

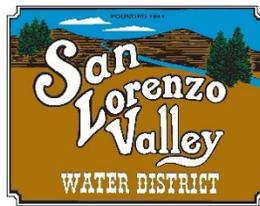
**INITIAL STUDY/
MITIGATED NEGATIVE DECLARATION**

for the

QUAIL HOLLOW PIPELINE REPLACEMENT PROJECT

November 2020

Prepared for



San Lorenzo Valley Water District
13060 Highway 9
Boulder Creek, CA 95006

Prepared by



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TABLE OF CONTENTS

Project Data	1
Chapter 1 Project Description	3
1.1 Introduction	3
1.2 Project Location.....	3
1.3 Project Background	6
1.4 Project Description	6
1.5 Required Permits	7
1.6 Project Objectives.....	7
Chapter 2 Environmental Factors Potentially Affected.....	9
Chapter 3 Determination	11
Chapter 4 Initial Study Environmental Checklist.....	13
4.2 Aesthetics.....	15
4.3 Agricultural and Forestry Resources	17
4.4 Air Quality	19
4.5 Biological Resources	23
4.6 Cultural Resources.....	33
4.7 Energy.....	37
4.8 Geology and Soils.....	39
4.9 Greenhouse Gas Emissions.....	43
4.10 Hazards and Hazardous Materials	45
4.11 Hydrology and Water Quality.....	47
4.12 Land Use and Planning.....	50
4.13 Mineral Resources	51
4.14 Noise.....	52
4.15 Population and Housing.....	55
4.16 Public Services	56
4.17 Recreation.....	57
4.18 Transportation.....	58
4.19 Tribal Cultural Resources	60
4.20 Utilities and Service Systems	62
4.21 Wildfire.....	64
4.22 Mandatory Findings of Significance.....	66
Chapter 5 References.....	69

TABLES

Table 1. North Central Coast Air Basin Attainment Status – January 2015	19
Table 2. Distances to Selected Major Active Faults.....	40

FIGURES

Figure 1. Project Location and Parcel Map	4
Figure 2. Site Photos.....	5
Figure 3. Habitat Map.....	25
Figure 4. Rare Plant Map.....	27

APPENDICES

- A. Project Site Plans
- B. Quail Hollow Pipeline Replacement Project Biological Resources Report
- C. Draft Geotechnical Design Report – San Lorenzo Valley Water District 2019 Waterline Project

Project Data

- 1 **Project Title:** Quail Hollow Pipeline Replacement Project
- 2 **Lead Agency Name and Address:** San Lorenzo Valley Water District, 13060 Highway 9, Boulder Creek, CA 95006
- 3 **Contact Person and Phone Number:** Carly Blanchard, Environmental Planner (831) 430-4639
- 4 **Project Proponent:** San Lorenzo Valley Water District
- 5 **Project Location:** The project is located within the Quail Hollow Road right-of-way, between Cumora Lane and West Zayante Road, in the Lompico community in Santa Cruz County, California.
- 6 **Santa Cruz County General Plan Designations:** The Santa Cruz County 1994 General Plan designates the project site as Parks, Recreation and Open Space (O-R), Residential – Rural (RR), Residential Mountain (R-M).
- 7 **Zoning:** The project site is located within the Parks and Recreation (PR-L), Special Use (SU), Single-Family Residential (R-1-15), and Residential Agricultural (RA) Zoning Districts.
- 8 **Project Description:** The San Lorenzo Valley Water District proposes to install approximately 7,500 linear feet (LF) of a 12-inch water supply transmission main pipeline that runs parallel to an existing 6-inch pipeline in the community of Lompico in Santa Cruz County, California. The project would improve water conveyance from the existing water lines to customers within the system.

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Chapter 1 Project Description

1.1 INTRODUCTION

This Initial Study has been prepared to evaluate the potential environmental effects associated with the Quail Hollow Pipeline Replacement Project (project or proposed project), located in the Lompico community in Santa Cruz County, California. This document has been prepared in accordance with the California Environmental Quality Act (CEQA), Public Resources Code §21000 et. seq., and the State CEQA Guidelines, California Code of Regulations §15000 et. seq.

An Initial Study is an informational document prepared by a lead agency to determine if a project may have a significant effect on the environment (CEQA Guidelines §15063, subd. (a)). If there is substantial evidence that a project may have a significant effect on the environment, an Environmental Impact Report (EIR) must be prepared, in accordance with CEQA Guidelines §15064(a). However, if the lead agency determines that revisions in the project plans or proposals made by or agreed to by the applicant mitigate the potentially significant effects to a less-than-significant level, an Initial Study/Mitigated Negative Declaration (IS/MND) may be prepared instead of an EIR (CEQA Guidelines §15070, subd. (b)). The lead agency prepares a written statement describing the reasons a proposed project would not have a significant effect on the environment and, therefore, why an EIR need not be prepared. This IS/MND conforms to the content requirements under CEQA Guidelines §15071.

The San Lorenzo Valley Water District (SLVWD) is acting as the lead agency pursuant to CEQA Guidelines §15050(a). The SLVWD serves the Lompico community in Santa Cruz County with approximately 498 residential service connections. As the lead agency, the SLVWD oversaw preparation of this IS/MND pursuant to CEQA Guidelines §15063, §15070, and §15152. This IS/MND will be circulated for agency and public review during a 30-day public review period pursuant to CEQA Guidelines §15073. Comments received by the SLVWD on this IS/MND will be reviewed and considered as part of the deliberative process in accordance with CEQA Guidelines §15074.

The following section is consistent with the requirements of CEQA Guidelines §15124 to the extent that it is applicable to the project. This section contains a detailed description of the project location, existing setting, project components and relevant project characteristics, and applicable regulatory requirements.

1.2 PROJECT LOCATION

The project is located in the community of Lompico in Santa Cruz County, California, near Quail Hollow Ranch County Park (**Figure 1**). The project site is located along Quail Hollow Road within the following Assessor Parcel Numbers (APNs): 074-171-07, 074-171-10, 074-171-12, 074-171-13, 074-171-15, 074-181-01, and 077-311-17.

Regional access is provided to the project site via East Zayante Road, which connects to Highway 9 at Felton about 8 miles north of Lompico. The project site consists of paved roadway within Quail Hollow Road surrounded primarily by forest/mountainous land (see site photos in **Figure 2**). Some residences are also located along Quail Hollow Road.



Photo 1. Entrance to Quail Hollow County Park Adjacent to Quail Hollow Road.



Photo 2. Typical Section of Quail Hollow Road Pipeline Alignment



Photo 3. Quail Hollow Road Pipeline Alignment from Southern Terminus at West Zayante Road



Photo 4. Typical Section of Quail Hollow Road Pipeline Alignment

Figure 2. Quail Hollow Road Pipeline Site Photos

1.3 PROJECT BACKGROUND

The SLVWD is a water supplier, that was established in 1941, and serves several communities within the 136 square-mile San Lorenzo River watershed. The SLVWD owns, operates, and maintains two permitted water systems. Each service area provides supplies from separate water sources. The Project is located in the North/South Service Area, which includes the unincorporated communities of Boulder Creek, Brookdale, Ben Lomond, Manana Woods, Scotts Valley, and Lompico.

The SLVWD legal boundaries encompass approximately 62 square miles. Land uses include timber, State and regional parks, water supply watersheds, rural residential, low-density urban residential, commercial quarries, agriculture, and other open space. Within these boundaries, the SLVWD's two service areas have a combined area of approximately 29 square miles, made up of the North Service Area (26.7 square miles) and the Felton Service Area (2.2 square miles).

The SLVWD relies on both surface water and groundwater resources, including nine stream diversions, one groundwater spring, and seven active groundwater wells. Source waters are derived solely from rainfall within the San Lorenzo River watershed.

The scale and complexity of the SLVWD's water distribution system reflects the San Lorenzo Valley's rugged topography, dispersed pattern of development, and widely distributed raw water sources. The SLVWD's two systems have limited above-ground storage capacity, equal to a few days' average use and rely on groundwater for seasonal and year-to-year storage. The SLVWD produces and treats water based on relatively immediate water demand.

The SLVWD serves the Lompico community in Santa Cruz County with approximately 498 residential service connections. The Lompico water system is supplied from the SLVWD's Quail Zone via the Lompico Booster Pump Station. The Lompico water system consists of a network of 4-inch and 6-inch water mains, three water tank sites, a booster pump station, and six pressure reducing valve (PRV) stations.

1.4 PROJECT DESCRIPTION

The SLVWD is proposing to install approximately 7,500 linear feet (LF) of new 12-inch water supply transmission main pipeline that runs parallel to an existing 6-inch water supply pipeline within the Quail Hollow Road right-of-way, specifically between Cumora Lane and West Zayante Road. The purpose of the proposed project is to improve water conveyance from the existing water lines to customers within the system. Plans for the proposed project are shown in **Appendix A**.

The following discussion provides a more detailed description of key project elements, including grading, construction activities, and schedule. The proposed project includes only the installation of a new water supply pipeline and would not require regular operation activities or maintenance. Therefore, the project under evaluation in this CEQA document is limited to the construction and installation of the pipeline, not the operation.

Project Construction

Project construction is only proposed within existing developed areas and would not require grading or demolition activities. The pipeline installation would occur under existing pavement and would include cutting pavement, excavating a trench, installing the pipeline, backfilling the trench, and repaving. Typical equipment that would be used during construction includes pick-up trucks, wheeled backhoes, dump trucks for hauling spoils and delivering slurry, delivery trucks, and paving equipment. The proposed project would

produce approximately 20 truck trips, and eight construction workers per day. Construction staging would be conducted on site. Solid waste would consist of cut pavement and trench spoils, which would be hauled to the Buena Vista Landfill in Watsonville, California. Water supply for the proposed project would be provided by existing fire hydrants along Quail Hollow Road.

Construction Schedule

Construction of the project is scheduled to begin in late spring/early summer of 2021 and would take approximately eight weeks to complete, with an additional two weeks for final paving. The anticipated production rate would be approximately 1,000 LF per week. Per the County of Santa Cruz's (County's) request, the proposed project would be constructed in the summer when the nearby schools are out of session.

1.5 REQUIRED PERMITS

California Government Code Section 53091 (d) and (e) provides that facilities for the production, generation, storage, treatment, or transmission of water supplies are exempt from local (i.e., city and county) building and zoning ordinances. The project relates exclusively to the transmission of water and is, therefore, legally exempt from County building and zoning ordinances. However, the proposed project would require the following permits and/or approvals:

- Compliance with Federal Endangered Species Act,
- County Encroachment Permit,
- Coverage under the San Francisco Bay Regional Water Quality Control Board (Water Board) National Pollutant Discharge Elimination System (NPDES) General Storm Water Permit, and
- Application for Domestic Water Supply Permit Amendment with the California State Water Resources Control Board's Division of Drinking Water.

1.6 PROJECT OBJECTIVES

The project is proposed to improve the existing water supply system by installing a new pipeline adjacent to the existing pipeline. Installation of the pipeline will improve water conveyance from existing water lines to customers along Zayante Road. The project would be constructed with essentially the same purpose as the existing pipeline and does not involve any expansion of services.

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Chapter 2 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 within Chapter 4. Initial Study Environmental Impacts. Sources used for analysis of environmental effects are cited in parenthesis after each discussion and are listed in Chapter 5. References.

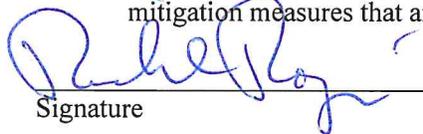
- | | | |
|--|--|--|
| <input type="checkbox"/> Aesthetics | <input type="checkbox"/> Agricultural & Forestry Resources | <input type="checkbox"/> Air Quality |
| <input checked="" type="checkbox"/> Biological Resources | <input checked="" type="checkbox"/> Cultural Resources | <input type="checkbox"/>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

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Chapter 3 Determination

On the basis of this initial evaluation:

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



Signature

Richard Rogers
Printed Name

12/10/2020

date

San Lorenzo Valley Water Dist.
for

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Chapter 4 Initial Study Environmental Checklist

The following chapter assesses the environmental consequences associated with the proposed project. Mitigation measures, where appropriate, are identified to address potential impacts.

EVALUATION OF ENVIRONMENTAL IMPACTS

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

7. **Supporting Information Sources:** A source list should be attached, and other sources used or individuals contacted should be cited in the discussion.
8. This is only a suggested form, and lead agencies are free to use different formats; however, lead agencies should normally address the questions from this checklist that are relevant to a project's environmental effects in whatever format is selected.
9. The explanation of each issue should identify:
 - a) The significance criteria or threshold, if any, used to evaluate each question; and
 - b) The mitigation measure identified, if any, to reduce the impact to less than significance.

4.2 AESTHETICS

Environmental Setting

The project site is located completely within the pavement of Quail Hollow Road, which is surrounded by both rural residential and recreational uses. The nearest residences are located along Quail Hollow Road and directly across the street from the project site at Cumora Lane. Photos of the project site are presented in **Figure 2**. The new pipeline would not be visible from public view as it would be located underground.

Environmental Impacts

ENVIRONMENTAL IMPACTS	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
AESTHETICS. Except as provided in Public Resources Code Section 21099, would the project:				
a) Have a substantial adverse effect on a scenic vista?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) In non-urbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings? (Public views are those that are experienced from publicly accessible vantage point). If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
d) Create a new source of substantial light or glare, which would adversely affect day or nighttime views in the area?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Explanation

- a) **No Impact.** The project would not impact any public scenic vistas, as designated in the Santa Cruz County General Plan and mapped in the County Geographic Information System (GIS), or obstruct any public views of these visual resources, including Quail Hollow County Park. The pipeline would be located underground, construction activities would be temporary, and the project site would be restored to its current condition after construction. Therefore, the proposed project would not have an adverse effect on a scenic vista. (1, 2, 9, 10)
- b) **No Impact.** The State Scenic Highways Program is designed to protect and enhance the natural scenic beauty of California highways and adjacent corridors through special conservation treatment. The Santa Cruz County General Plan does not designate any scenic resources within the community of Lompico. The closest scenic routes include Highway 9, which is approximately one mile west of the proposed project site, and Highway 17, which is approximately four miles to the east of the project site. The project site is not visible from these scenic routes, the pipeline would be located underground, construction activities would be temporary, and the project site would be restored to its current condition after construction. Therefore, the proposed project would not substantially damage any scenic resources. (1, 2, 9)

- c) **Less than Significant Impact.** The proposed pipeline would be located underground and would not be visible to the public. Construction activities would result in temporary visual impacts but would not have a permanent impact on the visual character or public views of the site because the site would be restored to its existing condition upon completion. Therefore, the project would not substantially degrade the visual character or quality of the area. This is a less-than-significant impact. (1, 2)
- d) **No Impact.** The proposed project includes the installation of an underground pipeline and, therefore, would not create a source of light or glare that may affect day or nighttime views in the area. (1, 2)

4.3 AGRICULTURAL AND FORESTRY RESOURCES

Environmental Setting

The California Department of Conservation Farmland Mapping and Monitoring Program (FMMP), established by the State Legislature in 1982, assesses the location, quality, and quantity of agricultural lands. The FMMP is a non-regulatory program contained in Section 612 of the Public Resources Code. In addition, the FMMP monitors the conversion of these lands over time. The FMMP contains five farmland categories with a purpose of providing consistent and impartial analysis of agricultural land use and land use changes throughout California. The five farmland categories consist of the following:

- Prime Farmland (P) comprises the best combination of physical and chemical features able to sustain long-term agricultural production. Irrigated agricultural production is a necessary land use four years prior to the mapping date to qualify as Prime Farmland. The land must be able to store moisture and produce high yields.
- Farmland of Statewide Importance (S) possesses similar characteristics to Prime Farmland with minor shortcomings, such as less ability to hold and store moisture and more pronounced slopes.
- Unique Farmland (U) has a production history of propagating crops with high-economic value.
- Farmland of Local Importance (L) is important to the local agricultural economy. Local advisory committees and a county specific Board of Supervisors determine this status.
- Grazing Land (G) is suitable for browsing or grazing of livestock.

The project site is in a generally forested area identified as “Other Land” and “Urban and Built-Up Land” on the Santa Cruz County Important Farmland Map (2016). The project site does not contain any land designated as Prime Farmland, Farmland of Statewide Importance, Unique Farmland, or Farmland of Local Importance.

The Williamson Act, codified in 1965 as the California Land Conservation Act, allows local governments to enter into contracts with private landowners, offering tax incentives in exchange for an agreement that the land will remain as agricultural or related open space use for a period of 10 years. The project site is not under a Williamson Act contract.

According to the California Public Resources Code §4526, the California Board of Forestry and Fire Protection defines “Timberland” as land not owned by the federal government, nor designated as experimental forest land, which is capable and available for growing any commercial tree species. The board defines commercial trees on a district basis following consultation with district committees and other necessary parties. The site does not contain any forest land as defined in Public Resources Code Section 12220(g), timberland as defined by Public Resources Code section 4526, or property zoned for Timberland Production as defined by Government Code Section 51104(g).

Environmental Impacts

ENVIRONMENTAL IMPACTS	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
AGRICULTURAL AND FORESTRY RESOURCES. In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Dept. of Conservation as an optional model to use in assessing impacts on agriculture and farmland. In determining whether impacts to forest resources, including timberland, are significant environmental effects, lead agencies may refer to information compiled by the California Department of Forestry and Fire Protection regarding the state’s inventory of forest land, including the Forest and Range Assessment Project and the Forest Legacy Assessment project; and forest carbon measurement methodology provided in Forest Protocols adopted by the California Air Resources Board. Would the project:				
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?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
d) Result in the loss of forest land or conversion of forest land to non-forest uses?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland to non-agricultural use or conversion of forest land to non-forest use?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Explanation

- a) **No Impact.** The project site is designated as “Other Land” and “Urban Built-up Land” on the Important Farmlands Map for Santa Cruz County and does not contain any Prime, Unique, or Farmland of Statewide Importance. The proposed project would not impact any agricultural land. (1, 3)
- b) **No Impact.** The project site is not zoned for agricultural use and does not contain Williamson Act lands; therefore, no conflicts would occur. (1, 3)
- c) **No Impact.** Although the project area supports evergreen forest, the land is not in a timber harvest area. The proposed project would not conflict with existing zoning for, or cause rezoning of, forest or timber lands. (1, 3)
- d,e) **No Impact.** See Responses b) and c) above. As the project is not designated as farmland or forest land and includes site improvements which are similar to the existing use, no other changes to the environment would occur from the project that would result in the loss or conversion of forest land or farmland to non-forest or non-farmland uses. (1, 3)

4.4 AIR QUALITY

Environmental Setting

The Federal Clean Air Act and the California Clean Air Act mandate the control and reduction of certain air pollutants. Under these Acts, the United States Environmental Protection Agency (U.S. EPA) and the California Air Resources Board (CARB) have established ambient air quality standards for specific “criteria” pollutants. These pollutants are carbon monoxide (CO), ozone (O₃), sulfur dioxide (SO₂), nitrogen oxides (NO_x), particulate matter less than 10 microns in diameter (PM₁₀), lead (Pb), and particulate matter less than 2.5 microns in diameter (PM_{2.5}). The project site is located within the North Central Coast Air Basin (NCCAB), which is comprised of Santa Cruz, San Benito, and Monterey Counties, and is regulated by the Monterey Bay Air Resources District (MBARD, formally known as Monterey Bay Unified Air Pollution Control District).

The U.S. EPA administers the National Ambient Air Quality Standards (NAAQS) under the Federal Clean Air Act. The U.S. EPA sets the NAAQS and determines if areas meet those standards. Violations of ambient air quality standards are based on air pollutant monitoring data and evaluated for each air pollutant. Areas that do not violate ambient air quality standards are considered to have attained the standard. The NCCAB is in attainment for all NAAQS and for all California Ambient Air Quality Standards (CAAQS) except O₃ and PM₁₀. The primary sources of O₃ and PM₁₀ in the NCAAB are from automobile engine combustion. To address exceedance of these CAAQS, the MBARD has developed and implemented several plans including the 2005 Particulate Matter Plan, the 2007 Federal Maintenance Plan, and the 2012-2015 Air Quality Management Plan (AQMP), a revision to the 2012 Triennial Plan. NCCAB Attainment Status to National and California Ambient Air Quality can be found in **Table 1** below.

Table 1. North Central Coast Air Basin Attainment Status – January 2015

Pollutant	State Standards¹	National Standards
Ozone (O ₃)	Nonattainment²	Attainment/Unclassified ³
Inhalable Particulates (PM ₁₀)	Nonattainment	Attainment
Fine Particulates (PM _{2.5})	Attainment	Attainment/Unclassified ⁴
Carbon Monoxide (CO)	Monterey Co. – Attainment San Benito Co. – Unclassified Santa Cruz Co. – Unclassified	Attainment/Unclassified
Nitrogen Dioxide (NO ₂)	Attainment	Attainment/Unclassified ⁵
Sulfur Dioxide (SO ₂)	Attainment	Attainment ⁶
Lead	Attainment	Attainment/Unclassified ⁷
Notes:		
1) State designations based on 2010 to 2012 air monitoring data.		
2) Effective July 26, 2007, the CARB designated the NCCAB a nonattainment area for the State ozone standard, which was revised in 2006 to include an 8-hour standard of 0.070 ppm.		
3) On March 12, 2008, EPA adopted a new 8-hour ozone standard of 0.075 ppm. In April 2012, EPA designated the NCCAB attainment/unclassified based on 2009-2011 data.		
4) This includes the 2006 24-hour standard of 35 µg/m ³ and the 2012 annual standard of 12 µg/m ³ .		
5) In 2012, EPA designated the entire state as attainment/unclassified for the 2010 NO ₂ standard.		
6) In June 2011, the CARB recommended to EPA that the entire state be designated as attainment for the 2010 primary SO ₂ standard. Final designations to be addressed in future EPA actions.		
7) On October 15, 2008 EPA substantially strengthened the national ambient air quality standard for lead by lowering the level of the primary standard from 1.5 µg/m ³ to 0.15 µg/m ³ . Final designations were made by EPA in November 2011.		
8) Nonattainment designations are highlighted in Bold .		
Source: CARB Area Designation Maps website http://www.arb.ca.gov/desig/adm/adm.htm and EPA Green Book Nonattainment Areas for Criteria Pollutants http://www.epa.gov/air/oaqps/greenbk/index.html .		

Plans to attain these standards already accommodate the future growth projections available at the time these plans were prepared. Any development project capable of generating air pollutant emissions exceeding regionally established criteria is considered significant for the purposes of CEQA, whether or not such emissions have been accounted for in regional air planning. Any project that would directly cause or substantially contribute to a localized violation of an air quality standard would generate substantial air pollution impacts. The same is true for a project that generates a substantial increase in health risks from toxic air contaminants.

Sensitive receptors are more susceptible to the effects of air pollution than the general population. Land uses that are considered sensitive receptors include residences, schools, and health care facilities. Sensitive receptors in the vicinity of the project site consists of existing adjacent residences. The closest residences are located immediately adjacent to the project site along Quail Hollow Road and across the street on Cumora Lane.

Environmental Impacts

ENVIRONMENTAL IMPACTS	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
AIR QUALITY. Where available, the significance criteria established by the applicable air quality management district or air pollution control district may be relied upon to make the following determinations. Would the project:				
a) Conflict with or obstruct implementation of the applicable air quality plan?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
b) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
c) Expose sensitive receptors to substantial pollutant concentrations?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
d) Result in other emissions (such as those leading to odors adversely affecting a substantial number of people)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Explanation

- a) **Less Than Significant Impact.** CEQA Guideline §15125(b) requires an evaluation of project consistency with applicable regional plans, including the AQMP. As stated above, the MBARD has developed and implemented several plans to address exceedance of State air quality standards, including the MBARD 2012-2015 AQMP. The MBARD 2012-2015 AQMP accommodates growth by projecting growth in emissions based on population forecasts prepared by the Association of Monterey Bay Area Governments (AMBAG) and other indicators. The proposed project would not induce potential population growth beyond existing levels; therefore, the project would not conflict with and/or obstruct the implementation of the MBARD 2012-2015 AQMP, or any other plans to address exceedance of State air quality standards.

The MBARD 2008 CEQA Air Quality Guidelines contains standards of significance for evaluating potential air quality effects of projects subject to the requirements of CEQA (see Table 5-1, pg. 5-14, of the MBARD 2008 CEQA Guidelines). According to the MBARD 2008 CEQA Guidelines, a project would result in a potentially significant construction effect related to PM₁₀ emissions if it would result in 8.1 acres per day of minimal earthmoving or 2.2 acres per day of earthmoving (i.e., grading and excavation). The proposed project does not include major grading activities, and therefore, does not exceed the MBARD threshold. In addition, the project would implement standard construction Best Management Practices (BMPs) related to dust suppression during trenching and other construction activities, which would include: 1) watering active construction areas; 2) prohibiting excavation activities during periods of high wind (over 15 mph); 3) covering trucks hauling soil; and, 4) covering exposed stockpiles. The implementation of BMPs would further ensure that potential construction-related emissions would be minimized. This represents a less-than-significant impact. Thus, no significant dust generation or PM₁₀ emissions impacts would be expected to occur in the vicinity of the project site during construction activities. (1, 4, 5)

- b) **Less than Significant Impact.** The proposed project would not result in a cumulatively considerable net increase of any air pollutant for which the project region is in non-attainment. Project construction would not result in a significant air quality impact (see Response a), above). All impacts would be below applicable MBARD thresholds of significance, including thresholds for ozone precursors. Since there would be no significant impacts, project construction would not result in a cumulatively considerable net increase in any criteria pollutant. Air quality impacts associated with the project would be less-than-significant. (1, 5)
- c) **Less than Significant Impact.** A “sensitive receptor” is generally defined as any residence including private homes, condominiums, apartments, or living quarters; education resources such as preschools and kindergarten through grade twelve (k-12) schools; daycare centers; and health care facilities such as hospitals or retirement and nursing homes. There are several residences within the vicinity of the proposed project. The closest residences are located immediately adjacent to the project on Quail Hollow Road and across the street on Cumora Lane. The MBARD’s 2008 CEQA Air Quality Guidelines state that a project would have a significant impact to sensitive receptors if it would cause a violation of any CO, PM₁₀, or toxic air contaminant standards at an existing or reasonably foreseeable sensitive receptor.

As stated above in Response a), the project would implement standard air quality BMPs during construction, and emissions of CO resulting from construction of the proposed project are below applicable MBARD thresholds of significance. As discussed in Response a) above, the proposed project would not exceed any MBARD thresholds, including CO and PM₁₀. Compliance with applicable MBARD regulations would also include, but is not limited to, Rule 402¹, which would minimize potential nuisance impacts to occupants of nearby land uses. For these reasons, construction activities would have a less-than-significant impact on sensitive receptors. (1, 2, 4, 5)

- d) **Less than Significant Impact.** Common sources of odors and odor complaints are uses such as transfer stations, recycling facilities, painting/coating facilities, landfills, and wastewater treatment plants. The proposed project consists of installation of a new water supply pipeline, which would not create new sources of odor. During construction, use of diesel-powered vehicles and equipment

¹ MBARD Rule 402 “Nuisance” states, “A person shall not discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health or safety of any such persons or the public, or which cause, or have a natural tendency to cause, injury or damage to business or property. The provisions of this rule shall not apply to odors emanating from agricultural operations necessary for the growing of crops or the raising of fowl or animals.”

could temporarily generate localized odors, which would cease upon project completion. This represents a less-than-significant impact. (1)

4.5 BIOLOGICAL RESOURCES

Environmental Setting

A Biological Resources Report (DD&A, 2020) was prepared for the project by Denise Duffy & Associates, Inc. (DD&A; **Appendix B**). DD&A biologists conducted surveys within and immediately adjacent to the project site (i.e. the survey area) on May 1, 2020 to characterize habitats present and to identify any special-status plant or wildlife species or suitable habitat for these species. The survey area is defined as approximately five feet from the project site (i.e. the Quail Hollow Road pavement)². Survey methods included walking the survey area using aerial maps and global positioning system (GPS) technology to identify general habitat types and potential sensitive habitat types, conducting focused surveys for special-status plant species, and conducting reconnaissance-level wildlife habitat survey to identify any special-status wildlife species occurring within the survey area or suitable habitat for those species. General and sensitive habitat types were mapped during the survey effort using a combination of GPS and hand drawing on aerial maps, which were later digitized using ArcGIS software.

Special Status Species

Special-status species are those plants and animals that have been formally listed or proposed for listing as Endangered or Threatened or are Candidates for such listing under the federal Endangered Species Act (ESA) or the California Endangered Species Act (CESA). Listed species are afforded legal protection under the ESA and CESA. Species that meet the definition of Rare or Endangered under the CEQA Section 15380 are also considered special-status species. Animals on the California Department of Fish and Wildlife (CDFW) list of “species of special concern” (most of which are species whose breeding populations in California may face extirpation if current population trends continue) meet this definition and are typically provided management consideration through the CEQA process, although they are not legally protected under the ESA or CESA. CDFW also includes some animal species that are not assigned any of the other status designations on their “Special Animals” list; however, these species have no legal or protection status and are not analyzed in this document.

Plants listed as rare under the California Native Plant Protection Act (CNPPA) or included in California Native Plant Society (CNPS) California Rare Plant Ranks (CRPR; formerly known as CNPS Lists) 1A, 1B, 2A, and 2B are also treated as special-status species as they meet the definitions of Sections 2062 and 2067 of the CESA and in accordance with CEQA Guidelines Section 15380.³ In general, the CDFW requires that plant species on CRPR 1A (Plants presumed extirpated in California and Either Rare or Extinct Elsewhere), CRPR 1B (Plants rare, threatened, or endangered in California and elsewhere), CRPR 2A (Plants presumed extirpated in California, but more common elsewhere); and CRPR 2B (Plants rare, threatened, or endangered in California, but more common elsewhere) of the CNPS *Inventory of Rare and Endangered Vascular Plants of California* be fully considered during the preparation of environmental documents relating to CEQA. CNPS CRPR 4 species (plants of limited distribution) may, but generally do not, meet the definitions of Sections 2062 and 2067 of CESA, and are not typically considered in environmental documents relating to CEQA. While other species (i.e., CRPR 3 or 4 species) are sometimes found in database searches or within the literature, these do not meet the definitions of Section 2062 and 2067 of CESA and are not analyzed in this document.

² Please note that the survey area was expanded in one location during the field survey due to the observation of sensitive resources. The expanded survey area and sensitive resources are shown on Figure 4.

³ CNPS initially created five CRPR to categorize degrees of concern; however, to better define and categorize rarity in California’s flora, the CNPS Rare Plant Program and Rare Plant Program Committee have developed the new CRPR 2A and CRPR 2B categories.

Raptors (e.g., eagles, hawks, and owls) and their nests are protected in California under Fish and Game Code Section 3503.5. Section 3503.5 states that it is “unlawful to take, possess, or destroy the nest or eggs of any such bird except otherwise provided by this code or any regulation adopted pursuant thereto.” In addition, fully protected species under the Fish and Game Code Section 3511 (birds), Section 4700 (mammals), Section 5515 (fish), and Section 5050 (reptiles and amphibians) are also considered special-status animal species. Species with no formal special-status designation but thought by experts to be rare or in serious decline may also be considered special-status animal species in some cases, depending on project-specific analysis and relevant, localized conservation needs or precedence.

Sensitive Habitats

Sensitive habitats include riparian corridors, wetlands, habitats for legally protected species, areas of high biological diversity, areas supporting rare or special-status wildlife habitat, and unusual or regionally restricted habitat types. Vegetation types considered sensitive include those identified as sensitive on the CDFW’s *California Natural Communities List* (i.e., those habitats that are rare or endangered within the borders of California), and those that are occupied by species listed under ESA or are critical habitat in accordance with ESA. Specific habitats may also be identified as sensitive in city or county general plans or ordinances. Sensitive habitats are regulated under federal regulations (such as the Clean Water Act and Executive Order 11990 – Protection of Wetlands), state regulations (such as CEQA and the CDFW Lake and Streambed Alteration Program), or local ordinances or policies (such as city or county tree ordinances and general plan policies).

Survey Results

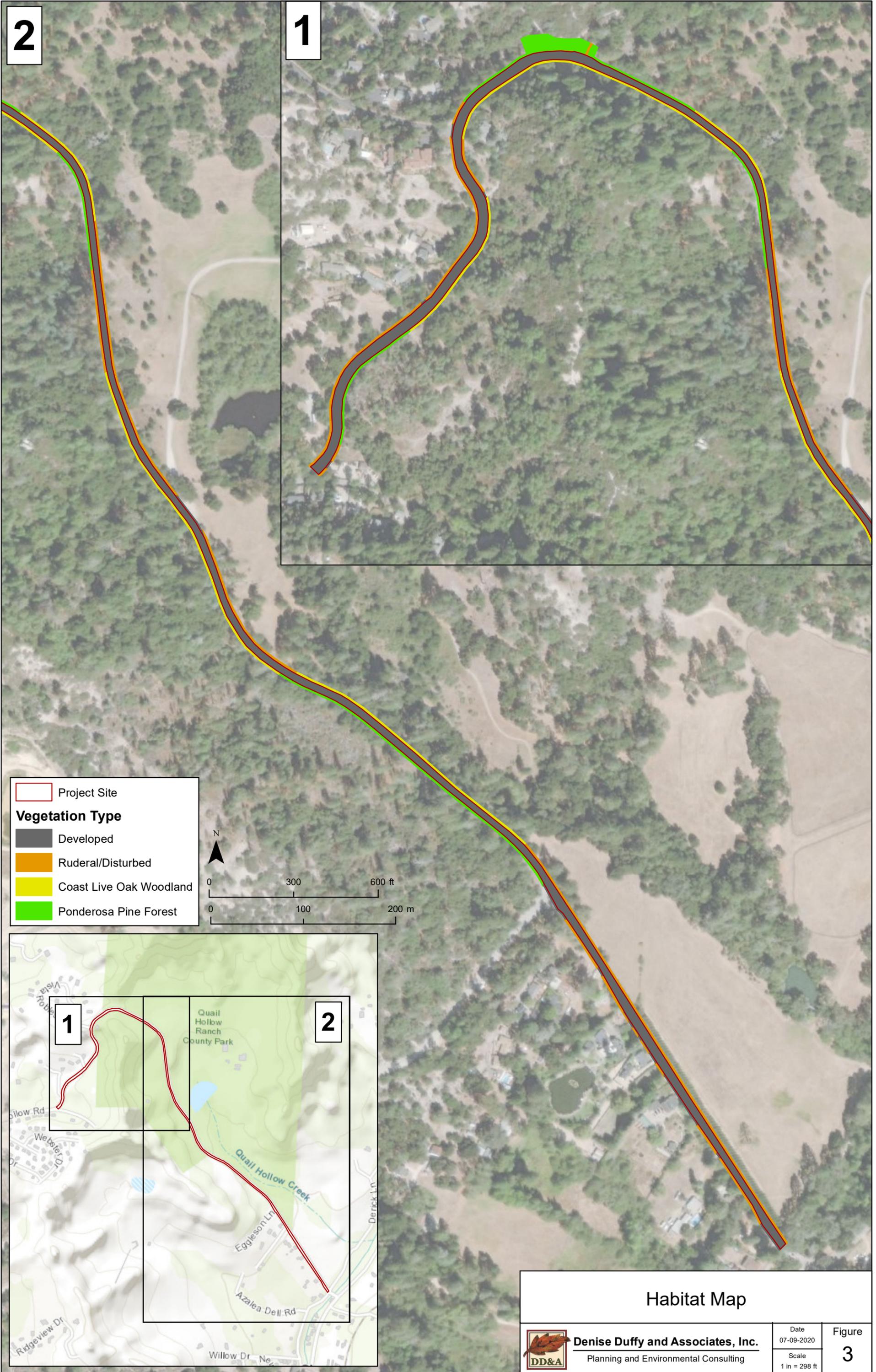
Habitat Types

The project site is located only within the developed areas of Quail Hollow Road; however, the field review included an evaluation of the habitats located immediately adjacent (within five feet) to the project site. Three habitat types were identified within the area surveyed (**Figure 3**): ruderal/disturbed, coast live oak woodland, and ponderosa pine forest. The Biological Resources Report provides a description of each of these areas (**Appendix B**).

Special-Status Species

Published occurrence data within the survey area and surrounding U.S. Geologic Survey (USGS) quadrangles⁴ were evaluated to compile a table of special-status species known to occur in the vicinity of the project (see *Appendix B* of the Biological Resources Report [**Appendix B**]). Each of these species was evaluated for their likelihood to occur within and immediately adjacent to the survey area. The special-status species that are known to or have been determined to have a moderate to high potential to occur within or immediately adjacent to the survey areas are discussed below. All other special-status species are assumed “not present,” “unlikely to occur,” or have a low potential to occur within the survey area for the species-specific reasons presented in *Appendix B* of **Appendix B**.

⁴ The USGS quadrangles in which published CNDDDB data was searched included Felton, Big Basin, Castle Rock Ridge, Los Gatos, Laurel, Soquel, Santa Cruz, and Davenport.



