these locations is not anticipated but could be necessary. Exploratory borings extended to near or below planned pipe bottom elevations in this portion of the alignment before encountering drilling refusal.

   At the location of seismic line S-2, very difficult excavation should be expected. Exploratory boring B-03 penetrated to a depth of only 4 feet near this location before drilling refusal was encountered. Blasting or other specialized excavation will likely be required in this portion of the alignment.

Excavation characteristics and the need for blasting will vary significantly. The contractor should make his own evaluation regarding excavation difficulty and the need for blasting.

All trenches and other excavations should be configured and shored in accordance with Cal/OSHA requirements. Preliminarily, the soil within the limits of the proposed excavation should be considered as Type C, according to Cal/OSHA criteria. The contractor should have a "competent person" on-site for the purpose of assuring safety within and about all construction excavations. For Type C soil, unshored excavations should have a maximum slope of 1.5:1 (H:V) and should not exceed twenty feet in height.

The soil and weathered bedrock will be subject to caving when exposed in unshored excavations. If a trench shield is used, diligent monitoring will be necessary to ensure that all caved and loose soil is removed or compacted. The potential for caving associated with existing backfill of other utilities should also be considered during excavation and construction for the sewer.

Shoring, shields, or other protective systems should be used in accordance with all specifications, recommendations, and limitations provided by the manufacturer. Braced shoring should be designed using an at-rest earth pressure of 65 pounds per cubic foot. Cantilever shoring should be designed using an active earth pressure of 43 pounds per cubic foot. A registered professional engineer should design shoring or benching for excavations deeper than twenty feet.

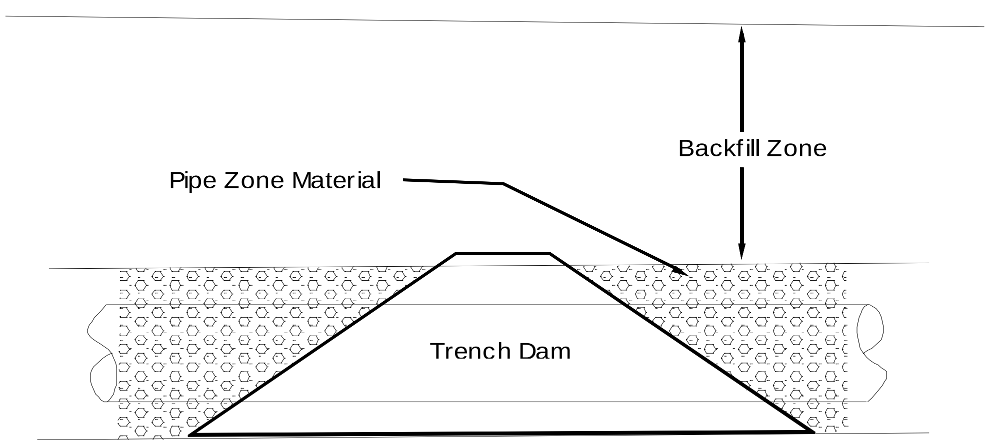
The pipe trench should be excavated to the line and grade shown on the drawings. The pipe trench should provide at least 12 inches of clearance between the edge of the pipe and the wall of the trench. The sides of the trench should be parallel to the pipe and maintained a uniform distance from the pipe.
If excavation for the pipe extends below the design invert grade, the bottom of the excavation should be refilled with approved material. Where soft or otherwise unstable materials are encountered, the excavation should be deepened and stabilized with gravel or other approved bedding material. All excavations should be free of trash, debris, or other unsuitable material prior to the placement of backfill.

2. **Groundwater:** Groundwater was not encountered within the exploratory borings, which extended from shallow refusal to approximately 37 feet below the existing ground surface. Possible groundwater soil mottling was observed at a depth of approximately 31.5 feet in boring B-02, evidence of higher and likely seasonal groundwater levels at this location.

Where groundwater is encountered during excavation above the pipe invert grade, it could destabilize excavation sidewalls and should be removed from outside the trench. If groundwater enters the excavations from the bottom, the excavation process should be discontinued to reduce the potential for base heave.

Groundwater conditions should be expected to fluctuate seasonally and from year-to-year, depending upon the weather and rainfall. The groundwater data in this report is representative of the conditions at the time of our exploration and may not reflect the conditions during construction. Therefore, the local groundwater conditions should be assessed by the contractor prior to the commencement of trenching to determine if groundwater will adversely affect the construction process. The contractor should be solely responsible for dewatering system design and operation.

In the constructed condition, groundwater may cause future difficulties if imported granular material placed in the pipe zone acts as a conduit or drain. This may be mitigated by the placement of clay trench dams. Trench dams are recommended at maximum 500-foot intervals where groundwater may encroach within the pipe zone. Elsewhere, dams should be placed as directed in the field by the engineer. Dams should be constructed using material having a coefficient of permeability of less than 10^{-6} cm/sec and should be placed within and extending at least six inches outside of the pipe zone for a distance of at least 2 feet at the top and five feet at the base as indicated in the following diagram:



The contractor should submit plans for any alternative trench dams for review and approval.

3. **Pipe Bedding:** The native soil within the project area is generally <u>not</u> suitable for use as pipe bedding. Pipe bedding material should comply with the pipe manufacturer's recommendations or EMWD Std. Dwg. SB-157, Pipe Zone

Bedding for Sewer Pipe. A minimum bedding thickness of 6 inches should be placed to provide uniform and adequate longitudinal support under the pipe. The bedding material should not be compacted within 6 inches of the bottom of the pipe. Blocking should not be used to bring the pipe to grade. Bell holes at each joint should be provided to permit the joint to be assembled properly while maintaining uniform pipe support.

4. **Excavation Backfill and Compaction**: All excavation backfill and compaction should be in accordance with EMWD Std. Dwg. SB-158, Trench Backfill for Sewer Pipe, and the following recommendations.

   Pipe Zone Backfill: Pipe zone backfill, extending from the top of pipe bedding to at least 12 inches over the top of pipe, should be free of organic matter and deleterious substances, contain no rocks larger than three (3) inches and no more than 15 percent rocks larger than two (2) inches. In general, the native soil within the project area is not suitable for use as pipe zone backfill.

   Imported pipe zone backfill should consist of clean, cohesionless soil having a sand equivalent greater than 30 and fewer than 10% particles finer than the No. 200 Sieve. To provide protection from particle migration, imported pipe zone material should also meet the following criteria:

   $$D_{15} > 0.15 \text{ and } D_{50} < 5 \text{ mm},$$

   where D_{15} and D_{50} represent bedding material particle sizes corresponding to 15 and 50 percent passing by weight, respectively. Concrete sand conforming to the requirements of ASTM C 33 will meet the piping criteria for this project. If this criteria cannot be met, a filter fabric should be used.

   Pipe zone material should be placed and compacted in a manner that will assure firm continuous encasement for the pipe. The minimum relative compaction within the pipe zone should be 90 percent unless otherwise specified. Flooding or jetting and vibratory compaction may be carefully used with imported pipe zone material meeting the above requirements.

   Trench Backfill: Trench backfill material over the pipe zone should be native or approved granular soil free of organic and deleterious materials, rocks or lumps greater than 3 inches in greatest dimension and other unsuitable material. In general, the native soil is suitable for use as trench backfill. Trench backfill may be compacted at near optimum moisture content by mechanical means as necessary for the achievement of satisfactory compaction. Flooding or jetting is not recommended. Unless otherwise specified by the drawings, specifications or encroachment permits, the minimum acceptable degree of compaction should be 90 percent of the maximum dry density. The upper 12 inches of trench backfill in pavement areas which should be compacted to a minimum of 95 percent relative compaction.

5. **Lateral Earth Pressure / Friction Coefficient:** Cantilever walls supporting native or compacted on-site fill soils should be designed using an equivalent active earth pressure of 43 pounds per cubic foot (pcf) for level backfill. Braced walls should be designed for at-rest earth pressure of 65 pcf, with the resultant applied at mid-height.

   A passive equivalent fluid pressure of 260 pcf can be used for resistance to lateral loads against compacted fill or dense native soil. A coefficient of friction of 0.40 between soil and concrete is suitable for use with dead load forces only.

6. **Corrosion:** Analytical testing indicates that sulfate concentrations are less than 0.10 percent. In accordance with ACI 201.2R, Table 6.1.4.1a, the soil can be classified as Class S0 with respect to sulfate exposure.

   Tested chloride concentrations of 36 and 34 ppm generally are not at levels high enough to be of concern with respect to corrosion of ferrous metals. The results should be considered in combination with the chloride content of the hardened concrete in evaluating the effect of chloride on reinforcing steel.

   The soil is slightly alkaline with pH values ranging of 7.4 and 7.6.

   Tested saturated resistivity values of 1,861 and 4,112 ohm-cm indicate the soil is moderately corrosive to corrosive with respect to buried ferrous metal. Specific corrosion control measures, such as coating of pipe with non-corrosive material or alternative non-metallic pipe material, are considered to be necessary if there is a potential for saturated soil.

7. **Pavement:** The following Table 3 summarizes the asphalt pavement sections encountered in the borings.

Table 3: Existing Pavement Sections

Boring	Asphalt Concrete Thickness (in.)	Aggregate Base Thickness (in.)
B-01	10	6
B-02	10	6
B-03	8	None
B-04	8	None

Where existing pavement is not replaced in kind, new pavement should be constructed in accordance with the recommendations in Table 4 below.

Table 4: Tentative Structural Pavement Design Recommendations

Service	Estimated Traffic Index (T.I.)	Asphalt Concrete Thickness (ft.)	Base Course Thickness (ft.)
Goetz Road	7.0	0.30	1.10

The structural sections recommended above were calculated using an assumed soil R-value of 20, based on the soil types and conditions encountered in the borings. At the completion of backfilling, when the actual pavement subgrade soils are known, the pavement subgrade should be evaluated to confirm the above recommended pavement sections are appropriate. All work within the roadway areas should be done in accordance with City of Menifee requirements.

All surfaces to receive asphalt concrete paving should be underlain by a minimum compacted fill thickness of 12 inches (excluding aggregate base), compacted to a minimum relative compaction of 95 percent.

8. **Protection of Existing Utilities and Storm Drains:** Where the pipeline is constructed below existing utility crossings and storm drains, care should be taken to assure adequate compaction of the backfill beneath the existing utilities. If the existing utilities are rigid or encased in concrete, we recommend that the backfill consist of compacted soil to a depth of not less than one foot beneath the existing utility invert. The remaining backfill should consist of sand-cement slurry poured around the existing utility line to assure adequate contact at the base. Protection of flexible pipes may also require the placement of sand-cement slurry.

9. **Observation and Compaction Testing**: During backfilling, continuous observation and compaction testing should be conducted to verify satisfactory compaction. The maximum dry density-optimum moisture content relationship should be determined in accordance with ASTM D1557. Field density testing should be performed in accordance with ASTM D1556 or ASTM D6938. Compaction should be verified at maximum intervals of 250 feet for each 2-foot vertical lift or as otherwise deemed necessary by the inspector in the field during backfilling. Some backfill and compaction methodologies will dictate shorter test intervals.

LIMITATIONS

The preliminary findings and recommendations presented in this report are based upon an interpolation of the soil conditions between boring and seismic refraction survey locations. Should conditions be encountered during construction that appear to be different than those indicated by this report, this office should be notified.

This report was prepared for Engineering Resources of Southern California, Inc. for their use in the design of the EMWD Quail Valley Goetz Road Sewer Extension project. This report may only be used by Engineering Resources of Southern California, Inc. for this purpose. The use of this report by parties or for other purposes is not authorized without written permission by Inland Foundation Engineering, Inc. Inland Foundation Engineering, Inc. will not be liable for any projects connected with the unauthorized use of this report.

The information in this report represents professional opinions that have been developed using that degree of care and skill ordinarily exercised, under similar circumstances, by reputable geotechnical consultants practicing in this or similar localities. No warranty, express or implied, is made.

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APPENDIX A – Field Exploration

APPENDIX A
FIELD EXPLORATION

Four exploratory borings were drilled with a truck-mounted hollow-stem auger drill rig at the approximate locations shown on Figure A-7. The materials encountered during drilling were logged by a staff geologist. Boring logs are included with this report as Figures A-3 through A-6.

Representative soil samples were obtained within the borings by driving a thin-walled steel penetration sampler with successive 30-inch drops of a 140-pound hammer. The numbers of blows required to achieve each six inches of penetration were recorded on the boring logs. Two different samplers were used; a Standard Penetration Test (SPT) sampler and a modified California sampler with brass sample rings. Representative bulk soil samples were also obtained from the auger cuttings. Samples were placed in moisture sealed containers and transported to our laboratory for further testing and evaluation. Laboratory tests results are discussed and included in Appendix B.