2

1

Project Site

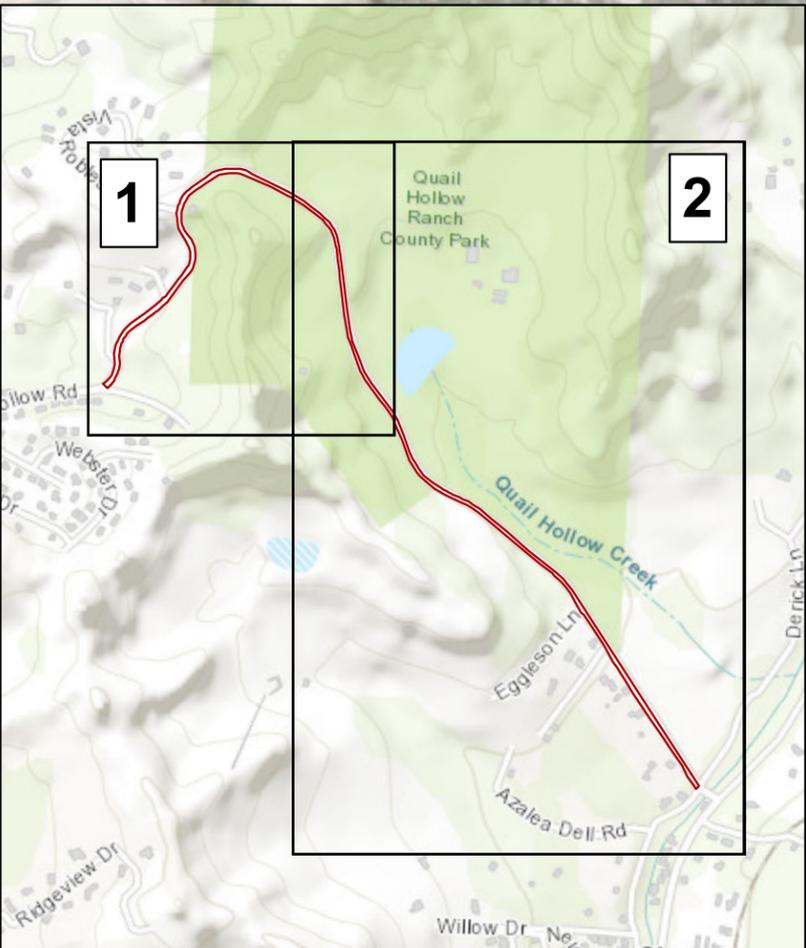
Vegetation Type

- Developed
- Ruderal/Disturbed
- Coast Live Oak Woodland
- Ponderosa Pine Forest

N

0 300 600 ft

0 100 200 m



1

2

Habitat Map



Denise Duffy and Associates, Inc.
 Planning and Environmental Consulting

Date
07-09-2020

Scale
1 in = 298 ft

Figure
3

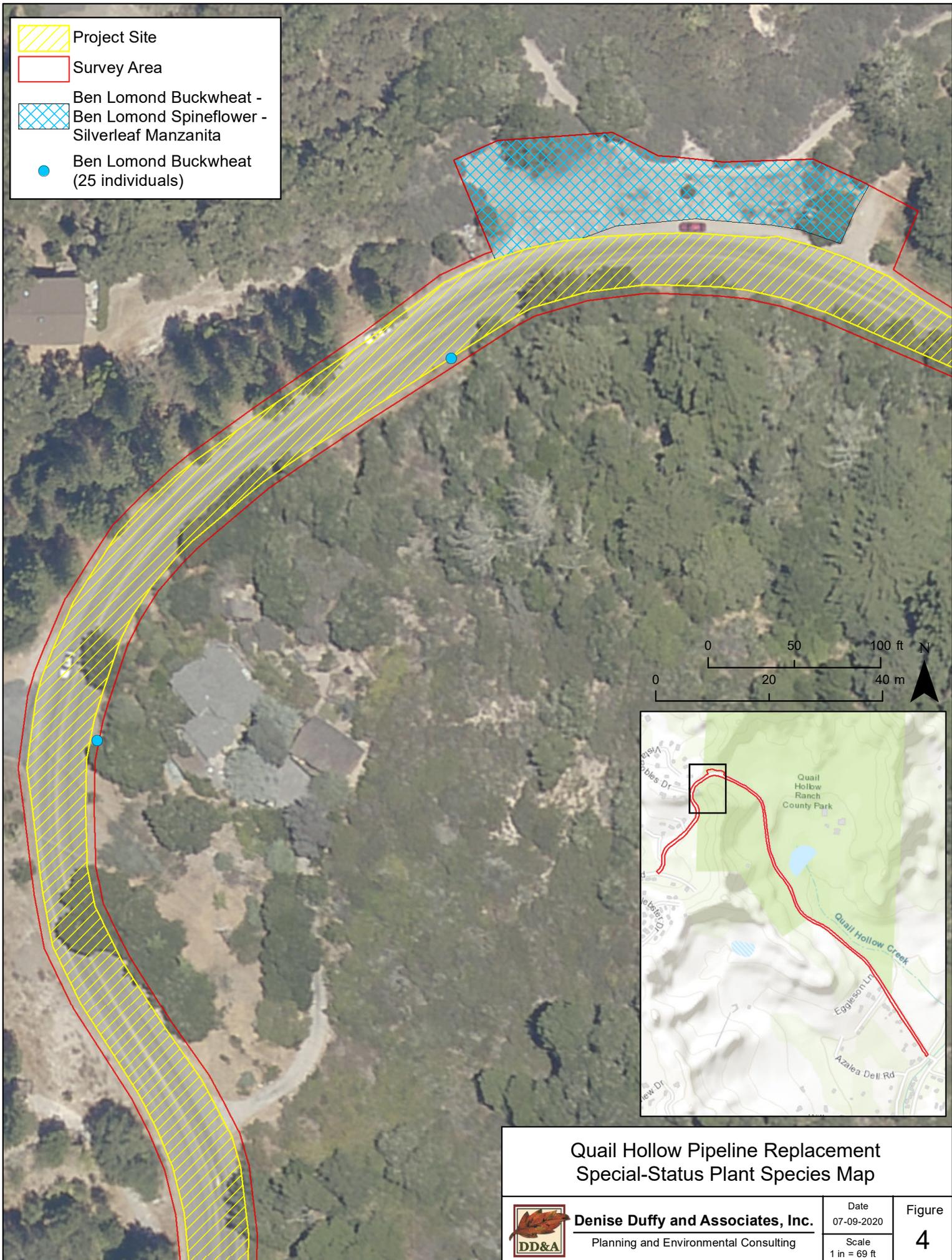
No suitable habitat for special-status wildlife species is present within the project site as it is located entirely within the pavement of Quail Hollow Road. However, suitable habitat was identified immediately adjacent to the project site for the following special-status species: pallid bat (*Antrozous pallidus*), Townsend's big-eared bat (*Corynorhinus townsendii*), hoary bat (*Lasiurus cinereus*), Santa Cruz kangaroo rat (*Dipodomys venustus venustus*), San Francisco dusky-footed woodrat (SFDW, *Neotoma fuscipes annectens*), mountain lion (*Puma concolor*), California red-legged frog (CRLF, *Rana draytonii*), Mount Hermon June beetle (MHJB, *Polyphylla barbata*), Cooper's hawk (*Accipiter cooperii*), white-tailed kite (*Elanus leucurus*), purple martin (*Progne subis*), raptors, and other protected avian species. For a detailed description of each species, please refer to the Biological Resources Report (**Appendix B**).

A focused botanical survey was conducted to identify the presence or absence of special-status plant species within the survey area. As identified above, the project site is located entirely within the pavement of Quail Hollow Road and, therefore, no special-status plant species were identified within the project site. However, three special-status plant species were identified immediately adjacent to the project site: silverleaf manzanita (*Arctostaphylos silvicola*), Ben Lomond spineflower (*Chorizanthe pungens* var. *hartwegiana*), and Ben Lomond buckwheat (*Eriogonum nudum* var. *decurrens*). For a detailed description of each species, please refer to the Biological Resources Report (**Appendix B**). These plants were all identified in the same small area, except for two Ben Lomond buckwheat occurrences (totaling 25 individuals) that were observed on the opposite side of Quail Hollow Road (**Figure 4**).

Sensitive Habitats

As identified above, the project site as it is located entirely within the pavement of Quail Hollow Road and therefore, no sensitive habitats are present within the project site. However, ponderosa pine forest, located immediately adjacent to the project site, is listed as a sensitive habitat on the CDFW's *California Natural Communities List* (**Figure 3**). This habitat is also a locally important to the area, identified as a sandhill community that is considered sensitive habitat by the County, as described in the County Code and the Santa Cruz County General Plan. Additionally, the ponderosa pine forest habitat occurs on Zayante soils, which represent suitable habitat for MHJB. For a detailed description of this sensitive habitat, please refer to the Biological Resources Report (**Appendix B**).

-  Project Site
-  Survey Area
-  Ben Lomond Buckwheat -
Ben Lomond Spineflower -
Silverleaf Manzanita
-  Ben Lomond Buckwheat
(25 individuals)



Quail Hollow Pipeline Replacement Special-Status Plant Species Map



Denise Duffy and Associates, Inc.
Planning and Environmental Consulting

Date
07-09-2020
Scale
1 in = 69 ft

Figure
4

Environmental Impacts

ENVIRONMENTAL IMPACTS	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
BIOLOGICAL RESOURCES. Would the project:				
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Wildlife or US Fish and Wildlife Service?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
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?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Explanation

- a) **Less Than Significant Impact with Mitigation Incorporated.** Several special-status plant and wildlife species have the potential to occur or were documented to occur within the survey area as defined in the Biological Resources Report (**Appendix B**):

Ben Lomond spineflower, Ben Lomond buckwheat, and silverleaf manzanita were observed immediately adjacent to the project site. Additionally, suitable habitat for the MHJB and Santa Cruz kangaroo rat is present immediately adjacent to the project site. Project implementation could result in direct impacts to individuals and loss of habitat if construction activities occur outside of the Quail Hollow roadway. This would be a potentially significant impact under CEQA. Implementation of **Mitigation Measures BIO-1** and **BIO-2**, which prevent construction activities

outside of the roadway and implements construction crew education, would reduce potentially significant impacts to Ben Lomond spineflower, Ben Lomond buckwheat, silverleaf manzanita, MHJB, and Santa Cruz kangaroo rat to a less-than-significant level.

Suitable habitat for the SFDW is present immediately adjacent to the project site and project implementation could result in direct impacts to individuals and loss of habitat if construction activities occur outside of the Quail Hollow roadway. Additionally, construction noise, dust, and vibration adjacent nests could cause indirect impacts to SFDW such as nest abandonment and death of young. This would be a potentially significant impact under CEQA. Implementation of **Mitigation Measures BIO-1 and BIO-2** and species-specific **Mitigation Measure BIO-3** would reduce potentially significant impacts to SFDW to a less-than-significant level through a combination of pre-construction surveys; protective measures during construction if woodrat nests are found; avoiding work outside of the roadway; and construction crew education.

The project site also occurs in the vicinity of suitable breeding habitat for CRLF; however, the species would only be expected to occur during dispersal. This species is highly aquatic and requires permanent or nearly permanent pools for larval development. This species typically requires rain events for dispersal and have been found at significant distances from breeding sites during rain events. CRLF have a low potential to occur on the project site during dispersal. If CRLF were to be injured or killed by construction activity this would be considered “take” under ESA. If “take” occurs because of the project, it would be considered a significant impact under CEQA. The potential for “take” to occur can be avoided and therefore the potential impacts to this species can be reduced to less-than-significant level with implementation of **Mitigation Measures BIO-1 and BIO-2** and species-specific **Mitigation Measure BIO-4**.

The trees located immediately adjacent to the project site may provide roosting habitat for special-status bat species and nesting habitat for raptors and other protected avian species. Project implementation could result in direct impacts to individuals and loss of habitat if construction activities occur outside of the Quail Hollow roadway. Additionally, construction noise, dust, and vibration adjacent to these trees could cause direct and indirect impacts to special-status bat and avian species, including roost/nest abandonment and death of young. This would be a potentially significant impact under CEQA. Additionally, construction activities that adversely affect the nesting success of raptors or result in mortality of individual birds constitute a violation of California law. Implementation of **Mitigation Measures BIO-1 and BIO-2** and species-specific **Mitigation Measures BIO-5 and BIO-6** would reduce potentially significant impacts to special-status bats, raptors, and other protected avian species to a less-than-significant level through a combination of pre-construction surveys; protective measures during construction if active roosting sites or nests if found; avoiding work outside of the roadway; and construction crew education.

Suitable habitat for mountain lions is present immediately adjacent to the project site. However, given the large home range and mobility of this species, as well as its nocturnal tendencies, it is unlikely that the project would impact this species. Therefore, the project will not impact mountain lions and no mitigation is required. (2, 6)

Mitigation

BIO 1. In order to avoid impacts to sensitive ponderosa pine forest and special-status species (i.e. MHJB, Santa Cruz kangaroo rat, CRLF, SFDW, special-status bats, raptors and other protected avian species, Ben Lomond spineflower, Ben Lomond buckwheat, and silverleaf manzanita) present or potentially present adjacent to the project site, no work, including staging and materials storage, shall occur outside of the pavement of Quail Hollow Road.

- BIO-2. SLVWD shall ensure that a qualified biologist conducts an education program for all persons employed on the project prior to performing construction activities. Instruction shall consist of a presentation by the qualified biologist that includes a discussion of the biology and general behavior of any special-status species which may be in the area, how they may be encountered within the work area, and procedures to follow when they are encountered. The status of ESA- and CESA-listed species including legal protection, penalties for violations and project-specific protective management measures shall be discussed. The discussion shall also include identification of the sensitive habitats present adjacent to the project site and the measures taken to avoid impacts to these habitats. The SLVWD shall prepare and distribute wallet-sized cards or a factsheet handout containing this information for workers to carry on-site. Upon completion of the program, employees shall sign an affidavit stating they attended the program and understand all protection measures.
- BIO-3. A qualified biologist shall conduct preconstruction surveys immediately adjacent to the project site to determine if SFDW are present prior to the start of construction. The biologist shall conduct these surveys no more than two weeks prior to the beginning of construction. If SFDW nests are found, nests shall be mapped, fenced, or flagged for avoidance, and documented in pre-construction report.
- BIO-4. The following procedures shall be implemented to avoid “take” and ensure that impacts to CRLF are less-than-significant.
- a) If feasible, initial ground disturbing activities shall be conducted between May 1 and October 31 during dry weather conditions to minimize the potential for encountering listed and non-listed amphibian species. Work shall be restricted to daylight hours.
 - b) If construction must occur between November 1 and April 30, the qualified biologist shall conduct a pre-activity clearance sweep prior to start of project activities within 48 hours after any rain events of 0.1 inch or greater or if wet conditions are present on site. The clearance survey would allow any frog, if found on-site, to leave of its own volition before any construction activities would begin. No relocation of CRLF would occur without written authorization of the U.S. Fish and Wildlife Service (USFWS), or by any individuals not specifically authorized by the USFWS for handling of CRLF.
 - c) SLVWD or its contractor shall cover dirt or sand piles left overnight with tarps or plastic to prevent CRLF from sheltering in the material. All holes and trenches shall be inspected each morning by a biological monitor.
 - d) All trash shall be removed from the site daily and disposed of properly to avoid attracting potential predators to the site.
 - e) Pets shall not be permitted on-site during project activities.
 - f) All vehicles shall be in good working condition and free of leaks. All leaks shall be contained and cleaned up immediately to reduce the potential of soil/vegetation contamination.
 - g) All refueling, maintenance, and staging of equipment and vehicles shall occur at least 100 feet from riparian habitat or water bodies and in a location from where a spill would not drain directly toward aquatic habitat (e.g., on a slope that drains away from the water).

- h) A County-approved biologist shall be present on site during initial ground disturbance. If any life stage of CRLF is found, work shall cease within 100 feet of the CRLF and the USFWS shall be contacted immediately to determine the appropriate course of action.

BIO-5. If equipment staging, site preparation, grading, excavation or other project-related construction work is scheduled during the nesting season of raptors and other protected avian species, a qualified biologist shall conduct two surveys for active nests: one within 14 days prior to the beginning of project construction and one within 48 hours prior to construction. Surveys shall be conducted in all suitable habitat located adjacent to the work site and any staging, storage, and stockpile areas. Nesting seasons are typically defined as March 15 to August 30 for small bird species such as passerines and February 15 to September 15 for other raptors. The minimum survey radius surrounding the work area shall be 300 feet. If an active nest is found during surveys, the qualified biologist shall designate a protected area (while occupied) during project construction by demarking a “No Work Zone” around each nest site. The qualified biologist shall monitor the behavior of the birds (adults and young, when present) at the nest site to ensure that they are not disturbed by project construction work. Nest monitoring shall continue during construction until the young have fully fledged (have completely left the nest site and are no longer being fed by the parents), as determined by the qualified biologist.

BIO-6. To avoid and reduce impacts to special-status bat species, if project construction is planned during the reproductive season (May 1 through September 15) SLVWD shall retain a qualified bat specialist or wildlife biologist to conduct site surveys to characterize bat utilization adjacent to the project site and potential species present (techniques utilized to be determined by the biologist) prior to construction. Based on the results of these initial surveys, one or more of the following shall occur:

- If it is determined that bats are not present adjacent to the site, no additional mitigation is required.
- If it is determined that bats are utilizing the trees adjacent to the site and may be impacted by the proposed project, pre-construction surveys shall be conducted within 50 feet of construction limits no more than 30 days prior to the start of construction. If, according to the bat specialist, no bats or bat signs are observed in the course of the pre-construction surveys, construction may proceed. If bats and/or bat signs are observed during the pre-construction surveys, the biologist will determine if disturbance will jeopardize the roost (i.e., maternity, foraging, day, or night).
- If a single bat and/or only adult bats are roosting, removal of trees, buildings, or other suitable habitat may proceed after the bats have been safely excluded from the roost. Exclusion techniques shall be determined by the biologist and would depend on the roost type.
- If an active maternity roost is detected, avoidance is preferred. Work in the vicinity of the roost (buffer to be determined by biologist) shall be postponed until the biologist monitoring the roost determines that the young are no longer dependent on the roost. The monitor shall ensure that all bats have left the area of disturbance prior to initiation of pruning and/or removal of trees, if necessary, that would disturb the roost.

- b) **Less Than Significant Impact with Mitigation Incorporated.** No sensitive habitats are present within the project site. However, ponderosa pine forest habitat, occurring immediately adjacent to the project site, is listed as sensitive on the CDFW’s *California Natural Communities List*. This area also provides habitat for several special-status plant and wildlife species, including habitat for the MHJB. This habitat may be impacted if work occurs outside of the Quail Hollow roadway. This would be a potentially significant impact under CEQA. Implementation of **Mitigation Measures BIO-1** and **BIO-2**, which avoids construction activities outside of the roadway and implements construction crew education, would reduce potentially significant impacts to ponderosa pine forest habitat to a less-than-significant level. (2, 6)
- c) **No Impact.** Based on the results of the Biological Resources Report (**Appendix B**), no state or federally protected wetlands occur within the project site or survey area. Therefore, the project would not impact or have a substantial adverse effect on state or federally protected wetlands. (2, 6)
- d) **Less Than Significant Impact.** Project activities may temporarily impact wildlife movement. Noise disturbance associated with construction activities could cause species that commonly use habitats surrounding the project site to, at least temporarily, avoid these habitats during construction. These effects would be temporary, and once construction activities are complete, wildlife movement conditions would return to pre-existing conditions. The project does not include any aboveground components that would impact wildlife movement following construction. This is a less-than-significant impact. (2, 6)
- e) **Less Than Significant Impact with Mitigation Incorporated.** The project would be required to comply with all applicable guidelines in the Santa Cruz County Code and General Plan. Santa Cruz County Code and Chapter 5.1.6 of the Santa Cruz County General Plan provides for the protection of sensitive habitats within and adjacent to development areas, including the ponderosa pine forests habitat that is present adjacent to the project site. The policy states that “Sensitive habitats shall be protected against any significant disruption of habitat values; and any proposed development within or adjacent to these areas must maintain or enhance the functional capacity of the habitat.” As identified above under **Impact BIO-2**, these habitats may be impacted if work occurs outside of the Quail Hollow roadway. However, implementation of **Mitigation Measures BIO-1** and **BIO-2**, which avoids construction activities outside of the roadway and implements construction crew education, would ensure that the project will not conflict with any local policies or ordinances protecting biological resources. This is a less-than-significant impact. (2, 6)
- f) **No Impact.** The project site is not located within any Habitat Management or Conservation Plan areas, and, therefore, will not conflict with such plans. (1,6)

4.6 CULTURAL RESOURCES

Environmental Setting

The Santa Cruz County General Plan identifies policies to protect areas of cultural and archaeological resource significance. Policy 5.19.3 aims to protect archaeological resources from development by restricting improvements and grading activities to portions of the property not containing these resources, as determined by a professional archaeologist. The County GIS Website identifies that a portion of APN 074-171-15 contains archaeological resources.

The following discussion is based on an archaeological literature search prepared by Basin Research & Associates (Basin, August 27, 2020).⁵ This report has been prepared to meet applicable CEQA mandates and Santa Cruz County requirements, which require the identification and evaluation of cultural resources including tribal cultural resources that could be affected by the project.

An archival records and literature search for a 0.25-mile radius of the project right-of-way was completed by the California Historical Resources Information System, Northwest Information Center, Sonoma State University (CHRIS/NWIC File No. 20-0018 dated 8/13/2020). Reference material from the Bancroft Library at the University of California, Berkeley, Basin, and information available on the web were also consulted.

The Native American Heritage Commission (NAHC) was contacted for a review of the Sacred Lands File (SLF). The NAHC SLF results were negative. Letters were sent to five locally knowledgeable Native American individuals/tribes identified by the NAHC, as follows:

- Valentin Lopez, Amah Mutsun Tribal Band, Galt;
- Irene Zwierlein, Chairperson, Amah/Mutsun Tribal Band (AMTB) of Mission San Juan Bautista, Woodside;
- Patrick Orozco, Chairman, Coastanoan Ohlone Rumsen Mutsun Tribe, Watsonville;
- Ann Marie Sayers, Indian Canyon Mutsun Band of Costanoan, Hollister; and,
- Monica Arellano, Muwekma Ohlone Indian Tribe of the San Francisco Bay Area, Castro Valley.

No other agencies, departments, or local historical societies were contacted regarding potential archaeological features/sites, landmarks, potential historic sites or structures due to Basin's extensive research files on the project area. A field review was not completed since installation of the new pipeline would occur within the existing roadway right-of-way.

⁵ The archaeological literature search may discuss locations of specific archaeological sites and is confidential. For this reason, it is not included in this Initial Study. Qualified personnel, however, may request a copy of the report from the SLVWD during normal business hours.

Environmental Impacts

ENVIRONMENTAL IMPACTS	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
CULTURAL RESOURCES. Would the project:				
a) Cause a substantial adverse change in the significance of a historical resource pursuant to in §15064.5?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c) Disturb any human remains, including those interred outside of dedicated cemeteries?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Explanation

a) **No Impact.** The proposed project consists of the installation of a new water supply pipeline in an area that has been previously disturbed during the installation of the existing pipeline and the Quail Hollow roadway. The County GIS Website does not identify any historical resources within the project site. Therefore, the proposed project would result in no impact to historical resources. (1, 7)

b) **Less than Significant Impact with Mitigation Incorporated.** Four reports are on file with the CHRIS/NWIC that include the project alignment or immediately adjacent areas. Eight additional studies (excluding State Historic Preservation Officers [SHPO] correspondence) are within 0.25 mile of the project alignment. None of the reports indicate the presence of cultural resources within or immediately adjacent to the project alignment. No prehistoric, combined prehistoric/historic era, historic era archaeological sites, or built environment resources have been recorded within or immediately adjacent to the pipeline alignment. One prehistoric archaeological site (CA-SCR-134) recorded in 1973 is located east of the pipeline alignment, not immediately adjacent, near West Zayante Road.

The NAHC was contacted for a review of the SLF. The NAHC SLF results were negative. As identified above, letters were sent to five locally knowledgeable Native American individuals/tribes identified by the NAHC. One response from the AMTB was received. The AMTB Director of Archaeological Resource Management responded at the direction of the Tribal Chair. The Director did not have additional information to share about cultural resources in the project vicinity. However, he noted a high potential for the presence of indigenous cultural resources and recommended the retention of a Native American archaeological monitor for ground disturbing activities conducted within 400 feet of a water source. Basin provided information on the pipeline and forwarded his request to the SLVWD.

No other local historical societies, planning departments, etc. were contacted regarding landmarks, potential historic sites, or structures in or adjacent to the project.

The proposed pipeline would be installed in the existing Quail Hollow Road right-of-way. However, construction operations have the potential to cause a substantial adverse change in the significance of archeological resources and potential prehistoric tribal cultural resources if present. The inadvertent exposure of buried prehistoric or historic archaeological materials as well as yet unknown tribal cultural resources that could be eligible for inclusion on the California Register of Historical Resources (CRHR; Public Resources Code Section 5024.1) and/or meet the definition

of a unique archeological resource as defined in Section 21083.2 of the Public Resources Code. This significant impact would be reduced to a less-than-significant impact with implementation of **Mitigation Measure CR-1** below in accordance with state law and the requirements of the County. (1, 7)

Mitigation

CR-1 The following protection measures are recommended in association with any specific requirements of Santa Cruz County and other regulatory authorities.

- a) The SLVWD shall note on any plans that require ground disturbing excavation that there is a potential for exposing buried cultural resources including prehistoric Native American burials.
- b) The SLVWD shall retain a professional archaeologist to develop an ALERT Sheet outlining the potential for the discovery of unexpected archaeological resources and protocols to deal with a discovery. The professional archaeologist shall provide the Contractor's construction crew "toolbox" sensitivity training to present the ALERT Sheet and protocols to supervisors, foreman, project managers, and non-supervisory contractor personnel. The contractor is responsible for ensuring that all workers requiring training are in attendance.
- c) The SLVWD shall retain a professional archaeologist on an "on-call" basis during ground disturbing construction to review, identify and evaluate cultural resources that may be inadvertently exposed during construction. The archaeologist shall review and evaluate any discoveries to determine if they are historical resource(s) and/or unique archaeological resources under CEQA.
- d) The SLVWD shall retain a Native American monitor for all work within 400 feet of a water source. The Native American monitor shall be provided contact, access, and schedule information sufficient to facilitate their monitoring efforts. The professional archeologist shall communicate and coordinate with the Native American monitor regarding the recovery of any significant cultural materials that may be found in the excavated soil within this area.
- e) If the professional archaeologist determines that any cultural resources exposed during construction constitute a historical resource and/or unique archaeological resource under CEQA, he/she shall notify the project proponent and other appropriate parties (including the Native American monitor, as appropriate) of the evaluation and recommend mitigation measures to mitigate to a less-than significant impact in accordance with California Public Resources Code Section 15064.5. Mitigation measures may include avoidance, preservation in-place, recordation, additional archaeological testing, and data recovery, among other options. The completion of a formal Archaeological Monitoring Plan (AMP) and/or Archaeological Treatment Plan (ATP) that may include data recovery may be recommended by the professional archaeologist if significant archaeological deposits are exposed during ground disturbing construction. Development and implementation of the AMP and ATP and treatment of significant cultural resources will be determined by the SLVWD in consultation with any regulatory agencies.
- f) A Monitoring Closure Report shall be filed with the SLVWD at the conclusion of ground disturbing construction if archaeological and Native American monitoring of excavation was undertaken.

- c) **Less than Significant Impact with Mitigation Incorporated.** Construction operations could potentially disturb human remains, including those interred outside of formal cemeteries. Previously unknown Native American human remains could be exposed during ground disturbing construction operations associated with soil removal. Construction operations could result in the inadvertent exposure of buried prehistoric or protohistoric (ethnographic) Native American human remains. This significant impact would be reduced to a less-than-significant impact with implementation of **Mitigation Measure CR-2** which requires that the treatment of human remains and or associated or unassociated funerary objects during any soil-disturbing activity must comply with applicable state law for Native American burials. (1, 7)

Mitigation

CR-2 The treatment of human remains and any associated or unassociated funerary objects discovered during any soil-disturbing activity within the project site shall comply with applicable State laws. This shall include immediate notification of the Santa Cruz County Coroner/Medical Examiner and the SLVWD. In the event of the coroner's determination that the human remains are Native American, notification of the Native American Heritage Commission, who shall appoint a Most Likely Descendant (MLD), is required (Public Resources Code Section 5097.98).

The SLVWD, professional archaeologist, and MLD shall make all reasonable efforts to develop an agreement for the treatment, with appropriate dignity, of human remains and associated or unassociated funerary objects (CEQA Guidelines Section 15064.5(d)). The agreement should take into consideration the appropriate excavation, removal, recordation, analysis, custodianship, curation, and final disposition of the human remains and associated or unassociated funerary objects. The California Public Resources Code allows 48 hours to reach agreement on these matters. If the MLD and the other parties do not agree on the reburial method, the project will follow Public Resources Code Section 5097.98(b), which states that "...the landowner or his or her authorized representative shall reinter the human remains and items associated with Native American burials with appropriate dignity on the property in a location not subject to further subsurface disturbance."

4.7 ENERGY

Environmental Setting

Pacific Gas and Electric Company (PG&E) is the County’s energy utility, providing both natural gas and electricity for residential, commercial, industrial, and municipal uses. Beginning in 2018, electrical energy is also offered by Monterey Bay Community Power (MBCP) using the community choice energy model provided for in the Public Utilities Code. PG&E would continue to provide transmission and distribution services.

PG&E generates or buys electricity from hydroelectric, nuclear, renewable, natural gas, and coal facilities. In 2018, natural gas facilities provided 15 percent of PG&E’s electricity delivered to retail customers; nuclear plants provided 34 percent; hydroelectric operations provided 13 percent; renewable energy facilities, including solar, geothermal, and biomass, provided 39 percent; and two percent was unspecified.⁶ MBCP intends to provide electricity with a higher renewable and carbon-free content compared to PG&E at competitive rates.

Environmental Impacts

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

Explanation

- a) **Less Than Significant Impact.** The proposed project consists of installation of a new water supply pipeline. The portion of the system associated with the pipeline operates by gravity and requires no energy use. In addition, as there are no operational activities associated with the project, the project would not result in an increase in traffic to/from that would cause a substantial increase in transportation-related energy use.

However, the construction phase would require energy for the manufacture and transportation of building materials, preparation of the site (e.g., excavation, and grading), and the actual pipeline installation. Petroleum-based fuels such as diesel fuel and gasoline would be the primary sources of energy for these tasks. The anticipated construction schedule assumes that the project would be built out over a period of approximately ten weeks. The construction energy use has not been determined at this time. However, the project would not cause inefficient, wasteful, or unnecessary consumption of energy as the construction schedule and process is already designed to be efficient to avoid excess monetary costs. Equipment and fuel are not typically used wastefully on construction sites due to the added expenses associated with renting, maintaining, and fueling

⁶ PG&E, Delivering low-emission energy. Accessed April 14, 2020. Available at: https://www.pge.com/en_US/about-pge/environment/what-we-are-doing/clean-energy-solutions/clean-energy-solutions.page

equipment. Hand tools would be used when possible to avoid use of heavy machinery. Furthermore, energy use required to complete construction would be limited and short-term.

Based on the discussion above, the project would not result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources during project construction or operation. This is a less-than-significant impact (1).

- b) **Less Than Significant Impact.** The construction of the proposed project would have a less-than-significant impact due to energy usage and efficiency (see Response a) above) and, thus, would not conflict with local or state plans for energy efficiency.

4.8 GEOLOGY AND SOILS

Environmental Setting

A Geotechnical Design Report was by Cal Engineering & Geology (CE&G) for multiple SLVWD pipeline projects, including the proposed project (CE&G, 2020; **Appendix C**). The following provides a summary of the results presented in the report.

Geologic Setting

The project site is located in the Santa Cruz Mountains, within the Coast Ranges geomorphic province of California. This province is characterized by northwest-southeast trending mountain ranges such as the Santa Cruz Mountains and intervening valleys such as that occupied by San Francisco Bay. The Santa Cruz Mountains mark a mountain-range scale regional uplift centered on the San Andreas fault.

The project site is located on the northeastern side of the Scotts Valley Syncline, in an area underlain by the Santa Margarita sandstone (Upper Miocene). This sandstone is described as very thick-bedded to massive thickly cross-bedded, yellowish-gray to white, friable, medium- to fine-grained arkosic sandstone. The southeastern part of the project alignment is in an area mapped as northeasterly dipping Monterey Formation bedrock. The Monterey Formation bedrock is described as medium to thick bedded and laminated olive-gray to light-gray semi-siliceous organic mudstone and sandy siltstone.

Borings were drilled along the project alignment. Ground surface conditions consisted of asphalt pavement ranging from four to seven inches thick. Subsurface materials encountered beneath the site primarily consist of medium dense to very dense silty sand and poorly graded sand. These sands are most likely representative of completely weathered bedrock from the underlying, weathered sandstone, which was encountered along the alignment at depths ranging from two to greater than 10 feet below ground surface (bgs). For a more detailed description of the materials encountered during this investigation, the boring logs and laboratory test results are included in *Appendices A and B* of the Geotechnical Design Report (**Appendix C**).

The elevation within the project area varies between approximately 344 feet and 655 feet above sea level (World Geodetic System 1984).

Geohazards

Active Faults

The project site is located within the greater San Francisco Bay Area, which is recognized as one of the more seismically active regions of California. The right-lateral strike-slip San Andreas fault system controls the northwest-southeast structural grain of the Coast Ranges and the Bay Area. The fault system marks the major boundary between two of earth's tectonic plates, the Pacific Plate on the west and the North American Plate on the east. The Pacific Plate is moving north relative to the North American plate at approximately 40 millimeter/year (1.6 inches) in the Bay Area.

Since the project site is located in the seismically active San Francisco Bay Area, it will likely experience significant ground shaking from moderate or large (MW >6.7) earthquakes on one or more of the nearby active faults during the design lifetime of the project. Some of the seismic sources in the San Francisco Bay area and their distances from the project site are summarized in Table 2.

Table 2. Distances to Selected Major Active Faults

Fault Name	Approximate Distance and Direction from Site to the nearest Surface Fault Traces
Zayante-Vergeles-Upper	2.8 km (1.7 miles) north
San Andreas	11.2 km (7.0 miles) northeast
Butano	11.4 km (7.0 miles) northwest
Sargent	12.2 km (7.6 miles) northeast
Berrocal	16.0 km (9.9 miles) northeast
Monterey Bay-Tularcitos	16.5 km (10.3 miles) south-southwest
San Gregorio	16.5 km (10.3 miles) southwest
Monte Vista-Shannon	18.9 km (11.7 miles) northeast
Hayward (southern segment)	35.7 km (22.2 miles) northeast

Seismogenic (capable of generating significant earthquakes) earthquake faults near the site include the Zayante-Vergeles and the San Andreas fault. However, the USGS’s Interactive Fault Map shows that the proposed project site does not cross mapped active faults (USGS, 2015). Additionally, the County has prepared a Fault Zone Hazards map which does not show the project site within areas mapped as fault hazard zones. Therefore, the pipeline is not expected to be damaged as a result of direct fault displacement. Further, due to the flexible nature of HDPE and PVC pipe, other specific design components for seismic elements to mitigate displacements are judged to be unwarranted.

Liquefaction and Seismic Densification

Soil liquefaction is a phenomenon in which saturated, cohesionless soils (generally sands) lose their strength due to the build-up of excess pore water pressure during cyclic loading, such as that induced by earthquakes. Soils most susceptible to liquefaction are saturated, clean, loose, fine-grained sands and silts. The primary factors affecting soil liquefaction include: 1) intensity and duration of seismic shaking; 2) soil type and relative density; 3) overburden pressure; and 4) depth to ground water.

The County’s geohazard maps do not show the project site within areas mapped as potentially liquefiable or landslide hazard zones. Additionally, subsurface information collected by CE&G, indicates that the potential for liquefaction within the upper 10 feet of the project site is low due to the lack of encountered groundwater.

Seismic densification is the densification of unsaturated, loose to medium dense granular soils due to strong vibration such as that resulting from earthquake shaking. CE&G identifies that the potential for seismic densification at the project site is moderate for the encountered alluvial materials because they are loose to medium dense, granular, and generally unsaturated in the upper 10 feet. The uppermost sandy, weathered bedrock along the project alignment are unsaturated and granular but is judged too dense for seismic densification.

Environmental Impacts

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

Explanation

a.i) **Less than Significant Impact.** The project site is located within a seismically active region; however, the site is not mapped within an Alquist-Priolo Earthquake Fault Zone. The nearest known active, or potentially active, fault trace is mapped approximately 2.8 miles from the site, and the USGS and County hazard maps do not show a fault hazard zone within the project site. Therefore, the potential for fault rupture at the site is low. This is a less-than-significant impact. (1, 8)

- a.ii) **Less than Significant Impact.** Due to its location in a seismically active region, the pipeline would likely be subject to strong seismic ground shaking during its design life in the event of a major earthquake on any of the region’s active faults. However, because the project site is not located in an area mapped as fault hazard zone, the pipeline is not expected to be damaged as a result of direct fault displacement. Further, the pipeline would be located underground and would follow standard engineering and construction techniques in compliance with the requirements of the California and Uniform Building Codes for Seismic Zone 4. Therefore, the project is unlikely to cause potential substantial adverse effects involving strong seismic ground shaking, directly or indirectly. This is a less-than-significant impact. (1, 8)
- a.iii) **Less Than Significant Impact.** As described above, the project site may be subject to strong ground shaking in the event of a major earthquake. However, the County’s Liquefaction Hazard Map does not show the project within a liquefaction hazard zone and subsurface information collected by CE&G indicates that the potential for liquefaction within the upper 10 feet of the project site is low due to the lack of encountered groundwater. Therefore, the project is unlikely to cause potential substantial adverse effects involving liquefaction, directly or indirectly. This is a less-than-significant impact. (1, 8, 10)
- a.iv) **Less Than Significant Impact.** The County’s Landslide Hazard Areas Map does not show the project site within a landslide hazard area. Additionally, the project site is located approximately 1.7 miles from any mapped landslide hazard area. As a result, there is a low potential for the project to cause potential substantial adverse effects involving landslides, directly or indirectly. This is a less-than-significant impact. (1, 8, 10)
- b) **Less Than Significant Impact.** Excavation activities could result in a temporary increase in erosion. However, the project would implement the standard measures identified in **Section 4.10 Hydrology and Water Quality** to minimize erosion, resulting in less-than-significant impact. (1, 8)
- c) **Less Than Significant Impact.** As identified in Response a.iii), the potential for liquefaction and liquefaction-induced settlement at the site is low, as is the potential for lateral spreading. This is a less-than-significant impact. (1, 8)
- d) **No Impact.** The County’s Expansive Soils Map does not show expansive soils within the project site. Therefore, the proposed project would not create a substantial direct or indirect risk to life or property due to expansive soils. This results in no impact. (1, 8, 10)
- e) **No Impact.** The project does not include any septic systems. (1)
- f) **No Impact.** There are no known paleontological resources or unique geologic features on the project site. The project site is not listed within an area identified as containing paleontological resources nor is it located in close proximity to any known paleontological resources. The project would not impact any paleontological resources, as none are known in the project area. (1, 7)

4.9 GREENHOUSE GAS EMISSIONS

Environmental Setting

Various gases in the earth's atmosphere, classified as atmospheric greenhouse gases (GHGs), play a critical role in determining the earth's surface temperature. Solar radiation enters the atmosphere from space and a portion of the radiation is absorbed by the earth's surface. The earth emits this radiation back toward space, but the properties of the radiation change from high-frequency solar radiation to lower-frequency infrared radiation. Greenhouse gases, which are transparent to solar radiation, are effective in absorbing infrared radiation. As a result, the radiation that otherwise would have escaped back into space is retained, resulting in a warming of the atmosphere known as the greenhouse effect. Among the prominent GHGs contributing to the greenhouse effect, or climate change, are carbon dioxide (CO₂), methane (CH₄), O₃, water vapor, nitrous oxide (N₂O), and chlorofluorocarbons (CFCs). Human-caused emissions of these GHGs in excess of natural ambient concentrations are responsible for enhancing the greenhouse effect. In California, the transportation sector is the largest emitter of GHGs.

Environmental Impacts

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

Explanation

- a) **Less than Significant Impact.** The project is located in the NCCAB, where air quality is regulated by MBARD. Neither the State, MBARD, nor the County have adopted GHG emissions thresholds or a GHG emissions reduction plan that would apply to the project. However, it is important to note that other air districts within the State of California have recently adopted recommended CEQA significance thresholds for GHG emissions. For instance, on March 28, 2012, the San Luis Obispo Air Pollution Control District (SLOAPCD) approved thresholds of significance for the evaluation of project-related increases of GHG emissions. Given that the MBARD has not yet adopted recommended GHG significance thresholds, the above threshold was relied upon for evaluation of the proposed project.

Implementation of the proposed project would contribute GHG emissions that are associated with global climate change. GHG emissions attributable to future development would be primarily associated with increases of CO₂ and, to a lesser extent, other GHG pollutants, such as CH₄ and N₂O. Sources of GHG emissions include area sources, mobile sources or vehicles, utilities (electricity and natural gas), water usage, and the generation of solid waste.

The proposed project would not generate any new sources of stationary GHG emissions. The new pipeline would improve service for existing customers within the system and would not change the level of use as compared to the existing conditions. The project would generate temporary construction related GHG emissions, with most of the emissions generated during the excavation and paving phases of construction, which would be minimal. Any potential impacts from GHG generation during construction would be short-term and temporary. As a result, the project is not anticipated to generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment. (1, 4, 5)

- b) **Less than Significant Impact.** Neither the State, MBARD, nor the County have adopted GHG emissions thresholds or a GHG emissions reduction plan that would apply to the project. As discussed in Response a) above, the project would not exceed acceptable thresholds. The County Board of Supervisors did approve the Climate Action Strategy (CAS) on February 26, 2013. The CAS outlines a course of action to reduce GHG emissions produced by governmental operations and community activities within unincorporated Santa Cruz County. The CAS articulates a broad strategy for reaching emission reduction goals within the major focus areas of transportation, energy, and solid waste. As stated above (a), the project would generate temporary construction related GHG emissions, however these temporary emissions would not conflict with any of the strategies presented in the CAS. Additionally, the CAS is not applicable to the proposed project because it is not considered one of the major focus areas. Therefore, the proposed project would not conflict with any applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs as described above. This represents a less-than significant-impact. (1, 4, 5)

4.10 HAZARDS AND HAZARDOUS MATERIALS

Environmental Setting

Hazardous materials, as defined by the California Code of Regulations, are substances with certain physical properties that could pose a substantial present or future hazard to human health or the environment when improperly handled, disposed, or otherwise managed. A hazardous waste is any hazardous material that is discarded, abandoned, or slated to be recycled. Hazardous materials and waste can result in public health hazards if improperly handled, released into the soil or groundwater, or through airborne releases in vapors, fumes, or dust. Soil and groundwater having concentrations of hazardous constituents higher than specific regulatory levels must be handled and disposed of as hazardous waste when excavated or pumped from an aquifer.

The State of California uses databases such as EnviroStor, GeoTracker, and Cortese to map the location of hazardous waste sites including sites that have been remediated, sites currently undergoing remediation, and sites that require cleanup. Based on a search of the above databases, no hazardous materials contamination has been documented within the project site.

Four airports are located within the County (one public airport and three private airports): the public Watsonville Municipal Airport, the private Bonny Doon Village Airport, the private Las Trancas Airport, and the private Monterey Bay Academy Airport. The project site is not in the immediate vicinity of any of these airports and is not located within an airport land use plan. The nearest airport to the project site is the Bonny Doon Village Airport, located over four miles southwest of the project site.

Based on factors such as fuels, terrain, and weather, the California Department of Forestry and Fire Protection (CalFire) recommends or adopts fire hazard severity zones in local and state responsibility areas, respectively. The Fire Hazard Severity Zones are used to develop recommendations for local land use agencies and for general planning purposes. The Fire Hazard Severity Zones are categorized as Very High, High, and Moderate. The project site is located in a Moderate fire zone as delineated by CalFire.

Environmental Impacts

ENVIRONMENTAL IMPACTS	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
HAZARDS AND HAZARDOUS MATERIALS. Would the project:				
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

ENVIRONMENTAL IMPACTS	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
HAZARDS AND HAZARDOUS MATERIALS. Would the project:				
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard or excessive noise for people residing or working in the project area?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
f) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g) Expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Explanation

- a,b) **Less than Significant Impact.** Construction activities would require the temporary use of hazardous substances, such as fuel for construction equipment, oil, solvents, or paints. Removal and disposal of hazardous materials from the project site would be conducted by an appropriately licensed contractor. Any handling, transporting, use, or disposal would comply with applicable laws, regulations, policies, and programs set forth by various federal, state, and local agencies. These impacts would be temporary in nature and would be considered a less-than-significant impact to public safety. (1, 2)
- c) **No Impact.** The project site is not located within one-quarter mile of an existing or proposed school. (1)
- d) **No Impact.** The project is not located on a site that is included on a list of hazardous materials sites compiled pursuant to Government Code Section 635962.5. (1)
- e) **No Impact.** The project site is not located within two miles of any airports or located within an airport land use plan. (1)
- f) **Less than Significant Impact with Mitigation Incorporated.** The proposed project would not interfere with any adopted emergency or evacuation plans as it is not located within the vicinity of any of these plans. However, the project could result reduced emergency access during construction due to temporary lane closures. This would be considered a significant impact that can be reduced to less-than-significant with implementation of **Mitigation Measure TR-1**. Please refer to **Section 4.18 Transportation**. (1)
- g) **Less than Significant Impact.** The proposed project would be the installation of a new underground water supply pipeline and would not expose people or structures to a significant risk from wildfire fires. See also **Section 4.21 Wildfires**. (1, 9)

4.11 HYDROLOGY AND WATER QUALITY

Environmental Setting

The proposed project is located within the San Lorenzo watershed and the Santa Margarita groundwater basin. Storm runoff from the site currently drains as sheet flow across the site. The project site does not contain any natural drainages or waterways; however, Zayante Creek is located approximately 100 feet from the project site.

Flood Insurance Rate Maps issued by the Federal Emergency Management Agency (FEMA) indicate that the project site is not located within a FEMA Insurance Zone.

The County is required to comply with the National Clean Water Act regulations regarding the reduction of non-point source pollutants, as mandated by the NPDES and regulated by the Water Board. The current NPDES program requires construction activities disturbing greater than one acre to obtain an NPDES storm water permit. Since the project proposes to cumulatively disturb more than one acre of land, it is subject to NPDES requirements.

The Santa Cruz County General Plan's Conservation Element addresses water resources protection, including surface and ground water quality and quantity. Additionally, the County's Erosion Control Ordinance (Section 16.22) minimizes site disturbance, requires controlling erosion at all stages of development, and prohibits maintaining any condition that results in excessive erosion.

The San Lorenzo River Watershed Management Plan Update (Watershed Management Plan) provides an evaluation of erosion, sedimentation, and water quality degradation in the urban areas of the lower San Lorenzo River, as well as a broader evaluation of water quality, water resources, and fishery issues within the entire watershed. The Watershed Management Plan also describes ongoing watershed management programs and provides recommendations for maintaining and expanding efforts.

Environmental Impacts

ENVIRONMENTAL IMPACTS	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
HYDROLOGY AND WATER QUALITY. Would the project:				
a) Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
b) Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Substantially alter the existing drainage pattern of the site 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:	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

ENVIRONMENTAL IMPACTS	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
HYDROLOGY AND WATER QUALITY. Would the project:				
i) result in substantial erosion or siltation on- or off-site;	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
ii) substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite;	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
iii) create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
iv) impede or redirect flood flows?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
d) In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
e) Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Explanation

a) **Less than Significant Impact.** The proposed project would occur in previously developed land and excavation activities could potentially harm water quality. As a result, the project would be required to obtain coverage under the Water Board NPDES General Storm Water Permit. The permit would require a Storm Water Pollution Prevention Plan (SWPPP), which contains BMPs for construction and post construction runoff. BMPs that are typically specified within the SWPPP may include, but would not be limited to the following:

- The use of sandbags, straw bales, and temporary de-silting basins during project grading and construction during the rainy season to prevent discharge of sediment-laden runoff into storm water facilities.

Compliance with existing laws and regulations would limit erosion, which would reduce temporary impacts to surface water quality. As such, the proposed project is not anticipated to violate water quality standards or contribute additional sources of polluted runoff. Construction impacts to water quality would be less-than-significant. (1, 9)

b) **No Impact.** The project site is completely paved, and the same area would be repaved following installation of the pipeline. Therefore, the proposed project would not increase the impervious surface and would not result in a substantial reduction in groundwater recharge. This is a less-than-significant impact. (1, 8)

- ci) **Less than Significant Impact.** Construction of the proposed project would not require grading activities that could result in a temporary increase in erosion affecting the quality of storm water runoff. Nevertheless, as stated above in Response a), the project would be required to obtain coverage under the Water Board NPDES General Storm Water Permit including implementation of a SWPPP and standard BMPs to provide erosion control. The project site is completely paved and the same area would be repaved following installation of the pipeline. Therefore, the project would not substantially alter existing drainage patterns or cause alteration of streams or rivers, nor would the project result in substantial erosion or siltation on or off site. This is a less-than-significant impact. (1)
- cii) **Less than Significant Impact.** Minor impacts to surface water quality could result during construction activities. The proposed project would be consistent with the County Erosion Control Ordinance (Section 16.22) and would implement a SWPPP and BMPs to avoid or reduce the amount of surface runoff during construction activities. Since the project site is developed and already consists of impervious surface, the proposed project would not increase the rate or amount of surface runoff compared to what is currently generated, resulting in no impact associated with flooding on- or off-site due to increased surface runoff following construction. This is a less-than-significant impact. (1)
- ciii) **Less than Significant Impact.** Surface runoff from the proposed project site is not expected to contain large quantities of pollutants. Runoff from the site could include oil, grease, and trace metals from construction equipment; however, the project would implement a stormwater control plan to treat runoff during construction. The project site is completely paved, and the same area would be repaved following installation of the pipeline. Therefore, the proposed project would not increase the impervious surface and would not create or contribute runoff water which would exceed the capacity of existing stormwater drainage systems. This is a less-than-significant impact. (1)
- civ) **Less than Significant Impact.** The project site is located outside the 100-year floodplain and would not significantly impede or redirect flood flows. (1, 8)
- d) **No Impact.** The project site is not located in an area subject to significant seiche or tsunami. The County of Santa Cruz Tsunami Coastal Inundation Map does not identify the project site in a tsunami inundation zone. No impact would occur. (1, 8)
- e) **Less than Significant Impact.** As outlined above, the proposed project would be required to obtain coverage under the Water Board NPDES General Storm Water Permit and implement a SWPPP and standard BMPs during construction. As such, the project will be consistent with the County Code, General Plan, and the Watershed Management Plan. (1)

4.12 LAND USE AND PLANNING

Environmental Setting

The project site is in a rural residential area within the County of Santa Cruz. The Santa Cruz County General Plan is the planning document that guides development within the County boundaries. The project site is designated Parks, Recreation and Open Space (O-R), Residential – Rural (RR), Residential Mountain (R-M).

By state law, building and zoning ordinances do not apply to the location or construction of facilities for the production, generation, storage, treatment, or transmission of drinking water (California Government Code Section 53091 (d) and (e)).

Environmental Impacts

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

Explanation

- a) **No Impact.** The proposed pipeline is located underground within the Quail Hollow roadway and would not physically divide an established community. (1)
- b) **No Impact.** The project is exempt from County building and zoning ordinances under California Code Section 53091 because it is exclusively installation of a water supply pipeline. As a result, the project is consistent with the County’s General Plan land use designation for the site and policies calling for the provision of water supplies to serve the County’s population. (1, 9)

4.13 MINERAL RESOURCES

Environmental Setting

The project area does not contain any known or designated mineral resources.

Environmental Impacts

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

Explanation

- a,b) **No Impact.** No minerals resources are known within or adjacent to the project site. Therefore, the project would not impact mineral resources⁷. (1)

⁷ California Department of Conservation, SMARA Mineral Land Classification Project.
<https://www.conservation.ca.gov/cgs/minerals/mineral-land-classification-smara>

4.14 NOISE

Environmental Setting

The land use policies in the Santa Cruz County General Plan identify noise standards to avoid conflicts between noise-sensitive uses and noise source contributors. The pipeline installation is proposed in a quiet area in a low-density community. The only significant source of noise in the project area is traffic along Quail Hollow Road and other nearby roads. Sensitive receptors in the vicinity of the project site consist of existing adjacent residences. The nearest residences are located immediately adjacent to the project site along Quail Hollow Road and directly across the street from the project site at Cumora Lane.

The Santa Cruz County General Plan identifies noise guidelines for construction activities. The noise guidelines generally utilize a limit of 75 decibels (dB)⁸ at the edge of the property line of the property from which the sound is broadcast between the hours of 8 AM and 10 PM. Santa Cruz County Code Chapter 8.30.010, noises are considered offensive if they exceed 75 dB and/or occur between the hours of 10 PM and 8 AM. Policy 9.2.6 of the Santa Cruz County General Plan states “Require mitigation and/or best management practices to reduce construction noise as a condition of project approvals, particularly if noise levels would exceed 75 dB at neighboring sensitive land uses or if construction would occur for more than seven days.

Environmental Impacts

ENVIRONMENTAL IMPACTS	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
NOISE. Would the project result in				
a) Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance or applicable standards of other agencies?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b) Generation of excessive ground borne vibration or ground borne noise levels?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Explanation

- a) **Less than Significant Impact with Mitigation Incorporated.** Construction of the project would result in short-term noise increases in the project vicinity. Construction activities generate considerable noise, especially during earth-moving activities when heavy equipment is used. The construction of the project would involve pavement cutting, trench excavation, pipe installation,

⁸ The Ldn is the average equivalent sound level over a 24 hour period, with a penalty added for noise during the nighttime hours of 22:00 to 07:00. During the nighttime period 10 dB is added to reflect the impact of the noise.

backfill of trench, and repave. The hauling of excavated materials and construction materials would generate truck trips and associated noise along local roadways. Noise impacts resulting from construction depend upon the noise generated by various pieces of construction equipment, the timing and duration of noise-generating activities, and the distance between construction noise sources and noise-sensitive areas. Construction noise impacts primarily result when construction activities occur during noise-sensitive times of the day (e.g., early morning, evening, or nighttime hours), the construction occurs in areas immediately adjoining noise-sensitive land uses, or when construction lasts over extended periods of time.

Construction of the project would occur over ten weeks. Equipment to be used may include a pick-up trucks, a wheeled backhoe, dump trucks, delivery trucks, and paving equipment. Typical hourly average construction noise levels could be as loud as 75-80 decibels at +100 feet from the construction area during active construction periods⁹. Construction would be conducted in accordance with the County of Santa Cruz Municipal Code Chapter 8.30, which states “offensive noise”¹⁰ shall not be permitted between the hours of 10:00 PM and 8:00 AM. Noise from construction of the project would be temporary and intermittent, and it would at times exceed the Santa Cruz County General Plan noise level guideline of 75 dB at the nearest residences along Quail Hollow Road and across the street on Cumora Lane. However, the noise level increase would not represent a significant impact on ambient noise, due to the short duration of construction activities.

Construction noise would be temporary in nature. Because the proposed project involves installation of a linear pipeline, the active construction area would be continuously moving along the length of the alignment as each segment is installed. As such, the active construction area would not typically be in the same location for more than five days. Furthermore, construction activities would be in accordance with the Section 8.30.010 of the County’s Noise Ordinance, which lists permitted construction activities as an example of necessary noise when considering whether a violation of the Noise Ordinance exists. Policy 9.2.6 of the Santa Cruz County General Plan Public Safety and Noise Element requires mitigation of construction noise as a condition of project approval; therefore, implementation of **Mitigation Measure N-1** is required to reduce potential impacts related to construction noise. (1, 9)

Mitigation

- N-1 To reduce noise during construction, the contractor shall implement the following noise control measures:
- a) Construction Hours Limit. Construction shall be limited to Monday through Friday from 8:00 a.m. to 6:00 p.m., and Saturday from 9:00 AM to 6:00 PM. No noise-generating work shall occur on Sundays or federal holidays.
 - b) Construction Staging Areas and Stationary Equipment Locations. The contractor shall select equipment staging areas and stationary noise-generating construction equipment locations as far as practicable from sensitive receptors.

⁹ California Department of Transportation, Transportation and Construction Vibration Guidance Manual, September 2013.

¹⁰ “Offensive noise” is defined as any noise which is loud, boisterous, irritating, penetrating, or unusual, or that is unreasonably distracting in any other manner such that it is likely to disturb people of ordinary sensitivities in the vicinity of such noise, and includes, but is not limited to, noise made by an individual alone or by a group of people engaged in any business, meeting, gathering, game, dance, or amusement, or by any appliance, contrivance, device, structure, construction, ride, machine, implement, instrument or vehicle [Santa Cruz County Municipal code, Section 8.30.010 (B)].

- c) **Equipment Maintenance.** All contractors, as a condition of contract, shall be required to maintain and tune-up all construction equipment to minimize noise emissions.
 - d) **Idling Prohibition and Enforcement.** Unnecessary idling of internal combustion engines shall be prohibited. In practice, this would mean turning off equipment if it would not be used for five or more minutes.
 - e) **Stationary Equipment Shielding.** Stationary equipment areas with appropriate acoustic shielding shall be designated on building and grading plans. Equipment and shielding shall be installed prior to construction and remain in designated location throughout construction activities. Pneumatic impact tools and equipment used at the construction site shall have intake and exhaust mufflers recommended by the manufacturers. Impact noise producing equipment (i.e., jackhammers and pavement breaker[s]) shall be equipped with noise attenuating shields, shrouds, or portable barriers or enclosures to reduce operating noise.
 - f) **Mufflers.** All diesel equipment shall be operated with closed engine doors and shall be equipped with properly operating and maintained residential grade mufflers.
 - g) **Electrically Powered Tools and Facilities.** Whenever feasible, electrical power shall be used to run air compressors and similar power tools rather than diesel equipment.
 - h) **Pre-Construction Notification.** Prior to construction, written notification that identifies the type, duration, and frequency of construction activities shall be provided to residents within 100 feet the pipeline alignment.
- b) **Less than Significant Impact.** The installation of the water supply pipeline would utilize equipment that would create groundborne vibration in the immediate vicinity of the project site during construction activities, such as cutting of existing pavement and repaving. Although groundborne vibrations would be created during construction activities, they would be limited to 8 AM to 5 PM Monday through Friday. Additionally, the construction vibration impacts would be temporary as the active construction site moves along the length of the pipeline alignment and total duration of construction activities would be ten weeks. This is a less-than-significant impact. (1)
 - c) **No Impact.** The project is not located in vicinity of a private airstrip or an airport land use plan or within two miles of a public airport or public use airport. (1)

4.15 POPULATION AND HOUSING

Environmental Setting

The project site is located in a rural residential community in the Santa Cruz Mountains. The most recent census for the County was in 2018, with a population of 274,255 and an estimated 106,718 housing units¹¹.

A project can induce substantial population growth by: 1) proposing new housing beyond projected or planned development levels, 2) generating demand for housing as a result of new businesses, 3) extending roads or other infrastructure to previously undeveloped areas, or 4) removing obstacles to population growth (e.g., expanding capacity of a wastewater treatment plant beyond that necessary to serve planned growth).

Environmental Impacts

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

Explanation

- a) **No Impact.** The proposed pipeline installation project would improve water conveyance to customers within the existing system and does not involve any expansion of use. As a result, the proposed project would not induce population growth in the area. (1)
- b) **No Impact.** The pipeline installation project would be located within the Quail Hollow roadway and would not displace any housing or people. (1)

¹¹ United States Census Bureau Website: <https://data.census.gov/cedsci/>. Accessed April 2020.

4.16 PUBLIC SERVICES

Environmental Setting

The project would be operated and maintained by the SLVWD. The project site is served by the Santa Cruz County Sheriff's Department and Santa Cruz County Fire District (SCCFD) in conjunction with CalFire and is within the Zayante Fire Protection District. The project site is not located in the vicinity of any schools or parks.

Environmental Impacts

ENVIRONMENTAL IMPACTS	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
PUBLIC SERVICES. Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities or 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:				
a) Fire protection?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b) Police protection?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c) Schools?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
d) Parks?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
e) Other public facilities?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Explanation

- a, b) **Less than Significant Impact with Mitigation Incorporated.** The project would install a new water supply pipeline, would be unmanned, and would not result in additional staff or indirect population growth that would lead to an increased demand for public services including fire or police protection. However, the project could result in reduced emergency access during construction due to temporary lane closures. This would be considered a significant impact that can be reduced to a less-than-significant with implementation of **Mitigation Measure TR-1**. Please refer to **Section 4.18 Transportation**. (1)
- c–e) **No Impact.** The project would install a new water supply pipeline, would be unmanned, and would not result in additional staff or indirect population growth that would lead to an increased demand for public services including schools, parks, or other public facilities. Funding is available for construction of the pipeline and would not adversely impact the SLVWD. (1)

4.17 RECREATION

Environmental Setting

The proposed project would be located within the vicinity of Quail Hollow Ranch County Park, a 300-acre historic horse ranch and natural preserve.

Environmental Impacts

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

Explanation

a,b) **No Impact.** The proposed pipeline installation would not increase demands on or require the construction or expansion of recreational facilities. (1)

4.18 TRANSPORTATION

Environmental Setting

The project site is located within Quail Hollow Road, which connects with West Zayante Road to the east, and Cumora Lane to the west. All these local access roads are single-lane public facilities that provide access for the local mountain community. Regional access is provided to the project sites via Glen Arbor Road, which connects to Highway 9 in the Glen Arbor community, approximately one mile southwest of the project site.

Environmental Impacts

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

Explanation

- a) **Less than Significant Impact.** The proposed project includes the installation of a new water supply pipeline and would not require regular operation activities or maintenance that would result in any additional vehicle trips. The proposed project would not generate pedestrian or bicycle traffic or transit usage due to the nature of the project and the isolated location.

Traffic impacts during project construction would be associated primarily with lane closures or disruptions caused by construction activity in the roadways as well as with construction related vehicle trips by construction workers traveling to and from the project work areas, soil haul trucks, and other trucks associated with equipment and material deliveries. Road closures are not anticipated; however, single lane closures will be necessary.

Therefore, the proposed project would not conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities. (1)

- b) **Less than Significant Impact.** The project would not conflict with an CEQA Guidelines Section 15064.3, subdivision (b). See Response a) above. (1)

- c) **No Impact.** The proposed project would not substantially increase hazards due to a geometric design feature or incompatible uses. The site will be repaved in the same location following installation of the pipeline and includes no incompatible uses. (1)

- d) **Less than Significant Impact with Mitigation Incorporated.** The proposed project is not in the vicinity of an emergency access route and would not increase the demand on local roads as the project does not require regular operation activities or maintenance. However, the project could result in reduced emergency access during construction due to temporary lane closures. This is a potentially significant impact that can be reduced to less-than-significant with implementation of **Mitigation Measure TR-1. (1)**

Mitigation

- TR-1 Prior to construction or the issuance of applicable permits, the contractor shall submit a Traffic Control Plan to SLVWD, the County of Santa Cruz, and any other agency with jurisdiction over roadways affected by project construction for review and approval. This plan shall:
- a) Describe the proposed lane closures, detours, staging areas, and routes of construction vehicles, including the timing and duration of anticipated closures.
 - b) Describe traffic control measures that will be implemented to manage traffic and reduce potential traffic impacts in accordance with stipulations of the most recent version of the California Manual of Uniform Traffic Control Devices. Traffic control measures may include, but are not limited to, flag persons, warning signs, lights, barricades, and cones to provide safe passage of vehicles (including cars and buses) and bicycle and pedestrian traffic.
 - c) Require written notification of the timing, location, and duration of construction activities, and the location of lane closures or detours (if any) to all emergency service providers (fire and police) prior to road closure. Emergency service vehicles shall be given priority for access.

4.19 TRIBAL CULTURAL RESOURCES

Environmental Setting

California Assembly Bill (AB) 52, in effect since July 2015, provides CEQA protections for tribal cultural resources. All lead agencies approving projects under CEQA are required, if formally requested by a culturally affiliated California Native American Tribe, to consult with such tribe regarding the potential impact of a project on tribal cultural resources before releasing an environmental document. Under California Public Resources Code §21074, tribal cultural resources include site features, places, cultural landscapes, sacred places, or objects that are of cultural value to a tribe and that are eligible for or listed on the CRHR or a local historic register, or that the lead agency has determined to be of significant tribal cultural value.

Environmental Impacts

ENVIRONMENTAL IMPACTS	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
TRIBAL CULTURAL RESOURCES. Would the project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:				
a) Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1(k), or	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resources Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American Tribe.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Explanation

- a) **No Impact.** As indicated above in **Section 4.5 Cultural Resources**, the proposed project would not result in any adverse impacts to historical resources within the project area. (1, 7, 9)
- b) **Less than Significant Impact with Mitigation Incorporated.** The NAHC was contacted for a review of the SLF. The NAHC SLF results were negative. Letters were sent to five locally knowledgeable Native American individuals/tribes identified by the NAHC, as follows:
- Valentin Lopez, Amah Mutsun Tribal Band, Galt;
 - Irene Zwierlein, Chairperson, AMTB of Mission San Juan Bautista, Woodside;
 - Patrick Orozco, Chairman, Coastanoan Ohlone Rumsen Mutsun Tribe, Watsonville;
 - Ann Marie Sayers, Indian Canyon Mutsun Band of Costanoan, Hollister; and,

- Monica Arellano, Muwekma Ohlone Indian Tribe of the San Francisco Bay Area, Castro Valley.

One response from the AMTB was received. The AMTB Director of Archaeological Resource Management responded at the direction of the Tribal Chair. The Director did not have additional information to share about cultural resources in the project vicinity. However, he noted a high potential for the presence of indigenous cultural resources and recommended the retention of a Native American archaeological monitor for ground disturbing activities conducted within 400 feet of a water source. Basin provided information on the pipeline and forwarded his request to the SLVWD.

This is considered a potentially significant impact that can be mitigated to less-than-significant with implementation of **Mitigation Measures CR-1** and **CR-2** outlined above in **Section 4.5 Cultural Resources** above. (1, 7)

4.20 UTILITIES AND SERVICE SYSTEMS

Environmental Setting

In the rural project area, wastewater treatment and disposal services are provided by individual septic systems, although the proposed project would not include these services. Water supply service in the project area is provided by the SLVWD. The storm drainage system in the Ben Lomond area is privately maintained or under the jurisdiction of the County.

Environmental Impacts

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

Explanation

- a) **Less than Significant Impact.** The project consists of the installation of a new water supply pipeline to improve water conveyance to customers within the existing system. The project does not include domestic sewage or septic facilities and as a result would not require the construction of expanded wastewater treatment for this use. Per the County's request, the proposed project will be constructed during the dry season. As outlined in **Section 4.6 Energy**, the project would not utilize natural gas and electrical power as this portion of the water system operates by gravity. No construction or replacement of power lines would be necessary.

The proposed project would be constructed as a service improvement from the existing pipeline and does not involve any expansion of use. Therefore, the project would not result in significant impacts requiring construction or relocation of new water, wastewater treatment, electrical power, natural gas, or telecommunication facilities. (1)

- b) **Less than Significant Impact.** The project is a water supply project and consists of the installation of a new water supply pipeline. Construction of the project would require some water use for dust suppression during construction activities, which would be provided by existing fire hydrants along Quail Hollow Road; the amount of water required for watering and construction activities is minor. This is a less-than-significant impact. (1)
- c) **No Impact.** The project would not require wastewater treatment services, see Response a) above. (1)
- d,e) **Less than Significant Impact.** Solid waste generated during construction and would consist of cut pavement and trench spoils, which would be hauled to the Buena Vista Landfill in Watsonville, California. However, construction would not generate or require solid waste services or impact landfills in excess of State or local standards or in excess of the capacity of local infrastructure, negatively impact solid waste services, impair the attainment of solid waste reduction goals. There would be less-than-significant impact associated with solid waste generation. (1)

4.21 WILDFIRE

Environmental Setting

Santa Cruz County experiences annual cycles of elevated fire danger, with the wildfire season typically extending from roughly May into late October or early November. The project area is served by the SCCFD in conjunction with CalFire and is within the Zayante Fire Protection District.

The CalFire San Mateo – Santa Cruz Unit, which is the County Fire Department for both San Mateo County and Santa Cruz County, recently developed and adopted the 2016 Strategic Fire Plan for the San Mateo County and Santa Cruz County unit (CalFire, 2016). Fire Hazard Severity Zone maps categorizes parcel categories of Very High, High, and Moderate, the project site is located in Moderate fire hazard severity zone as delineated by CalFire.

Environmental Impacts

ENVIRONMENTAL IMPACTS	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
WILDFIRE. If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the project:				
a) Substantially impair an adopted emergency response plan or emergency evacuation plan?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
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?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
d) Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Explanation

- a) **Less Than Significant Impact with Mitigation Incorporated.** As stated above in **Section 4.9 Hazards and Hazardous Materials**, the proposed project site is not part of vehicular transportation network used by emergency vehicles. However, the project could result reduced emergency access during construction due to temporary lane closures. This would be considered a significant impact that can be reduced to less-than-significant with implementation of **Mitigation Measure TR-1**. Please refer to **Section 4.18 Transportation**. (1, 9, 10, 11)
- b) **No Impact.** The proposed project is installation of an unmanned water supply pipeline, and therefore, would not expose occupants to a significant risk from wildland fire. Although the site is located in a relatively undeveloped area with natural vegetation, the proposed project is not anticipated to create a significant risk from wildland fire due to its nature. Additionally, the replacement pipeline would improve flow of water from storage tanks to hydrants. As a result, the project would have no impact due to slope, prevailing winds, and other factors which exacerbate wildfire risks and thereby expose nearby residents to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire. (1, 9, 10, 11)
- c) **No Impact.** The proposed project would be the installation of a new water supply pipeline and will be completely underground upon completion. Therefore, the project will not require the installation or maintenance of associated infrastructure that would exacerbate fire risk or result in temporary or ongoing impacts to the environment, and no impacts would occur. (1)
- d) **No Impact.** See Responses b) and c) above. Although the proposed project is located in a moderate fire hazard severity zone, it would be unmanned and located underground. As a result, the project would not result in an impact due to exposure of people or structures to significant wildfire risks as a result of runoff, post-fire slope instability, or drainage changes. (1, 9, 10, 11)

4.22 MANDATORY FINDINGS OF SIGNIFICANCE

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

Explanation

- a) **Less than Significant Impact with Mitigation.** Based on the analysis provided in this IS/MND, the proposed project has 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. However, mitigation measures are identified for potential impacts of the project on biological and cultural resources to reduce these effects to a less-than-significant level. (1-11)

- b) **Less Than Significant Impact with Mitigation.** Based on the analysis provided in this IS/MND, the proposed project would not significantly contribute to cumulative impacts, because the proposed pipeline installation project would be constructed to improve water conveyance within an existing system.

Under CEQA “cumulatively considerable” means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects. The proposed project would not result in a cumulatively considerable adverse environmental effect. This IS/MND contains mitigation to ensure that all impacts would be minimized to a less than significant level. The project would have temporary air quality impacts and GHG emissions that would contribute to the overall regional and global GHG emissions. However, air quality impacts and GHG emissions would not exceed the MBARD’s thresholds of significance. In addition, the proposed project would not increase the capacity of the existing system, would not introduce new service connections and would not induce potential population growth beyond existing levels; therefore, the project would not conflict with and/or obstruct the implementation of the MBARD 2012-2015 AQMP, or any other plans to address exceedance of State air quality standards. For these reasons, the project would have a less than significant cumulative impact on the air quality and GHG emissions. (1-11)

- c) **Less than Significant Impact with Mitigation.** The proposed project would not cause any adverse effects on human beings. Construction impacts would be temporary in nature and mitigated to a less-than-significant extent. Furthermore, temporary construction impacts to sensitive receptors would be limited since potential construction-related air quality impacts and GHG emissions would not exceed the MBARD’s significance thresholds and compliance with applicable MBARD regulations, including, but not limited to, Rule 402, would minimize potential nuisance impacts to occupants of nearby land uses. In addition, potential impacts due to construction noise and traffic would be mitigated to a less-than-significant level. The project would not have a substantial adverse effect on human beings, either directly or indirectly. (1-11)

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Chapter 5 References

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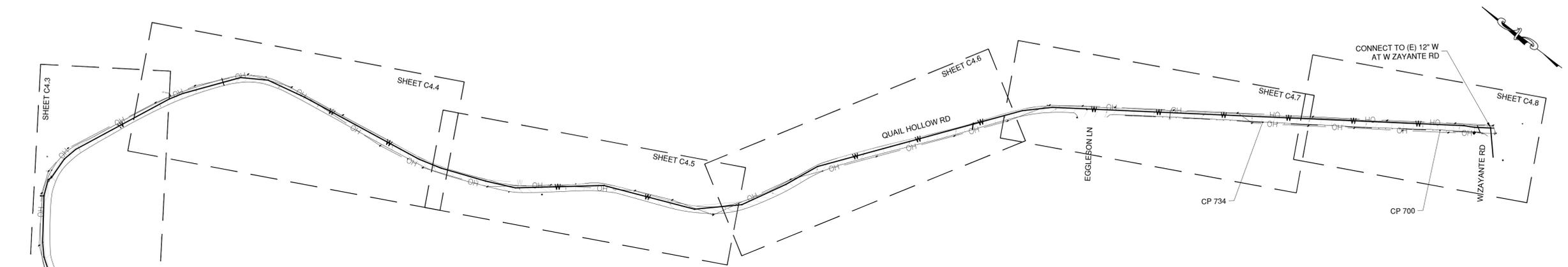
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Appendix A.