UNIFIED SOIL CLASSIFICATION SYSTEM (ASTM D2487)

PRIMARY DIVISIONS			GROUP SYMBOLS	SECONDARY DIVISIONS
COARSE GRAINED SOILS MORE THAN HALF OF MATERIALS IS LARGER THAN #200 SIEVE SIZE	GRAVELS MORE THAN HALF OF COARSE FRACTION IS LARGER THAN #4 SIEVE	CLEAN GRAVELS (LESS THAN) 5% FINES	GW	WELL GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
			GP	POORLY GRADED GRAVELS OR GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
		GRAVEL WITH FINES	GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES
			GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES
	SANDS MORE THAN HALF OF COARSE FRACTION IS SMALLER THAN #4 SIEVE	CLEAN SANDS (LESS THAN) 5% FINES	SW	WELL GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
			SP	POORLY GRADED SANDS OR GRAVELLY SANDS, LITTLE OR NO FINES
		SANDS WITH FINES	SM	SILTY SANDS, SAND-SILT MIXTURES
			SC	CLAYEY SANDS, SAND-CLAY MIXTURES
FINE GRAINED SOILS MORE THAN HALF OF MATERIALS IS SMALLER THAN #200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMIT IS LESS THAN 50	ML	INORGANIC SILTS, VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS
			CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
			OL	ORGANIC SILTS AND ORGANIC SILT-CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS	LIQUID LIMIT IS GREATER THAN 50	MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SANDS OR SILTS, ELASTIC SILTS
			CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
			OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
	HIGHLY ORGANIC SOILS		PT	PEAT, MUCK AND OTHER HIGHLY ORGANIC SOILS
TYPICAL FORMATIONAL MATERIALS	SANDSTONES		SS	
	SILTSTONES		SH	
	CLAYSTONES		CS	
	LIMESTONES		LS	
	SHALE		SL	

CONSISTENCY CRITERIA BASES ON FIELD TESTS

RELATIVE DENSITY – COARSE – GRAIN SOIL

RELATIVE DENSITY	SPT * (# BLOWS/FT)	RELATIVE DENSITY (%)
VERY LOOSE	<4	0-15
LOOSE	4-10	15-35
MEDIUM DENSE	10-30	35-65
DENSE	30-50	65-85
VERY DENSE	>50	85-100

CONSISTENCY – FINE-GRAIN SOIL

CONSISTENCY	SPT* (# BLOWS/FT)	TORVANE UNDRAINED SHEAR STRENGTH (tsf)	POCKET ** PENETROMETER UNCONFINED COMPRESSIVE STRENGTH (tsf)
Very Soft	<2	<0.13	<0.25
Soft	2-4	0.13-0.25	0.25-0.5
Medium Stiff	4-8	0.25-0.5	0.5-1.0
Stiff	8-15	0.5-1.0	1.0-2.0
Very Stiff	15-30	1.0-2.0	2.0-4.0
Hard	>30	>2.0	>4.0

* NUMBER OF BLOWS OF 140 POUND HAMMER FALLING 30 INCHES TO DRIVE A 2 INCH O.D. (1 3/8 INCH I.D.) SPLIT BARREL SAMPLER (ASTM -1586 STANDARD PENETRATION TEST)

** UNCONFINED COMPRESSIVE STRENGTH IN TONS/SQ.FT. READ FROM POCKET PENETROMETER

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

CEMENTATION

DESCRIPTION	FIELD TEST
Weakly	Crumbled 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

EXPLANATION OF LOGS

LOG OF BORING B-01

DRILLING RIG	Mobile B-61	DATE DRILLED	12/21/21	HAMMER TYPE	Auto-Trip
DRILLING METHOD	Rotary Auger			HAMMER WEIGHT	140-lb.
LOGGED BY	FWC			HAMMER DROP	30-inches
GROUND ELEVATION	+/-			BORING DIAMETER	8-inches

DEPTH (ft)	U.S.C.S.	GRAPHIC LOG	SUMMARY OF SUBSURFACE CONDITIONS This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered and is representative of interpretations made during drilling. Contrasting data derived from laboratory analysis may not be reflected in these representations.	BULK SAMPLE	DRIVE SAMPLE	SAMPLE TYPE	BLOW COUNTS /6"	MOISTURE (%)	DRY UNIT WT. (pcf)
			ASPHALT CONCRETE over AGGREGATE BASE, (10 inches over 6 inches)						
						AU			
	SC		**METASEDIMENTARY BEDROCK,** (CLAYEY SAND with GRAVEL), slightly weathered, very dark grayish brown (2.5Y 3/2), moist, moderately fractured, very dense.			SS	50/5"	3	107
5									
						SS	15 52	4	125
						AU			
10									
						SS	50/3"		
15									
			End of boring at 16 feet. No groundwater encountered. Auger refusal. Backfilled with native soils.						

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CLIENT	ERSC
PROJECT NAME	Quail Valley Goetz Rd Sewer Extension
PROJECT LOCATION	Goetz Rd, Menifee, CA
PROJECT NUMBER	E080-062

FIGURE NO. A-3

LOG OF BORING B-02

DRILLING RIG	**Mobile B-61**	HAMMER TYPE	**Auto-Trip**
DRILLING METHOD	**Rotary Auger**	HAMMER WEIGHT	**140-lb.**
LOGGED BY	**FWC**	HAMMER DROP	**30-inches**
GROUND ELEVATION	**+/-**	BORING DIAMETER	**8-inches**

DATE DRILLED **12/21/21**

SUMMARY OF SUBSURFACE CONDITIONS

This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered and is representative of interpretations made during drilling. Contrasting data derived from laboratory analysis may not be reflected in these representations.

DEPTH (ft)	U.S.C.S.	DESCRIPTION	SAMPLE TYPE	BLOW COUNTS /6"	MOISTURE (%)	DRY UNIT WT. (pcf)
		ASPHALT CONCRETE over AGGREGATE BASE, (10 inches over 6 inches)				
	SC	**ARTIFICIAL FILL,** CLAYEY SAND, fine- to medium, dark olive, moist, dense.	AU			
5	SC	**METASEDIMENTARY BEDROCK,** (CLAYEY SAND), highly to moderately weathered, olive-brown (2.5Y 4/3) to dark grayish brown (10YR 4/2), moist, slightly fractured, dense. - (CLAYEY SAND) -	SS	28 50	10	126
10			SS	34 50/3"	8	111
15		- (SILTY SAND) -	SS	50/5"	5	111
20	SC		SS	55	4	114
25			SS	53	4	119
30		- VERY HARD DRILLING -	SPT	18 30	26	
35			SPT	16 50/4"	15	

End of boring at 37 feet. No groundwater encountered. Possible mottling observed at 31.5 feet. Auger refusal. Backfilled with native soils.

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CLIENT	**ERSC**
PROJECT NAME	**Quail Valley Goetz Rd Sewer Extension**
PROJECT LOCATION	**Goetz Rd, Menifee, CA**
PROJECT NUMBER	**E080-062**

FIGURE NO. A-4

LOG OF BORING B-03

DRILLING RIG	**Mobile B-61**	DATE DRILLED **12/30/21**	HAMMER TYPE	**Auto-Trip**
DRILLING METHOD	**Rotary Auger**		HAMMER WEIGHT	**140-lb.**
LOGGED BY	**FWC**		HAMMER DROP	**30-inches**
GROUND ELEVATION	**+/-**		BORING DIAMETER	**8-inches**

DEPTH (ft)	U.S.C.S.	GRAPHIC LOG	SUMMARY OF SUBSURFACE CONDITIONS This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered and is representative of interpretations made during drilling. Contrasting data derived from laboratory analysis may not be reflected in these representations.	BULK SAMPLE	DRIVE SAMPLE	SAMPLE TYPE	BLOW COUNTS /6"	MOISTURE (%)	DRY UNIT WT. (pcf)
			ASPHALT CONCRETE, (8 inches)						
	SC-SM		**METASEDIMENTARY BEDROCK,** (SILTY, CLAYEY SAND with GRAVEL), slightly weathered, olive-brown (2.5Y 4/3), slightly moist, fractured, dense.			AU			
						SS	50/5"		
			End of boring at 4 feet. No groundwater encountered. Auger refusal. Backfilled with native soils.						

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CLIENT	**ERSC**
PROJECT NAME	**Quail Valley Goetz Rd Sewer Extension**
PROJECT LOCATION	**Goetz Rd, Menifee, CA**
PROJECT NUMBER	**E080-062**

FIGURE NO.

A-5

LOG OF BORING B-04

DRILLING RIG	**Mobile B-61**	DATE DRILLED	**12/30/21**	HAMMER TYPE	**Auto-Trip**
DRILLING METHOD	**Rotary Auger**			HAMMER WEIGHT	**140-lb.**
LOGGED BY	**FWC**			HAMMER DROP	**30-inches**
GROUND ELEVATION	**+/-**			BORING DIAMETER	**8-inches**

SUMMARY OF SUBSURFACE CONDITIONS

This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered and is representative of interpretations made during drilling. Contrasting data derived from laboratory analysis may not be reflected in these representations.

DEPTH (ft)	U.S.C.S.	GRAPHIC LOG	SUMMARY OF SUBSURFACE CONDITIONS	BULK SAMPLE	DRIVE SAMPLE	SAMPLE TYPE	BLOW COUNTS /6"	MOISTURE (%)	DRY UNIT WT. (pcf)
			ASPHALT CONCRETE, (8 inches)						
	SC		**CLAYEY SAND,** fine- to medium, dark-brown (10YR 3/3), moist, medium dense to dense.			AU			
	CL		**SANDY CLAY,** very dark gray-brown (10YR 3/2), moist, stiff to very stiff.			AU			
5						SS	6 15	12	121
	SC-SM		**METASEDIMENTARY BEDROCK,** (SILTY, CLAYEY SAND) highly to slightly weathered, olive-brown (2.5Y 4/3), slightly moist to moist, fractured, dense.			AU			
10						SS	22 50/4"	13	116
			End of boring at 11 feet. No groundwater encountered. Auger refusal. Backfilled with native soils.						

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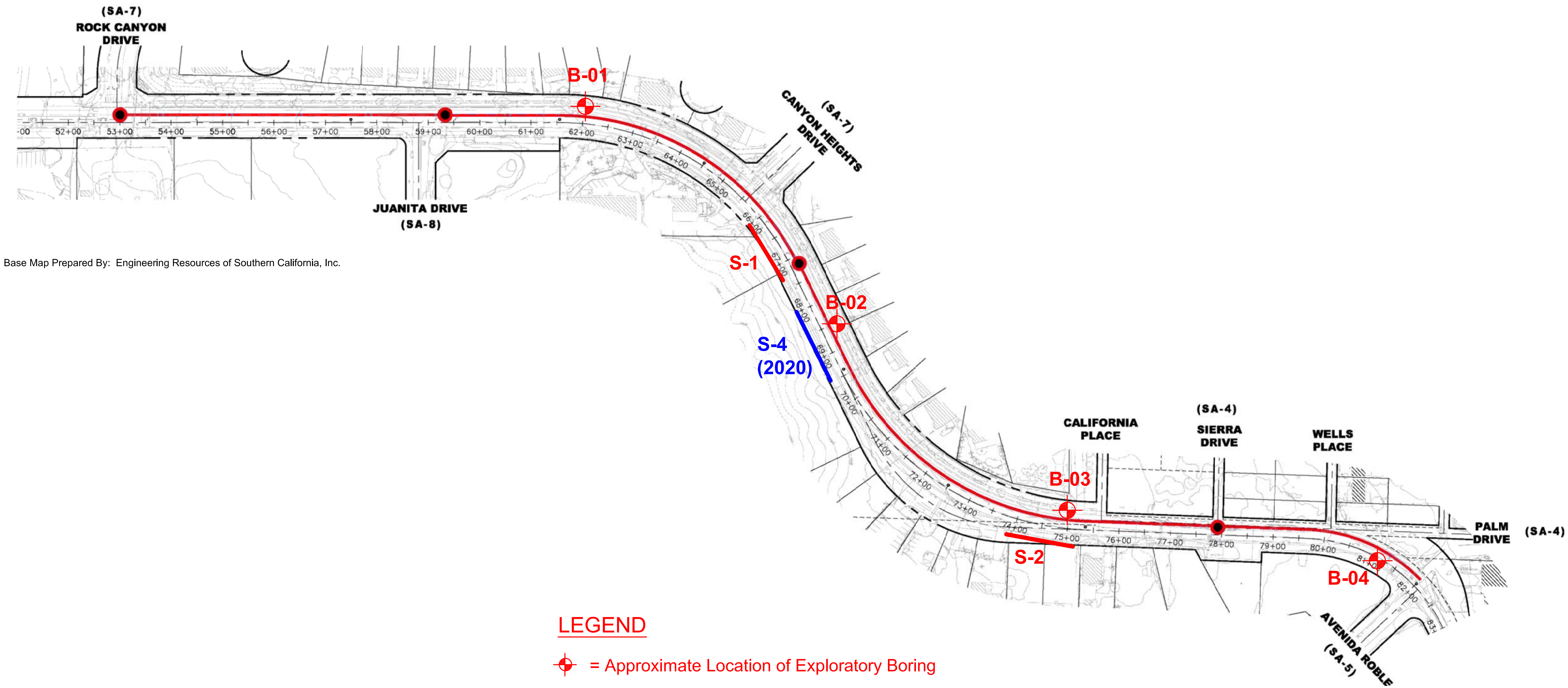
CLIENT	**ERSC**
PROJECT NAME	**Quail Valley Goetz Rd Sewer Extension**
PROJECT LOCATION	**Goetz Rd, Menifee, CA**
PROJECT NUMBER	**E080-062**

FIGURE NO.

A-6

SITE PLAN
EMWD QUAIL VALLEY
GOETZ ROAD SEWER EXTENSION PROJECT



Base Map Prepared By: Engineering Resources of Southern California, Inc.

LEGEND

= Approximate Location of Exploratory Boring

= Approximate Location of Seismic Line

= Approximate Location of Seismic Line (2020)

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1310 South Santa Fe Avenue
San Jacinto, California
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DRAWN BY: ES	JOB NO.: E080-060	
SCALE: 1" = 200'	DATE: February 2022	A-7

APPENDIX B –
Laboratory Testing

APPENDIX B

LABORATORY TESTING

Representative soil samples obtained from our borings were returned to our laboratory for additional observations and testing. Descriptions of the tests performed are provided below.

Unit Weight and Moisture Content: Ring samples were weighed and measured to evaluate their unit weight. A small portion of each sample was then tested for moisture content. The testing was performed per ASTM D2937 and D2216. The results of the testing are shown on the boring logs (Figures A-3 through A-6).