Project Site Plans



SURVEY CONTROL POINTS			
CP NUMBER	NORTHING	EASTING	ELEVATION
13	3469.85	4231.59	477.99
500	3781.74	4267.95	500.00
501	4123.84	4650.15	542.71
539	4334.29	4760.99	571.71
541	4683.92	4615.06	610.25
578	4956.74	4969.64	615.43
500	5000.00	5000.00	629.47
1012	4772.80	5454.04	586.89
968	4534.15	5723.80	564.71
958	3934.72	5800.13	526.04
935	3563.44	5930.09	503.36
898	3384.52	6103.56	488.10
887	2913.72	6321.74	463.46
855	2687.33	6694.81	438.08
805	2173.04	7390.14	392.07
734	1502.84	7823.49	347.88
700	962.63	8197.26	315.01
2	735.29	8400.60	303.90

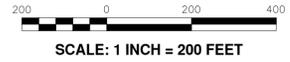
STATION ANGLE POINTS		
STATION	NORTHING	EASTING
1+00.00	3445.96	4199.89
1+24.22	3463.85	4216.22
1+62.87	3497.28	4235.61
2+16.86	3548.27	4253.38
2+39.77	3570.98	4256.37
3+32.27	3663.46	4256.51
3+92.40	3722.83	4266.06
4+48.30	2773.78	4289.08
5+10.14	3823.54	4325.80
8+56.84	4048.63	4589.49
11+02.79	4249.90	4730.85
11+50.57	4294.23	4748.68
11+95.32	4338.44	4755.63
12+37.70	4380.80	4754.23
12+66.06	4408.33	4747.44
14+01.75	4520.07	4670.46
14+65.93	4579.32	4645.81
15+10.86	4623.82	4639.58
16+25.79	4735.28	4664.40
16+86.11	4785.33	4698.09
17+41.36	4822.52	4738.94
19+12.50	4922.31	4877.97
19+73.49	4945.71	4934.30
19+87.17	4940.69	4947.03
20+70.87	4944.22	5030.66
21+26.15	4932.37	5084.65
25+18.67	4769.75	5441.89
25+73.90	4741.63	5489.43
27+94.14	4607.96	5664.47
28+96.66	4520.94	5718.66
30+44.67	4376.37	5750.40
35+26.72	3900.12	5825.01
36+14.43	3815.56	5848.25
37+84.95	3656.54	5909.82
38+97.56	3553.99	5956.35
42+25.62	3298.40	6162.01
45+71.81	2979.04	6295.67
47+46.61	2850.45	6414.07
49+25.81	2766.04	6572.15
50+60.29	2712.94	6695.69
58+45.76	2234.82	7318.89
59+55.85	2155.16	7394.87
74+79.46	903.43	8263.53
75+19.02	868.59	8282.27
75+92.60	808.12	8324.18

HORIZONTAL CONTROL:
 AZIMUTH BEARING BETWEEN CONTROL POINTS CP 700 AND CP 734 (N34°40'45"E)

VERTICAL CONTROL:
 ELEVATION DATUM IS ASSUMED OVER CP 700 (315.01 FEET)

- PIPELINE NOTES:
1. ALL NEW WATER MAINS IN THIS AREA SHALL BE DUCTILE IRON PIPE (AWWA C151)
 2. PIPE BEDDING AND TRENCH BACKFILL SHALL BE PER SANTA CRUZ COUNTY FIGURE EP-1.
 3. REPAVE TRENCH AND SET VALVE LIDS PER SANTA CRUZ COUNTY FIGURE EP-1, EP-2, & EP-5.

PLAN
 SCALE: 1" = 200'



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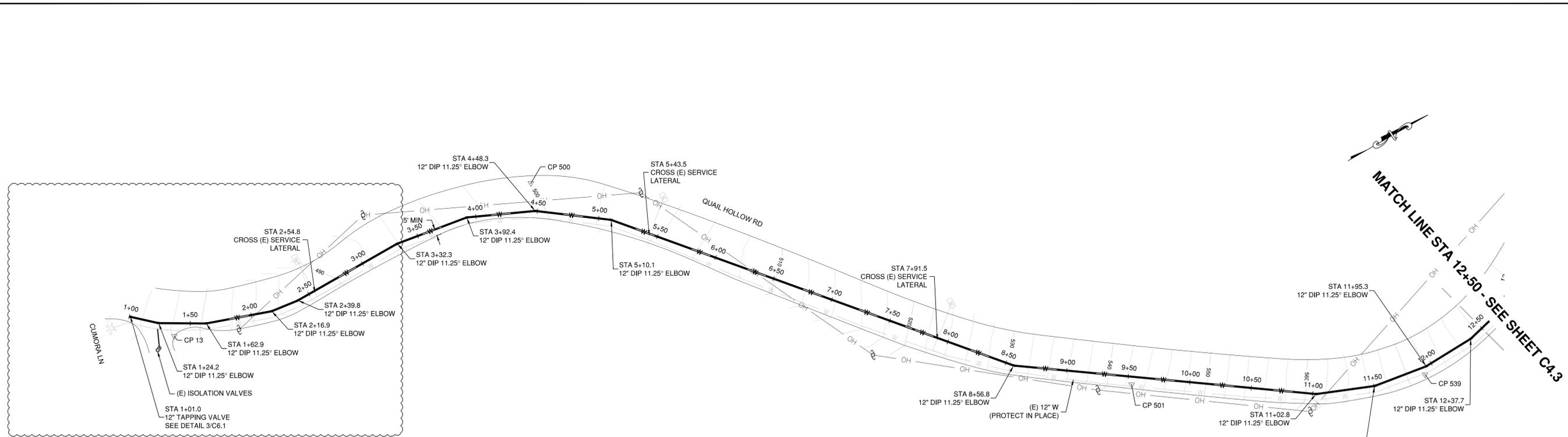
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 3 Quail Run Circle, Suite 101
 Salinas, CA 93907-2348
 (831) 883-4848



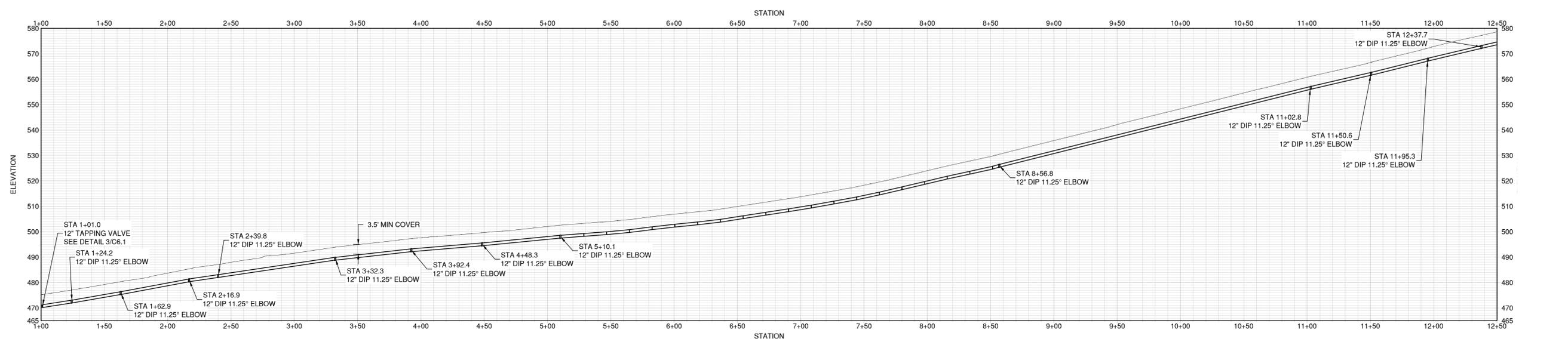
QUAIL HOLLOW ROAD OVERALL PLAN
PIPELINE REPLACEMENT



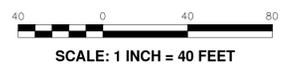
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PROFILE
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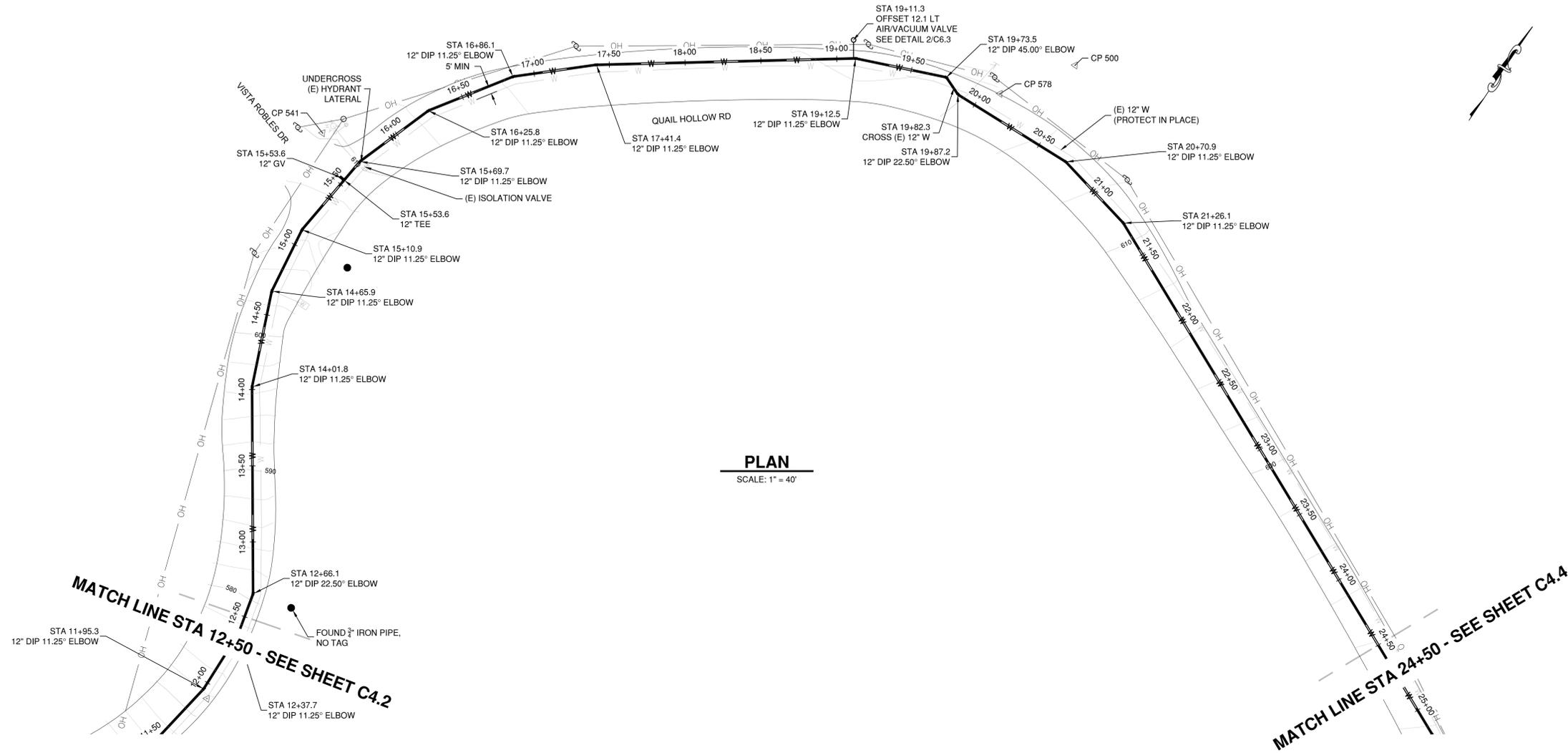
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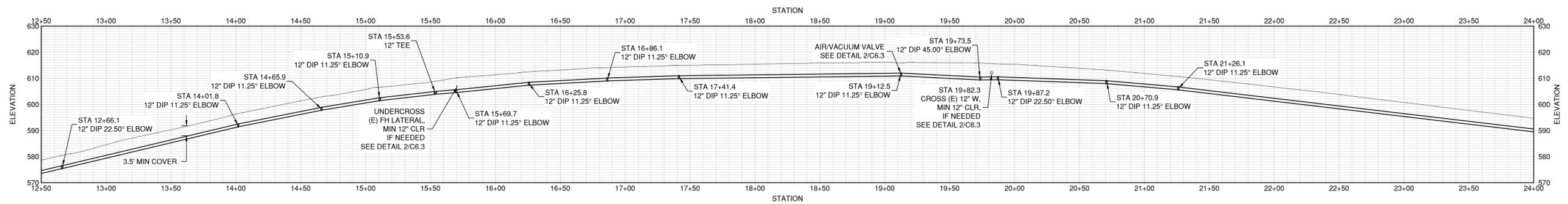
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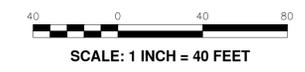
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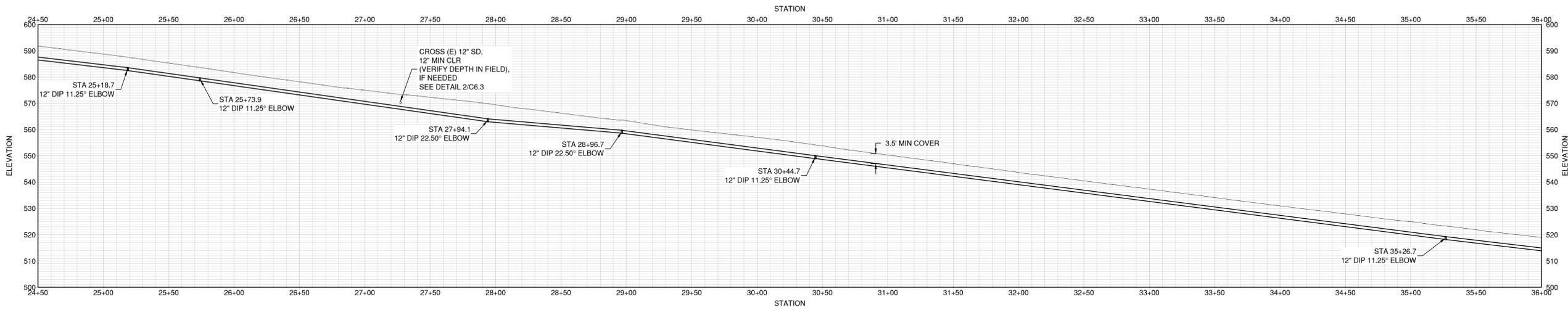
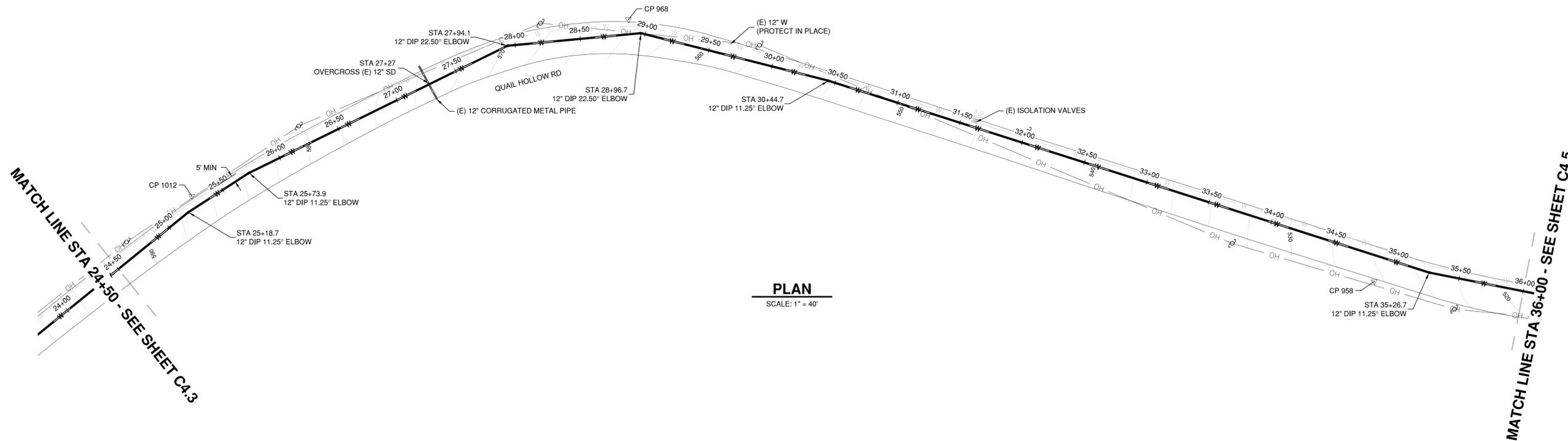
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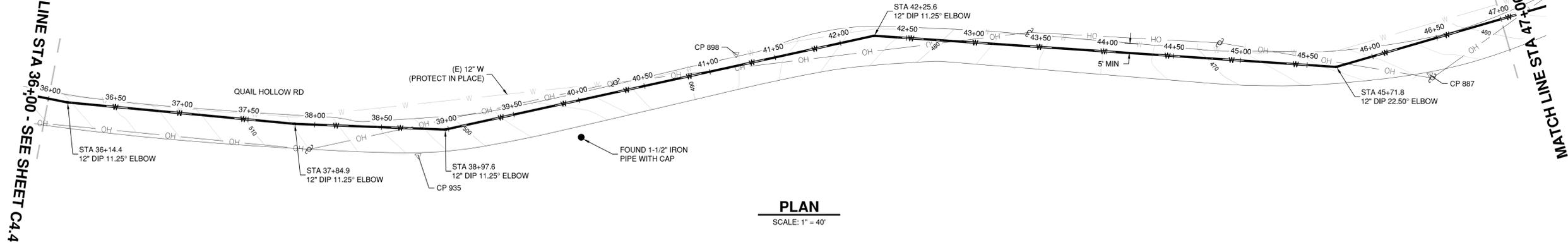
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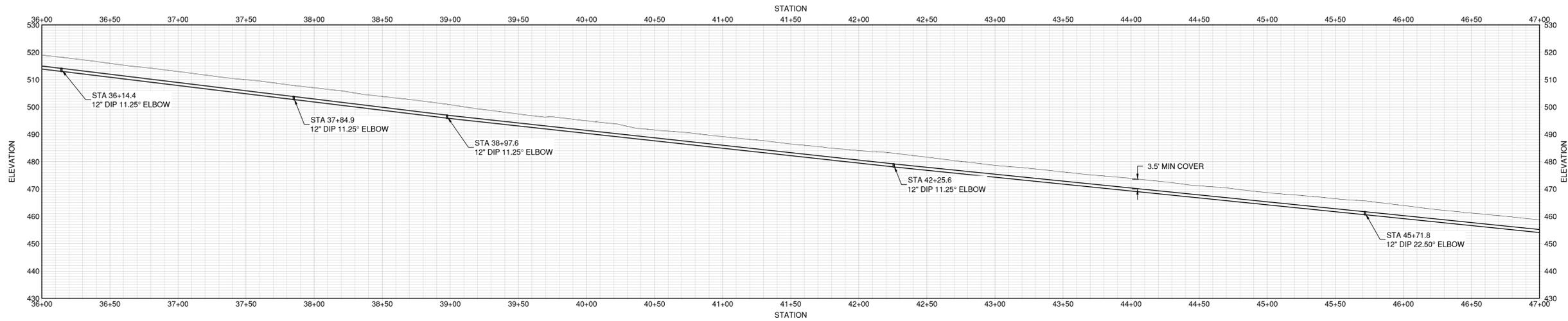
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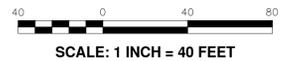
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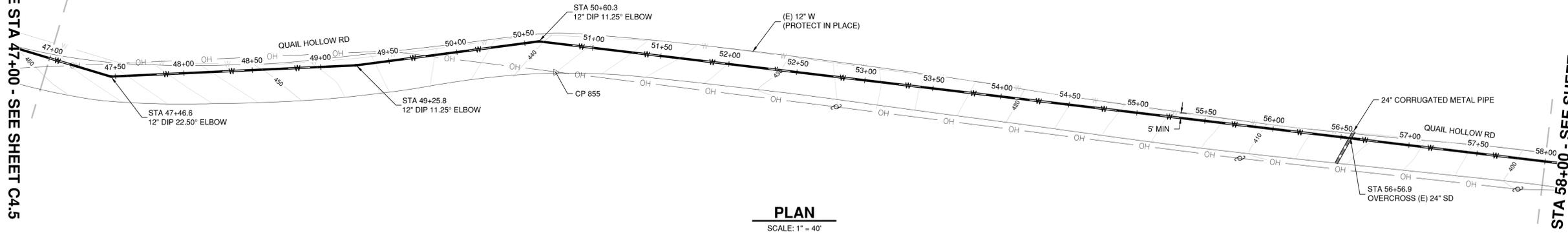
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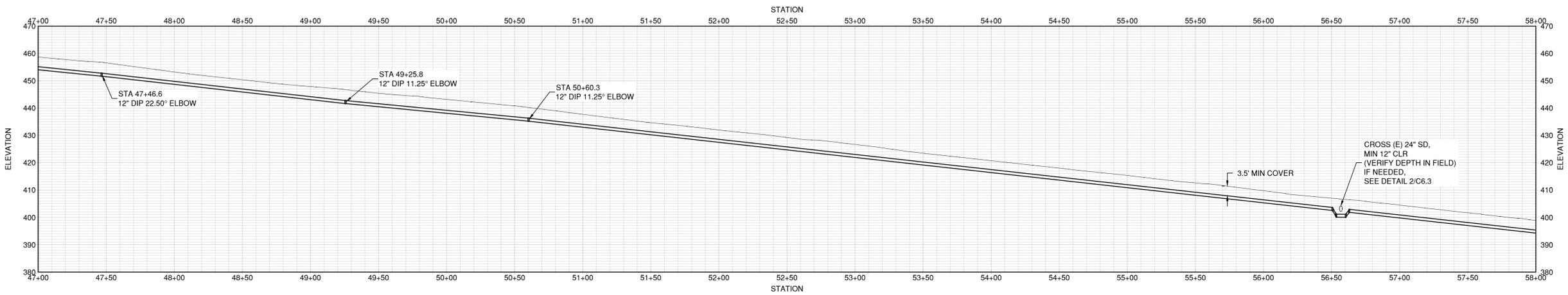
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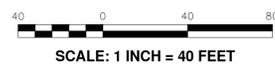
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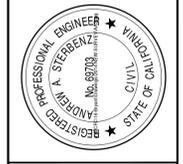


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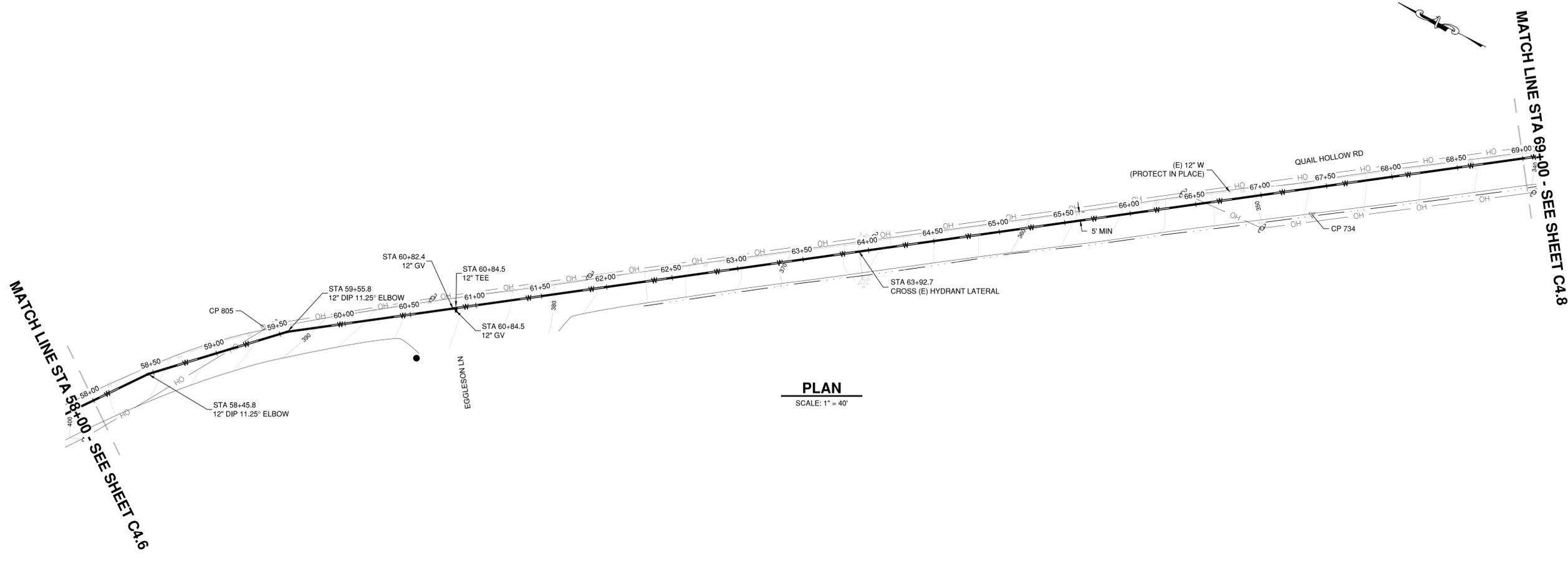
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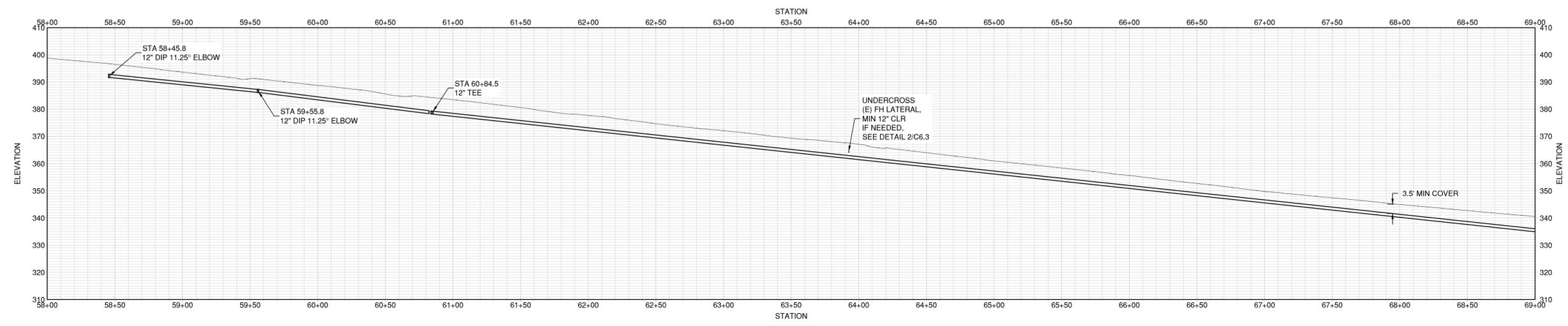
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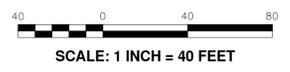
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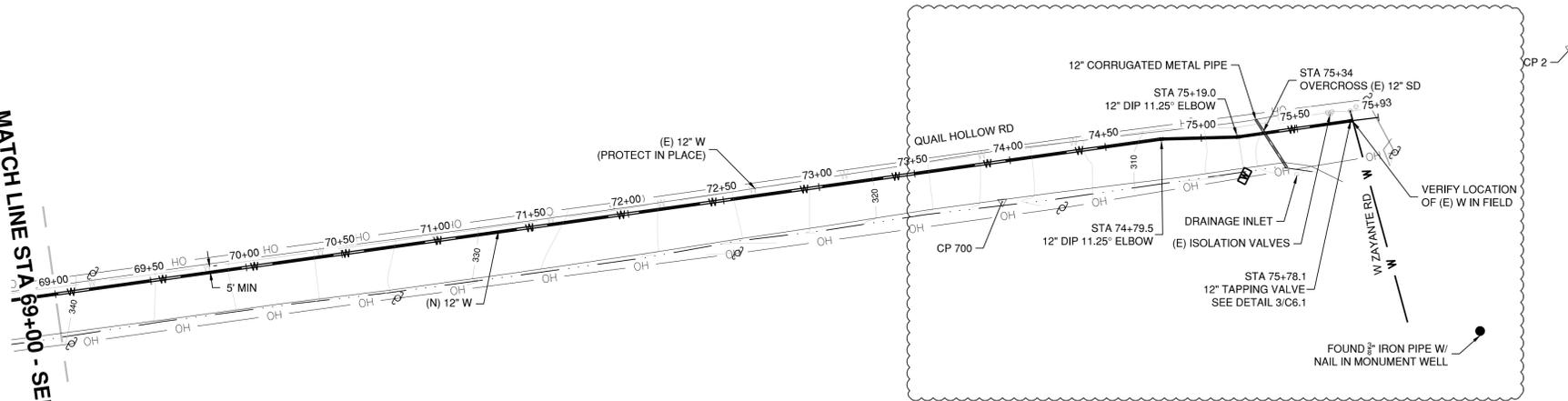


QUAIL HOLLOW ROAD PLAN AND PROFILE - VI
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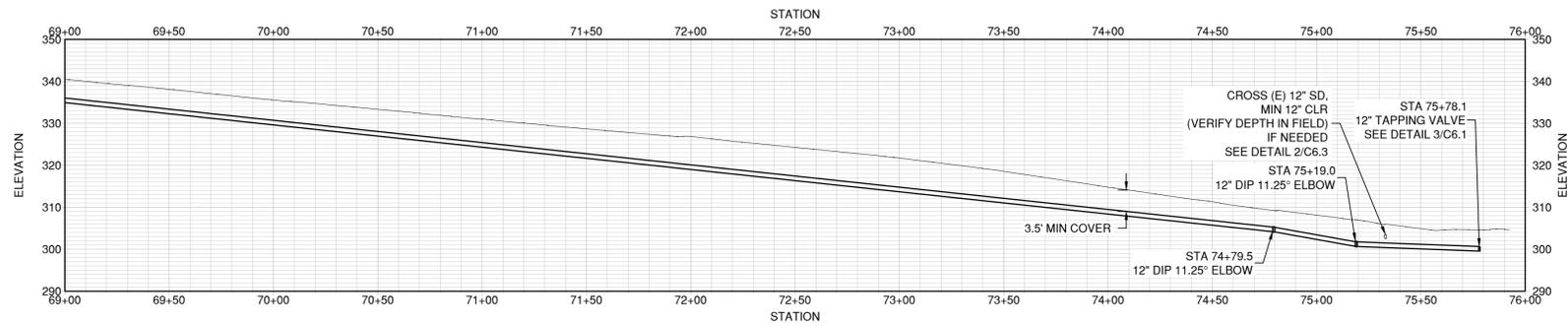


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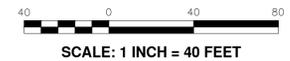
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QUAIL HOLLOW ROAD PLAN AND PROFILE - VII
PIPELINE REPLACEMENT



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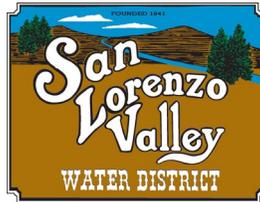
Appendix B.

Quail Hollow Pipeline Replacement Project Biological Resources Report

QUAIL HOLLOW PIPELINE REPLACEMENT PROJECT BIOLOGICAL RESOURCES REPORT

August 2020

Prepared for



San Lorenzo Valley Water District
13060 Highway 9
Boulder Creek, CA 95006

Prepared by



Denise Duffy & Associates, Inc
947 Cass Street, Suite 5
Monterey, CA 93940

Contact: Matthew Johnson
(831) 373-4341

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TABLE OF CONTENTS

1. INTRODUCTION..... 4

 1.1. Project Background..... 4

 1.2. Project Description..... 4

2. METHODS..... 7

 2.1. Personnel and Survey Dates..... 7

 2.2. Data Sources 7

Botany..... 8

Wildlife 8

 2.3. Special-Status Species..... 8

 2.4. Sensitive Habitats..... 9

 2.5. Regulatory Setting..... 9

 2.5.1. Federal Regulations..... 9

 2.5.2. State Regulations..... 10

 2.5.3. Local Regulations 11

3. RESULTS..... 13

 3.1. Habitat Types 13

 3.1.1. Ruderal/Disturbed 13

 3.1.2. Coast Live Oak Woodland 13

 3.1.3. Ponderosa Pine Forest..... 15

 3.2. Sensitive Habitats..... 15

 3.2.1. Ponderosa Pine Forest..... 15

 3.2.2. Suitable Habitat for Mount Hermon June Beetle 15

 3.3. Special-Status Species..... 16

 3.3.1. Special-Status Wildlife 16

 3.3.2. Special-Status Plant Species 20

4. IMPACTS AND MITIGATION 23

 4.1. Thresholds of Significance..... 23

 4.2. Approach to Analysis..... 23

 4.3. Areas of No Impact 23

 4.4. Impacts and Mitigation Measures 24

5. REFERENCES..... 29

FIGURES

FIGURE 1. PROJECT LOCATION.....5
FIGURE 2. QUAIL HOLLOW PIPELINE REPLACEMENT HABITAT CLASSIFICATION MAP14
FIGURE 3. QUAIL HOLLOW PIPELINE REPLACEMENT SPECIAL STATUS PLANT SPECIES MAP21

APPENDIX

APPENDIX A: PROJECT PLANS
APPENDIX B: SPECIAL-STATUS SPECIES TABLE
APPENDIX C: BOTANICAL PLANT LIST
APPENDIX D: CNDDDB OCCURRENCE REPORT
APPENDIX E: IPaC RESOURCES LIST FOR THE SURVEY AREA

1. INTRODUCTION

Denise Duffy & Associates, Inc. (DD&A) was contracted by Schaaf and Wheeler Consulting Civil Engineers to prepare a Biological Resources Report for San Lorenzo Valley Water District's (SLVWD or District) Quail Hollow Pipeline Replacement Project (project). The project is located within the Quail Hollow Road right-of-way, in the Lompico community in Santa Cruz County (**Figure 1**). The analysis presented in this report describes the existing biological resources within the survey area, including identification of any special-status species and sensitive habitats known to occur or with the potential to occur, and provides recommended avoidance, minimization, and mitigation measures to reduce impacts to a less-than-significant level under the California Environmental Quality Act (CEQA). In addition, the report includes an overview of applicable federal, state, and local regulation, regulatory and responsible agencies with jurisdiction over sensitive resources within the survey area, and the relevant permits that may be required.

1.1. Project Background

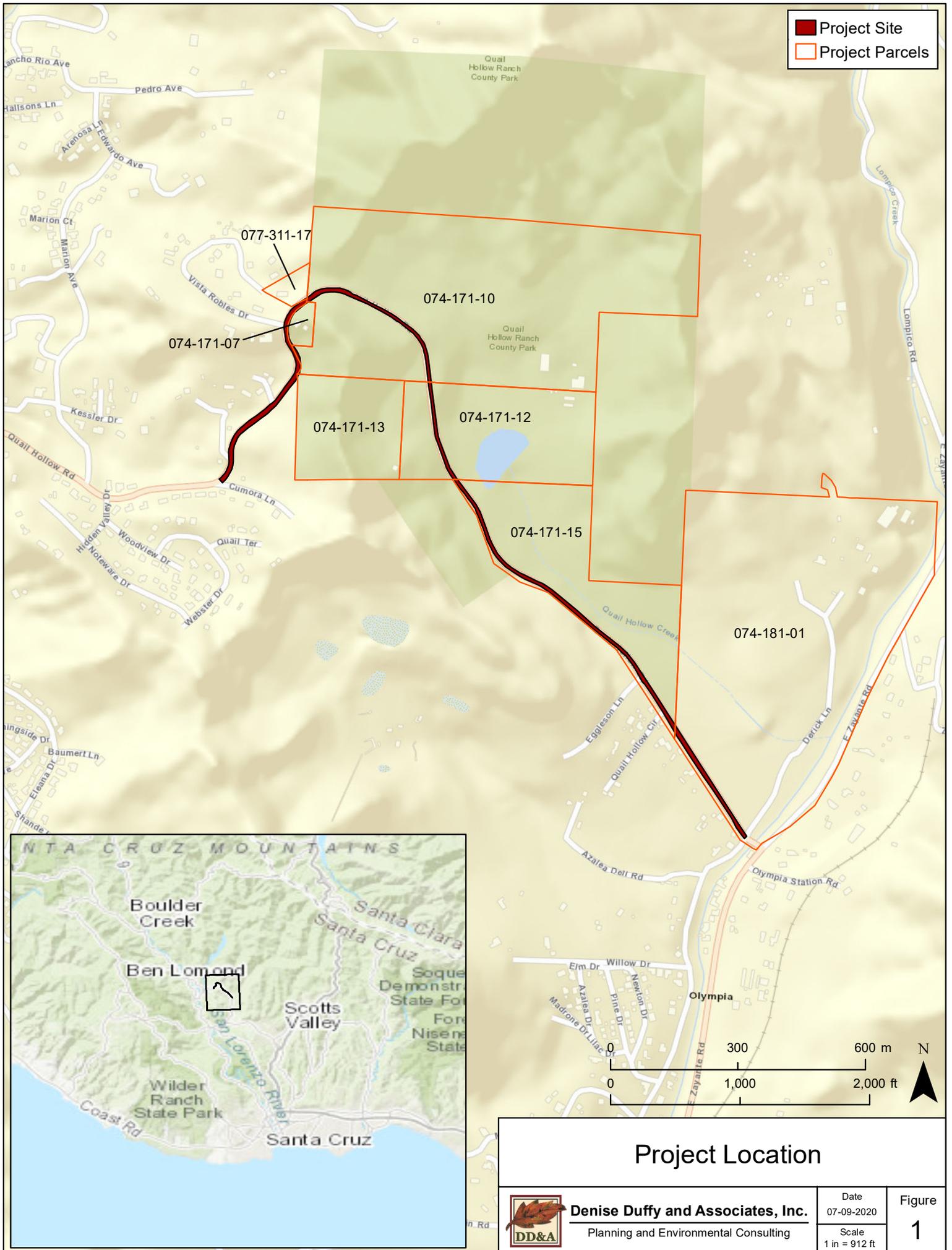
The SLVWD is a water supplier established in 1941 and serves several communities within the 136 square-mile San Lorenzo River watershed. The SLVWD relies on both surface water and groundwater resources, including nine currently active stream diversions, one groundwater spring, and eight active groundwater wells. These sources are derived solely from rainfall within the San Lorenzo River watershed.

The SLVWD owns, operates, and maintains two permitted water systems; each service area is provided supplies from separate water sources. The project is located in the North/South Service Area, which includes the unincorporated communities of Boulder Creek, Brookdale, Ben Lomond, Manana Woods, Scotts Valley and Lompico. The SLVWD serves the Lompico community with approximately 498 residential service connections. The Lompico water system is supplied from the SLVWD's Quail Zone via the Lompico Booster Pump Station. The Lompico water system consists of a network of 4-inch and 6-inch water mains, three water tank sites, a booster pump station, and six pressure reducing valve (PRV) stations.

1.2. Project Description

The SLVWD is proposing to replace the existing outdated pipelines to improve water conveyance from the Quail Tanks to customers along Zayante Road. The proposed project will replace pipeline that is no longer efficient or effective due to age or because it is undersized, in order to improve fire flow and water quality. The replacement project would be constructed with essentially the same purpose and capacity as the existing facilities and does not involve any expansion of use or services.

The project includes replacement of approximately 7,500 LF of existing 6-inch water supply pipeline with a new 12-inch pipeline within the Quail Hollow Road right-of-way, specifically between Cumora Lane and West Zayante Road (**Figure 1**). Project construction is only proposed within existing developed areas and would not require grading or demolition activities. The pipe replacement would occur under existing pavement and would include cutting pavement, excavating a trench, installing the pipeline, backfilling the trench, and repaving. Plans for the proposed project are shown in **Appendix A**.



Construction of the project is scheduled to begin in June of 2021 and would take approximately eight weeks to complete, with an additional two weeks for final paving. The anticipated production rate would be approximately 1,000 LF per week. Per the County of Santa Cruz's (County's) request, the proposed project would be constructed in the summer when the nearby schools are out of session.

Typical construction vehicles that would be used on the project site during construction include pick-up trucks, wheeled backhoe, dump trucks for hauling spoils and delivering slurry, delivery trucks, and paving equipment. Construction staging would be conducted on site. Solid waste would consist of cut pavement and trench spoils, which would be hauled to the Buena Vista Landfill in Watsonville, California. Water supply for the proposed project would be provided by existing fire hydrants along Quail Hollow Road.

2. METHODS

2.1. Personnel and Survey Dates

DD&A Senior Environmental Scientist Matthew Johnson conducted a survey of the project site and immediately adjacent areas (referred to as the survey area) on May 1, 2020 to characterize habitats present and to identify any special-status plant or wildlife species or suitable habitat for these species. The survey area is defined as approximately five feet from the Quail Hollow Road pavement¹. Survey methods included walking the survey area using aerial maps and GPS to identify general habitat types and potential sensitive habitat types, conducting focused surveys for special-status plant species, and conducting reconnaissance-level wildlife habitat survey to identify any special-status wildlife species occurring within the survey area or suitable habitat for those species. General and sensitive habitat types were mapped during the survey effort using a combination of GPS and hand drawing on aerial maps, which were later digitized using ArcGIS software.

The project site was surveyed for botanical resources following the applicable guidelines outlined in the U.S. Fish and Wildlife Service (USFWS) *Guidelines for Conducting and Reporting Botanical Inventories for Federally listed, Proposed and Candidate Plants* (USFWS, 2000), the California Department of Fish and Wildlife (CDFW) *Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities* (CDFW, 2018), and the California Native Plant Society (CNPS) *Botanical Survey Guidelines* (CNPS, 2001).

Data collected during the surveys were used to assess the environmental conditions of the project site and its surroundings, evaluate environmental constraints at the site and within the local vicinity, and provide a basis for recommendations to minimize and avoid impacts to biological resources.

2.2. Data Sources

The primary literature and data sources reviewed in order to determine the occurrence or potential for occurrence of special-status species within and adjacent to the survey area are as follows: current agency status information from the USFWS and CDFW for species listed, proposed for listing, or candidates for listing as Threatened or Endangered under the federal Endangered Species Act (ESA) or California Endangered Species Act (CESA) and those considered CDFW “species of special concern” (USFWS, 2020 and CDFW, 2019a); the CNPS *Inventory of Rare and Endangered Vascular Plants of California* (CNPS, 2020); and CNDDDB occurrence reports from the United States Geological Survey (USGS) Felton quadrangle and the seven surrounding USGS quadrangles (Big Basin, Castle Rock Ridge, Los Gatos, Laurel, Soquel, Santa Cruz, and Davenport) (CDFW, 2020). From these resources, a list of special-status plant and wildlife species known or with the potential to occur in the vicinity of the proposed project will be created (**Appendix B**). The list presents species along with their legal status, habitat requirements, and a brief statement of the likelihood to occur.

¹ Please note that the survey area was expanded in one location during the field survey due to the observation of sensitive resources. The expanded survey area and sensitive resources are shown on Figure 3.

Botany

Vegetation alliances identified in *A Manual of California Vegetation* (Sawyer et al., 2009) were utilized to determine if habitat types identified as sensitive on CDFW's *California Natural Communities List* (CDFW, 2019b) are present within the survey area. Information regarding the distribution and habitats of local and state vascular plants was also reviewed (Munz and Keck, 1973; Baldwin et al., 2012; Jepson Flora Project, 2020). All plants observed within the evaluation area during the surveys were identified to species or intraspecific taxon necessary to eliminate them as being special-status species using keys and descriptions in *The Jepson Manual: Vascular Plants of California, Edition 2* (Baldwin et al., 2012) and *Plants of the San Francisco Bay Region: Mendocino to Monterey* (Beidleman and Kozloff, 2014). Scientific nomenclature and common names for plant species identified within this document CalFlora's Online Inventory (Accessed August 2020). A full botanical inventory was recorded for the survey area and the dominant species within each habitat were noted. Dominant plant species are those which are more numerous than its competitors in an ecological community or makes up more of the biomass; generally, the species that are most abundant. Most ecological communities are defined by their dominant species.

The California Invasive Plant Council (Cal-IPC) Inventory (Cal-IPC, 2020) was reviewed to determine if any invasive plant species are present within the survey area.

Wildlife

The following literature and data sources were reviewed: CDFW reports on special-status wildlife (Remsen, 1978; Williams, 1986; Jennings and Hayes, 1994; Thelander, 1994; Thomson et al., 2016); California Wildlife Habitat Relationships Program species-habitat models (Zeiner et al., 1988 and 1990); and general wildlife references (Stebbins, 1972, 1985, and 2003).

2.3. Special-Status Species

Special-status species are those plants and animals that have been formally listed or proposed for listing as Endangered or Threatened or are Candidates for such listing under ESA or CESA. Listed species are afforded legal protection under the ESA and CESA. Species that meet the definition of Rare or Endangered under CEQA Section 15380 are also considered special-status species. Animals identified as "species of special concern" on the CDFW's list of "species of special concern" (most of which are species whose breeding populations in California may face extirpation if current population trends continue) meet this definition and are typically provided management consideration through the CEQA process, although they are not legally protected under the ESA or CESA (CDFW, 2019a). CDFW also includes some animal species that are not assigned any of the other status designations on their "Special Animals" list. These species have no legal or protection status; however, some of these species are of known local importance and are analyzed in this document.

Plants listed as rare under the California Native Plant Protection Act (CNPPA) or included in CNPS California Rare Plant Ranks (CRPR; formerly known as CNPS Lists) 1A, 1B, 2A, and 2B are also treated as special-status species as they meet the definitions of Sections 2062 and 2067 of the CESA and in accordance with CEQA Guidelines Section 15380.² In general, the CDFW requires that plant species on

² CNPS initially created five CRPR to categorize degrees of concern; however, to better define and categorize rarity in California's flora, the CNPS Rare Plant Program and Rare Plant Program Committee have developed the new CRPR 2A and CRPR 2B categories.

CRPR 1A (Plants presumed extirpated in California and Either Rare or Extinct Elsewhere), CRPR 1B (Plants rare, threatened, or endangered in California and elsewhere), CRPR 2A (Plants presumed extirpated in California, but more common elsewhere); and CRPR 2B (Plants rare, threatened, or endangered in California, but more common elsewhere) of the CNPS *Inventory of Rare and Endangered Vascular Plants of California* (CNPS, 2020) be fully considered during the preparation of environmental documents relating to CEQA. CNPS CRPR 4 species (plants of limited distribution) may, but generally do not, meet the definitions of Sections 2062 and 2067 of CESA, and are not typically considered in environmental documents relating to CEQA. While other species (i.e., CRPR 3 or 4 species) are sometimes found in database searches or within the literature, these do not meet the definitions of Section 2062 and 2067 of CESA and are not analyzed in this document.

Raptors (e.g., eagles, hawks, and owls) and their nests are protected in California under Fish and Game Code Section 3503.5. Section 3503.5 states that it is “unlawful to take, possess, or destroy the nest or eggs of any such bird except otherwise provided by this code or any regulation adopted pursuant thereto.” In addition, fully protected species under the Fish and Game Code Section 3511 (birds), Section 4700 (mammals), Section 5515 (fish), and Section 5050 (reptiles and amphibians) are also considered special-status animal species. Species with no formal special-status designation but thought by experts to be rare or in serious decline may also be considered special-status animal species in some cases, depending on project-specific analysis and relevant, localized conservation needs or precedence.

2.4. Sensitive Habitats

Sensitive habitats include riparian corridors, wetlands, habitats for legally protected species, areas of high biological diversity, areas supporting rare or special-status wildlife habitat, and unusual or regionally restricted habitat types. Vegetation types considered sensitive include those identified as sensitive on the CDFW’s *California Natural Communities List* (i.e., those habitats that are rare or endangered within the borders of California) (CDFW, 2019b), and those that are occupied by species listed under ESA or are critical habitat in accordance with ESA. Specific habitats may also be identified as sensitive in city or county general plans or ordinances. Sensitive habitats are regulated under federal regulations (such as the Clean Water Act [CWA] and Executive Order 11990 – Protection of Wetlands), state regulations (such as CEQA and the CDFW Lake and Streambed Alteration Program), or local ordinances or policies (such as city or county tree ordinances and general plan policies).

2.5. Regulatory Setting

The following regulatory discussion describes the major federal, state, and local laws that may be applicable to the project.

2.5.1. Federal Regulations

Federal Endangered Species Act

Provisions of the ESA of 1973 (16 USC 1532 et seq., as amended) protect federally Listed Threatened or Endangered species and their habitats from unlawful take. Listed species include those for which proposed and final rules have been published in the Federal Register. The ESA is administered by the Service or NMFS. In general, NMFS is responsible for the protection of ESA-Listed marine species and anadromous fish, whereas other listed species are under Service jurisdiction.

Section 9 of ESA prohibits the take of any fish or wildlife species listed under ESA as endangered or threatened. Take, as defined by ESA, is “to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct.” Harm is defined as “any act that kills or injures the fish or wildlife...including significant habitat modification or degradation that significantly impairs essential behavioral patterns of fish or wildlife.” In addition, Section 9 prohibits removing, digging up, and maliciously damaging or destroying federally listed plants on sites under federal jurisdiction. Section 9 does not prohibit take of federally listed plants on sites not under federal jurisdiction. If there is the potential for incidental take of a federally listed fish or wildlife species, take of listed species can be authorized through either the Section 7 consultation process for federal actions or a Section 10 incidental take permit process for non-federal actions. Federal agency actions include activities that are on federal land, conducted by a federal agency, funded by a federal agency, or authorized by a federal agency (including issuance of federal permits).

2.5.2. State Regulations

California Endangered Species Act

CESA was enacted in 1984. The California Code of Regulations (Title 14, §670.5) lists animal species considered Endangered or Threatened by the State. Section 2090 of CESA requires State agencies to comply with endangered species protection and recovery and to promote conservation of these species. Section 2080 of the Fish and Game Code prohibits "take" of any species that the commission determines to be an Endangered species or a Threatened species. “Take” is defined in Section 86 of the Fish and Game Code as "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill." A Section 2081 Incidental Take Permit from the CDFW may be obtained to authorize “take” of any State Listed species.

California Fish and Game Code

Birds: Section 3503 of the Fish and Game Code states that it is “unlawful to take, possess, or destroy the nest or eggs of any such bird except as otherwise provided by this code or any regulation adopted pursuant thereto.” Section 3503.5 prohibits the killing, possession, or destruction of any birds in the orders Falconiformes or Strigiformes (birds-of-prey). Section 3511 prohibits take or possession of fully protected birds. Section 3513 prohibits the take or possession of any migratory nongame birds designated under the federal Migratory Bird Treaty Act. Section 3800 prohibits take of nongame birds.

Fully Protected Species: The classification of fully protected was the state's initial effort in the 1960's to identify and provide additional protection to those animals that were rare or faced possible extinction. Lists were created for fish (§5515), mammals (§4700), amphibians and reptiles (§5050), and birds (§3511). Most fully protected species have also been listed as threatened or endangered species under the more recent endangered species laws and regulations. Fully protected species may not be taken or possessed at any time and no licenses or permits may be issued for their take except for collecting these species for necessary scientific research and relocation of the bird species for the protection of livestock.

Species of Special Concern: As noted above, the CDFW also maintains a “Special Animals List” that includes species of special concern. Although these species have no legal status, the CDFW recommends considering these species during analysis of project impacts to protect declining populations and avoid the need to list them as Endangered in the future.

California Native Plant Protection Act

The CNPPA of 1977 directed the CDFW to carry out the legislature’s intent to “preserve, protect and enhance rare and Endangered plants in the State.” The CNPPA prohibits importing rare and Endangered plants into California, taking rare and Endangered plants, and selling rare and Endangered plants. The CESA and CNPPA authorized the Fish and Game Commission to designate endangered, threatened, and rare species and to regulate the taking of these species (§2050-2098, Fish and Game Code). Plants listed as rare under the CNPPA are not protected under CESA; however, these plants may not be taken or possessed at any time and no licenses or permits may be issued for their take except for collecting these species for necessary scientific research.

2.5.3. Local Regulations

Habitat Conservation Plans or NCCP

There are no adopted Habitat Conservation Plans (HCPs) or Natural Community Conservation Plans (NCCPs) associated with the project site.

Santa Cruz County Code

Title 16, Chapter 16.32 of the Santa Cruz County Code provides for the protection of sensitive habitats within the unincorporated areas of the County. As defined in Chapter 16.32.040, an area is defined as a “sensitive habitat” if it meets one or more of the following criteria:

- 1) Areas of special biological significance as identified by the State Water Resources Control Board.
- 2) Areas which provide habitat for locally unique biotic species/communities including but not limited to: oak woodlands, coastal scrub, maritime chaparral, native rhododendrons and associated Elkgrass, indigenous Ponderosa Pine, indigenous Monterey Pine, mapped grassland in the Coastal Zone and sand parkland; and special forests including San Andreas Oak Woodlands, indigenous Ponderosa Pine, indigenous Monterey Pine and ancient forests.
- 3) Areas adjacent to essential habitats of rare, endangered or threatened species as defined in subsections (5) and (6) of this definition.
- 4) Areas which provide habitat for species of special concern as listed by the California Department of Fish and Game in the special animals list, natural diversity database.
- 5) Areas which provide habitat for rare or endangered species which meet the definition of Section 15380 of the California Environmental Quality Act guidelines.
- 6) Areas which provide habitat for rare, endangered or threatened species as designated by the State Fish and Game Commission, United States Fish and Wildlife Service or California Native Plant Society.
- 7) Nearshore reefs, rocky intertidal areas, seacaves, islets, offshore rocks, kelp beds, marine mammal hauling grounds, sandy beaches, shorebird roosting, resting and nesting areas, cliff nesting areas and marine, wildlife or educational/research reserves.
- 8) Dune plant habitats.

- 9) All lakes, wetlands, estuaries, lagoons, streams and rivers.
- 10) Riparian corridors.

Santa Cruz County General Plan and Local Coastal Program

Chapter 5.1.6 of the Santa Cruz County General Plan provides for the protection of sensitive habitats within and adjacent to development areas. Sensitive habitats are defined as detailed above in the Santa Cruz County Code. The policy states that “Sensitive habitats shall be protected against any significant disruption of habitat values; and any proposed development within or adjacent to these areas must maintain or enhance the functional capacity of the habitat.” The County of Santa Cruz has mapped several of the sensitive habitat areas within the General Plan area, including potential sensitive sandhill habitat, riparian habitats, and habitat for special-status plant and wildlife species. The project site is located within areas identified as potential sandhill habitat and habitat for special-status plant species.

3. RESULTS

3.1. Habitat Types

The project site is located only within the developed areas of Quail Hollow Road; however, the field review included an evaluation of the habitats located immediately adjacent (within five feet) to the project site. Three habitat types were identified within the area surveyed (**Figure 2**): Ruderal/Disturbed, Coast Live Oak Woodland, and Ponderosa Pine Forest. The following provides a description of each of these areas.

3.1.1. Ruderal/Disturbed

- *A Manual of California Vegetation* classification(s): None
- CDFW *California Natural Communities List*: N/A

Ruderal areas are those areas which have been developed or have been subject to historic and ongoing disturbance by human activities and are devoid of vegetation or dominated by non-native and/or invasive weed species. Ruderal areas within the survey area include roadside edges and residential landscaping (**Figure 2**). Ruderal vegetation within the survey area is dominated by non-native grasses, such as slender wild oat (*Avena barbata*), ripgut brome (*Bromus diandrus*), little rattlesnake grass (*Briza minor*), and rattlesnake grass (*B. maxima*), as well as other weedy species, including poison hemlock (*Conium maculatum*), black mustard (*Brassica nigra*), telegraph weed (*Heterotheca grandiflora*), long-beaked filaree (*Erodium botrys*), and smooth cat's ear (*Hypochaeris glabra*). Some areas also include large blue gum trees (*Eucalyptus globulus*) and coast live oak trees (*Quercus agrifolia*).

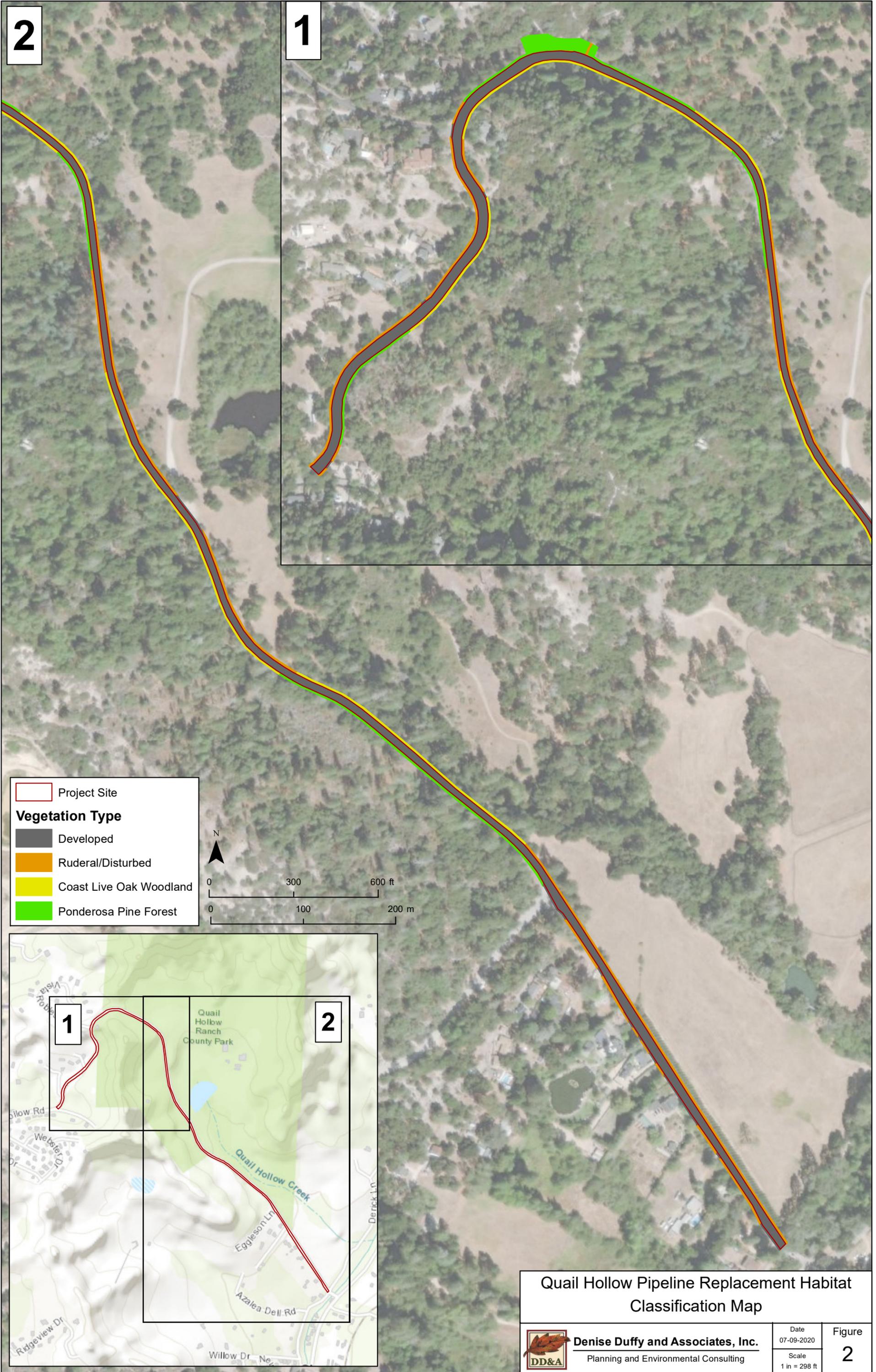
Ruderal areas provide only low-quality habitat for plants and wildlife. Common wildlife species that do well in urbanized and disturbed areas that may occur within the ruderal habitat include American crow (*Corvus brachyrhynchos*), raccoon (*Procyon lotor*), California ground squirrel (*Spermophilus beecheyi*), striped skunk (*Mephitis mephitis*), scrub jay (*Aphelocoma californica*), European starling (*Sturnus vulgaris*), western fence lizard (*Sceloporus occidentalis*), and rock dove (*Columba livia*).

3.1.2. Coast Live Oak Woodland

- *A Manual of California Vegetation* classification: Coast Live Oak (*Quercus agrifolia*) Woodland Alliance
- CDFW *California Natural Communities List*: Not Sensitive

Coast live oak woodland is present on the east and west sides of Quail Hollow Road within the Quail Hollow Ranch Community Park (**Figure 2**). The canopy ranges from dense to open and is dominated by coast live oak trees with scattered ponderosa pine, madrone (*Arbutus menziesii*), and coast redwood (*Sequoia sempervirens*). The understory is dominated by poison oak (*Toxicodendron diversilobum*), California blackberry (*Rubus ursinus*), toyon (*Heteromeles arbutifolia*), sticky monkey flower (*Diplacus aurantiacus*), California coffeeberry (*Frangula californica*), and non-native grasses.

Coast live oak woodland is important habitat to many wildlife species. Oaks provide nesting sites for many avian species and cover for a variety of mammals, including mourning dove (*Zenaida macroura*), American kestrel (*Falco sparverius*), California ground squirrel, and California pocket mouse (*Chaetodipus californicus*). Acorns provide an important food source for acorn woodpecker (*Melanerpes formicivorus*), scrub jay, and mule deer (*Odocoileus hemionus columbianus*). Other common wildlife species found in the



2

1

Project Site

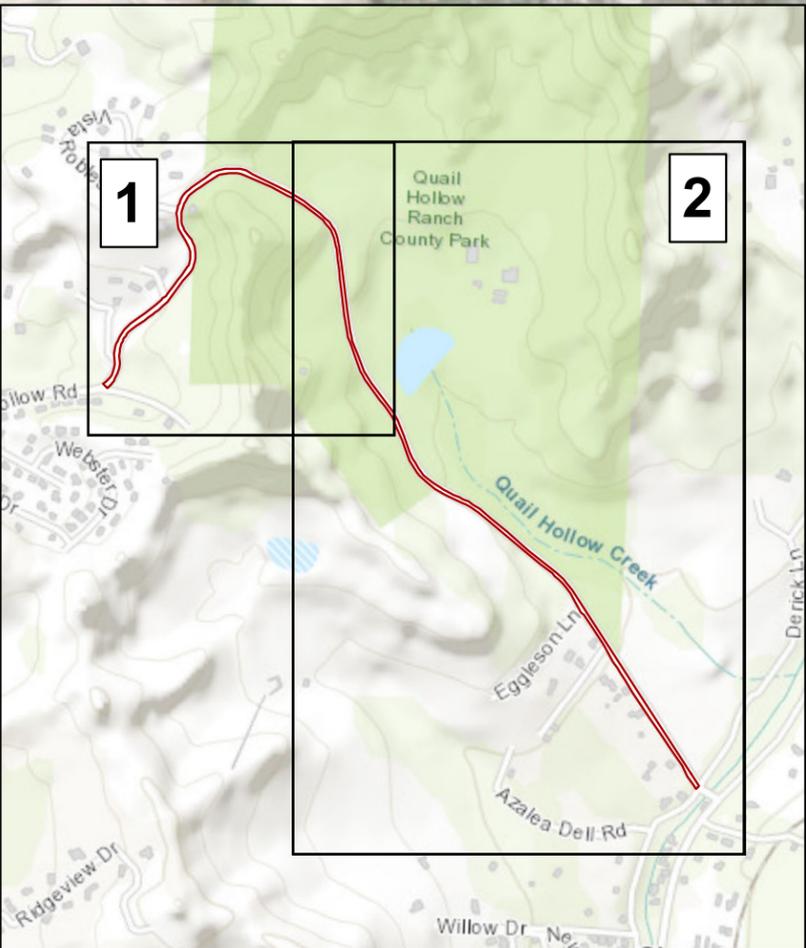
Vegetation Type

- Developed
- Ruderal/Disturbed
- Coast Live Oak Woodland
- Ponderosa Pine Forest

N

0 300 600 ft

0 100 200 m



Quail Hollow Pipeline Replacement Habitat Classification Map

 Denise Duffy and Associates, Inc. Planning and Environmental Consulting	Date 07-09-2020	Figure 2
	Scale 1 in = 298 ft	

coast live oak woodland are raccoon, Nuttall's woodpecker (*Picoides nuttallii*), northern flicker (*Colaptes auratus*), bobcat (*Lynx rufus*), and coyote (*Canis latrans*). Generally, red-tailed hawks (*Buteo jamaicensis*) and great-horned owls (*Bubo virginianus*) nest and roost in the coast live oaks.

3.1.3. Ponderosa Pine Forest

- *A Manual of California Vegetation classification*: Ponderosa Pine (*Pinus ponderosa*) Forest Alliance
- *CDFW California Natural Communities List*: Sensitive

Isolated stands of ponderosa pine (*Pinus ponderosa*) also occur on sandhills in the Santa Cruz Mountains. These stands are dissimilar from other stands of ponderosa pine forest found at higher elevations in the Coast, Sierra Nevada, and Cascade Ranges, which have only minimal overlap in species composition (McGraw, 2004). Within the survey area, this community occurs on the east and west sides of Quail Hollow Road within the Quail Hollow Ranch Community Park (**Figure 2**). This area is dominated by a ponderosa pine and some coast live oak within the tree canopy, with an understory is dominated by poison oak, chamise (*Adenostoma fasciculata*), and Bonny doon manzanita (*Arctostaphylos silvicola*). A complete list of plants observed during the site visit is provided in **Appendix C**.

Ponderosa pine forest provides habitat to a number of wildlife species, including mule deer, coyote, deer mouse (*Peromyscus maniculatus*), pinyon mouse (*P. truei*), California vole (*Microtus californicus*), brush rabbit (*Sylvilagus bachmani*), gopher snake (*Pituophis catenifer*), red tail hawk (*Buteo jamaicensis*), American kestrel, California quail (*Callipepla californica*), northern flicker, acorn woodpecker, scrub jay, chestnut-backed chickadee (*Poecile rufescens*), white-breasted nuthatch (*Sitta carolinensis*), California towhee (*Melospiza crissalis*), and dark-eyed junco (*Junco hyemalis*).

3.2. Sensitive Habitats

3.2.1. Ponderosa Pine Forest

Ponderosa pine forest is listed as a sensitive habitat on the CDFW's *California Natural Communities List* (**Figure 2**). This habitats is also a locally important area, identified as a sandhill community that is considered sensitive habitat by the County of Santa Cruz, as described in the County Code and General Plan. A description of this habitat type is presented above.

3.2.2. Suitable Habitat for Mount Hermon June Beetle

DD&A's field investigation identified suitable habitat for Mount Hermon June Beetle (MHJB) immediately adjacent to the project site. The ponderosa pine forest habitat occurs on Zayante soils, which represent suitable habitat for MHJB (**Figure 2**). Descriptions of this habitat type is presented above. No habitat for MHJB is present within the areas that will be impacted by the project.

3.3. Special-Status Species

Published occurrence data within the project site and surrounding USGS quadrangles were evaluated to compile a table of special-status species known to occur in the vicinity of the evaluation area (see *Methods* and **Appendix B**). Each of these species was evaluated for their likelihood to occur within and immediately adjacent to the site. The special-status species that are known to occur or have been determined to have a moderate or high potential to occur within or immediately adjacent the project site are discussed below. All other species are assumed unlikely to occur or have a low potential to occur based on the species-specific reasons presented in **Appendix B**, are therefore unlikely to be impacted by the project, and are not discussed further.

3.3.1. Special-Status Wildlife

Pallid Bat

The pallid bat (*Antrozous pallidus*) is a CDFW species of special concern, and is a year round resident in California. This species of bat occurs in a wide variety of habitats including grasslands, shrublands, arid desert areas, oak savanna, coastal forested areas, and coniferous forests of the mountain regions of California and forests ranging from sea level up through mixed conifer forests. Pallid bats are most common in open, dry habitats with rocky areas for roosting. Day roosts of this species include caves, crevices, mines, and occasionally hollow trees and buildings. This species seems to prefer rocky outcrops, cliffs, and crevices with access to open habitats for foraging. Pallid bats make use of similar structures for night roosting and will use more open sites such as eaves, awnings, and open areas under bridges for feeding roosts. Pallid bats feed on large insects (20 to 70 mm in length). Foraging takes place over open ground, at heights generally not greater than 7.5 feet, although prey is most often caught on the ground. Jerusalem crickets, scorpions and beetles make up most of the diet of pallid bats in central California. Copulation occurs in the fall, October through December. Females store the sperm and ovulation occurs in the following spring. Parturition timing is determined by local climate and embryonic development usually takes about 9 weeks with birth occurring in May or June. Twins are the norm in northern California but in other areas they are known to have triplets. Maternity colonies range from 20 to 200 individual adult bats. Males roost in much smaller groupings (Hermanson and O'Shea, 1983).

The CNDDDB reports four occurrences of pallid bat within the eight quadrangles reviewed, the nearest of which is located approximately 3.7 miles from the survey area. Trees adjacent to the project site may provide suitable roosting habitat for this species.

Townsend's Big-eared Bat

The Townsend's big-eared bat (*Corynorhinus townsendii*) is a CDFW species of special concern. The Townsend's big-eared bat is a year-round resident in California occurring from low desert to mid-elevation montane habitats. It is found primarily in rural settings from inland deserts to coastal redwoods, oak woodland of the inner Coast Ranges and Sierra foothills, and low to mid-elevation mixed coniferous-deciduous forests. Townsend's big-eared bats typically roost during the day in caves and mines but can roost in buildings that offer suitable conditions. Night roosts are in more open settings and include bridges, rock crevices, and trees. This species hibernates in mixed sex aggregations of a few to several hundred individuals. Hibernation is more prolonged in colder areas. This species arouses periodically and moves to alternative roosts and actively forages and drinks throughout the winter. A single young is born per year between May and July.

The CNDDDB reports seven occurrences of Townsend's big-eared bat within the eight quadrangles reviewed, the nearest of which is located approximately 4.2 miles from the survey area. Trees adjacent to the project site may provide suitable night roosting habitat for this species; however, day and maternity roost habitat is not present within or adjacent to the project site.

Hoary Bat

The hoary bat (*Lasiurus cinereus*) is included on CDFW's CNDDDB "Special Animals" list. This species has the broadest range of any North American bat, occurring from Northern Canada to South America, and may be found at any location in California. This species winters in California and Mexico and often migrates towards summer quarters in the north and east during the spring (Cryan, 2003). Spring migration is typically February to May, while fall migration typically occurs September through November. Hoary bats are a solitary species except during migration when larger groups are often formed or when mothers are rearing their young (Tuttle, 1995); however, unlike other bat species, hoary bats do not form maternity colonies. Hoary bats mate in fall or winter and sperm is stored over winter. Fertilization occurs in early spring and gestation is 80 to 90 days. One to four young are born in late May to late June. As such, parturition occurs at summer quarters and there is little evidence that females give birth and raise young in California (Cryan, 2003; Findley and Jones, 1964). Unlike many other bat species that often roost in buildings, hoary bats are seldom found in urban settings (Tuttle, 1995). The hoary bat typically roosts 10-15 feet above ground in the branches/foilage of medium to large deciduous and coniferous trees. Individuals wintering in cold climates hibernate, but may be active on warm winter days. This species is nocturnal, emerging late in the evening with peak activity varying with season and location, but usually three to five hours after sunset. The hoary bat hunts above canopy level, in clearings, and over water. This species has also been known to set up foraging territories at bright lights where insects congregate.

The CNDDDB reports three occurrences of hoary bat within the eight quadrangles reviewed, the nearest of which is approximately 0.4 mile from the survey area. Suitable foraging and day and night roost habitat for this species is present within the evaluation area; however, this species is not known to breed in California.

Santa Cruz Kangaroo Rat

The Santa Cruz kangaroo rat (*Dipodomys venustus venustus*) is included on the CDFW's CNDDDB "Special Animals" list. Santa Cruz kangaroo rats occur in the cool, maritime mountains of west-central California. Historical records range from Mount Hamilton to Corralitos, with most specimens collected around Mount Hermon, Felton, and Bonny Doon, in Santa Cruz County. Populations of Santa Cruz kangaroo rat in the Santa Cruz Mountains are disjunct from populations in the Diablo and Gabilan ranges (Williams et al. 1993). The species occurs in Mount Hermon, but in remnant patches of suitable habitat surrounded by development. Burrow surveys at Bonny Doon suggest the species still occurs there, although limited live-trapping efforts yielded no captures. This species is active year-round, and with a diet dominated by seeds. Burrows are simple often located in open, abandoned agricultural land. Santa Cruz kangaroo rat occurs in chaparral habitat in the low foothills of the Santa Cruz Mountains, on substrates of sands, loams, and sandy loams; often described as sandy ponderosa pine parkland, with a chaparral understory. The species' distribution conforms closely to the distribution of open chaparral habitat occurring on sandy soils (Zayante or Santa Margarita soils) (Hawbecker 1940, Rudd 1948). The largest undisturbed area of occupied habitat in Santa Cruz County is the S. H. Cowell Foundation property adjacent to Henry Cowell State Park; the CDFW Reserve in Bonny Doon, Wilder Ranch State Park, and Henry Cowell State Park also contains important patches of habitat, that may or may not be occupied by this species.

The CNDDDB reports 15 occurrences of Santa Cruz kangaroo rat within the eight quadrangles reviewed, including an occurrence that overlaps with a portion of the survey area. This occurrence notes that a few individuals were collected in 1940 and 1961; however, no individuals were observed during surveys in 1995 and 2018. Suitable habitat for this species is present adjacent to the project site within the ponderosa pine forest habitat.

San Francisco Dusky-footed Woodrat

The San Francisco dusky-footed woodrat (SFDW; *Neotoma fuscipes annectens*) is listed on the CDFW's list of species of special concern. This species is found in heavy chaparral, hardwood, conifer, and mixed forests, typically in densely wooded areas with heavy undergrowth riparian woodlands. This species builds its nest with debris on the ground or in a tree; nests tend to be in situations that are shaded, relatively cool, and in good cover, and they may be used by many generations over several years (Carraway, 1991).

The CNDDDB reports five occurrences SFDW within the eight quadrangles reviewed, the nearest of which is located approximately 5.9 miles from the survey area. Suitable habitat for this species is present adjacent to the project site within the coast live oak woodland and ponderosa pine forest habitats, and one woodrat nests was observed during the site survey.

Mountain Lion (Southern California/Central Coast ESU)

The southern California/central coast evolutionarily significant unit (ESU) of the mountain lion (*Puma concolor*) is a candidate for listing under CESA. The ESU is comprised of six mountain lion subpopulations: Santa Ana Mountains, Eastern Peninsular Ranges, San Gabriel/San Bernardino Mountains, Central Coast South (Santa Monica Mountains), Central Coast North (Santa Cruz Mountains), and Central Coast Central. Most of these populations appear to be struggling with low genetic diversity and effective population sizes, which puts them at increased risk of extinction (Center for Biological Diversity [CBD] and the Mountain Lion Foundation [MLF], 2019). Mountain lions require large areas of relatively undisturbed habitats with adequate connectivity to allow for dispersal and gene flow. Mountain lions have large home ranges that include a variety of vegetation types, including pine forests, riparian and oak woodlands, chaparral, and grasslands; however, desert habitats are also used. Mountain lions are opportunistic predators and have been documented to eat a wide variety of prey; however, large ungulates, such as deer, are preferred (CBD and MLF, 2019). This species will use moderately disturbed areas as they travel and hunt; however, they generally avoid areas with human disturbance. Mountain lions are polygamous breeders and may reproduce at any time of the year, although kitten births are most common between April and September. Females keep their kittens in dens located in rocky terrain or in dense vegetation, and may move to several different dens until the kittens are weaned at about two to three months old (CBD and MLF, 2019).

The CNDDDB does not report any occurrences of mountain lion within the eight quadrangles evaluated; however, this species is known to occur within the Santa Cruz Mountains. Portions of the project site border undeveloped areas that are connected with largely undeveloped areas of the Santa Cruz mountains. As such, suitable habitat for this species is located adjacent to the project site.

California Red-Legged Frog

The California red-legged frog (CRLF, *Rana draytonii*) was listed as a federally Threatened species on June 24, 1996 (61 FR 25813-25833) and is also a CDFW species of special concern. Critical Habitat was designated for CRLF on April 13, 2006 (71 FR 19244-19292) and went into effect on May 15, 2006.