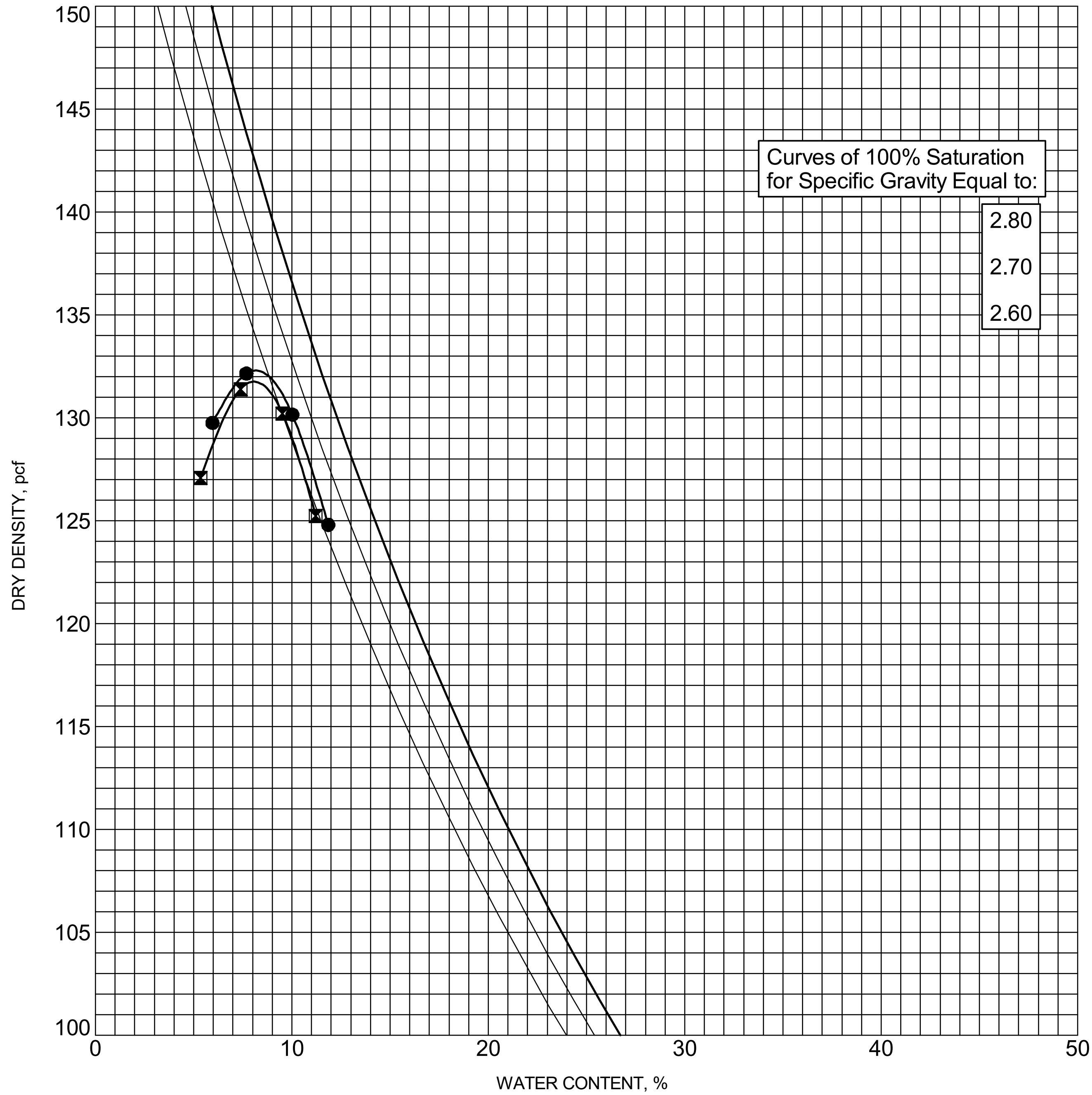
Maximum Density-Optimum Moisture: Two soil samples were selected for maximum density testing in accordance with ASTM D1557. The maximum density is compared to the field density of the soil to evaluate the existing relative compaction to the soil. This is useful in estimating the strength and compressibility of the soil. The results of this testing are presented graphically on Figure No. B-2.

Sieve Analysis: Six soil samples were selected for sieve analysis testing in accordance with ASTM D6913. These tests provide information for classifying the soil in accordance with the Unified Classification System. This classification system categorizes the soil into groups having similar engineering characteristics. The results of this testing are shown on Figures B-3 and B-4.

Atterberg Limits: Three samples were delivered to AP Engineering and Testing in Pomona, California for Atterberg limits testing in accordance with ASTM D4318. These tests provide information regarding soil plasticity and are also used for classifying the soil in accordance with the Unified Classification System. The results are shown on Figures B-5 and B-6.

Analytical Testing: Two samples were delivered to AP Engineering and Testing in Pomona, California to evaluate the concentration of soluble sulfates and chlorides, pH level, and resistivity of and within the on-site soils. The test results are shown on Figure B-7.

Direct Shear Strength: Two samples were delivered to AP Engineering and Testing in Pomona, California for direct shear strength testing in accordance with ASTM D3080. This testing measures the shear strength of the soil under various normal pressures and is used to develop parameters for foundation bearing capacity and lateral earth pressure. Test results are shown on Figures B-8 and B-9.



	BOREHOLE	DEPTH	Description of Materials	Max DD	Optimum WC
●	**B-02**	**7.0**	**CLAYEY SAND(SC)**	**132.3 PCF**	**8.2 %**
⧗	**B-04**	**4.0**	**SANDY LEAN CLAY(CL)**	**131.8 PCF**	**8.1 %**

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MOISTURE-DENSITY CURVES (ASTM D1557)

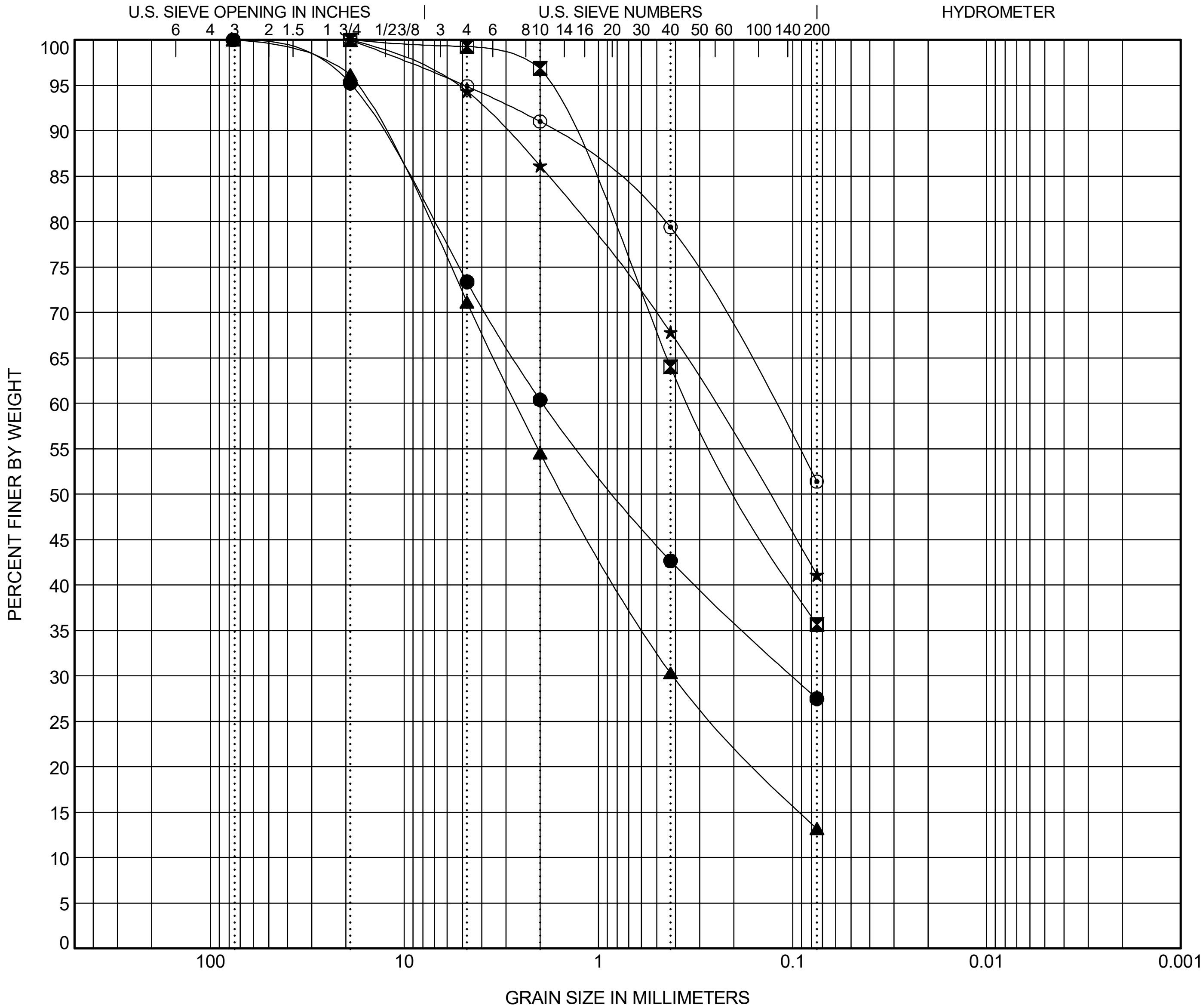
FIGURE NO. B-2

CLIENT ERSC

PROJECT NAME Quail Valley Goetz Rd Sewer Extension

PROJECT NUMBER E080-062

PROJECT LOCATION Goetz Rd, Menifee, CA



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

SAMPLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
● B-01	1.3	**CLAYEY SAND with GRAVEL(SC)**	25	16	9		
⊠ B-02	7.0	**CLAYEY SAND(SC)**	31	16	15		
▲ B-03	0.7	**SILTY, CLAYEY SAND with GRAVEL (SC-SM)**					
★ B-04	0.7	**CLAYEY SAND (SC)**					
⊙ B-04	4.0	**SANDY LEAN CLAY(CL)**	27	12	15		

BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● B-01	1.3	76.2	1.933	0.1		26.6	45.9	27.5	
⊠ B-02	7.0	19	0.332			0.7	63.7	35.7	
▲ B-03	0.7	76.2	2.655	0.411		28.8	58.0	13.2	
★ B-04	0.7	19	0.255			5.6	53.2	41.1	
⊙ B-04	4.0	19	0.128			5.1	43.5	51.4	

GRADATION CURVES (ASTM D6913, ASTM D4318)

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FIGURE NO. B-3

CLIENT ERSC

PROJECT NAME Quail Valley Goetz Rd Sewer Extension

PROJECT NUMBER E080-062

PROJECT LOCATION Goetz Rd, Menifee, CA

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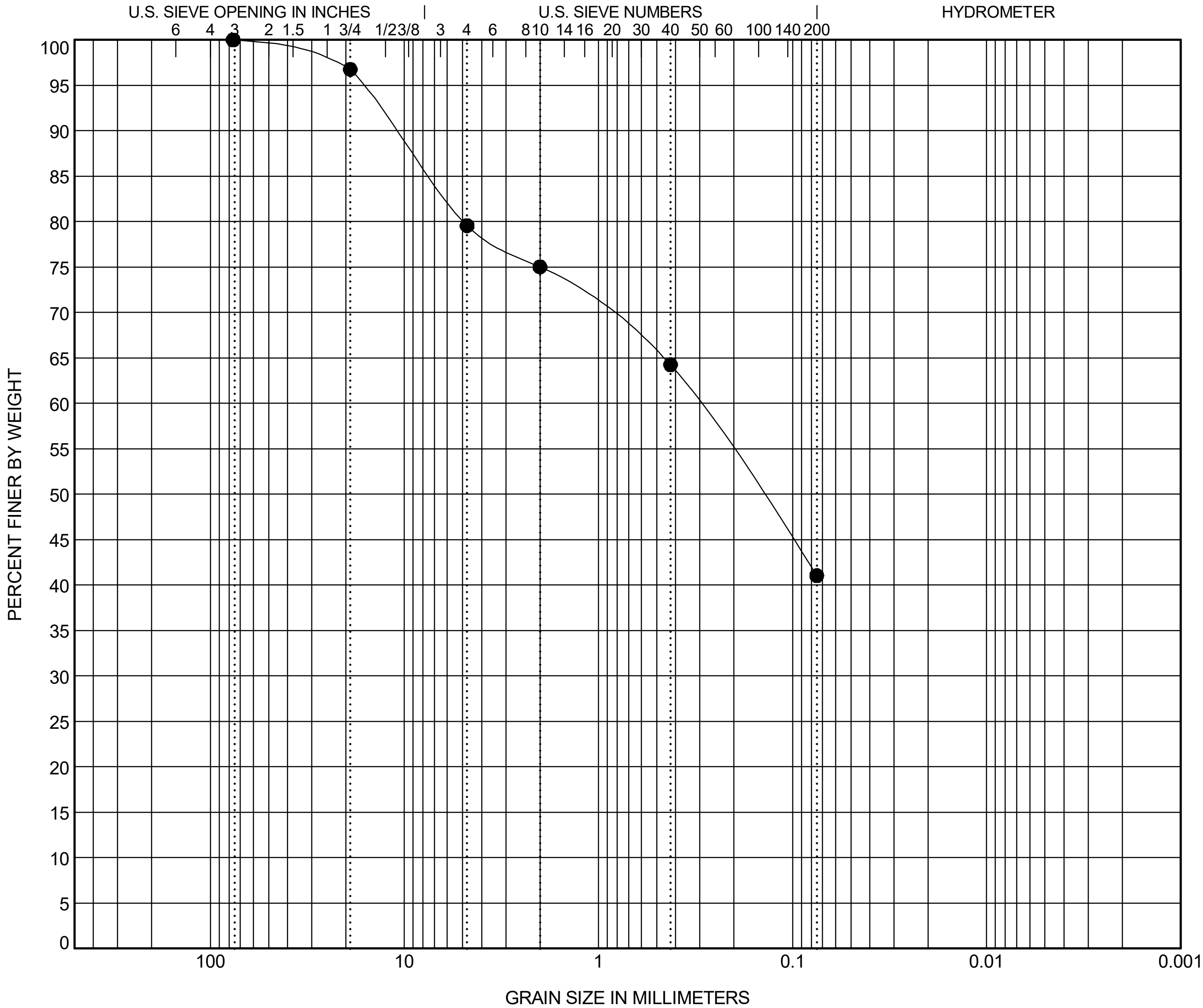


COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	SAMPLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
●	**B-04**	**6.5**	**CLAYEY SAND with GRAVEL (SC)**					

	BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**B-04**	**6.5**	**76.2**	**0.309**			**20.4**	**38.5**	**41.0**	

GRADATION CURVES (ASTM D6913, ASTM D4318)

INLAND FOUNDATION ENGINEERING, INC.

FIGURE NO. B-4

CLIENT ERSC

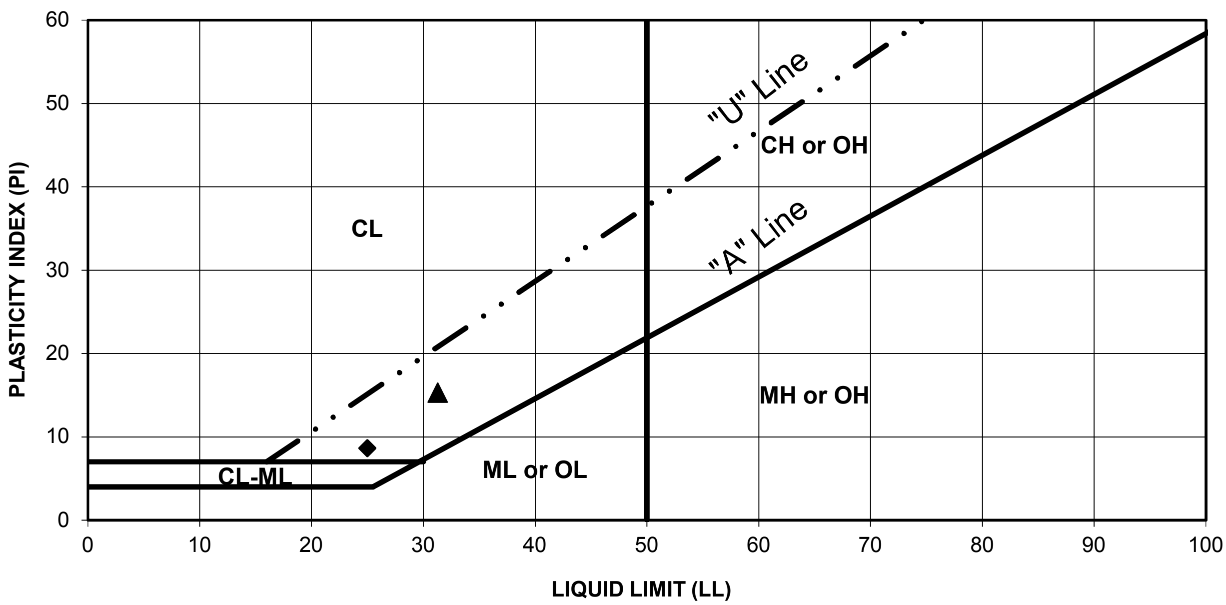
PROJECT NAME Quail Valley Goetz Rd Sewer Extension

PROJECT NUMBER E080-062

PROJECT LOCATION Goetz Rd, Menifee, CA

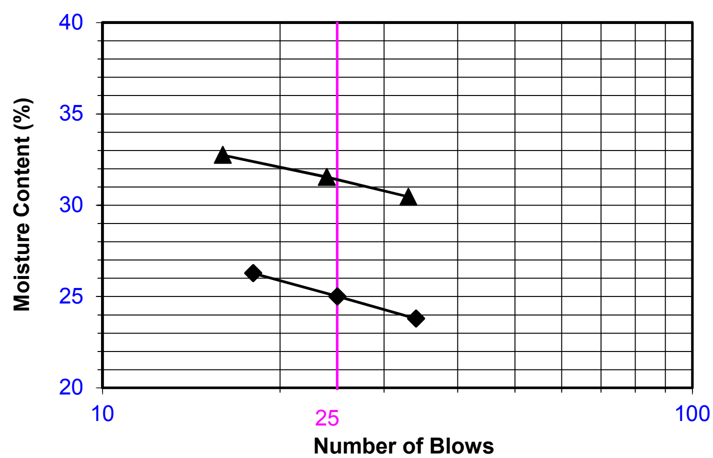
ATTERBERG LIMITS
ASTM D 4318

Client Name:	Inland Foundation Engineering	Tested By:	DK	Date:	02/07/22
Project Name:	ERSC - Goetz Rd Sewer	Computed By:	NR	Date:	02/08/22
Project No.:	E080-062	Checked By:	AP	Date:	02/08/22



PROCEDURE USED

- [ ] Wet Preparation
- [X] Dry Preparation
- [X] Procedure A Multipoint Test
- [ ] Procedure B One-point Test

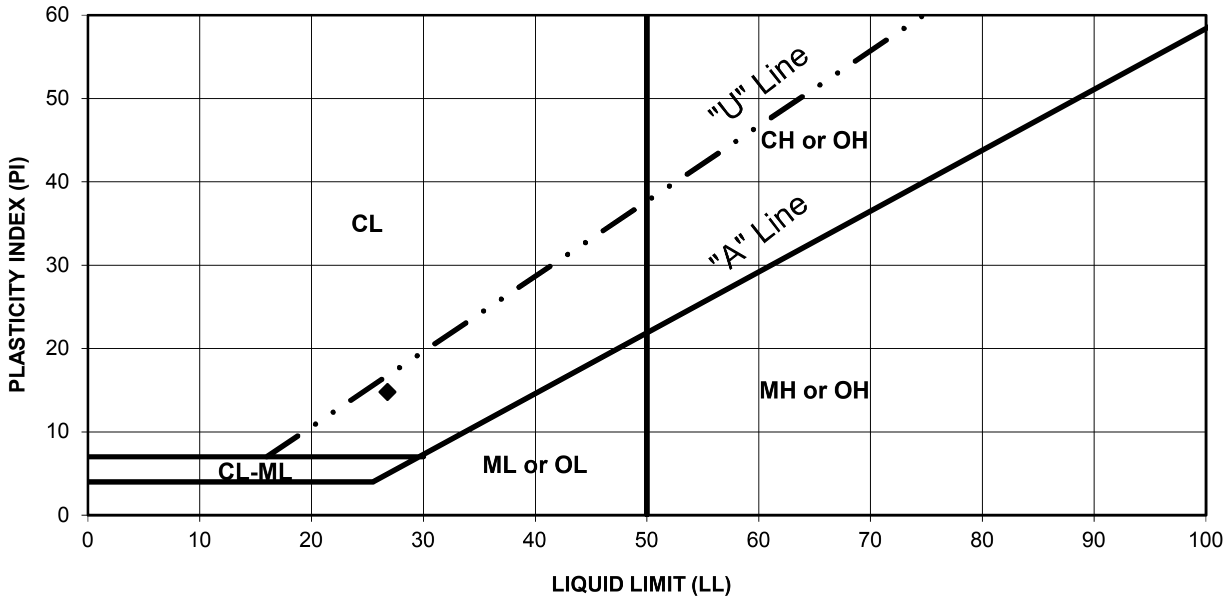


Symbol	Boring Number	Sample Number	Depth (feet)	LL	PL	PI	Plasticity Chart Symbol
♦	B-01	-	1.33-8	25	16	9	CL
▲	B-02	-	7-12	31	16	15	CL

AP Engineering and Testing, Inc.
DBE|MBE|SBE
2607 Pomona Boulevard | Pomona, CA 91768
t. 909.869.6316 | f. 909.869.6318 | www.aplaboratory.com

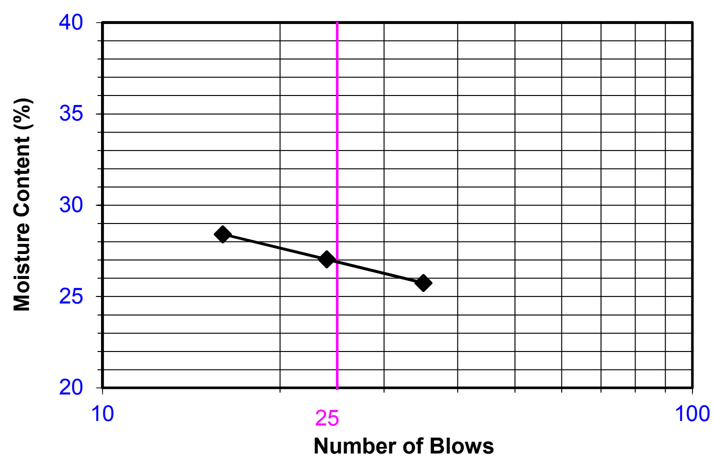
ATTERBERG LIMITS
ASTM D 4318

Client Name: Inland Foundation Engineering — Tested By: DK — Date: 02/07/22
Project Name: ERSC - Goetz Rd Sewer — Computed By: NR — Date: 02/08/22
Project No.: E080-062 — Checked By: AP — Date: 02/08/22



PROCEDURE USED

- [ ] Wet Preparation
- [X] Dry Preparation
- [X] Procedure A Multipoint Test
- [ ] Procedure B One-point Test



Symbol	Boring Number	Sample Number	Depth (feet)	LL	PL	PI	Plasticity Chart Symbol
♦	B-04	-	4-6.5	27	12	15	CL

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CORROSION TEST RESULTS

Client Name: Inland Foundation Engineering
Project Name: ERSC - Goetz Rd Sewer
Project No.: E080-062

AP Job No.: 22-0139
Date: 01/26/22

Boring No.	Sample No.	Depth (feet)	Soil Description	Minimum Resistivity (ohm-cm)	pH	Sulfate Content (ppm)	Chloride Content (ppm)
B-01	-	1.33-8	Clayey Sand	4,112	7.6	47	36
B-04	-	4-6.5	Sandy Clay	1,861	7.4	58	34

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

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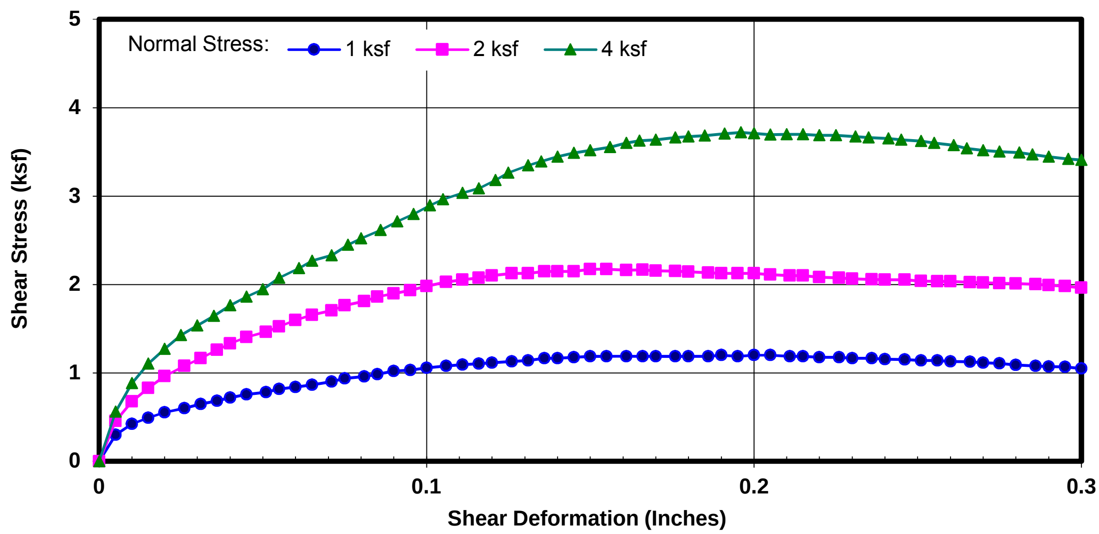
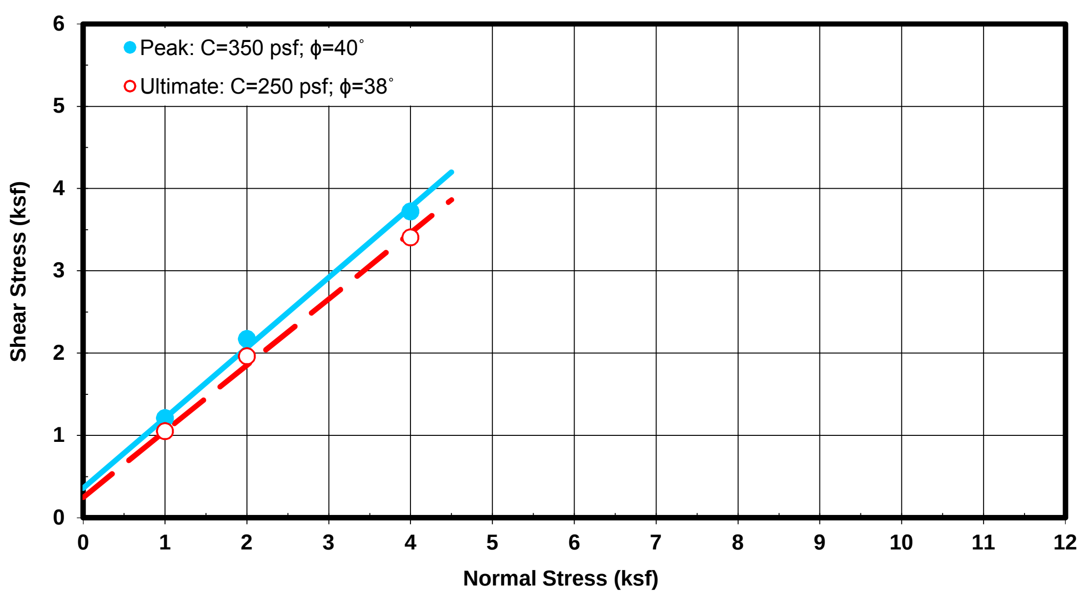
DIRECT SHEAR TEST RESULTS
ASTM D 3080