The CRLF is the largest native frog in California (44-131 mm snout-vent length) and was historically widely distributed in the central and southern portions of the state (Jennings & Hayes, 1994). Adults generally inhabit aquatic habitats with riparian vegetation, overhanging banks, or plunge pools for cover, especially during the breeding season (Jennings and Hayes, 1988). They may take refuge in small mammal burrows, leaf litter, or other moist areas during periods of inactivity or to avoid desiccation (Rathbun, et al., 1993; Jennings and Hayes, 1994). Radiotelemetry data indicates that adults engage in straight-line breeding season movements irrespective of riparian corridors or topography and they may move up to two miles between non-breeding and breeding sites (Bulger et. al., 2003). During the non-breeding season, a wider variety of aquatic habitats are used including small pools in coastal streams, springs, water traps, and other ephemeral water bodies (USFWS, 1996). CRLF may also move up to 300 feet from aquatic habitats into surrounding uplands, especially following rains, where individuals may spend days or weeks (Bulger et al., 2003).

This species requires still or slow-moving water during the breeding season where it can deposit large egg masses, which are most often attached to submergent or emergent vegetation. Breeding typically occurs between December and April depending on annual environmental conditions and locality. Eggs require 6 to 12 days to hatch and metamorphosis generally occurs after 3.5 to 7 months, although larvae are also capable of over-wintering. Following metamorphosis, generally between July and September, juveniles are 25-35 mm in size. Juvenile CRLF appear to have different habitat needs than adults. Jennings and Hayes (1988) recorded juvenile frogs mostly from sites with shallow water and limited shoreline or emergent vegetation. Additionally, it was important that there be small one-meter breaks in the vegetation or clearings in the dense riparian cover to allow juveniles to sun themselves and forage, but to also have close escape cover from predators. Jennings and Hayes also noted that tadpoles have different habitat needs and that in addition to vegetation cover, tadpoles use mud. It is speculated that CRLF larvae are algae grazers, however, foraging larval ecology remains unknown (Jennings, et. al., 1993).

The CNDDDB reports 58 occurrences of CRLF within the quadrangles evaluated, including an occurrence that overlaps with a portion of the project site. Although the likelihood of this species occurring is considered low (Appendix B) a discussion of this species has been included in the main body of this report due to their federal listing and local interest in this species. No suitable habitat exists within the project site; however, there is an aquatic resource located approximately 180 feet from the project site within the adjacent Quail Hollow Ranch Community Park. This species has been reported to occur within the park; however, it is unknown if this pond is a breeding resource (Santa Cruz County Parks Department website). The closest CNDDDB occurrence is approximately 2.5 miles from the project site. No habitat for CRLF is present within the areas that will be impacted by the project.

Mount Hermon June Beetle

The MHJB was listed as federally Endangered species under the ESA on February 24, 1997 (62 FR 3616-3628). This species is restricted to the Zayante sandhills habitat of the Ben Lomond-Mount Harmon-Scotts Valley area. MHJB feeds as a fossorial larva on plant roots and associated mycorrhizae, and then emerges as an adult in late spring and early summer to mate. MHJB occurs in areas with Zayante soils that feature a variety of vegetation. While not always present, silver-leaf manzanita is often an indicator of suitable habitat. Other vegetation types that may provide suitable habitat include but are not limited to sand parkland, ponderosa pine forest, as well as areas that have been landscaped and feature ornamental vegetation.

The CNDDDB reports 11 occurrences of MHJB within the eight quadrangles evaluated, including an occurrence that overlaps with a portion of the project site. Suitable habitat for MHJB is present within the

ponderosa pine forest habitat present immediately adjacent to the project site (**Figure 2**). No habitat for MHJB is present within the areas that will be impacted by the project.

Raptors and Other Protected Avian Species

Raptors, their nests, and other nesting birds are protected under California Fish and Game Code. While the life histories of these species vary, overlapping nesting (approximately February through August) and foraging similarities allow for their concurrent discussion. Most raptors are breeding residents throughout most of the wooded portions of the state. Stands of live oak, riparian deciduous, or other forest habitats, as well as individual or isolated trees, are used for nesting. Breeding occurs February through August, with peak activity May through July. Prey for these species includes small birds, small mammals, and some reptiles and amphibians. Many raptor species hunt in open woodland, grasslands and habitat edges.

Various species of raptors, such as turkey vulture (*Cathartes aura*), red-tailed hawk, red-shouldered hawk (*Buteo lineatus*), American kestrel, and great horned owl (*Bubo virginianus*), and several special-status avian species, such as Cooper's hawk (*Accipiter cooperii*), white-tailed kite (*Elanus leucurus*) and purple martin (*Progne subis*) have a potential to nest within the trees present directly adjacent to the project site on either side of Quail Hollow Road.

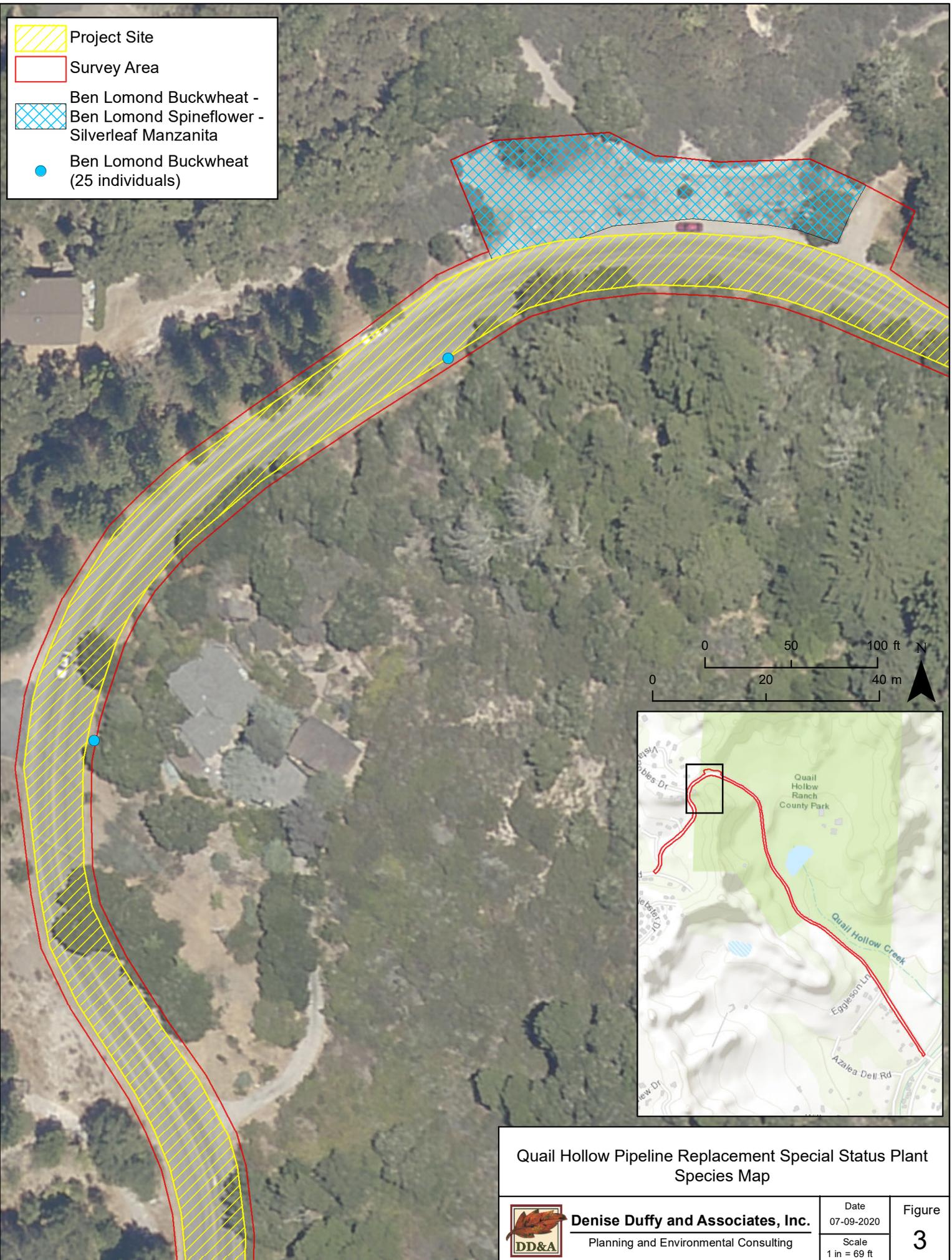
3.3.2. Special-Status Plant Species

Silverleaf Manzanita

Silverleaf manzanita is endemic to the Santa Cruz sandhills is a CNPS CRPR 1B species. This evergreen shrub, in the Ericaceae family, is associated with chaparral, closed-cone coniferous forests, and lower montane coniferous forests on inland marine Zayante soils at a range of 120-600 meters in elevation. The typical blooming period is from February through March.

A population of silverleaf manzanita was observed adjacent to the project site surveys, within the ponderosa pine forest habitat, during focused botanical (**Figure 3**).

-  Project Site
-  Survey Area
-  Ben Lomond Buckwheat -
Ben Lomond Spineflower -
Silverleaf Manzanita
-  Ben Lomond Buckwheat
(25 individuals)



Quail Hollow Pipeline Replacement Special Status Plant Species Map



Denise Duffy and Associates, Inc.
Planning and Environmental Consulting

Date
07-09-2020
Scale
1 in = 69 ft

Figure
3

Ben Lomond Spineflower

Ben Lomond spineflower (*Chorizanthe pungens* var. *hartwegiana*) is a federally endangered, CNPS 1B species. This annual herb, in the Polygonaceae family, typically blooms from April through July. Ben Lomond spineflower is associated with lower montane coniferous forest (maritime ponderosa pine sandhills) at elevations of 90-610 meters.

A population of Ben Lomond spineflower was observed adjacent to the project site, within the ponderosa pine forest habitat, during focused botanical surveys (**Figure 3**).

Ben Lomond Buckwheat

Ben Lomond buckwheat (*Eriogonum nudum* var. *decurrens*) is a CNPS CRPR 1B species. This perennial herb, in the Polygonaceae family, is associated with chaparral, cismontane woodland, and lower montane coniferous forest (maritime ponderosa pine sandhills) on sandy soils, at elevations of 50-800 meters. The typical blooming period is from July through October.

A population of Ben Lomond buckwheat was observed adjacent to the project site, within the ponderosa pine forest habitat, during focused botanical surveys. DD&A also recorded two points (totaling 25 individuals) of this species on the opposite side of Quail Hollow Road within the coast live oak woodland habitat (**Figure 3**).

4. IMPACTS AND MITIGATION

4.1. Thresholds of Significance

For the purposes of this analysis, an impact is considered to be significant and require mitigation if it would result in any of the following:

- a. Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by CDFW or USFWS;
- b. Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by 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 nursery sites;
- e. Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance; or
- 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.

4.2. Approach to Analysis

The following impact analysis addresses direct and indirect impacts that may result from the construction and operation of the proposed project. Direct impacts are those effects of a project that occur at the same time and place of project implementation, such as removal of habitat from ground disturbance. Indirect impacts are those effects of a project that occur either later in time or at a distance from the project location but are reasonably foreseeable, such as loss of aquatic species from upstream effects on water quality. Direct and indirect impacts can also vary in duration and result in temporary, short-term, and long-term effects on biological resources. A temporary effect would occur only during the activity. A short-term effect would last from the time an activity ceases to some intermediate period of approximately one to five years (i.e., repopulation of habitat following restoration). A long-term or permanent effect would last longer than five years after an activity ceases. Long-term effects may include the ongoing maintenance and operation of a project, or may result in a permanent change in the condition of a resource, in which case it could be considered a permanent impact.

4.3. Areas of No Impact

Criterion “c” is not evaluated for impacts to State or Federally protected wetlands as there are none present within or adjacent the project site, and thus, would not be impacted by the proposed project.

Criterion “f” is not evaluated as there are no adopted HCPs, NCCPs, or other approved local, regional, or state habitat conservation plans associated with the project site

4.4. Impacts and Mitigation Measures

- a. *Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by CDFW or USFWS.*

The proposed project site is completely developed and does not contain suitable habitat for any special-status species. However, suitable habitat for several special-status wildlife species is present immediately adjacent to the project site. The special-status wildlife species that are known or have a moderate to high potential to occur adjacent to the project include pallid bat, Townsend's big-eared bat, hoary bat, SFDW, mountain lion, MHJB, CRLF, and nesting raptors and other protected avian species (including, but not limited to, Cooper's hawk, white-tailed kite, and purple martin). Additionally, three special-status plant species were identified immediately adjacent to the project site: silverleaf manzanita, Ben Lomond spineflower, and Ben Lomond buckwheat.

Ben Lomond spineflower, Ben Lomond buckwheat, and silverleaf manzanita were observed immediately adjacent to the project site. Additionally, suitable habitat for the MHJB and Santa Cruz kangaroo rat is present immediately adjacent to the project site. Project implementation could result in direct impacts to individuals and loss of habitat if construction activities occur outside of the Quail Hollow roadway. This would be a potentially significant impact under CEQA. Implementation of **Mitigation Measures BIO-1** and **BIO-2**, which avoids construction activities outside of the roadway and implements construction crew education, would reduce potentially significant impacts to Ben Lomond spineflower, Ben Lomond buckwheat, silverleaf manzanita, MHJB, and Santa Cruz kangaroo rat to a less-than-significant level.

Suitable habitat for the SFDW is present immediately adjacent to the project site and project implementation could result in direct impacts to individuals and loss of habitat if construction activities occur outside of the Quail Hollow roadway. Additionally, construction noise, dust, and vibration adjacent nests could cause indirect impacts to SFDW such as nest abandonment and death of young. This would be a potentially significant impact under CEQA. Implementation of **Mitigation Measures BIO-1** and **BIO-2** and species-specific **Mitigation Measure BIO-3** would reduce potentially significant impacts to SFDW to a less-than-significant level through a combination of pre-construction surveys; protective measures during construction if woodrat nests are found; avoiding work outside of the roadway; and construction crew education.

The project site also occurs in the vicinity of suitable breeding habitat for CRLF; however, the species would only be expected to occur during dispersal. This species is highly aquatic and requires permanent or nearly permanent pools for larval development. This species typically requires rain events for dispersal and have been found at significant distances from breeding sites during rain events. CRLF have a low potential to occur on the project site during dispersal. If frogs were to be injured or killed by construction activity the impact would be significant under CEQA. Potential impacts to this species can be reduced to less than significant level with implementation of **Mitigation Measures BIO-1** and **BIO-2** and species-specific **Mitigation Measure BIO-4**.

The trees located immediately adjacent to the project site may provide roosting habitat for special-status bat species and nesting habitat for raptors and other protected avian species. Project implementation could result in direct impacts to individuals and loss of habitat if construction activities occur outside of the Quail

Hollow roadway. Additionally, construction noise, dust, and vibration adjacent to these trees could cause direct and indirect impacts to special-status bat and avian species, including roost/nest abandonment and death of young. This would be a potentially significant impact under CEQA. Additionally, construction activities that adversely affect the nesting success of raptors or result in mortality of individual birds constitute a violation of California law. Implementation of **Mitigation Measures BIO-1 and BIO-2** and species-specific **Mitigation Measures BIO-5 and BIO-6** would reduce potentially significant impacts to special-status bats, raptors, and other protected avian species to a less-than-significant level through a combination of pre-construction surveys; protective measures during construction if active roosting sites or nests if found; avoiding work outside of the roadway; and construction crew education.

Suitable habitat for mountain lions is present immediately adjacent to the project site. However, given the large home range and mobility of this species, as well as its nocturnal tendencies, it is unlikely that the project would impact this species. Therefore, the project will not impact mountain lions and no mitigation is required.

- BIO-1. In order to avoid impacts to sensitive ponderosa pine forest and special-status species (i.e. MHJB, Santa Cruz kangaroo rat, Ben Lomond spineflower, Ben Lomond buckwheat, and silverleaf manzanita) present or potentially present adjacent to the project site, no work, including staging and materials storage, shall occur outside of the pavement of Quail Hollow Road.
- BIO-2. SLVWD shall ensure that a qualified biologist conducts an education program for all persons employed on the project prior to performing construction activities. Instruction shall consist of a presentation by the qualified biologist that includes a discussion of the biology and general behavior of any special-status species which may be in the area, how they may be encountered within the work area, and procedures to follow when they are encountered. The status of ESA- and CESA-listed species including legal protection, penalties for violations and project-specific protective management measures shall be discussed. The discussion shall also include identification of the sensitive habitats present adjacent to the project site and the measures taken to avoid impacts to these habitats. The SLVWD shall prepare and distribute wallet-sized cards or a factsheet handout containing this information for workers to carry on-site. Upon completion of the program, employees shall sign an affidavit stating they attended the program and understand all protection measures.
- BIO-3. A qualified biologist will conduct preconstruction surveys immediately adjacent to the project site to determine if SFDW are present prior to the start of construction. The biologist will conduct these surveys no more than two weeks prior to the beginning of construction. If SFDW nests are found, nests shall be mapped, fenced or flagged for avoidance, and documented in pre-construction report.
- BIO-4. The following procedures shall be implemented to ensure that impacts to listed and non-listed amphibian species are less than significant.

- a) If feasible, initial ground disturbing activities should be conducted between May 1 and October 31 during dry weather conditions to minimize the potential for encountering listed and non-listed amphibian species. Work should be restricted to daylight hours.
- b) If construction must occur between November 1 and April 30, the qualified biologist should conduct a pre-activity clearance sweep prior to start of project activities within 48 hours after any rain events of 0.1 inch or greater or if wet conditions are present on site. The clearance survey would allow any frog, if found on-site, to leave of its own volition before any construction activities would begin. No relocation of frogs would occur without written authorization of the USFWS, or by any individuals not specifically authorized by the USFWS for handling of CRLF.
- c) SLVWD or its contractor would cover dirt or sand piles left overnight with tarps or plastic to prevent CRLF from sheltering in the material. All holes and trenches would be inspected each morning by a biological monitor.
- d) All trash should be removed from the site daily and disposed of properly to avoid attracting potential predators to the site.
- e) Pets should be permitted on-site during project activities.
- f) All vehicles should be in good working condition and free of leaks. All leaks should be contained and cleaned up immediately to reduce the potential of soil/vegetation contamination.
- g) All refueling, maintenance, and staging of equipment and vehicles should occur at least 100 feet from riparian habitat or water bodies and in a location from where a spill would not drain directly toward aquatic habitat (e.g., on a slope that drains away from the water).
- h) A County-approved biologist shall be present on site during initial ground disturbance. If any life stage of CRLF is found, work shall cease within 100 feet of the CRLF and the USFWS shall be contacted immediately to determine the appropriate course of action.

BIO-5 If equipment staging, site preparation, grading, excavation or other project-related construction work is scheduled during the nesting season of protected raptors and other avian species, a qualified biologist shall conduct two surveys for active nests; one within 14 days prior to the beginning of project construction and one within 48 hours prior to construction. Surveys shall be conducted in all suitable habitat located adjacent to the work site and any staging, storage and stockpile areas. Nesting seasons are typically defined as March 15 to August 30 for small bird species such as passerines and February 15 to September 15 for other raptors. The minimum survey radius surrounding the work area shall be 300 feet. If an active nest is found during surveys, the qualified biologist shall designate a protected area (while occupied) during project construction by demarking a “No Work Zone” around each nest site. The qualified biologist shall monitor the behavior of the birds (adults and young, when present) at the nest site to ensure that they are not disturbed by project construction work. Nest monitoring shall continue during construction until the young have fully fledged (have completely left the nest site and are no longer being fed by the parents), as determined by the qualified biologist.

BIO-6. To avoid and reduce impacts to special-status bat species, if the project construction is planned during the reproductive season (May 1 through September 15) SLVWD will retain a qualified bat specialist or wildlife biologist to conduct site surveys to characterize bat utilization adjacent to the project site and potential species present (techniques utilized to be determined by the biologist) prior to construction. Based on the results of these initial surveys, one or more of the following will occur:

- If it is determined that bats are not present adjacent to the site, no additional mitigation is required.
- If it is determined that bats are utilizing the trees adjacent to the site and may be impacted by the proposed project, pre-construction surveys will be conducted within 50 feet of construction limits no more than 30 days prior to the start of construction. If, according to the bat specialist, no bats or bat signs are observed in the course of the pre-construction surveys, construction may proceed. If bats and/or bat signs are observed during the pre-construction surveys, the biologist will determine if disturbance will jeopardize the roost (i.e., maternity, foraging, day, or night).
- If a single bat and/or only adult bats are roosting, removal of trees, buildings, or other suitable habitat may proceed after the bats have been safely excluded from the roost. Exclusion techniques shall be determined by the biologist and would depend on the roost type.
- If an active maternity roost is detected, avoidance is preferred. Work in the vicinity of the roost (buffer to be determined by biologist) shall be postponed until the biologist monitoring the roost determines that the young have fledged and are no longer dependent on the roost. The monitor shall ensure that all bats have left the area of disturbance prior to initiation of pruning and/or removal of trees that would disturb the roost.

b. Substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by CDFW or USFWS.

No sensitive habitats are present within the project site. However, ponderosa pine forest habitat, occurring immediately adjacent to the project site, is listed as sensitive on the CDFW's *California Natural Communities List*. This area also provides habitat for several special-status plant and wildlife species, including habitat for the MHJB. This habitat may be impacted if work occurs outside of the Quail Hollow roadway. This would be a potentially significant impact under CEQA. Implementation of **Mitigation Measures BIO-1** and **BIO-2**, which avoids construction activities outside of the roadway and implements construction crew education, would reduce potentially significant impacts to ponderosa pine forest habitat to a less-than-significant level.

- 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 nursery sites.*

Project activities may temporarily impact wildlife movement. Noise disturbance associated with construction activities could cause species that commonly use habitats surrounding the project site to, at least temporarily, avoid these habitats during construction. These effects would be temporary, and once construction activities are complete, wildlife movement conditions return to pre-existing conditions. The project does not include any aboveground components that would impact wildlife movement following construction. This is a less than significant impact and no mitigation is necessary.

- e. Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.*

The Project would be required to comply with all applicable guidelines in the Santa Cruz County Code and General Plan. Santa Cruz County Code and Chapter 5.1.6 of the Santa Cruz County General Plan provides for the protection of sensitive habitats within and adjacent to development areas, including the ponderosa pine forests habitat that is present adjacent to the project site. The policy states that “Sensitive habitats shall be protected against any significant disruption of habitat values; and any proposed development within or adjacent to these areas must maintain or enhance the functional capacity of the habitat.” As identified above under **Impact BIO-2**, these habitats may be impacted if work occur outside of the Quail Hollow roadway. However, implementation of **Mitigation Measures BIO-1** and **BIO-2**, which avoids construction activities outside of the roadway and implements construction crew education, would ensure that the Project will not conflict with any local policies or ordinances protecting biological resources. This is a less-than-significant impact.

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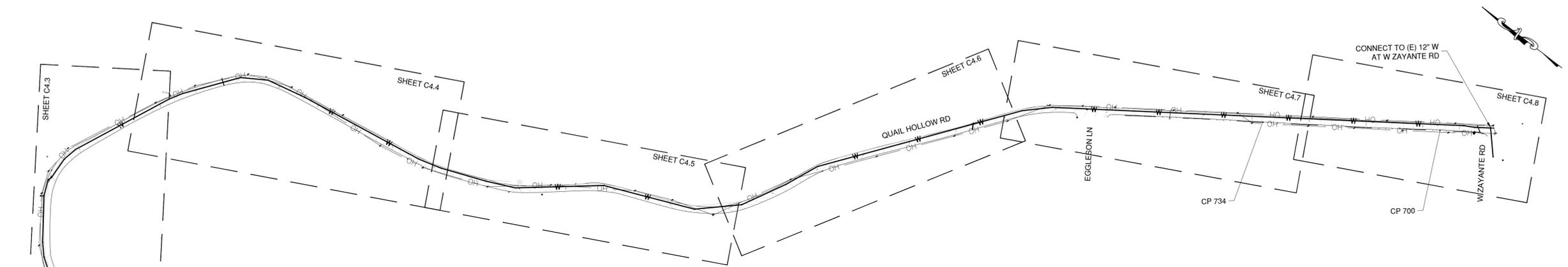
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APPENDIX A

PROJECT PLANS



SURVEY CONTROL POINTS			
CP NUMBER	NORTHING	EASTING	ELEVATION
13	3469.85	4231.59	477.99
500	3781.74	4267.95	500.00
501	4123.84	4650.15	542.71
539	4334.29	4760.99	571.71
541	4683.92	4615.06	610.25
578	4956.74	4969.64	615.43
500	5000.00	5000.00	629.47
1012	4772.80	5454.04	586.89
968	4534.15	5723.80	564.71
958	3934.72	5800.13	526.04
935	3563.44	5930.09	503.36
898	3384.52	6103.56	488.10
887	2913.72	6321.74	463.46
855	2687.33	6694.81	438.08
805	2173.04	7390.14	392.07
734	1502.84	7823.49	347.88
700	962.63	8197.26	315.01
2	735.29	8400.60	303.90

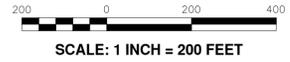
STATION ANGLE POINTS		
STATION	NORTHING	EASTING
1+00.00	3445.96	4199.89
1+24.22	3463.85	4216.22
1+62.87	3497.28	4235.61
2+16.86	3548.27	4253.38
2+39.77	3570.98	4256.37
3+32.27	3663.46	4256.51
3+92.40	3722.83	4266.06
4+48.30	2773.78	4289.08
5+10.14	3823.54	4325.80
8+56.84	4048.63	4589.49
11+02.79	4249.90	4730.85
11+50.57	4294.23	4748.68
11+95.32	4338.44	4755.63
12+37.70	4380.80	4754.23
12+66.06	4408.33	4747.44
14+01.75	4520.07	4670.46
14+65.93	4579.32	4645.81
15+10.86	4623.82	4639.58
16+25.79	4735.28	4664.40
16+86.11	4785.33	4698.09
17+41.36	4822.52	4738.94
19+12.50	4922.31	4877.97
19+73.49	4945.71	4934.30
19+87.17	4940.69	4947.03
20+70.87	4944.22	5030.66
21+26.15	4932.37	5084.65
25+18.67	4769.75	5441.89
25+73.90	4741.63	5489.43
27+94.14	4607.96	5664.47
28+96.66	4520.94	5718.66
30+44.67	4376.37	5750.40
35+26.72	3900.12	5825.01
36+14.43	3815.56	5848.25
37+84.95	3656.54	5909.82
38+97.56	3553.99	5956.35
42+25.62	3298.40	6162.01
45+71.81	2979.04	6295.67
47+46.61	2850.45	6414.07
49+25.81	2766.04	6572.15
50+60.29	2712.94	6695.69
58+45.76	2234.82	7318.89
59+55.85	2155.16	7394.87
74+79.46	903.43	8263.53
75+19.02	868.59	8282.27
75+92.60	808.12	8324.18

HORIZONTAL CONTROL:
AZIMUTH BEARING BETWEEN CONTROL POINTS CP 700 AND CP 734 (N34°40'45"E)

VERTICAL CONTROL:
ELEVATION DATUM IS ASSUMED OVER CP 700 (315.01 FEET)

- PIPELINE NOTES:
1. ALL NEW WATER MAINS IN THIS AREA SHALL BE DUCTILE IRON PIPE (AWWA C151)
 2. PIPE BEDDING AND TRENCH BACKFILL SHALL BE PER SANTA CRUZ COUNTY FIGURE EP-1.
 3. REPAVE TRENCH AND SET VALVE LIDS PER SANTA CRUZ COUNTY FIGURE EP-1, EP-2, & EP-5.

PLAN
SCALE: 1" = 200'



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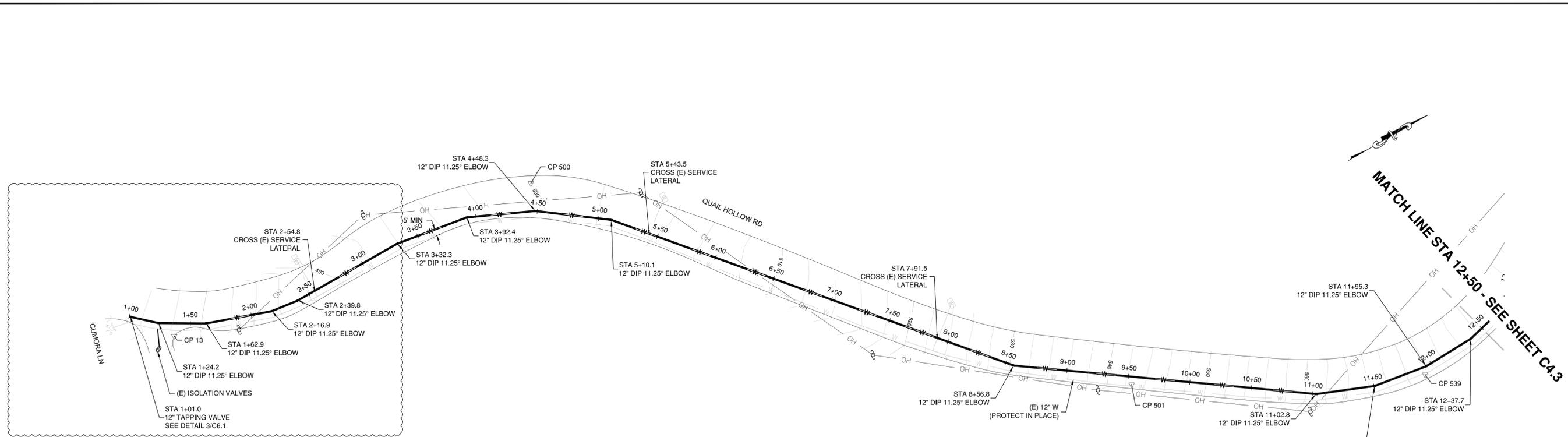
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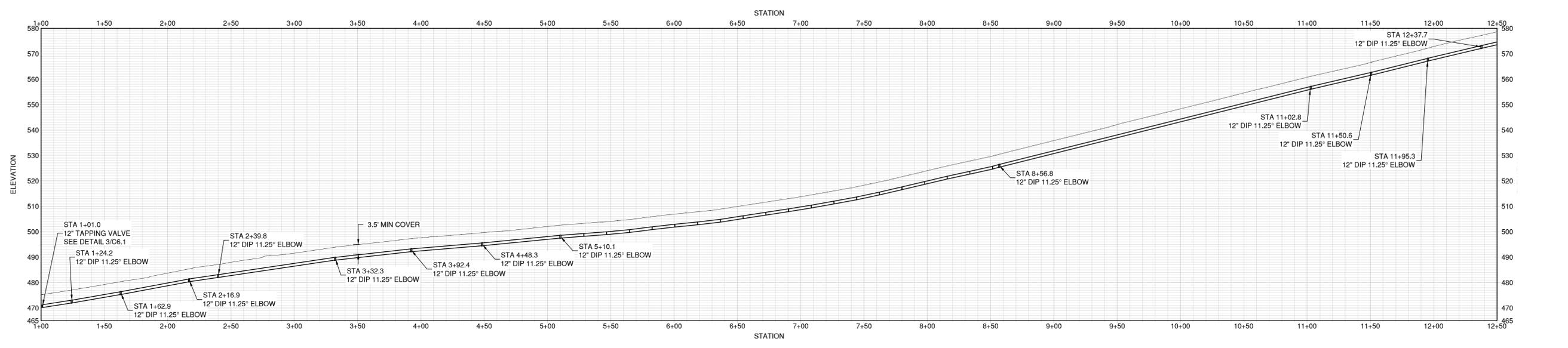
QUAIL HOLLOW ROAD OVERALL PLAN
PIPELINE REPLACEMENT



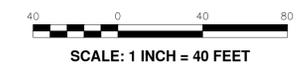
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QC CHECKED BY: AAS	DATE: 03/10/2020
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SCALE: AS SHOWN	
SUBMITTAL: 100% SUBMITTAL	



PLAN
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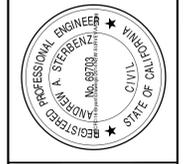


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VER. SCALE: 1" = 20'

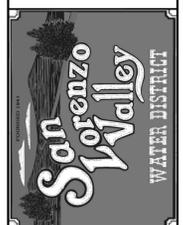


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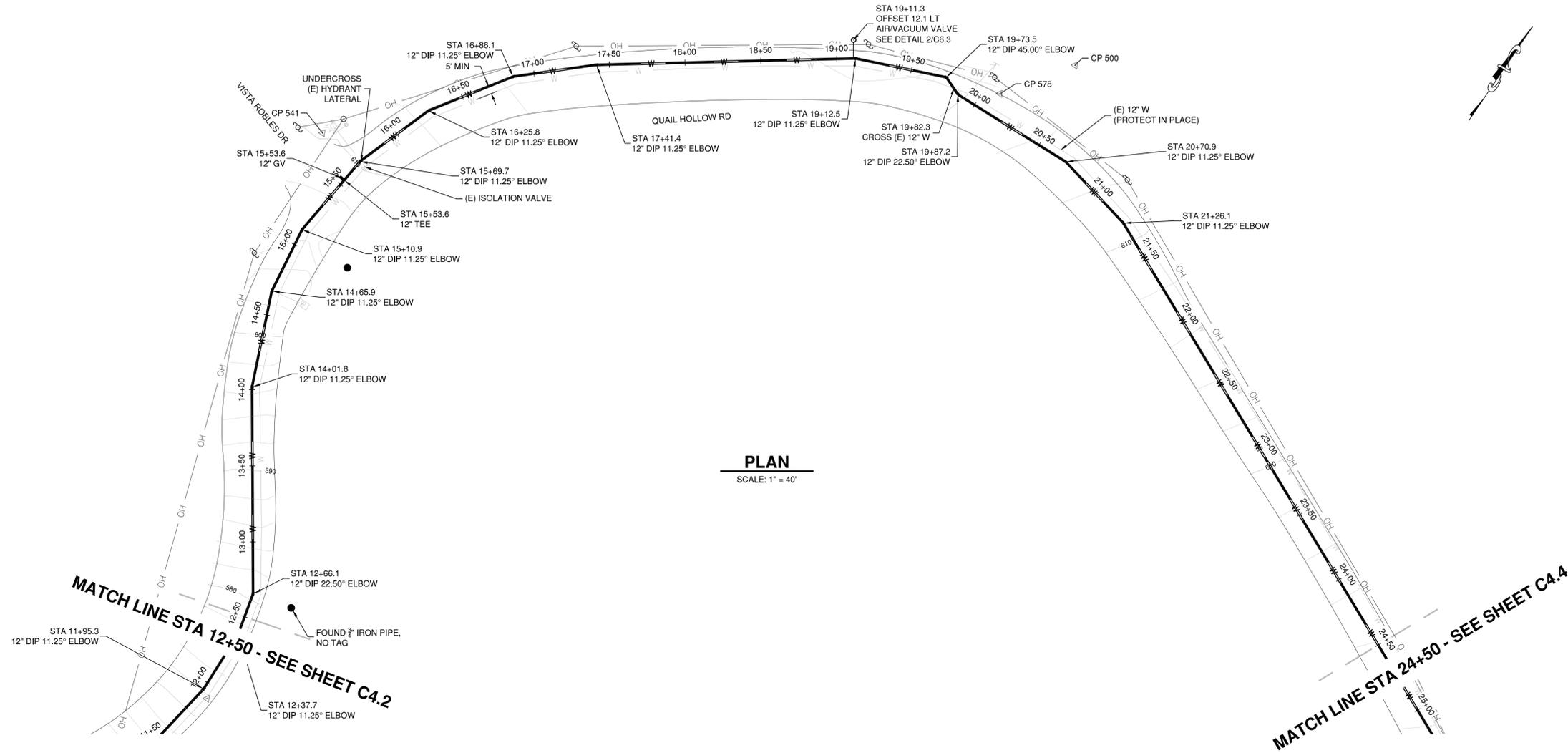
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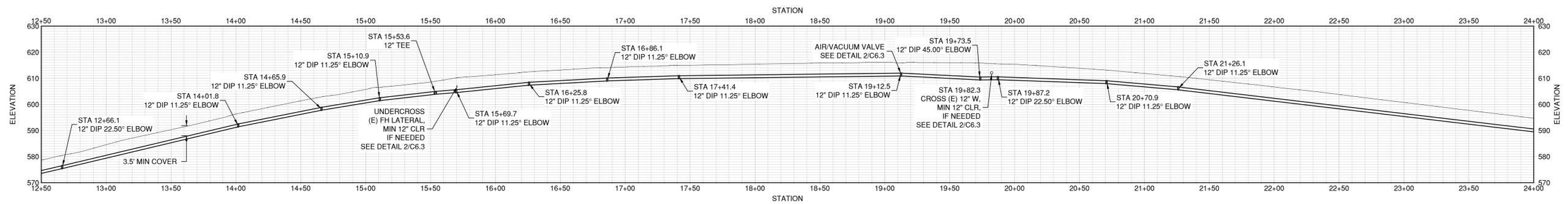
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PROFILE - I
PIPELINE REPLACEMENT**



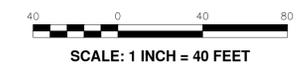
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PROJECT NO.:		SCALE:	AS SHOWN
SUBMITTAL:			100% SUBMITTAL



PLAN
SCALE: 1" = 40'



PROFILE
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VER. SCALE: 1" = 20'