Client:	Inland Foundation Engineering	**Tested By:** ST	**Date:** 01/25/22
Project Name:	ERSC - Goetz Rd Sewer	**Computed By:** NR	**Date:** 01/26/22
Project No.:	E080-062	**Checked by:** AP	**Date:** 01/27/22
Boring No.:	B-02		
Sample No.:	- **Depth (ft):** 11-11.75		
Sample Type:	Mod. Cal.		
Soil Description:	Silty Sand w/decomposed granite		
Test Condition:	Inundated **Shear Type:** Regular		

Wet Unit Weight (pcf)	Dry Unit Weight (pcf)	Initial Moisture Content (%)	Final Moisture Content (%)	Initial Degree Saturation (%)	Final Degree Saturation (%)	Normal Stress (ksf)	Peak Shear Stress (ksf)	Ultimate Shear Stress (ksf)
115.4	107.5	7.3	18.9	35	90	1	1.212	1.051
						2	2.172	1.962
						4	3.720	3.408





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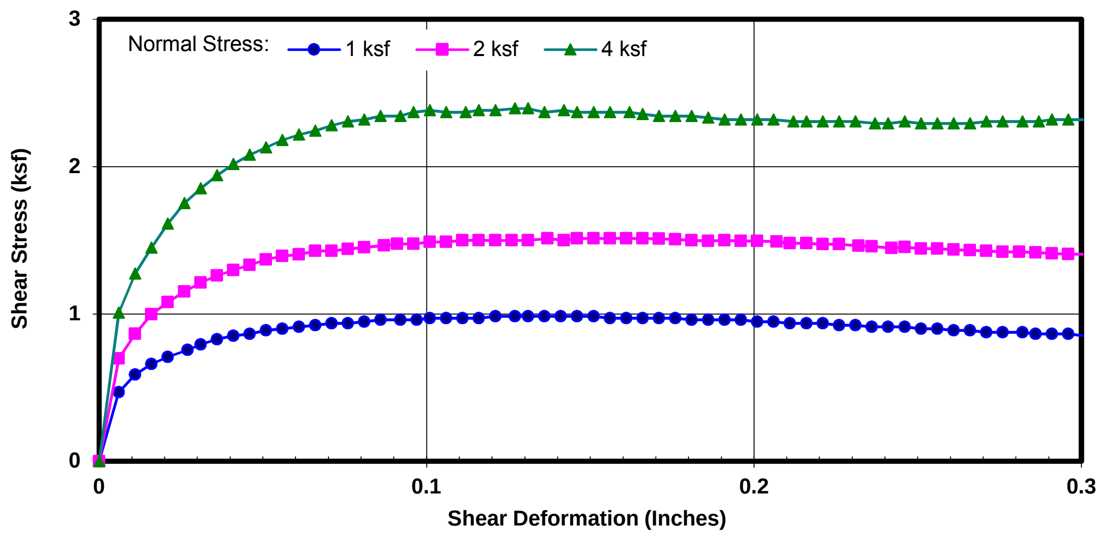
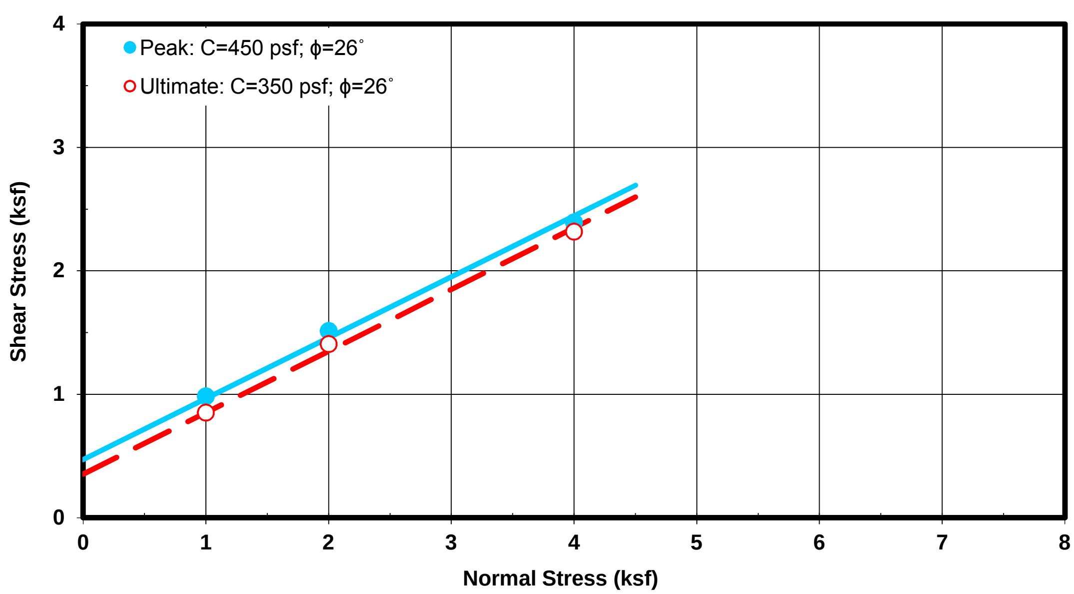
DIRECT SHEAR TEST RESULTS
ASTM D 3080

Client:	Inland Foundation Engineering	**Tested By:**	ST	**Date:**	01/25/22
Project Name:	ERSC - Goetz Rd Sewer	**Computed By:**	NR	**Date:**	01/26/22
Project No.:	E080-062	**Checked by:**	AP	**Date:**	01/27/22
Boring No.:	B-04				
Sample No.:	- **Depth (ft):** 5.5-6.5				
Sample Type:	Mod. Cal.				
Soil Description:	Sandy Clay				
Test Condition:	Inundated **Shear Type:** Regular				

Wet Unit Weight (pcf)	Dry Unit Weight (pcf)	Initial Moisture Content (%)	Final Moisture Content (%)	Initial Degree Saturation (%)	Final Degree Saturation (%)	Normal Stress (ksf)	Peak Shear Stress (ksf)	Ultimate Shear Stress (ksf)
128.3	107.7	19.2	20.6	91	99	1	0.984	0.852
						2	1.512	1.406
						4	2.394	2.318





APPENDIX C –
Seismic Refraction Survey

TERRA GEOSCIENCES

SEISMIC REFRACTION SURVEY

EMWD QUAIL VALLEY SUB-AREA 4 PROJECT

GOETZ ROAD SEWER EXTENSION

MENIFEE, RIVERSIDE COUNTY, CALIFORNIA

Project No. 223768-1

January 21, 2022

Prepared for:

Inland Foundation Engineering, Inc.
1310 South Santa Fe Avenue
San Jacinto, CA 92583

Inland Foundation Engineering, Inc.
1310 South Santa Fe Avenue
San Jacinto, CA 92583

January 21, 2022
Project No. 223768-1

Attention: Mr. Allen Evans, G.E.

Regarding: Seismic Refraction Survey
EMWD Quail Valley Sub-Area 4 Project
Goetz Road Sewer Extension
Menifee, Riverside County, California
IFE Project No. E080-062

EXECUTIVE SUMMARY

As requested, this firm has performed a geophysical survey using the seismic refraction method for the above-referenced site. The purpose of this investigation was to assess the general seismic velocity characteristics of the underlying earth materials and to evaluate whether high velocity bedrock materials (non-rippable) may be present. Additionally, the structure and seismic velocity distribution of the subsurface earth materials was also assessed. This report will describe in further detail the procedures used and the results of our findings, along with presentation of representative seismic models for the survey traverses.

For this study, as selected by your office, two survey traverses (Seismic Lines S-1 and S-2) were performed along the dirt shoulders of Goetz Road, in the Quail Valley area of Riverside County, California. These traverses were located in the field by use of Google™ Earth imagery (2022) along with GPS coordinates and physical landmarks. The approximate locations of these traverses have been approximated on a captured Google™ Earth image (2022), as presented on the Seismic Line Location Map, Plate 1.

This opportunity to be of service is sincerely appreciated. If you should have questions regarding this report or do not understand the limitations of this study or the data and results that are presented, please do not hesitate to contact our office.

Respectfully submitted,
TERRA GEOSCIENCES

Donn C. Schwartzkopf
Principal Geophysicist
PGP 1002

PROFESSIONAL GEOPHYSICIST
DONN C. SCHWARTZKOPF
No. 1002
STATE OF CALIFORNIA

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GEOLOGIC EARTH MATERIALS

Locally, surficial mapping by Morton (2003) indicates the subject study area to be underlain by various Mesozoic age metasedimentary rocks, generally comprised of quartz-rich rocks, intermixed graywacke and phyllite, and phyllite. Deposits of very old alluvial deposits are shown to mantle the region, along with probable topsoil and colluvium. Local deposits of artificial fill may also be present that may have been placed during previous grading of the roadways.

SEISMIC REFRACTION SURVEY

Methodology

The seismic refraction method consists of measuring (at known points along the surface of the ground) the travel times of compressional waves generated by an impulsive energy source and can be used to estimate the layering, structure, and seismic acoustic velocities of subsurface horizons. Seismic waves travel down and through the soils and rocks, and when the wave encounters a contact between two earth materials having different velocities, some of the wave's energy travels along the contact at the velocity of the lower layer. The fundamental assumption is that each successively deeper layer has a velocity greater than the layer immediately above it. As the wave travels along the contact, some of the wave's energy is refracted toward the surface where it is detected by a series of motion-sensitive transducers (geophones). The arrival time of the seismic wave at the geophone locations can be related to the relative seismic velocities of the subsurface layers in feet per second (fps), which can then be used to aid in interpreting both the depth and type of materials encountered.

Field Procedures

Two seismic refraction survey lines (Seismic Lines S-1 and S-2) have been performed across the locations as selected by you. The traverses were located in the field by use of Google™ Earth imagery (2022), along with GPS coordinates and physical landmarks, and have been delineated on the Seismic Line Location Map, as presented on Plate 1. These traverses were each 125 feet in length, which consisted of a total of twenty-four 40-Hertz geophones, spaced at regular five-foot intervals, in order to detect both the direct and refracted waves. A 16-pound sledge-hammer was used as the energy source to produce the seismic waves. Seven shot points were utilized along each spread using forward, reverse, and several intermediate locations in order to obtain high resolution survey data for velocity analysis and depth modeling purposes. Multiple hammer impacts were utilized at each shot point location in order to increase the signal to noise ratio, which enhanced the primary seismic "P"-waves. The seismic wave arrivals were digitally recorded in SEG-2 format on a Geometrics StrataVisor™ NZXP model signal enhancement refraction seismograph. The data was acquired using a sampling rate of 0.0625 milliseconds having a record length of 0.064 seconds. No acquisition filters were used during data collection.

During acquisition, the seismograph displays the seismic wave arrivals on the computer screen which were used to analyze the arrival time of the primary seismic "P"-waves at each geophone station, in the form of a wiggle trace for quality control purposes in the field. If spurious "noise" was observed, the shot location was resampled during relatively quieter periods. Each geophone and seismic shot location were surveyed using a hand level and ruler for topographic correction, with "0" being the lowest point along each survey line.

Data Processing

The recorded seismic data was subsequently transferred to our office computer for processing and analyzing purposes, using the computer programs **SIPwin** (**S**eismic Refraction **I**nterpretation **P**rogram for **Win**dows) developed by Rimrock Geophysics, Inc. (2004); **Refractor** (Geogiga, 2001-2020); and **Rayfract™** (Intelligent Resources, Inc., 1996-2021). All of the computer programs perform their individual analyses using exactly the same input data, which includes the first-arrival times of the "P"-waves and the survey line geometry.

- **SIPwin** is a ray-trace modeling program that evaluates the subsurface using layer assignments based on time-distance curves and is better suited for layered media, using the "Seismic Refraction Modeling by Computer" method (Scott, 1973). The first step in the modeling procedure is to compute layer velocities by least-squares techniques. Then the program uses the delay-time method to estimate depths to the top of layer-2. A forward modeling routine traces rays from the shot points to each geophone that received a first-arrival ray refracted along the top of layer-2. The travel time of each such ray is compared with the travel time recorded in the field by the seismic system. The program then adjusts the layer-2 depths so as to minimize discrepancies between the computed ray-trace travel times and the first arrival times picked from the seismic waveform record.

  The process of ray tracing and model adjustment is repeated a total of six times to improve the accuracy of depths to the top of layer-2. This first-arrival picks were then used to generate the Layer Velocity Model using the **SIPwin** computer program, which presents the subsurface velocities as individual layers and is presented within Appendix A for reference. In addition, the associated Time-Distance Plot, which shows the individual data picks of the first "P-wave" arrival times, also appears in Appendix A.

- **Refractor** is seismic refraction software that also evaluates the subsurface using layer assignments utilizing interactive and interchangeable analytical methods that include the Plus-Minus method, the Delay-Time method, and the Generalized Reciprocal Method (GRM). These methods are used for defining irregular non-planar refractors and are briefly described below.

- The Delay-Time method will measure the delay time depth to a refractor beneath each geophone rather than at shot points. Delay-time is the time spent by a wave to travel up or down through the layer (slant path) compared to the time the wave would spend if traveling along the projection of the slant path on the refractor.

- The Plus-Minus time analysis method includes a Plus time analysis for depth analysis and a Minus time analysis for velocity determination. The basis of the Plus-Minus time analysis method lies in the traveltime reciprocity, i.e., the traveltime of a seismic wave from source to receiver is equal to the traveltime in the opposite direction if source and receiver are interchanged. It can be used to calculate the depth and velocity variations of an undulating layer boundary for slope angles less than ~10°.

- The GRM method is a technique for delineating undulating refractors at any depth from in-line seismic refraction data consisting of forward and reverse travel-times and is capable of resolving dips of up to 20% and does not over-smooth or average the subsurface refracting layers. In addition, the technique provides an approach for recognizing and compensating for hidden layer conditions.

➢ **Rayfract™** is seismic refraction tomography software that model's subsurface refraction, transmission, and diffraction of acoustic waves which generally indicates the relative structure and velocity distribution of the subsurface using first break energy propagation modeling. An initial 1D gradient model is created using the DeltatV method (Gebrande and Miller, 1985) which gives a good initial fit between modeled and picked first breaks. The DeltatV method is a turning-ray inversion method which delivers continuous depth vs. velocity profiles for all profile stations. These profiles consist of horizontal inline offset, depth, and velocity triples. The method handles real-life geological conditions such as velocity gradients, linear increasing of velocity with depth, velocity inversions, pinched-out layers and outcrops, and faults and local velocity anomalies. This initial model is then refined automatically with a true 2D WET (Wavepath Eikonal Traveltime) tomographic inversion (Schuster and Quintus-Bosz, 1993).

WET tomography models multiple signal propagation paths contributing to one first break, whereas conventional ray tracing tomography is limited to the modeling of just one ray per first break. This computer program performs the analysis by using the same first-arrival P-wave times and survey line geometry that were generated during the layer velocity model analyses. The associated Refraction Tomographic Models which display the subsurface earth material velocity structure, is represented by the velocity contours (isolines displayed in feet/second), supplemented with the color-coded velocity shading for visual reference, and are presented within Appendix B. The colors representing the velocity gradients have been standardized on both of the models for comparative purposes.

The combined use of these seismic refraction computer programs provided a more thorough and comprehensive analysis of the subsurface structure and velocity characteristics. Each computer program has a specific purpose based on the objective of the analysis being performed. **SIPwin** and **Refractor** were primarily used for detecting generalized subsurface velocity layers providing “weighted average velocities.”

The processed seismic data of these two programs were compared and averaged to provide a final composite layer velocity model which provided a more thorough representation of the subsurface (see Appendix A). **Rayfract™** provided tomographic velocity and structural imaging that is very conducive to detecting strong lateral velocity characteristics such as imaging corestones, dikes, and other subsurface structural characteristics (see Appendix B).

SUMMARY OF GEOPHYSICAL INTERPRETATION

It is important to consider that the seismic velocities obtained within bedrock materials are influenced by the nature and character of the localized major structural discontinuities (foliation, fracturing, relic bedding, etc.), creating anisotropic conditions. Anisotropy (direction-dependent properties of materials) can be caused by “micro-cracks,” jointing, foliation, layered or inter-bedded rocks with unequal layer stiffness, small-scale lithologic changes, etc. (Barton, 2007). Velocity anisotropy complicates interpretation and it should be noted that the seismic velocities obtained during this survey may have been influenced by the nature and character of any localized structural discontinuities within the bedrock underlying the subject site.

Generally, it is expected that higher (truer) velocities will be obtained when the seismic waves propagate along direction (strike) of the dominant structure, with a damping effect when the seismic waves travel in a perpendicular direction. Such variable directions can result in velocity differentials of between 2% to 40% depending upon the degree of the structural fabric (i.e., weakly-moderately-strongly foliated, respectively). The first computer analytical method described below that was used for data analysis is the traditional layer method (**SIPwin** and **Refractor**). Using this method, it should be understood that the data obtained represents an average of seismic velocities within any given layer. For example, high seismic velocity boulders or other local lithologic inconsistencies, may be isolated within a low velocity matrix, thus yielding an average medium velocity for that layer. Therefore, in any given layer, a range of velocities could be anticipated, which can also result in a wide range of excavation characteristics.

In general, the site where locally surveyed, was noted to be characterized by three major subsurface layers (Layers V1, V2, and V3, see Appendix A) with respect to seismic velocities. The following velocity layer summaries have been prepared with respect to the **SIPwin** and **Refractor** analysis, with the representative Layer Velocity Models being presented within Appendix A, along with the respective Time-Distance Plots for reference.

- **Velocity Layer V1:**

  The surficial layer (V1) yielded a seismic velocity range of 1,182 to 1,488 fps, which may be comprised of localized artificial fill, topsoil, colluvium, and/or completely-weathered metasedimentary bedrock, which is typical for these types of unconsolidated surficial earth materials.

- **Velocity Layer V2:**

  The second layer (V2) has a seismic velocity range of 2,856 to 4,484 fps, which is believed to be highly-weathered bedrock materials. These rocks may be generally homogeneous with a relatively wide spaced joint/fracture system and/or may include buried relatively-fresher boulders within a completely decomposed bedrock matrix.

- **Velocity Layer V3:**

  The third layer (V3) was found to have a very wide velocity range. These velocities indicate the presence of moderately- to slightly-weathered metasedimentary bedrock, having a seismic velocity range of 5,024 to 10,456 fps. These higher velocities signify the decreasing effect of weathering as a function of depth and could indicate a moderately- to slightly-weathered bedrock matrix that has a wide-spaced fracture system, or possibly the presence of abundant widely-scattered buried fresh large crystalline boulders in a relatively less-weathered matrix.

Table 1 below summarizes the results of the survey lines with respect to the "weighted average" seismic velocities for each layer, as discussed above.

TABLE 1- VELOCITY SUMMARY OF SEISMIC SURVEY LINES

Seismic Line	V1 Layer (fps)	V2 Layer (fps)	V3 Layer (fps)
S-1	**1,182**	**2,856**	**5,024**
S-2	**1,488**	**4,484**	**10,456**

Using **Rayfract™**, tomographic refraction models were also prepared for comparative purposes. The tomographic method better illustrates the general structure and velocity distribution of the subsurface, using velocity contour isolines, as presented within Appendix B. Although no discrete velocity layers or boundaries are created such as in the layer models, these models generally resemble the corresponding overall average layer velocities as presented within Appendix A. Contact boundaries for the variable earth materials cannot be discerned using tomography.

GENERALIZED RIPPABILITY CHARACTERISTICS OF BEDROCK

Although the proposed pipeline project will be most likely be using excavator/trenching equipment, the rippability performance chart prepared by Caterpillar, Inc. (2019) has been provided as Figure 1 below for reference. This chart has been prepared for conventional bulldozer equipment (based on a D9R/D9T dozer) and cannot be directly correlated with excavator-type trenching equipment, which will most likely be used for the subject construction project. Currently, there are no published performance charts that are available which compare rippability potentials versus seismic velocity for excavator-type equipment. Trenching operations, of which this project will most likely utilize, that utilize large excavator-type equipment, typically encounter very difficult to non-productable conditions where seismic velocities are generally greater than 4,000± fps, with lower velocities for smaller backhoe-type equipment.

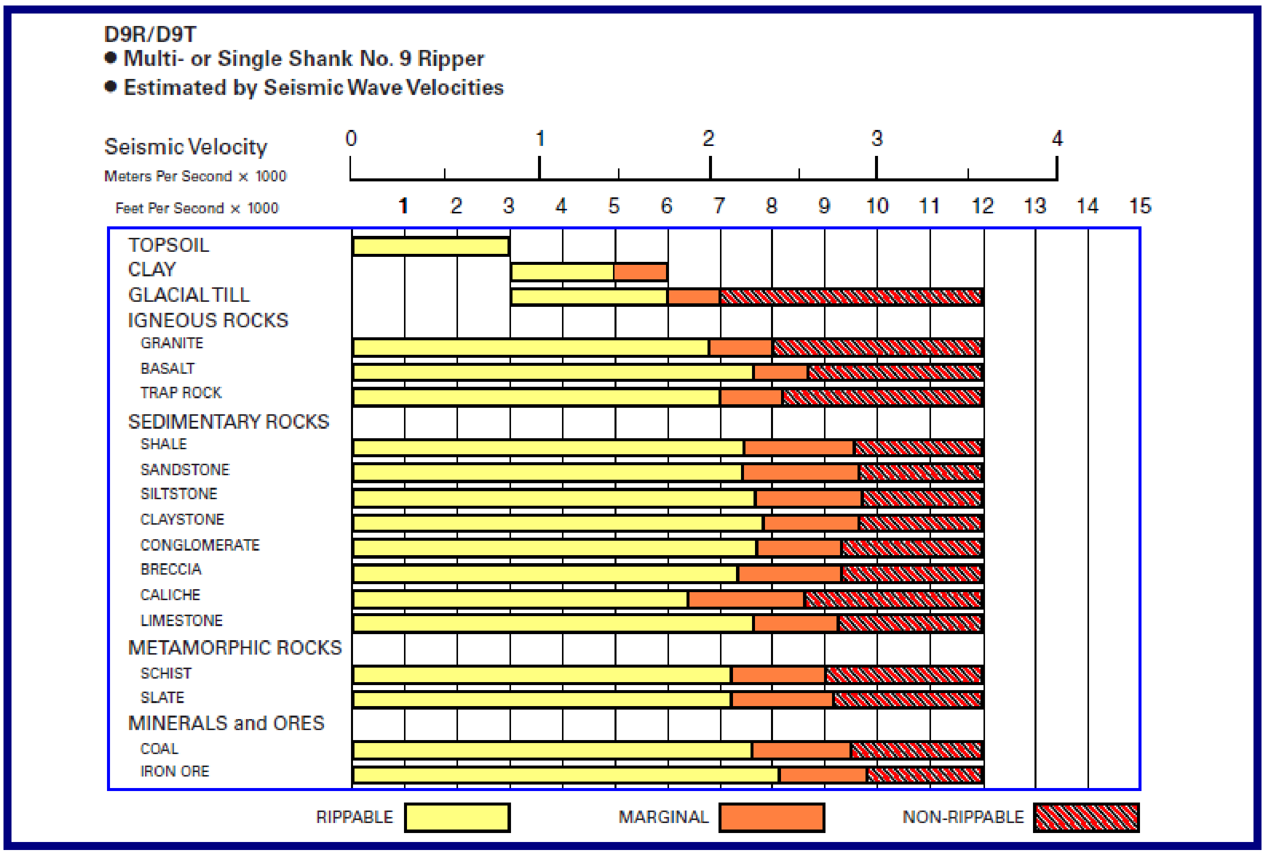


FIGURE 1- Caterpillar D9R Ripper Performance Chart (2019).

SUMMARY OF FINDINGS AND CONCLUSIONS

The raw field data was considered to be of good quality with minor amounts of ambient “noise” that was introduced during our survey, predominantly from vehicular traffic originating along the adjacent and nearby roadways, and to a lesser degree, some overhead powerline/voltage interference. Analysis of the data and picking of the primary "P"-wave arrivals was therefore performed with some difficulty, with minor interpolation of some data points being necessary. Every effort was made to obtain seismic records with the least amount of background noise. This was accomplished by waiting for periods where there were breaks in the traffic during our seismic shots, but the ground vibrations could not be completely eliminated.

Based on the results of our comparative seismic analyses of the computer programs **SIPwin**, **Refractor**, and **Rayfract™**, the seismic refraction survey line models appear to generally coincide with one another, with some minor variances due to the methods that these programs process, integrate, and display the input data. It should be noted that Seismic Line S-1 was performed slightly above the street grade, therefore both the layer and tomographic models indicate the actual street grade relative to the survey profiles, for reference. The anticipated excavation potentials of the velocity layers encountered locally during our survey are as follows:

- **Velocity Layer V1:**

  The upper V1 layer (average weighted velocity of 1,182 to 1,488 fps) may be comprised of a variety of materials that consist of localized artificial fill, topsoil, colluvium, and/or completely-weathered metasedimentary bedrock. No excavation difficulties are expected within this velocity layer.

- **Velocity Layer V2:**

  The second V2 layer (average weighted velocity of 2,856 to 4,484 fps) is expected to consist of highly-weathered bedrock materials. With the assumed use of large excavator-type equipment, these materials should excavate with minor to moderate difficulty, however, deep trenching typically results in a loss of mechanical and weight advantage for the excavators, resulting in the need for some breaking and/or light blasting to obtain desired grade, in addition to encountering velocities that are generally greater than 4,000± fps. The possibility of encountering isolated floaters (i.e., boulders, corestones, lithologic variations, etc.) could be expected, which could also produce somewhat difficult conditions locally and may require some light blasting and/or breaking.

- **Velocity Layer V3:**

  The third V3 layer is believed to consist of slightly- to moderately-weathered metasedimentary bedrock. Very hard excavation difficulties within this deeper velocity layer (average weighted velocity range of 5,024 to 10,456 fps) should be anticipated if encountered during the excavation operations. This layer may consist of relatively homogeneous bedrock, or could possibly contain higher velocity scattered corestones, dikes, and other lithologic variables, within a relatively lower velocity bedrock matrix. Continuous blasting/breaking will most likely be necessary within this velocity layer to achieve desired grade.

The ray sampling coverage of the subsurface seismic waves that were acquired during the processing of the tomographic models using **Rayfract™**, appeared to be of good quality which was verified by having a Root Mean Square Error (RMS) of 2.3 and 4.9 percent (see lower right-hand corner of each model). The RMS error (misfit between picked and modeled first break times) is automatically calculated during the processing routine, with a value of less than 5.0% being preferred, of which both models obtained, verifying the modeled data.

It should be noted that since the proposed Goetz Road Sewer Extension construction project (i.e., utility infrastructure) will most likely be using conventional trenching equipment, there are no currently published rippability performance charts available that compare rippability potentials versus seismic velocity for excavator-type equipment, as previously discussed. The rippability comparison charts such as prepared by Caterpillar (2000 and 2019) are tailored for conventional bulldozer equipment and cannot be directly correlated. However, we understand from many excavation contractors over the years that trenching operations (using large excavators) which have seismic velocities generally greater than 4,000- to 4,500±-feet per second typically encounter very difficult to non-productable conditions, depending upon the type and size of equipment being used.

CLOSURE

The field geophysical survey was performed on January 19, 2022 by the undersigned using "state of the art" geophysical equipment and techniques along the selected traverse locations. The seismic data was further evaluated using recently developed computerized tomographic inversion techniques to provide a more thorough analysis and understanding of the subsurface velocity and structural conditions.

It should be noted that our data presented within this report was obtained along two specific locations therefore other areas in the local vicinity may contain different velocity layers and depths not encountered during our field survey. It should be noted that our survey lines were performed within the landscaped shoulder of the roads. Due to any variable distances of the survey lines to the proposed pipeline location from the actual survey locations, there may be local velocity differentials encountered during excavation of the pipeline with respect to the data presented within this report.