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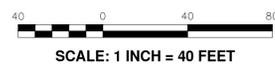
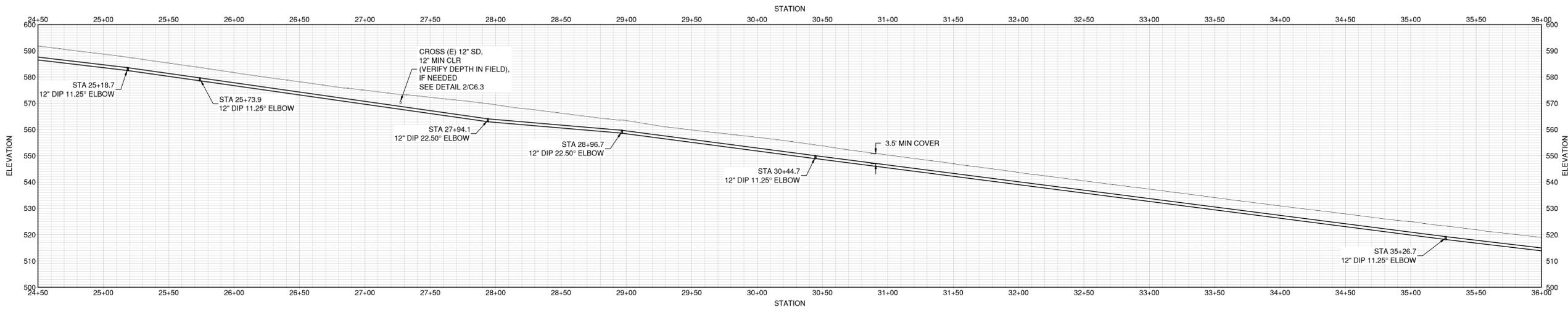
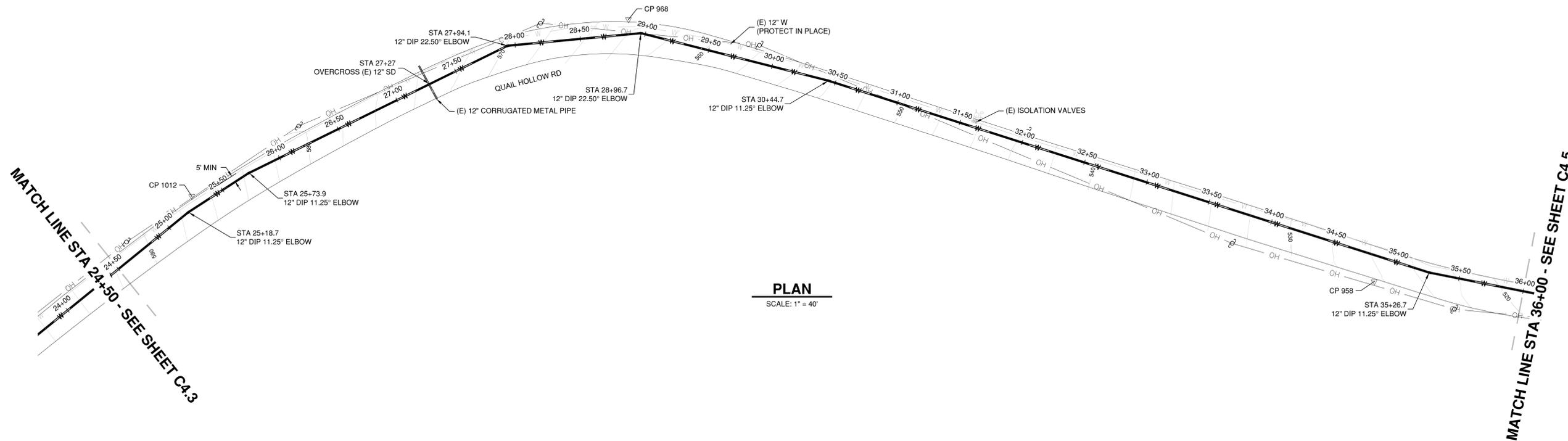
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**QUAIL HOLLOW ROAD PLAN AND
PROFILE - II
PIPELINE REPLACEMENT**



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DRAWN BY:	CJM	DATE:	03/10/2020
QC CHECKED BY:	AAS	DATE:	03/10/2020
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SUBMITTAL:	100% SUBMITTAL		

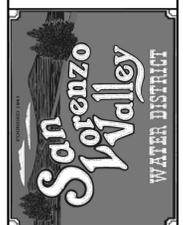


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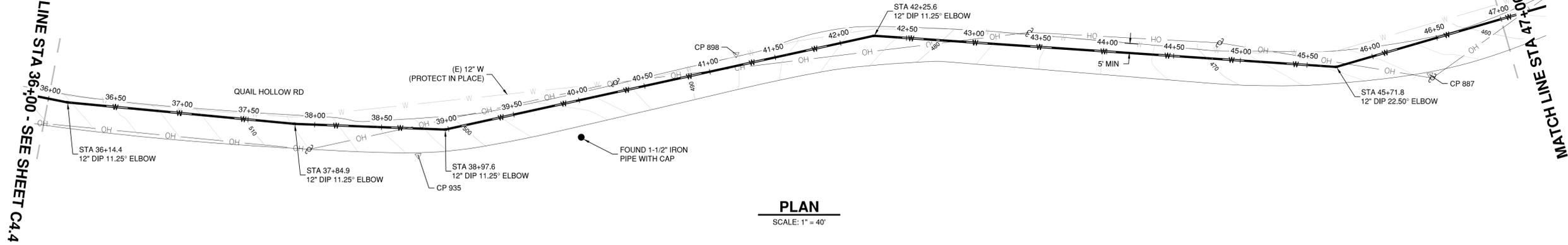
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PIPELINE REPLACEMENT



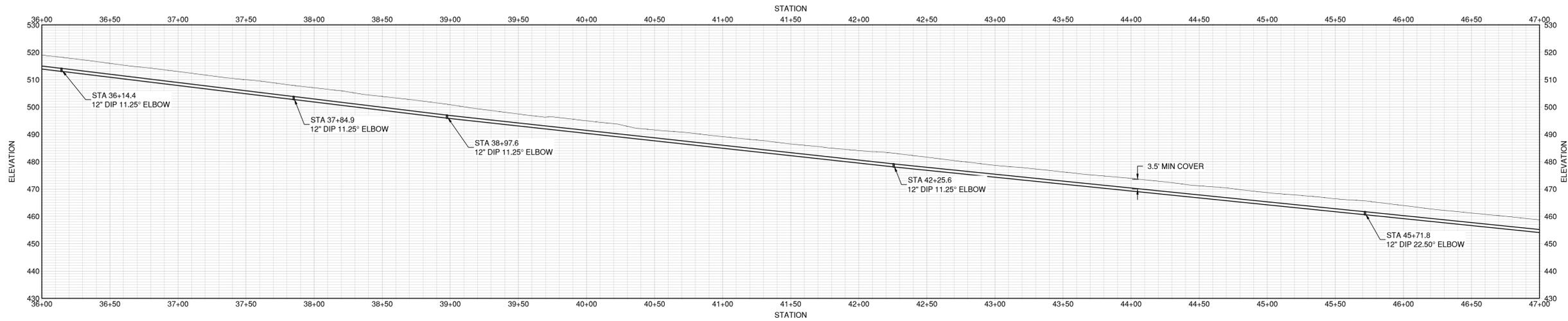
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QC CHECKED BY:	AAS	DATE:	03/10/2020
PROJECT NO.:			
SCALE:	AS SHOWN		
SUBMITTAL:	100% SUBMITTAL		

MATCH LINE STA 36+00 - SEE SHEET C4.4

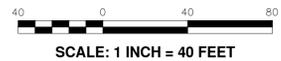
MATCH LINE STA 47+00 - SEE SHEET C4.6



PLAN
SCALE: 1" = 40'



PROFILE
HOR. SCALE: 1" = 40'
VER. SCALE: 1" = 20'



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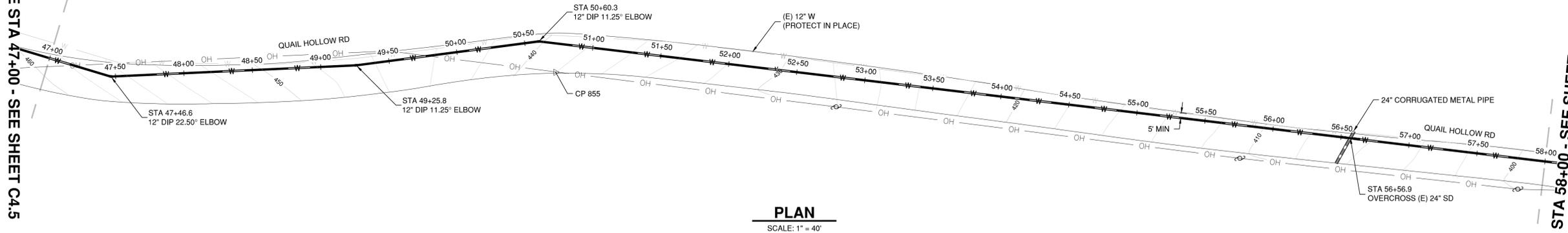
QUAIL HOLLOW ROAD PLAN AND
 PROFILE - IV
 PIPELINE REPLACEMENT



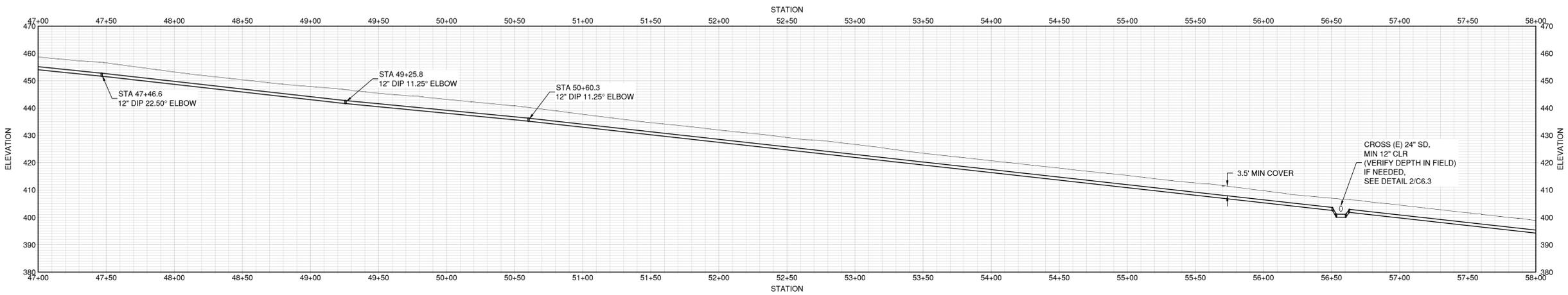
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MATCH LINE STA 47+00 - SEE SHEET C4.5

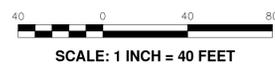
MATCH LINE STA 58+00 - SEE SHEET C4.7



PLAN
SCALE: 1" = 40'



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VER. SCALE: 1" = 20'



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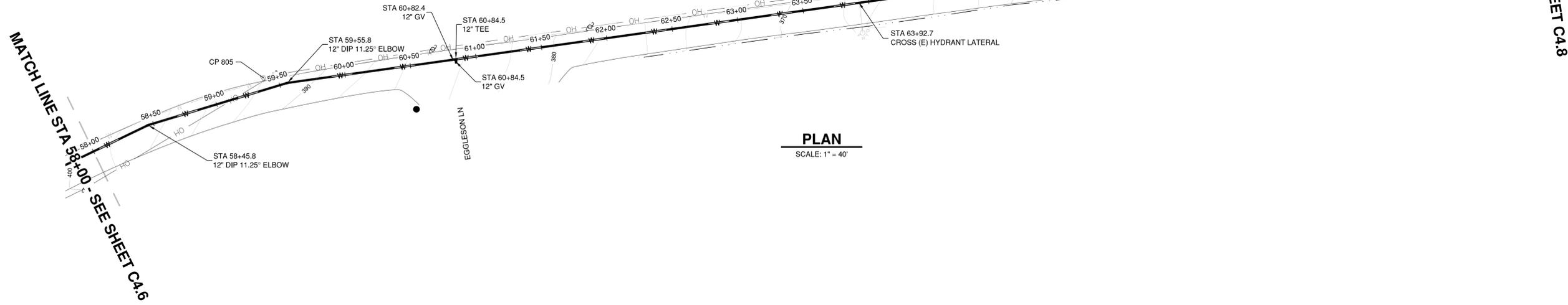
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PROFILE - V
PIPELINE REPLACEMENT**



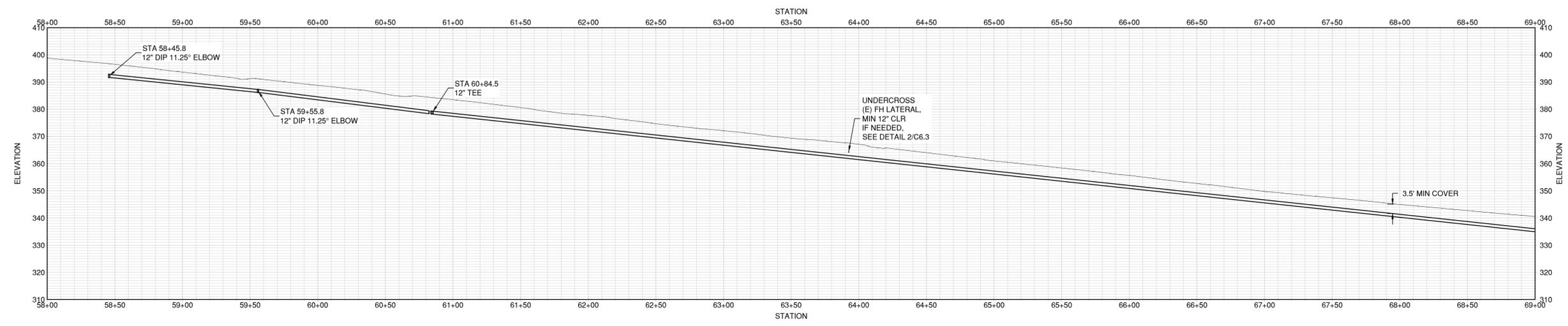
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SCALE:	AS SHOWN		
SUBMITTAL:	100% SUBMITTAL		

MATCH LINE STA 58+00 - SEE SHEET C4.6

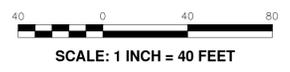
MATCH LINE STA 69+00 - SEE SHEET C4.8



PLAN
SCALE: 1" = 40'



PROFILE
HOR. SCALE: 1" = 40'
VER. SCALE: 1" = 20'



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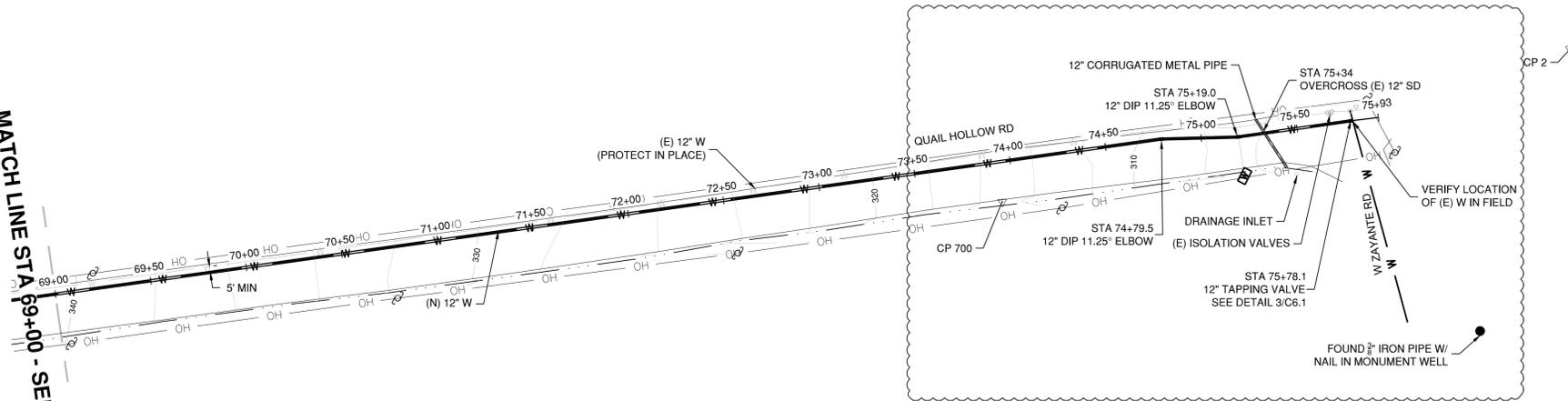


**QUAIL HOLLOW ROAD PLAN AND
PROFILE - VI
PIPELINE REPLACEMENT**

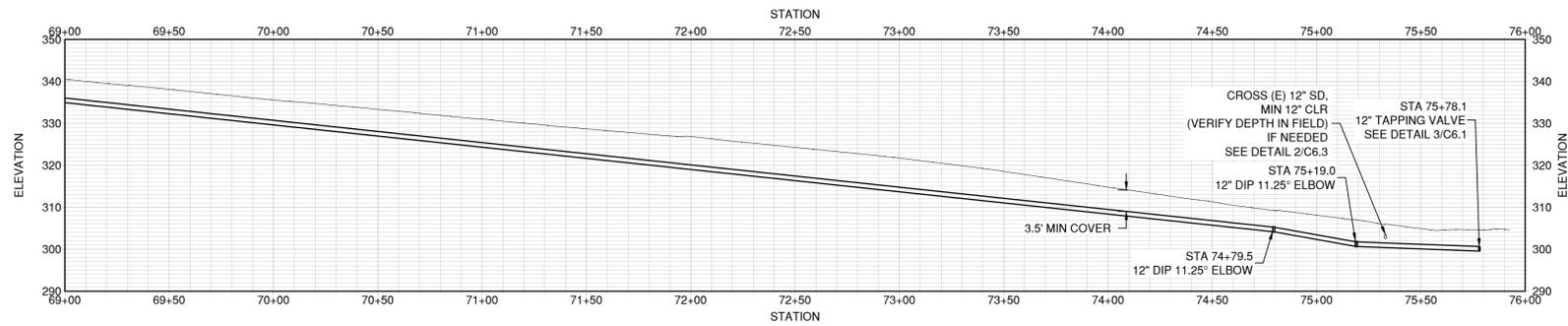


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PROJECT NO.:			
SCALE:	AS SHOWN		
SUBMITTAL:	100% SUBMITTAL		

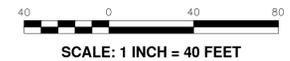
MATCH LINE STA 69+00 - SEE SHEET CA.7



PLAN
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PROFILE
HOR. SCALE: 1" = 40'
VER. SCALE: 1" = 20'



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**QUAIL HOLLOW ROAD PLAN AND
PROFILE - VII
PIPELINE REPLACEMENT**



DESIGNED BY:	CJM	DATE:	03/10/2020
DRAWN BY:	CJM	DATE:	03/10/2020
QC CHECKED BY:	AAS	DATE:	03/10/2020
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SUBMITTAL:	100% SUBMITTAL		

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APPENDIX B

SPECIAL-STATUS SPECIES TABLE

Quail Hollow Road California Natural Diversity Database Occurrence Table

(Felton, Big Basin, Castle Rock Ridge, Los Gatos, Davenport, Santa Cruz, Soquel, and Laurel Quadrangles)

Species	Status (Service/ CDFW/CNPS)	General Habitat	Potential Occurrence within Project Vicinity
MAMMALS			
<i>Antrozous pallidus</i> Pallid bat	-- / CSC / --	Occurs in a wide variety of habitats including grasslands, shrublands, arid desert areas, oak savanna, coastal forested areas, and coniferous forests of the mountain regions of California. Most common in open, dry habitats with rocky areas for roosting. Day roosts include caves, crevices, mines, and occasionally hollow trees and buildings. Seems to prefer rocky outcrops, cliffs, and crevices with access to open habitats for foraging. Similar structures are used for night roosting and will also use more open sites such as eaves, awnings, and open areas under bridges for feeding roosts.	Moderate: Trees adjacent to the project site may provide suitable roosting habitat. The closest CNDDDB occurrence is located approximately 3.7 miles north of the survey area.
<i>Corynorhinus townsendii</i> Townsend's big-eared bat	-- / CSC / --	Found primarily in rural settings from inland deserts to coastal redwoods, oak woodland of the inner Coast Ranges and Sierra foothills, and low to mid-elevation mixed coniferous-deciduous forests. Typically roost during the day in limestone caves, lava tubes, and mines, but can roost in buildings that offer suitable conditions. Night roosts are in more open settings and include bridges, rock crevices, and trees.	Moderate: Trees adjacent to the project site may provide suitable night roost habitat; however, no day or maternity roost habitat is present within or adjacent to the project site. The closest CNDDDB occurrence is located approximately 4.2 miles from the survey area and is a non-specific occurrence that includes the entire Big Basin quadrangle.
<i>Dipodomys venustus venustus</i> Santa Cruz kangaroo rat	-- / CNDDDB / --	Common permanent residents of chaparral and foothill woodland habitats within the Santa Cruz Mountains from 0-1799 meters. Use well-drained loam or sandy loam soils for burrowing. Burrows are typically shallow (2-20 inches below the surface) and simple with a main chamber and few escape chambers.	High: Suitable habitat is present adjacent to the project site. The CNDDDB reports and occurrence that includes a portion of the project site; however, it is noted that this species was not identified within this area during surveys conducted in 1995 or 2008.
<i>Lasiurus cinereus</i> Hoary bat	-- / CNDDDB / --	Prefers open habitats or habitat mosaics with access to trees for cover and open areas or edge for feeding. Generally, roost in dense foliage of trees; does not use buildings for roosting. Winters in California and Mexico and often migrates towards summer quarters in the north and east during the spring. Young are born and reared in summer grounds, which is unlikely to occur in California.	Moderate: Trees adjacent to the project site may provide suitable roosting habitat; however, maternity roost habitat is present within or adjacent to the project site. The closest CNDDDB occurrence is located approximately 0.4 mile from the survey area.

Species	Status (Service/ CDFW/CNPS)	General Habitat	Potential Occurrence within Project Vicinity
<i>Neotoma fuscipes annectens</i> San Francisco dusky-footed woodrat	-- / CSC / --	Forest habitats of moderate canopy with moderate to dense understory. Also occurs in chaparral habitats.	Moderate: Suitable habitat is present adjacent to the project site. The closest known CNDDDB occurrence is located approximately 5.9 miles from the survey area.
<i>Puma concolor</i> Mountain lion (Southern California/Central Coast ESU)	-- / SC / --	Typically found in pine forest, riparian and oak woodlands, streams, chaparral, and grasslands; however, also use desert habitats. Require large areas of relatively undisturbed habitat with adequate connectivity to allow for dispersal and gene flow. Generally avoids areas with human disturbance.	Moderate: Suitable habitat is present adjacent to the project site. No CNDDDB occurrences are known within the USGS quadrangles evaluated; however, this species is known to occur in the Santa Cruz Mountains.
<i>Taxidea taxus</i> American badger	-- / CSC / --	Dry, open grasslands, fields, pastures savannas, and mountain meadows near timberline are preferred. The principal requirements seem to be sufficient food, friable soils, and relatively open, uncultivated grounds.	Unlikely: No suitable habitat within or adjacent to the project site.
BIRDS			
<i>Accipiter cooperii</i> Cooper's hawk (nesting)	-- / CNDDDB / --	Resident throughout most of the wooded portion of the state. Dense stands of live oak, riparian deciduous, or other forest habitats near water used most frequently. Seldom found in areas without dense tree stands, or patchy woodland habitats.	Moderate: Suitable habitat is present adjacent to the project site. The closest known CNDDDB occurrence is located approximately 2.3 miles from the survey area.
<i>Agelaius tricolor</i> Tricolored blackbird (nesting colony)	-- / ST / --	Nest in colonies in dense riparian vegetation, along rivers, lagoons, lakes, and ponds. Forages over grassland or aquatic habitats.	Unlikely: No suitable nesting habitat within or adjacent to the project site.
<i>Aquila chrysaetos</i> Golden eagle (nesting & wintering)	-- / CFP / --	Use rolling foot-hills, mountain terrain, wide arid plateaus deeply cut by streams and canyons, open mountain slopes, cliffs, and rocky outcrops. Nest in secluded cliffs with overhanging ledges as well as large trees.	Unlikely: No suitable nesting habitat within or adjacent to the project site.
<i>Athene cunicularia</i> Burrowing owl (burrow sites & some wintering sites)	-- / CSC / --	Year-round resident of open, dry grassland and desert habitats, and in grass, forb and open shrub stages of pinyon-juniper and ponderosa pine habitats. Frequent open grasslands and shrublands with perches and burrows. Use rodent burrows (often California ground squirrel) for roosting and nesting cover. Pipes, culverts, and nest boxes may be substituted for burrows in areas where burrows are not available.	Unlikely: No suitable nesting habitat within or adjacent to the project site.

Species	Status (Service/ CDFW/CNPS)	General Habitat	Potential Occurrence within Project Vicinity
<i>Brachyramphus marmoratus</i> Marbled murrelet (nesting)	FT / SE / --	Occur year-round in marine subtidal and pelagic habitats from the Oregon border to Point Sal. Partial to coastlines with stands of mature redwood and Douglas-fir. Requires dense mature forests of redwood and/or Douglas-fir for breeding and nesting.	Unlikely: No suitable nesting habitat within or adjacent to the project site.
<i>Charadrius alexandrinus nivosus</i> Western snowy plover (nesting)	FT / CSC / --	Sandy beaches on marine and estuarine shores, also salt pond levees and the shores of large alkali lakes. Requires sandy, gravelly or friable soil substrate for nesting.	Unlikely: No suitable nesting habitat within or adjacent to the project site.
<i>Coturnicops noveboracensis</i> Yellow rail	-- / CSC / --	Wet meadows and coastal tidal marshes. Occurs year round in California, but in two primary seasonal roles: as a very local breeder in the northeastern interior and as a winter visitor (early Oct to mid-Apr) on the coast and in the Suisun Marsh region.	Unlikely: No suitable habitat within or adjacent to the project site.
<i>Cypseloides niger</i> Black swift (nesting)	-- / CSC / --	Regularly nests in moist crevice or cave on sea cliffs above the surf, or on cliffs behind, or adjacent to, waterfalls in deep canyons. Forages widely over many habitats.	Unlikely: No suitable nesting habitat within or adjacent to the project site.
<i>Elanus leucurus</i> White-tailed kite (nesting)	-- / CFP / --	Open groves, river valleys, marshes, and grasslands. Prefer such area with low roosts (fences etc.). Nest in shrubs and trees adjacent to grasslands.	Moderate: Suitable nesting habitat is present adjacent to project site. The closest CNDDDB occurrence is located approximately 15 miles from the survey area.
<i>Empidonax traillii extimus</i> Southwestern willow flycatcher (nesting)	FE / SE / --	Breeds in riparian habitat in areas ranging in elevation from sea level to over 2,600 meters. Builds nest in trees in densely vegetated areas. This species establishes nesting territories and builds and forages in mosaics of relatively dense and expansive areas of trees and shrubs, near or adjacent to surface water or underlain by saturated soils. Not typically found nesting in areas without willows (<i>Salix sp.</i>), tamarisk (<i>Tamarix ramosissima</i>), or both.	Unlikely: No suitable nesting habitat within or adjacent to the project site.
<i>Falco peregrinus anatum</i> American peregrine falcon (nesting)	-- / CFP / --	Forages for other birds over a variety of habitats. Breeds primarily on rocky cliffs.	Unlikely: No suitable nesting habitat within or adjacent to the project site.
<i>Geothlypis trichas sinuosa</i> Saltmarsh common yellowthroat	-- / CSC / --	Resident of the San Francisco bay region, in fresh and saltwater marshes. Requires thick, continuous cover down to water surface for foraging; tall grasses, tule patches, willows for nesting.	Unlikely: No suitable habitat within or adjacent to the project site.
<i>Laterallus jamaicensis coturniculus</i> California black rail	-- / ST&CFP / --	Inhabits freshwater marshes, wet meadows & shallow margins of saltwater marshes bordering larger bays. Needs water depths of about 1 inch that does not fluctuate during the year & dense vegetation for nesting habitat.	Unlikely: No suitable habitat within or adjacent to the project site.

Species	Status (Service/ CDFW/CNPS)	General Habitat	Potential Occurrence within Project Vicinity
<i>Progne subis</i> Purple martin (nesting)	-- / CSC / --	Valley foothill and montane hardwood, valley foothill conifer, riparian habitats, and coniferous habitats, including closed-cone pine-cypress, ponderosa pine, Douglas-fir, and redwood. Hawks insects on long, gliding flights above ground. Occasionally ground forages. Typically nest in woodpecker cavity, or other natural/man-made cavities including bridges.	Moderate: Suitable nesting habitat is present adjacent to project site. The closest known CNDDDB occurrence is located approximately 10 miles east of the survey area
<i>Riparia riparia</i> Bank swallow (nesting)	-- / ST / --	Nest colonially in sand banks. Found near water; fields, marshes, streams, and lakes.	Unlikely: No suitable nesting habitat within or adjacent to the project site.
<i>Sterna antillarum browni</i> California least tern (nesting colony)	FE / SE&CFP / --	Sea beaches, bays; large rivers, bars.	Unlikely: No suitable nesting habitat within or adjacent to the project site.
<i>Vireo bellii pusillus</i> Least Bell's vireo (nesting)	FE / SE / --	Riparian areas and drainages. Breed in willow riparian forest supporting a dense, shrubby understory. Oak woodland with a willow riparian understory is also used in some areas, and individuals sometimes enter adjacent chaparral, coastal sage scrub, or desert scrub habitats to forage.	Unlikely: No suitable nesting habitat within or adjacent to the project site. The project site is likely outside of the current range for this species.
REPTILES AND AMPHIBIANS			
<i>Ambystoma californiense</i> California tiger salamander	FT / ST / --	Annual grassland and grassy understory of valley-foothill hardwood habitats in central and northern California. Need underground refuges and vernal pools or other seasonal water sources.	Unlikely: Suitable upland habitat is present adjacent to the project site; however, the project site is outside of the known dispersal range from known breeding resources. The closest known CNDDDB occurrence is located approximately 11 miles (20 km) from the survey area. This species has not been observed at the adjacent Quail Hollow Ranch Community Park (Santa Cruz County Parks Department website).
<i>Ambystoma macrodactylum croceum</i> Santa Cruz long-toed salamander	FE / SE&CFP / --	Preferred habitats include ponderosa pine, montane hardwood-conifer, mixed conifer, montane riparian, red fir and wet meadows. Occurs in a small number of localities in Santa Cruz and Monterey Counties. Adults spend the majority of the time in underground burrows and beneath objects. Larvae prefer shallow water with clumps of vegetation.	Unlikely: Marginal upland habitat is present adjacent to the project site; however, the project site is outside of the known dispersal range from known breeding resources. The closest known CNDDDB occurrence is located approximately 12 miles (18 km) from the survey area. This species has not been observed at the adjacent Quail Hollow Ranch Community Park (Santa Cruz County Parks Department website).

Species	Status (Service/ CDFW/CNPS)	General Habitat	Potential Occurrence within Project Vicinity
<i>Aneides niger</i> Santa Cruz black salamander	-- / CSC / --	Endemic to California. Occurs in the fog belt of the outer Coastal Range in mesic forests. This species occurs in moist streamside microhabitats. This species is often found in shallow standing water or seeps. Small geographical range consisting of woodland habitat within the Santa Cruz Mountains in western Santa Clara, northern Santa Cruz, and southernmost San Mateo Counties.	Unlikely: No suitable habitat within or adjacent to the project site. The CNDDDB includes an occurrence of this species that overlaps with a portion of the survey area; however, this is a non-specific occurrence that is attributed to Ben Lomond Creek and it is unlikely this species was observed within the project site. This species has not been observed at the adjacent Quail Hollow Ranch Community Park (Santa Cruz County Parks Department website).
<i>Dicamptodon ensatus</i> California giant salamander	-- / CSC / --	Endemic to California. Occurs within the Coast Range from just north of the southern border of Mendocino County to southern Santa Cruz County. Found in wet coastal forests in or around clear, cold permanent and semi-permanent streams and seepages. Typically, within elevations ranging from sea level to approximately 3000 feet.	Unlikely: No suitable habitat within or adjacent to the project site. This species has been observed in the adjacent Quail Hollow Ranch Community Park (Santa Cruz County Parks Department website) and the CNDDDB includes two occurrences of this species that overlap with portions of the survey area; however, they are non-specific occurrences from the 1930s and 1950s and it is unlikely this species was observed within the project site.
<i>Emys marmorata</i> Western pond turtle	-- / CSC / --	Associated with permanent or nearly permanent water in a wide variety of habitats including streams, lakes, ponds, irrigation ditches, etc. Require basking sites such as partially submerged logs, rocks, mats of vegetation, or open banks.	Unlikely: No suitable habitat within the project site. There is a pond located approximately 180 feet from the project site within the adjacent Quail Hollow Ranch Community Park and this species has been reported to occur within the park (Santa Cruz County Parks Department website). The CNDDDB includes an occurrence of this species that overlaps with a portion of the survey area; however, this is a non-specific occurrence that is attributed to Highlands Springs County Park and it is unlikely this occurrence was observed within the project site. Although these resources and occurrences are in the vicinity of the project site no western pond turtle habitat will be impacted during construction.
<i>Rana boylei</i> Foothill yellow-legged frog	-- / SC&CSC / --	Partly-shaded, shallow streams and riffles with a rocky substrate in a variety of habitats, including hardwood, pine, and riparian forests, scrub, chaparral, and wet meadows. Rarely encountered far from permanent water.	Unlikely: No suitable habitat within or adjacent to the project site.

Species	Status (Service/ CDFW/CNPS)	General Habitat	Potential Occurrence within Project Vicinity
<i>Rana draytonii</i> California red-legged frog	FT / CSC / --	Lowlands and foothills in or near permanent or late-season sources of deep water with dense, shrubby, or emergent riparian vegetation. During late summer or fall adults are known to utilize a variety of upland habitats with leaf litter or mammal burrows.	Low: No suitable habitat within the project site; however, there is a pond located approximately 180 feet from the project site within the adjacent Quail Hollow Ranch Community Park. This species has been reported to occur within the park; however, it is unknown if this pond is a breeding resource (Santa Cruz County Parks Department website). The closest CNDDDB occurrence is approximately 2.5 miles from the project site.
FISH			
<i>Eucyclogobius newberryi</i> Tidewater goby	FE / CSC / --	Brackish water habitats found in shallow lagoons and lower stream reaches. Tidewater gobies appear to be naturally absent (now and historically) from three large stretches of coastline where lagoons or estuaries are absent and steep topography or swift currents may prevent tidewater gobies from dispersing between adjacent localities. The southernmost large, natural gap occurs between the Salinas River in Monterey County and Arroyo del Oso in San Luis Obispo County.	Unlikely: No suitable habitat within or adjacent to the project site.
<i>Oncorhynchus kisutch</i> Coho salmon (central California coast ESU)	FE / SE / --	All naturally spawned populations from Punta Gorda south to and including the San Lorenzo River; populations in tributaries to San Francisco Bay, excluding the Sacramento–San Joaquin River system; and four artificial propagation programs.	Unlikely: No suitable habitat within or adjacent to the project site.
<i>Oncorhynchus mykiss irideus</i> Steelhead (Central California Coast DPS)	FT / -- / --	Coastal perennial and near perennial streams, with suitable spawning and rearing habitat and no major barriers.	Unlikely: No suitable habitat within or adjacent to the project site.
<i>Thaleichthys pacificus</i> Eulachon	FT / -- / --	Occur in nearshore ocean waters and to 1,000 feet in depth, except for the brief spawning runs into their natal streams. Spawning grounds are typically in the lower reaches of larger snowmelt-fed rivers with water temperatures ranging from 39 to 50°F. Spawning occurs over sand or coarse gravel substrates.	Unlikely: No suitable habitat within or adjacent to the project site.
INVERTEBRATES			
<i>Bombus occidentalis</i> Western bumble bee	-- / SC / --	Occurs in open grassy areas, urban parks, urban gardens, chaparral, and meadows. This species generally nests underground. Western bumble bee populations are currently largely restricted to high elevation sites in the Sierra Nevada.	Unlikely: Suitable habitat is present adjacent to the project site; however, the project site is outside of the currently known range for this species.

Species	Status (Service/ CDFW/CNPS)	General Habitat	Potential Occurrence within Project Vicinity
<i>Cicindela ohlone</i> Ohlone tiger beetle	FE / -- / --	Coastal terraces with remnant stand of open native grassland with clay or sandy soils. Hunt, breed, and dig small vertical burrows along sunny single-track trails and dirt roads (maintained by cattle, hikers, etc.) in coast terrace meadows that still support native grasses. Current range from the City of Scotts Valley to the eastern edge of the City of Santa Cruz.	Unlikely: No suitable habitat within or adjacent to the project site.
<i>Danaus plexippus</i> Monarch butterfly	-- / CNDDDB / --	Overwinters in coastal California using colonial roosts generally found in Eucalyptus, pine and acacia trees. Overwintering habitat for this species within the Coastal Zone represents ESHA. Local ordinances often protect this species as well.	Low: Eucalyptus and pine trees are present adjacent to the project site; however, these trees are unlikely to provide suitable habitat. The closest CNDDDB occurrence is located approximately 6.5 miles from the project site.
<i>Euphilotes enoptes smithi</i> Smith's blue butterfly	FE / -- / --	Most commonly associated with coastal dunes and coastal sage scrub plant communities in Monterey and Santa Cruz Counties. Plant hosts are <i>Eriogonum latifolium</i> and <i>E. parvifolium</i> .	Unlikely: No suitable habitat within or adjacent to the project site. Host plant species were not observed during field surveys.
<i>Polyphylla barbata</i> Mount Hermon (barbate) June beetle	FE / -- / --	Ponderosa pine-chaparral habitat with sandy soil and open, sparsely vegetated areas. May also occur in more vegetated areas of chaparral. While not always present, silver-leaved manzanita is often an indicator of suitable habitat. Restricted to the Zayante sandhills habitat of the Ben Lomond-Mount Harmon-Scotts Valley area.	High: Suitable habitat is present adjacent to project site and the CNDDDB reports one occurrence that overlaps with the project site.
<i>Trimerotropis infantillis</i> Zayante band-winged grasshopper	FE / -- / --	Open sandy areas with sparse, low annual and perennial herbs on high ridges with sparse ponderosa pine. Often occurs with Ben Lomond wallflower. Restricted to sand parkland habitat found on ridges and hills within the Zayante sandhills habitat in Santa Cruz County. Flight season extends from late May through August.	Low: Although Zayante sandhill habitat is present adjacent to project site, this species is typically associated with ridges and hills with sparse understory, which is largely absent from areas adjacent to the project site. The CNDDDB reports one occurrence that overlaps with the project site.
PLANTS			
<i>Agrostis blasdalei</i> Blasdale's bent grass	-- / -- / 1B	Coastal bluff scrub, coastal dunes, and coastal prairie at elevations from 0-150 meters. Perennial rhizomatous herb in the Poaceae family. Blooms May-July.	Not Present: No suitable habitat within or adjacent to the project site. Site is located out of suitable elevation for this species. Not observed during the survey in May 2020.
<i>Amsinckia lunaris</i> Bent-flowered fiddleneck	-- / -- / 1B	Coastal bluff scrub, cismontane woodland, and valley and foothill grassland at elevations of 3-500 meters. Annual herb in the Boraginaceae family; blooms March-June.	Not Present: Suitable habitat is present adjacent to the project site; however, this species was not observed during the survey in May 2020.