It is important to understand that the fundamental limitation for seismic refraction surveys is known as nonuniqueness, wherein a specific seismic refraction data set does not provide sufficient information to determine a single “true” earth model. Therefore, the interpretation of any seismic data set uses “best-fit” approximations along with the geologic models that appear to be most reasonable for the local area being surveyed. Estimates of layer velocity boundaries as presented in this report are generally considered to be within 10± percent of the total depth of the contact.

Client should also understand that when using the theoretical geophysical principles and techniques discussed in this report, sources of error are possible in both the data obtained, and in the interpretation, and that the results of this survey may not represent actual subsurface conditions. These are all factors beyond Terra Geosciences control and no guarantees as to the results of this survey can be made. We make no warranty, either expressed or implied.

SEISMIC LINE LOCATION MAP

Base Map: Google™ Earth imagery (2022); Seismic traverses S-1 and S-2 shown as red lines.

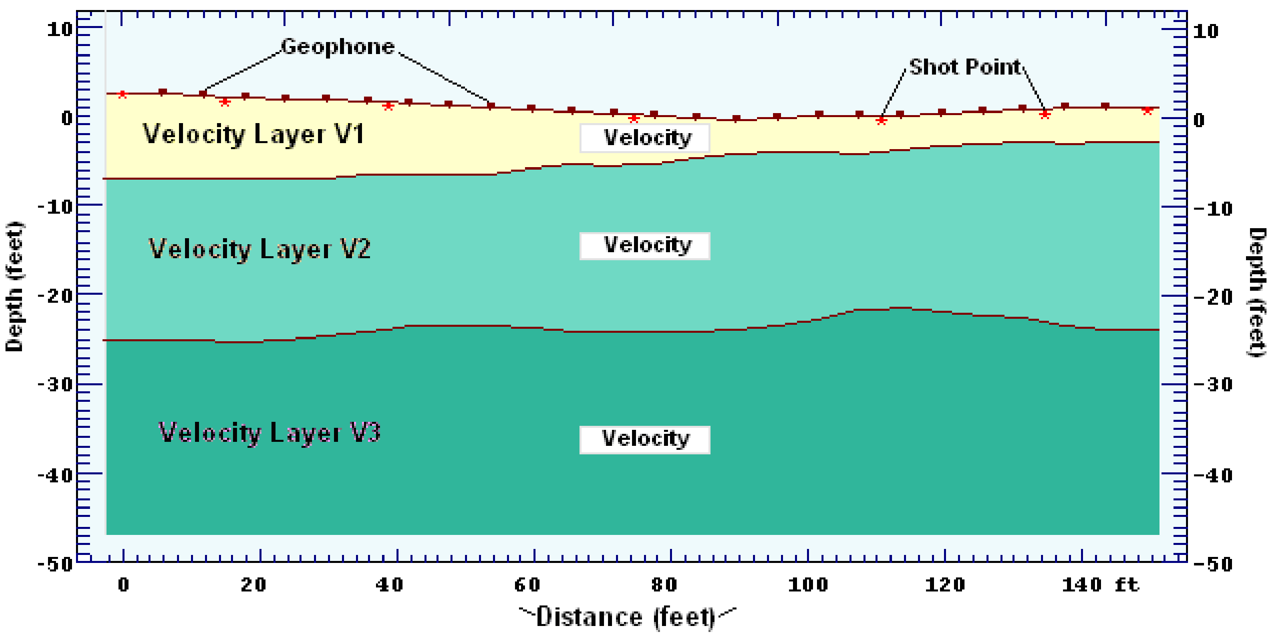
PROJECT NO. 223768-1 **PLATE 1**

APPENDIX A

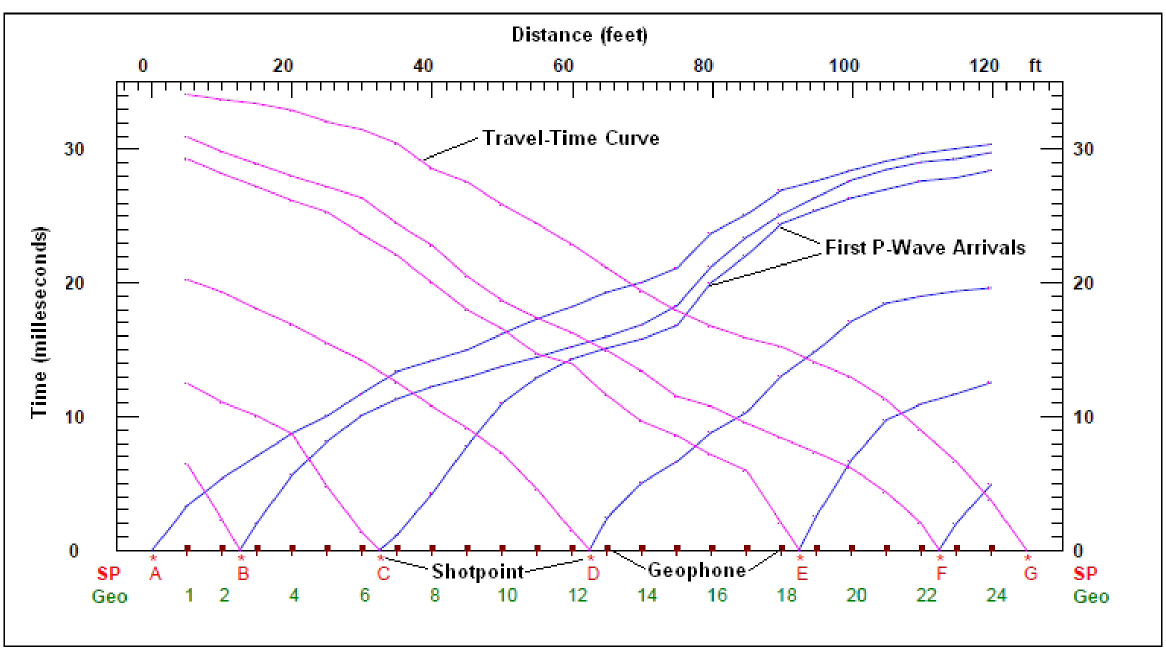
LAYER VELOCITY MODELS

LAYER VELOCITY MODEL LEGEND

LAYER VELOCITY MODEL



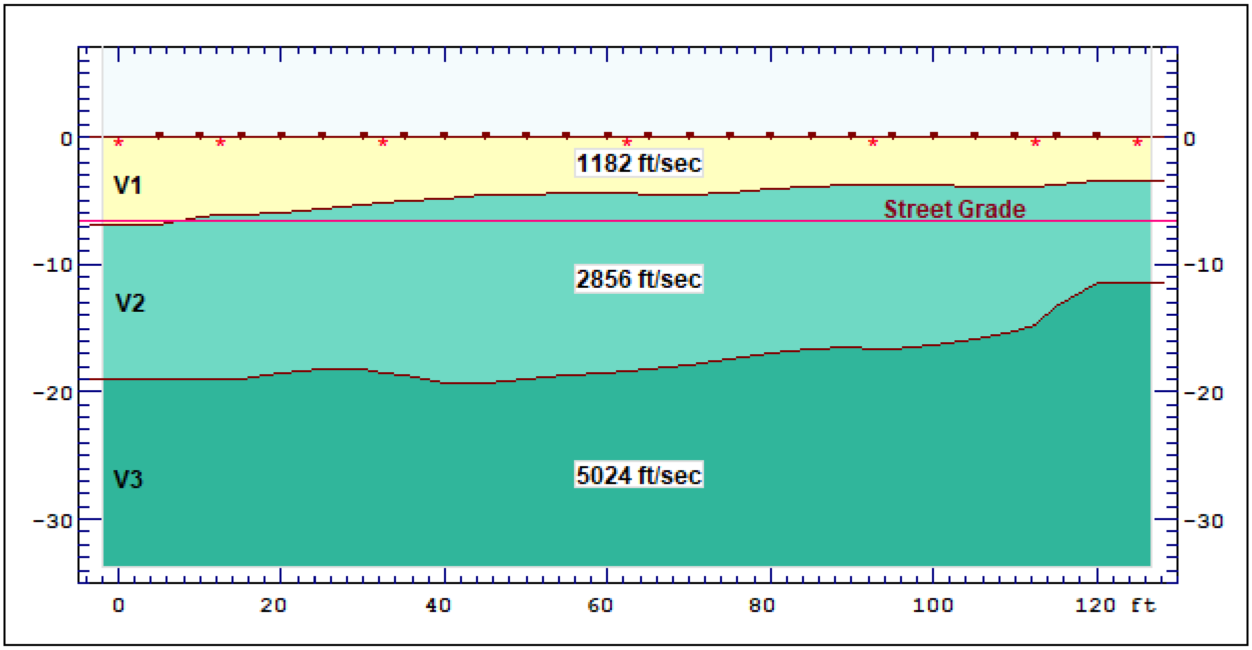
TIME-DISTANCE PLOT



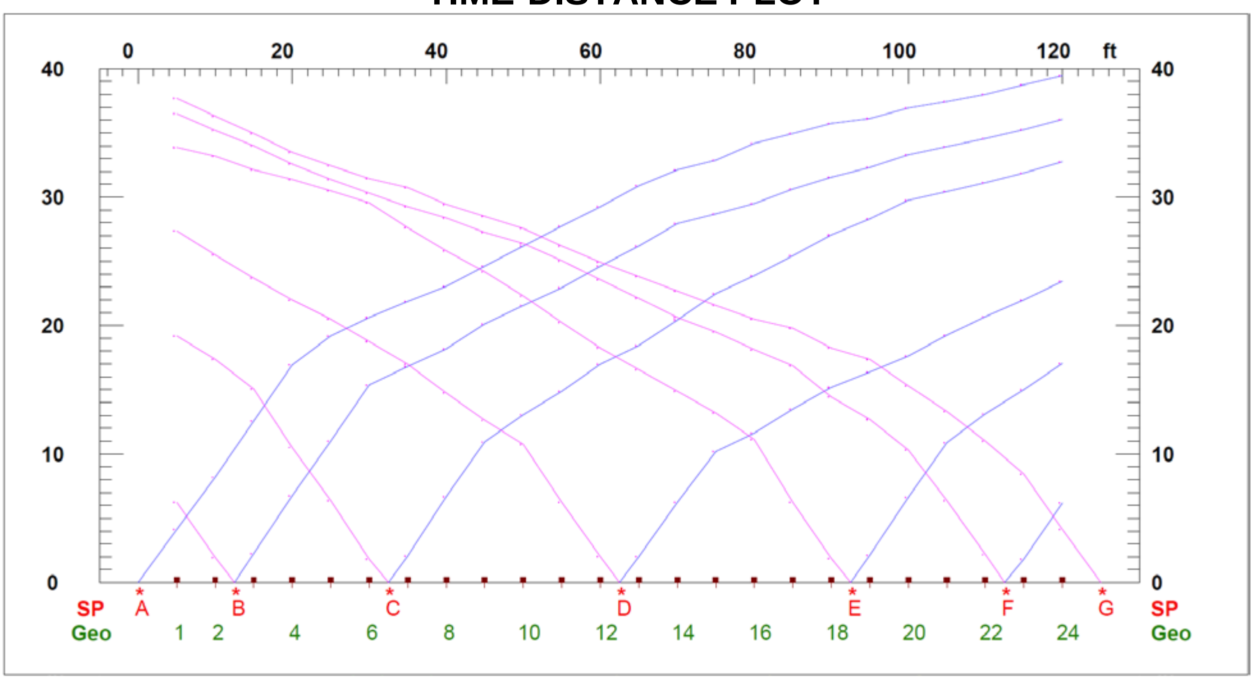
SEISMIC LINE S-1

< West - East >

LAYER VELOCITY MODEL



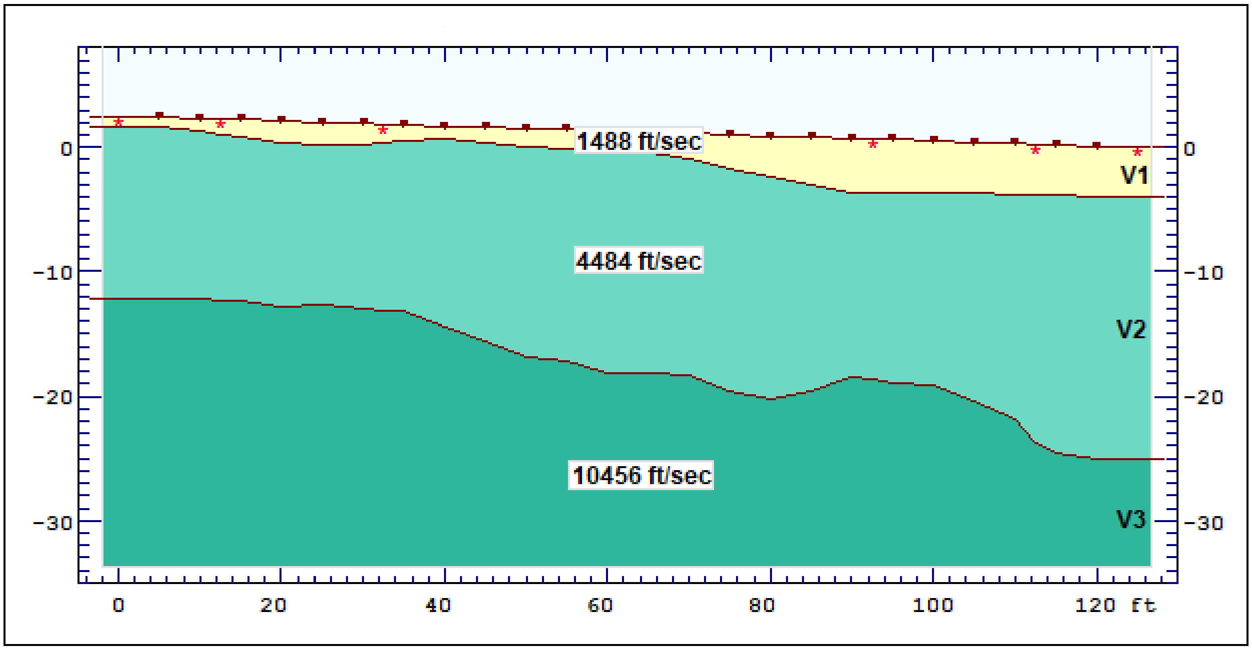
TIME-DISTANCE PLOT



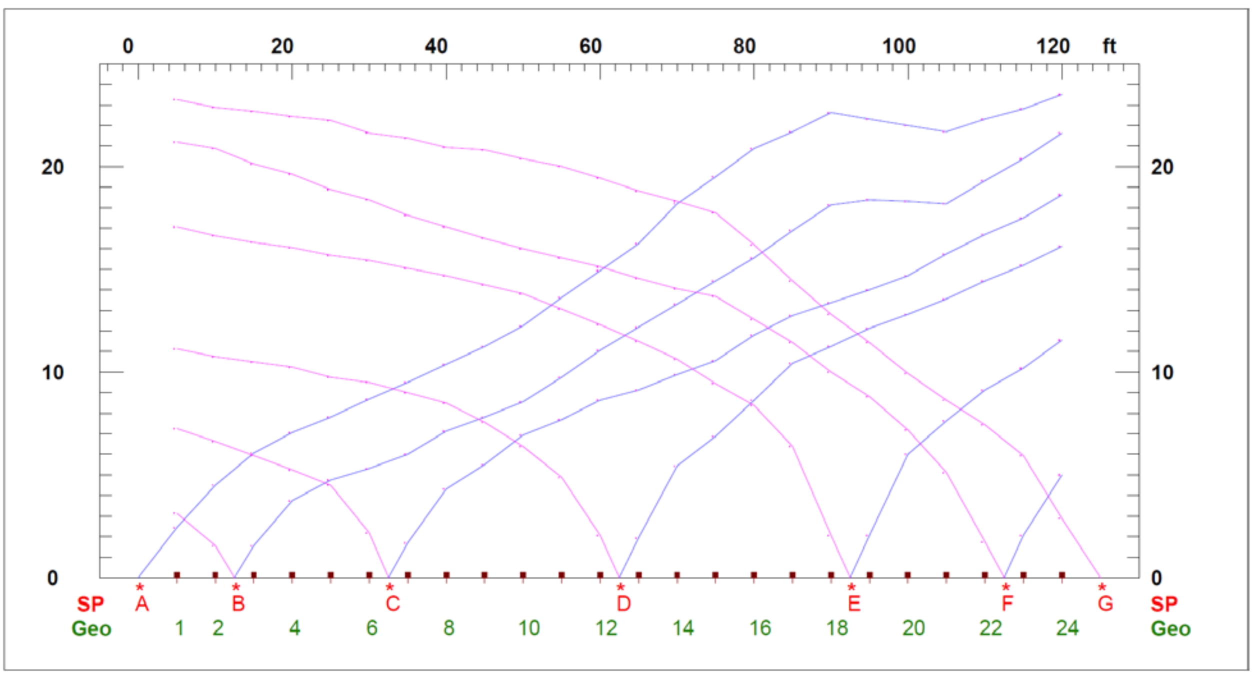
SEISMIC LINE S-2

< South - North >

LAYER VELOCITY MODEL



TIME-DISTANCE PLOT



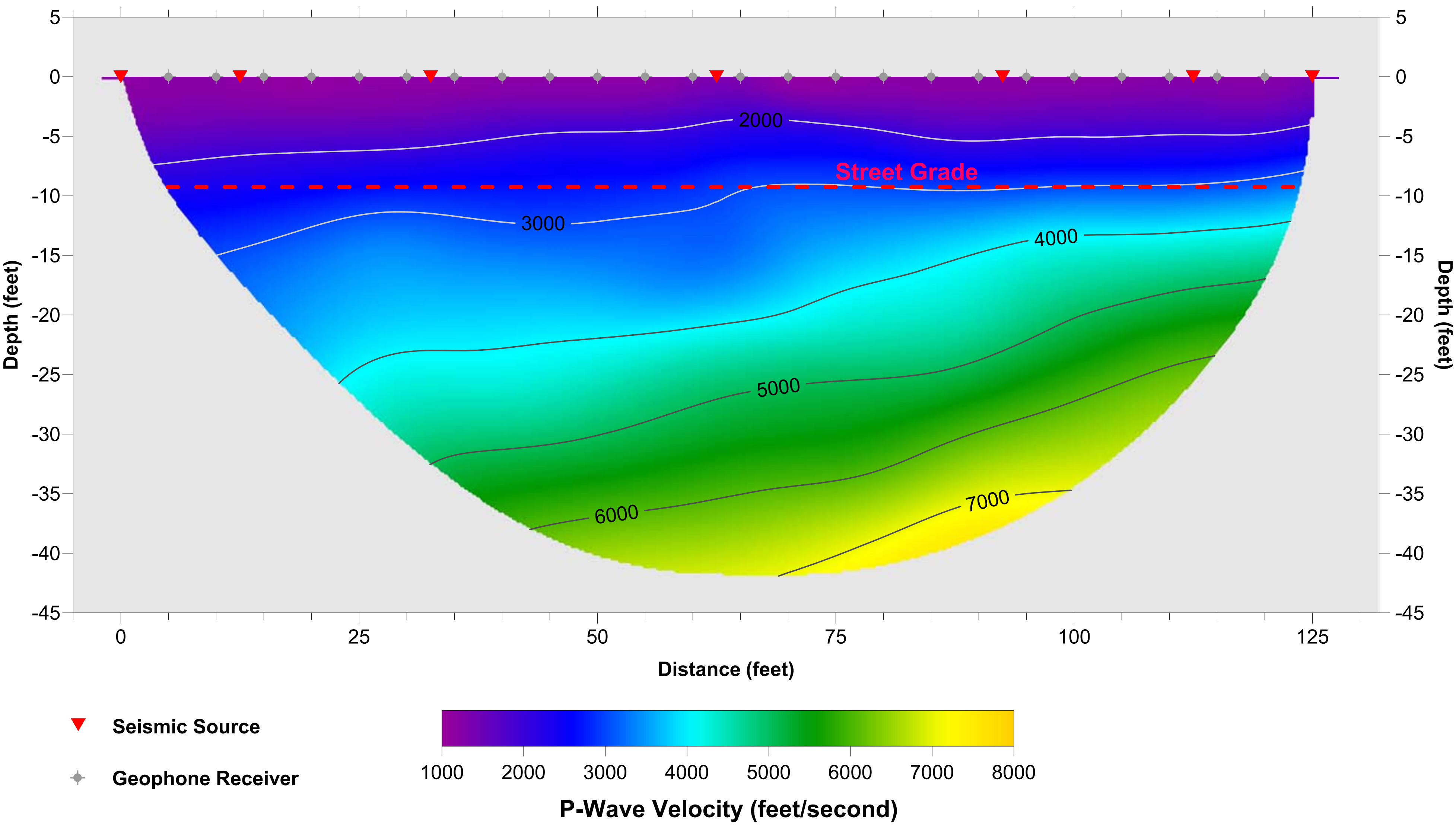
APPENDIX B

REFRACTION TOMOGRAPHIC MODELS

SEISMIC LINE S-1

North 52° East →

REFRACTION TOMOGRAPHIC MODEL



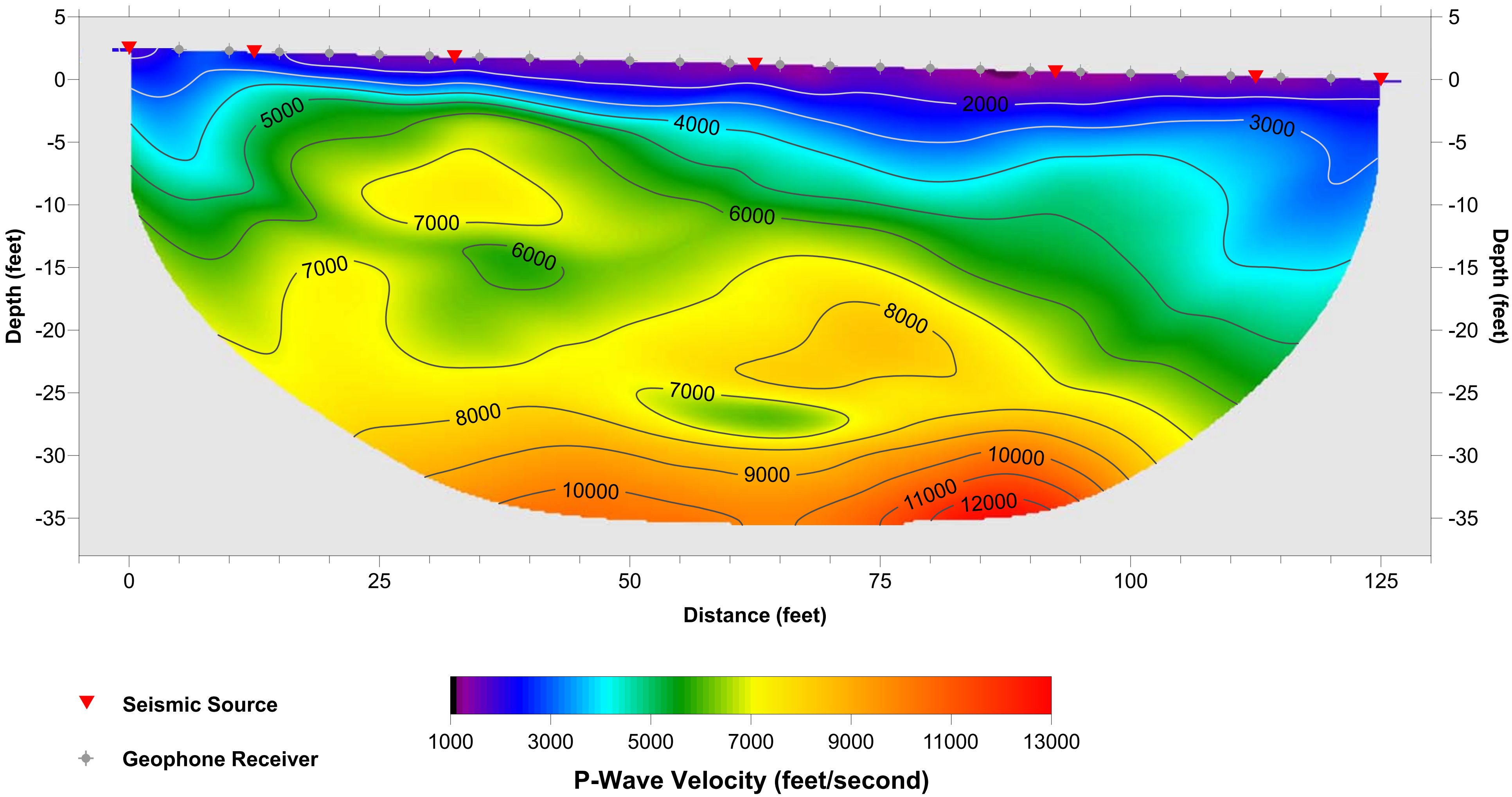
SCALE: Vertical Exaggeration 1.25X

RMS error 2.3%, Rayfract Version 4.02

SEISMIC LINE S-2

North 7° East →

REFRACTION TOMOGRAPHIC MODEL



SCALE: Vertical Exaggeration 1.25X

RMS error 4.9%, Rayfract Version 4.02

APPENDIX C

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REFERENCES

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APPENDIX F

Noise Calculations

Equipment	Max Noise Level at 50 Feet	Typical Duty Cycle	Average Noise Level at 50 Feet
Auger Drill Rig	84	20%	77
Backhoe	80	40%	76
Blasting	94	1%	74
Chain Saw	85	20%	78
Clam Shovel	93	20%	86
Compactor (ground)	80	20%	73
Compressor (air)	80	40%	76
Concrete Mixer Truck	85	40%	81
Concrete Pump	82	20%	75
Concrete Saw	90	20%	83
Crane (mobile or stationary)	81	16%	73
Dozer	85	40%	81
Dump Truck	84	5%	71
Excavator	85	40%	81
Front End Loader	80	40%	76
Generator (25 kilovolt amps or less)	70	50%	67
Generator (more than 25 kilovolt amps)	82	50%	79
Grader	85	40%	81
Hydra Break Ram	90	10%	80
Impact Pile Driver (diesel or drop)	95	20%	88
In situ Soil Sampling Rig	84	20%	77
Jackhammer	85	20%	78
Mounted Impact Hammer (hoe ram)	90	20%	83
Paver	85	50%	82
Pneumatic Tools	85	50%	82
Pumps	77	50%	74
Rock Drill	85	20%	78
Roller	74	40%	70
Scraper	85	40%	81
Tractor	84	40%	80
Vacuum Excavator (vac-truck)	85	40%	81
Vibratory Concrete Mixer	80	20%	73
Vibratory Pile Driver	95	20%	88

Phase	Equipment	Maximum Average Hourly Noise Level at 50 Feet [dB(A) L_{eq}]	Phase Duration (months)	Active Construction Area (feet/day)	Average Distance to Receiver (feet)	Average Noise Level at Receiver [dB(A) L_{eq}]
Grubbing/	Concrete Saw	83				
Land Clearing	Dump Truck	71	1.2	30	67	80
	Total	**83**				
Grading/	Excavator	81				
Excavation	Front End Loader	76	5.4	30	67	79
	Total	**82**				
Drainage/	Excavator	81				
Utilities/	Utility Truck	74	3.6	30	67	79
Subgrade	**Total**	**82**				
Paving	Paver	82				
	Utility Truck	65	1-Jan	30	67	79
	Total	**82**				

Nearest residence	65	feet
Linear work area	30	feet
Average distance	67	feet