Species	Status (Service/ CDFW/CNPS)	General Habitat	Potential Occurrence within Project Vicinity
<i>Arctostaphylos andersonii</i> Anderson's manzanita	-- / -- / 1B	Openings and edges of broadleaved upland forest, chaparral, and north coast coniferous forest at elevations of 60-760 meters. Evergreen shrub in the Ericaceae family; blooms November-May.	Not Present: Suitable habitat is present adjacent to the project site; however, this species was not observed during the survey in May 2020.
<i>Arctostaphylos glutinosa</i> Schreiber's manzanita	-- / -- / 1B	Broadleaved upland forest, chaparral, and north coast coniferous forest on granitic or sandstone soils at elevations between 170-685 meters. Perennial evergreen shrub in the Ericaceae family; blooms November-April.	Not Present: Suitable habitat is present adjacent to the project site; however, this species was not observed during the survey in May 2020.
<i>Arctostaphylos ohloneana</i> Ohlone manzanita	-- / -- / 1B	Closed-cone coniferous forest and coastal scrub within siliceous shale, at elevations between 450-530 meters. Evergreen shrub in the Ericaceae family; blooms February-March.	Not Present: No suitable habitat within or adjacent to the project site. Site is located out of suitable elevation range for this species. Not observed during the survey in May 2020.
<i>Arctostaphylos regismontana</i> Kings Mountain manzanita	-- / -- / 1B	Broadleaved upland forest, chaparral, and north coast coniferous forest on granitic or sandstone soils at elevations between 305-730 meters. Evergreen shrub in the Ericaceae family; blooms January-April.	Not Present: Suitable habitat is present adjacent to the project site; however, the site is located out of suitable elevation range for this species and this species was not observed during the survey in May 2020.
<i>Arctostaphylos silvicola</i> Bonny Doon manzanita	-- / -- / 1B	Chaparral, closed-cone coniferous forest, and lower montane coniferous forest on inland marine sands at elevations of 120-600 meters. Evergreen shrub in the Ericaceae family; blooms February-March.	Present: This species was observed adjacent to the project site during the survey in May 2020.
<i>Arenaria paludicola</i> Marsh sandwort	FE / SE / 1B	Known from only two natural occurrences in Black Lake Canyon and at Oso Flaco Lake. Sandy openings of freshwater of brackish marshes and swamps at elevations of 3-170 meters. Stoloniferous perennial herb in the Caryophyllaceae family; blooms May-August.	Not Present: No suitable habitat within or adjacent to the project site. Site is located out of the currently known range for this species. Not observed during the survey in May 2020.
<i>Calyptridium parryi</i> var. <i>hesseae</i> Santa Cruz Mountains pussypaws	-- / -- / 1B	Sandy or gravelly openings of chaparral and cismontane woodlands at elevations of 305-1530 meters. Annual herb in the Montiaceae family; blooms May-August.	Not Present: Suitable habitat is present adjacent to the project site; however, the site is located out of suitable elevation range for this species and this species was not observed during the survey in May 2020.
<i>Campanula californica</i> Swamp harebell	-- / -- / 1B	Mesic areas of bogs and fens, closed-cone coniferous forest, coastal prairie, meadows and seeps, freshwater marshes and swamps, and North Coast coniferous forest at elevations of 1-405 meters. Perennial rhizomatous herb in the Campanulaceae family; blooms June-October.	Unlikely: No suitable habitat within or adjacent to the project site.
<i>Carex comosa</i> Bristly sedge	-- / -- / 2B	Coastal prairie, marshes and swamps on lake margins, and valley and foothill grassland at elevations of 0-625 meters. Perennial rhizomatous herb in the Cyperaceae family; blooms May-September.	Not Present: No suitable habitat within or adjacent to the project site. Not observed during the survey in May 2020.

Species	Status (Service/ CDFW/CNPS)	General Habitat	Potential Occurrence within Project Vicinity
<i>Carex saliniformis</i> Deceiving sedge	-- / -- / 1B	Mesic areas of coastal prairie, coastal scrub, meadows and seeps, and coastal salt marshes and swamps at elevations of 3-230 meters. Perennial rhizomatous herb in the Cyperaceae family; blooms June-July.	Unlikely: No suitable habitat within or adjacent to the project site. Site is located out of suitable elevation range for this species.
<i>Centromadia parryi</i> ssp. <i>congdonii</i> Congdon's tarplant	-- / -- / 1B	Valley and foothill grassland on heavy clay, saline, or alkaline soils at elevations of 0-230 meters. Annual herb in the Asteraceae family; blooms May-November.	Not Present: No suitable habitat within or adjacent to the project site. Not observed during the survey in May 2020.
<i>Chorizanthe pungens</i> var. <i>hartwegiana</i> Ben Lomond spineflower	FE / -- / 1B	Lower montane coniferous forest (maritime ponderosa pine sandhills) at elevations of 90-610 meters. Annual herb in the Polygonaceae family; blooms April-July.	Present: This species was observed adjacent to the project site during the survey in May 2020.
<i>Chorizanthe pungens</i> var. <i>pungens</i> Monterey spineflower	FT / -- / 1B	Maritime chaparral, cismontane woodland, coastal dunes, coastal scrub, and valley and foothill grassland on sandy soils at elevations of 3-450 meters. Annual herb in the Polygonaceae family; blooms April-July.	Not Present: Suitable habitat is present adjacent to the project site; however, this species was not observed during the survey in May 2020.
<i>Chorizanthe robusta</i> var. <i>hartwegii</i> Scott's Valley spineflower	FE / -- / 1B	Meadows and seeps on sandy soils and valley and foothill grassland on mudstone and Purisima outcrops at elevations of 230-245 meters. Annual herb in the Polygonaceae family; blooms April-July.	Not Present: No suitable habitat within or adjacent to the project site. Not observed during the survey in May 2020.
<i>Chorizanthe robusta</i> var. <i>robusta</i> Robust spineflower	FE / -- / 1B	Openings in cismontane woodland, coastal dunes, maritime chaparral, and coastal scrub on sandy or gravelly soils at elevations of 3-300 meters. Annual herb in the Polygonaceae family; blooms April-September.	Not Present: Marginal habitat is present adjacent to the project site; however, this species was not observed during the survey in May 2020.
<i>Cirsium fontinale</i> var. <i>campylon</i> Mount Hamilton fountain thistle	-- / -- / 1B	Chaparral, cismontane woodland, and valley and foothill grassland on serpentinite seeps, at elevations of 100-890 meters. Perennial herb in the Asteraceae family; blooms February-October.	Not Present: Suitable habitat is present adjacent to the project site; however, this species was not observed during the survey in May 2020.
<i>Collinsia multicolor</i> San Francisco collinsia	-- / -- / 1B	Closed-cone coniferous forest and coastal scrub, sometimes on serpentinite soils, at elevations of 30-250 meters. Annual herb in the Plantaginaceae family; blooms March-May.	Not Present: No suitable habitat within or adjacent to the project site. Site is located out of suitable elevation range for this species. Not observed during the survey in May 2020.
<i>Dacryophyllum falcifolium</i> Tear drop moss	-- / -- / 1B	North coast coniferous forests on carbonate soils at elevations of 50-275 meters. Moss. Known only in Monterey and Santa Cruz counties.	Not Present: No suitable habitat within or adjacent to the project site. Not observed during the survey in May 2020.
<i>Dudleya abramsii</i> ssp. <i>setchellii</i> Santa Clara Valley dudleya	FE / -- / 1B	Cismontane woodland and valley and foothill grasslands on rocky serpentinite soils, at elevations of 60-455 meters. Perennial herb in the Crassulaceae family; blooms April-October.	Not Present: Suitable habitat is present adjacent to the project site; however, this species was not observed during the survey in May 2020.
<i>Eriogonum nudum</i> var. <i>decurrrens</i> Ben Lomond buckwheat	-- / -- / 1B	Chaparral, cismontane woodland, and lower montane coniferous forest (maritime ponderosa pine sandhills) on sandy soils, at elevations of 50-800 meters. Perennial herb in the Polygonaceae family; blooms June-October.	Present: This species was observed adjacent to the project site during the survey in May 2020.

Species	Status (Service/ CDFW/CNPS)	General Habitat	Potential Occurrence within Project Vicinity
<i>Erysimum menziesii</i> Menzies' wallflower	FE / SE / 1B	Coastal dunes at elevations of 0-35 meters. Perennial herb in the Brassicaceae family; blooms March-September.	Not Present: No suitable habitat within or adjacent to the project site. Site is located out of suitable elevation range for this species. Not observed during the survey in May 2020.
<i>Erysimum teretifolium</i> Santa Cruz wallflower	FE / SE / 1B	Chaparral and lower montane coniferous forest on inland marine sands, at elevations of 120-610 meters. Perennial herb in the Brassicaceae family; blooms March-July.	Not Present: Suitable habitat is present adjacent to the project site; however, this species was not observed during the survey in May 2020.
<i>Fissidens pauperculus</i> Minute pocket moss	-- / -- / 1B	North coast coniferous forest on damp coastal soil at elevations of 10-1024 meters. Moss in the Fissidentaceae family.	Not Present: No suitable habitat within or adjacent to the project site. Not observed during the survey in May 2020.
<i>Fritillaria liliacea</i> Fragrant fritillary	-- / -- / 1B	Cismontane woodland, coastal prairie, coastal scrub, and valley and foothill grassland, often serpentinite, at elevations of 3-410 meters. Bulbiferous perennial herb in the Liliaceae family; blooms February-April.	Not Present: Soils within and adjacent to the project site are unlikely to support this species. Not observed during the survey in May 2020.
<i>Grimmia torenii</i> Toren's grimmia	-- / -- / 1B	Endemic to California. Occurrences are known from Lake, Mendocino, Contra Costa, and Santa Cruz Counties. Found in the Coast Range at elevations of 325 to 1160 meters. Occurs on pillow basalts and some sandstones. Often serpentine soil occurs in areas occupied by this species. A moss in the Gimmiaceae family.	Not Present: No suitable habitat within or adjacent to the project site. Not observed during the survey in May 2020.
<i>Grimmia vaginulata</i> Vaginulate grimmia	-- / -- / 1B	Believed to be extremely rare. So far, most occurrences have been found on the vertical or underhanging surfaces of calcareous sandstone boulders created from the bedrock of the Butano Formation. The boulders with occurrences of this species were located in dense chaparral at elevations of approximately 700 meters. A moss in the Gimmiaceae family.	Not Present: No suitable habitat within or adjacent to the project site. Site is located out of suitable elevation range for this species. Not observed during the survey in May 2020.
<i>Hesperevax sparsiflora</i> var. <i>brevifolia</i> Short-leaved evax	-- / -- / 1B	Occurs in coastal bluff scrub, coastal dunes, and coastal prairie habitats. Elevation range of 0-215 meters. Asteraceae family; blooms March-June.	Not Present: No suitable habitat within or adjacent to the project site. Not observed during the survey in May 2020.
<i>Hesperocyparis abramsiana</i> var. <i>abramsiana</i> Santa Cruz cypress	FT / SE / 1B	Closed-cone coniferous forest, chaparral, and lower montane coniferous forest on sandstone or granitic soils at elevations of 280-800 meters. Evergreen tree in the Cupressaceae family.	Not Present: Suitable habitat is present adjacent to the project site; however, the site is located out of suitable elevation range for this species and this species was not observed during the survey in May 2020.

Species	Status (Service/ CDFW/CNPS)	General Habitat	Potential Occurrence within Project Vicinity
<i>Hesperocyparis abramsiana</i> var. <i>butanoensis</i> Butano Ridge cypress	FT / SE / 1B	Only known from the Butano Ridge of the Santa Cruz Mountains. Occurs on sandstone in closed-cone coniferous forest, chaparral, and lower montane coniferous forest habitats. Elevation range of 400-490 meters. Evergreen tree in the Cupressaceae family.	Not Present: Suitable habitat is present adjacent to the project site; however, the site is located out of suitable distribution and elevation ranges for this species. Not observed during the survey in May 2020.
<i>Hoita strobilina</i> Loma Prieta hoita	-- / -- / 1B	Mesic areas of chaparral, cismontane woodland, and riparian woodland, usually on serpentinite soils, at elevations of 30-860 meters. Perennial herb in the Fabaceae family; blooms May-October.	Not Present: Suitable habitat is present adjacent to the project site; however, this species was not observed during the survey in May 2020.
<i>Holocarpha macradenia</i> Santa Cruz tarplant	FT / SE / 1B	Coastal prairies and valley foothill grasslands often clay or sandy soils, at elevations of 10-220 meters. Annual herb in the Asteraceae family; blooms June-October.	Unlikely: No suitable habitat within or adjacent to the project site.
<i>Horkelia cuneata</i> ssp. <i>sericea</i> Kellogg's horkelia	-- / -- / 1B	Openings of closed-cone coniferous forests, maritime chaparral, coastal dunes, and coastal scrub on sandy or gravelly soils at elevations of 10-200 meters. Perennial herb in the Rosaceae family; blooms April-September.	Not Present: Suitable habitat is present adjacent to the project site; however, this species was not observed during the survey in May 2020.
<i>Horkelia marinensis</i> Point Reyes horkelia	-- / -- / 1B	Coastal dunes, coastal prairie, and coastal scrub on sandy soils at elevations of 5-350 meters. Perennial herb in the Rosaceae family; blooms May-September.	Not Present: No suitable habitat within or adjacent to survey area. Not observed during the survey in May 2020.
<i>Lasthenia californica</i> ssp. <i>macrantha</i> Perennial goldfields	-- / -- / 1B	Coastal bluff scrub, coastal dunes, and coastal scrub at an elevation of 5-520 meters. Perennial herb in the Asteraceae family; blooms January–November.	Not Present: No suitable habitat within or adjacent to survey area. Not observed during the survey in May 2020.
<i>Lessingia micradenia</i> var. <i>glabrata</i> Smooth lessingia	-- / -- / 1B	Chaparral and cismontane woodlands on serpentinite soils, often on roadsides, at elevations of 120-420 meters. Annual herb in the Asteraceae family; blooms July-November.	Unlikely: Soils within the project site are unlikely to support this species.
<i>Malacothamnus arcuatus</i> Arcuate bush-mallow	-- / -- / 1B	Chaparral and cismontane woodland at elevations of 15-355 meters. Perennial evergreen shrub in the Malvaceae family; blooms April-September.	Not Present: Suitable habitat is present adjacent to the project site; however, this species was not observed during the survey in May 2020.
<i>Microseris paludosa</i> Marsh microseris	-- / -- / 1B	Closed-cone coniferous forest, cismontane woodland, coastal scrub, and valley and foothill grassland at elevations of 5-300 meters. Perennial herb in the Asteraceae family; blooms April-July.	Not Present: Suitable habitat is present adjacent to the project site; however, this species was not observed during the survey in May 2020.
<i>Monardella sinuata</i> ssp. <i>nigrescens</i> Northern curly-leaved monardella	-- / -- / 1B	Chaparral, coastal dunes, coastal scrub, and lower montane coniferous forest (ponderosa pine sandhills) on sandy soils at elevations of 0-300 meters. Annual herb in the Lamiaceae family; blooms April-September.	Not Present: Suitable habitat is present adjacent to the project site; however, this species was not observed during the survey in May 2020.

Species	Status (Service/ CDFW/CNPS)	General Habitat	Potential Occurrence within Project Vicinity
<i>Monolopia gracilens</i> Woodland woollythreads	-- / -- / 1B	Openings of broadleaved upland forest, chaparral, cismontane woodland, North Coast coniferous forest, and valley and foothill grassland on serpentinite soils at elevations of 100-1200 meters. Annual herb in the Asteraceae family; blooms February-July.	Not Present: Suitable habitat is present adjacent to the project site; however, this species was not observed during the survey in May 2020.
<i>Orthotrichum kellmanii</i> Kellman's Bristle Moss	-- / -- / 1B	Chaparral or cismontane woodland on sandstone and carbonate soils at elevations of 343-685 meters. Moss in the Orthotrichaceae family; blooms January-February.	Not Present: No suitable habitat within or adjacent to survey area. Site is located out of suitable elevation range for this species. Not observed during the survey in May 2020.
<i>Pedicularis dudleyi</i> Dudley's lousewort	-- / SR / 1B	Maritime chaparral, cismontane woodland, North Coast coniferous forest, and valley and foothill grassland at elevations of 60-900 meters. Perennial herb in the Orbanchaceae family; blooms April-June.	Not Present: Suitable habitat is present adjacent to the project site; however, this species was not observed during the survey in May 2020.
<i>Penstemon rattanii</i> var. <i>kleei</i> Santa Cruz Mountains beardtongue	-- / -- / 1B	Chaparral and lower montane and North Coast coniferous forests at elevations of 400-1100 meters. Perennial herb in the Plantaginaceae family; blooms May-June.	Not Present: Suitable habitat is present adjacent to the project site; however, the site is located out of suitable elevation range for this species. Not observed during the survey in May 2020.
<i>Pentachaeta bellidiflora</i> White-rayed pentachaeta	FE / SE / 1B	Cismontane woodland and valley and foothill grasslands, often on serpentinite soils, at elevations of 35-620 meters. Annual herb in the Asteraceae family; blooms March-May.	Not Present: Suitable habitat is present adjacent to the project site; however, this species was not observed during the survey in May 2020.
<i>Pinus radiata</i> Monterey pine	-- / -- / 1B	Closed-cone coniferous forest and cismontane woodland at elevations of 25-185 meters. Evergreen tree in the Pinaceae family. Only three native stands in CA at Ano Nuevo, Cambria, and the Monterey Peninsula; introduced in many areas.	Not Present: Suitable habitat is present adjacent to the project site; however, this species was not observed during the survey in May 2020.
<i>Piperia candida</i> White-flowered rein orchid	-- / -- / 1B	Broadleaved upland forest, lower montane coniferous forest, and North Coast coniferous forest, sometimes on serpentinite soils, at elevations of 30-1310 meters. Perennial herb in the Orchidaceae family; blooms May-September.	Not Present: Suitable habitat is present adjacent to the project site; however, this species was not observed during the survey in May 2020.
<i>Plagiobothrys chorisianus</i> var. <i>chorisianus</i> Choris' popcorn-flower	-- / -- / 1B	Mesic areas of chaparral, coastal prairie, and coastal scrub at elevations of 15-160 meters. Annual herb in the Boraginaceae family; blooms March-June.	Not Present: No suitable habitat within or adjacent to the project site. Not observed during the survey in May 2020.
<i>Plagiobothrys diffusus</i> San Francisco popcorn-flower	-- / SE / 1B	Coastal prairie and valley and foothill grassland at elevations of 60-360 meters. Annual herb in the Boraginaceae family; blooms March-June.	Not Present: No suitable habitat within or adjacent to the project site. Not observed during the survey in May 2020.

Species	Status (Service/ CDFW/CNPS)	General Habitat	Potential Occurrence within Project Vicinity
<i>Plagiobothrys glaber</i> Hairless popcorn-flower	-- / -- / 1A	Alkaline meadows and seeps, and coastal salt marshes and swamps at elevations of 15-180 meters. Annual herb in the Boraginaceae family; blooms March-May.	Not Present: No suitable habitat within or adjacent to the project site. Not observed during the survey in May 2020.
<i>Polygonum hickmanii</i> Scotts Valley polygonum	FE / SE / 1B	Valley and foothill grassland on mudstone and sandstone at elevations of 210-250 meters. Annual herb in the Polygonaceae family; blooms: May-August.	Not Present: No suitable habitat within or adjacent to the project site. Site is located out of suitable elevation range for this species. Not observed during the survey in May 2020.
<i>Sanicula saxatilis</i> Rock sanicle	-- / SR / 1B	Broadleaved upland forest, chaparral, and valley and foothill grassland on rocky soils at elevations of 620-1175 meters. Perennial herb in the Apiaceae family; blooms April-May.	Not Present: Suitable habitat is present adjacent to the project site; however, the site is located out of suitable elevation range for this species. Not observed during the survey in May 2020.
<i>Senecio aphanactis</i> Chaparral ragwort	-- / -- / 2B	Chaparral, cismontane woodland, and coastal scrub, sometimes on alkaline soils, at elevations of 15-800 acres. Annual herb in the Asteraceae family; blooms January-April.	Not Present: Marginal habitat is present adjacent to the project site; however, this species was not observed during the survey in May 2020.
<i>Stebbinsoseris decipiens</i> Santa Cruz microseris	-- / -- / 1B	Broadleaved upland forest, closed-cone coniferous forest, chaparral, coastal prairie, coastal scrub, and openings in valley and foothill grassland, sometimes on serpentinite, at elevations of 10-500 meters. Annual herb in the Asteraceae family; blooms April-May.	Not Present: Suitable habitat is present adjacent to the project site; however, this species was not observed during the survey in May 2020.
<i>Streptanthus albidus</i> ssp. <i>peramoenus</i> Most beautiful jewel-flower	-- / -- / 1B	Chaparral, cismontane woodlands, and valley and foothill grasslands on serpentinite soils at elevations of 94-1000 meters. Annual herb in the Brassicaceae family; blooms March-October.	Not Present: Suitable habitat is present adjacent to the project site; however, this species was not observed during the survey in May 2020.
<i>Trifolium buckwestiorum</i> Santa Cruz clover	-- / -- / 1B	Gravelly margins of broadleaved upland forest, cismontane woodland, and coastal prairie at elevations of 105-610 meters. Annual herb in the Fabaceae family; blooms April-October.	Not Present: No suitable habitat within or adjacent to the project site. Not observed during the survey in May 2020.
<i>Trifolium polyodon</i> Pacific Grove clover	-- / SR / 1B	Mesic areas of closed-cone coniferous forest, coastal prairie, meadows and seeps, and valley and foothill grassland at elevations of 5-120 meters. Annual herb in the Fabaceae family; blooms April-July.	Not Present: No suitable habitat within or adjacent to the project site. Not observed during the survey in May 2020.

STATUS DEFINITIONS

Federal

- FE = listed as Endangered under the federal Endangered Species Act
- FT = listed as Threatened under the federal Endangered Species Act
- = no listing

State

- SE = listed as Endangered under the California Endangered Species Act
- ST = listed as Threatened under the California Endangered Species Act
- SR = listed as Rare under the California Endangered Species Act
- SC = Candidate for listing under the California Endangered Species Act
- CSC = California Department of Fish and Wildlife Species of Concern
- CFP = California Fully Protected Animal

CNDDDB= This designation is being assigned to animal species with no other status designation defined in this table. These animal species are included in the CDFW's "Special Animals List," which includes all taxa the CNDDDB is interested in tracking, regardless of their legal or protection status. This list is also referred to as the list of "species at risk" or "special-status species." The CDFW considers the taxa on this list to be those of the greatest conservation need.

- = no listing

California Native Plant Society

- 1A = California Rare Plant Rank 1A species; plants presumed extirpated in California and either rare or extinct elsewhere
- 1B = California Rare Plant Rank 1B species; rare, threatened, or endangered in California and elsewhere
- 2B = California Rare Plant Rank 2B species; rare, threatened, or endangered in California, but more common elsewhere
- = no listing

POTENTIAL TO OCCUR

- Present = known occurrence of species within the site; presence of suitable habitat conditions; or observed during field surveys
- High = known occurrence of species in the vicinity from the CNDDDB or other documentation; presence of suitable habitat conditions
- Moderate = known occurrence of species in the vicinity from the CNDDDB or other documentation; presence of marginal habitat conditions within the site
- Low = species known to occur in the vicinity from the CNDDDB or other documentation; lack of suitable habitat or poor quality
- Unlikely = species not known to occur in the vicinity from the CNDDDB or other documentation, no suitable habitat is present within the site
- Not Present = species was not observed during surveys

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APPENDIX C

BOTANICAL PLANT LIST

Quail Hollow Pipeline Plant List

Common Name	Scientific Name
Acacia	<i>Acacia sp.</i>
Deerweed	<i>Acmispon glaber</i>
Chamise	<i>Adenostoma fasciculatum</i>
California buckeye	<i>Aesculus californica</i>
Madrone	<i>Arbutus menziesii</i>
Silverleaf manzanita	<i>Arctostaphylos silvicola*</i>
California sagebrush	<i>Artemisia californica</i>
California mugwort	<i>Artemisia douglasiana</i>
Slender oat	<i>Avena barbata</i>
Coyote brush	<i>Baccharis pilularis</i>
Black mustard	<i>Brassica nigra</i>
Rattlesnake grass	<i>Briza maxima</i>
Little rattlesnake grass	<i>Briza minor</i>
Ripgut brome	<i>Bromus diandrus</i>
Foxtail chess	<i>Bromus madritensis</i>
Italian thistle	<i>Carduus pycnocephalus</i>
Ben lomond spineflower	<i>Chorizanthe pungens var. hartwegiana*</i>
Poison hemlock	<i>Conium maculatum</i>
Pampas grass	<i>Cortaderia jubata</i>
Peak rush-rose	<i>Crocanthemum scoparium</i>
Sticky monkeyflower	<i>Diplacus aurantiacus</i>
California wood fern	<i>Dryopteris arguta</i>
Mock heather	<i>Ericameria ericoides</i>
Ben lomond buckwheat	<i>Eriogonum nudum var. decurrens*</i>
Lizard tail	<i>Eriophyllum staechadifolium</i>
Long beaked filaree	<i>Erodium botrys</i>
California poppy	<i>Eschscholzia californica</i>
Blue gum	<i>Eucalyptus globulus</i>
California coffeeberry	<i>Frangula californica</i>
French broom	<i>Genista monspessulana</i>
Cut leaved geranium	<i>Geranium dissectum</i>
Slender flowered gilia	<i>Gilia tenuiflora ssp. tenuiflora</i>
Toyon	<i>Heteromeles arbutifolia</i>
Telegraph weed	<i>Heterotheca grandiflora</i>
Farmer's foxtail	<i>Hordeum murinum</i>
Smooth cats ear	<i>Hypochaeris glabra</i>
Northern california black walnut	<i>Juglans hindsii</i>
Silver bush lupine	<i>Lupinus albifrons</i>
Yellow bush lupine	<i>Lupinus arboreus</i>
Sky lupine	<i>Lupinus nanus</i>
California man-root	<i>Marah fabacea</i>
Black medic	<i>Medicago lupulina</i>
Ponderosa pine	<i>Pinus ponderosa</i>
English plantain	<i>Plantago lanceolata</i>
Coast live oak	<i>Quercus agrifolia</i>
Valley oak	<i>Quercus lobata</i>
Himalayan blackberry	<i>Rubus armeniacus</i>
California blackberry	<i>Rubus ursinus</i>
Common sheep sorrel	<i>Rumex acetosella</i>
Black elderberry	<i>Sambucus nigra</i>
Peruvian peppertree	<i>Schinus molle</i>
Mountain bog bulrush	<i>Scirpus microcarpus</i>
Coast redwood	<i>Sequoia sempervirens</i>
Hedge nettle	<i>Stachys ajugoides</i>
Wood mint	<i>Stachys bullata</i>
Common snowberry	<i>Symphoricarpos albus</i>
Poison oak	<i>Toxicodendron diversilobum</i>
Narrow leaved clover	<i>Trifolium angustifolium</i>
Rose clover	<i>Trifolium hirtum</i>
Vetch species	<i>Vicia sp.</i>

*Rare

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APPENDIX D

CNDDDB OCCURRENCE REPORT



Selected Elements by Scientific Name

California Department of Fish and Wildlife

California Natural Diversity Database



Query Criteria: Quad (Big Basin (371222) OR Castle Rock Ridge (371221) OR Los Gatos (371212) OR Davenport (371212) OR Felton (371211) OR Laurel (371211) OR Santa Cruz (361228) OR Soquel (361218))

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
<i>Accipiter cooperii</i> Cooper's hawk	ABNKC12040	None	None	G5	S4	WL
<i>Adela oplerella</i> Opler's longhorn moth	IILEE0G040	None	None	G2	S2	
<i>Agelaius tricolor</i> tricolored blackbird	ABPBXB0020	None	Threatened	G2G3	S1S2	SSC
<i>Agrostis blasdalei</i> Blasdale's bent grass	PMPOA04060	None	None	G2	S2	1B.2
<i>Ambystoma californiense</i> California tiger salamander	AAAAA01180	Threatened	Threatened	G2G3	S2S3	WL
<i>Ambystoma macrodactylum croceum</i> Santa Cruz long-toed salamander	AAAAA01082	Endangered	Endangered	G5T1T2	S1S2	FP
<i>Amsinckia lunaris</i> bent-flowered fiddleneck	PDBOR01070	None	None	G3	S3	1B.2
<i>Aneides niger</i> Santa Cruz black salamander	AAAAD01070	None	None	G3	S3	SSC
<i>Anomobryum julaceum</i> slender silver moss	NBMUS80010	None	None	G5?	S2	4.2
<i>Antrozous pallidus</i> pallid bat	AMACC10010	None	None	G5	S3	SSC
<i>Aquila chrysaetos</i> golden eagle	ABNKC22010	None	None	G5	S3	FP
<i>Arctostaphylos andersonii</i> Anderson's manzanita	PDERI04030	None	None	G2	S2	1B.2
<i>Arctostaphylos glutinosa</i> Schreiber's manzanita	PDERI040G0	None	None	G1	S1	1B.2
<i>Arctostaphylos ohloneana</i> Ohlone manzanita	PDERI042Y0	None	None	G1	S1	1B.1
<i>Arctostaphylos regismontana</i> Kings Mountain manzanita	PDERI041C0	None	None	G2	S2	1B.2
<i>Arctostaphylos silvicola</i> Bonny Doon manzanita	PDERI041F0	None	None	G1	S1	1B.2
<i>Ardea herodias</i> great blue heron	ABNGA04010	None	None	G5	S4	
<i>Arenaria paludicola</i> marsh sandwort	PDCAR040L0	Endangered	Endangered	G1	S1	1B.1
<i>Athene cunicularia</i> burrowing owl	ABNSB10010	None	None	G4	S3	SSC



Selected Elements by Scientific Name
California Department of Fish and Wildlife
California Natural Diversity Database



Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
<i>Bombus caliginosus</i> obscure bumble bee	IIHYM24380	None	None	G4?	S1S2	
<i>Bombus occidentalis</i> western bumble bee	IIHYM24250	None	Candidate Endangered	G2G3	S1	
<i>Brachyramphus marmoratus</i> marbled murrelet	ABNNN06010	Threatened	Endangered	G3G4	S1	
<i>Calasellus californicus</i> An isopod	ICMAL34010	None	None	G2	S2	
<i>Calyptidium parryi var. hesseae</i> Santa Cruz Mountains pussypaws	PDPOR09052	None	None	G3G4T2	S2	1B.1
<i>Campanula californica</i> swamp harebell	PDCAM02060	None	None	G3	S3	1B.2
<i>Carex comosa</i> bristly sedge	PMCYP032Y0	None	None	G5	S2	2B.1
<i>Carex saliniformis</i> deceiving sedge	PMCYP03BY0	None	None	G2	S2	1B.2
<i>Centromadia parryi ssp. congdonii</i> Congdon's tarplant	PDAST4R0P1	None	None	G3T1T2	S1S2	1B.1
<i>Charadrius alexandrinus nivosus</i> western snowy plover	ABNNB03031	Threatened	None	G3T3	S2S3	SSC
<i>Chorizanthe pungens var. hartwegiana</i> Ben Lomond spineflower	PDPGN040M1	Endangered	None	G2T1	S1	1B.1
<i>Chorizanthe pungens var. pungens</i> Monterey spineflower	PDPGN040M2	Threatened	None	G2T2	S2	1B.2
<i>Chorizanthe robusta var. hartwegii</i> Scotts Valley spineflower	PDPGN040Q1	Endangered	None	G2T1	S1	1B.1
<i>Chorizanthe robusta var. robusta</i> robust spineflower	PDPGN040Q2	Endangered	None	G2T1	S1	1B.1
<i>Cicindela hirticollis gravida</i> sandy beach tiger beetle	IICOL02101	None	None	G5T2	S2	
<i>Cicindela ohlone</i> Ohlone tiger beetle	IICOL026L0	Endangered	None	G1	S1	
<i>Cirsium fontinale var. campylon</i> Mt. Hamilton thistle	PDAST2E163	None	None	G2T2	S2	1B.2
<i>Clarkia concinna ssp. automixa</i> Santa Clara red ribbons	PDONA050A1	None	None	G5?T3	S3	4.3
<i>Coelus globosus</i> globose dune beetle	IICOL4A010	None	None	G1G2	S1S2	
<i>Collinsia multicolor</i> San Francisco collinsia	PDSCR0H0B0	None	None	G2	S2	1B.2
<i>Corynorhinus townsendii</i> Townsend's big-eared bat	AMACC08010	None	None	G3G4	S2	SSC



Selected Elements by Scientific Name
California Department of Fish and Wildlife
California Natural Diversity Database



Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
<i>Coturnicops noveboracensis</i> yellow rail	ABNME01010	None	None	G4	S1S2	SSC
<i>Cypseloides niger</i> black swift	ABNUA01010	None	None	G4	S2	SSC
<i>Dacryophyllum falcifolium</i> tear drop moss	NBMUS8Z010	None	None	G2	S2	1B.3
<i>Danaus plexippus pop. 1</i> monarch - California overwintering population	IILEPP2012	None	None	G4T2T3	S2S3	
<i>Dicamptodon ensatus</i> California giant salamander	AAAAH01020	None	None	G3	S2S3	SSC
<i>Dipodomys venustus venustus</i> Santa Cruz kangaroo rat	AMAFD03042	None	None	G4T1	S1	
<i>Dudleya abramsii ssp. setchellii</i> Santa Clara Valley dudleya	PDCRA040Z0	Endangered	None	G4T2	S2	1B.1
<i>Elanus leucurus</i> white-tailed kite	ABNKC06010	None	None	G5	S3S4	FP
<i>Emys marmorata</i> western pond turtle	ARAAD02030	None	None	G3G4	S3	SSC
<i>Erethizon dorsatum</i> North American porcupine	AMAFJ01010	None	None	G5	S3	
<i>Eriogonum nudum var. decurrens</i> Ben Lomond buckwheat	PDPGN08492	None	None	G5T1	S1	1B.1
<i>Erysimum teretifolium</i> Santa Cruz wallflower	PDBRA160N0	Endangered	Endangered	G1	S1	1B.1
<i>Eucyclogobius newberryi</i> tidewater goby	AFCQN04010	Endangered	None	G3	S3	SSC
<i>Euphilotes enoptes smithi</i> Smith's blue butterfly	IILEPG2026	Endangered	None	G5T1T2	S1S2	
<i>Falco peregrinus anatum</i> American peregrine falcon	ABNKD06071	Delisted	Delisted	G4T4	S3S4	FP
<i>Fissidens pauperculus</i> minute pocket moss	NBMUS2W0U0	None	None	G3?	S2	1B.2
<i>Fissilicreagris imperialis</i> Empire Cave pseudoscorpion	ILARAE5010	None	None	G1	S1	
<i>Fritillaria liliacea</i> fragrant fritillary	PMLIL0V0C0	None	None	G2	S2	1B.2
<i>Geothlypis trichas sinuosa</i> saltmarsh common yellowthroat	ABPBX1201A	None	None	G5T3	S3	SSC
<i>Grimmia torenii</i> Toren's grimmia	NBMUS32330	None	None	G2	S2	1B.3
<i>Grimmia vaginulata</i> vaginulate grimmia	NBMUS32340	None	None	G3	S1	1B.1



Selected Elements by Scientific Name
California Department of Fish and Wildlife
California Natural Diversity Database



Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
<i>Hesperevax sparsiflora</i> var. <i>brevifolia</i> short-leaved evax	PDASTE5011	None	None	G4T3	S2	1B.2
<i>Hesperocyparis abramsiana</i> var. <i>abramsiana</i> Santa Cruz cypress	PGCUP04081	Threatened	Endangered	G1T1	S1	1B.2
<i>Hesperocyparis abramsiana</i> var. <i>butanoensis</i> Butano Ridge cypress	PGCUP04082	Threatened	Endangered	G1T1	S1	1B.2
<i>Hoita strobilina</i> Loma Prieta hoita	PDFAB5Z030	None	None	G2?	S2?	1B.1
<i>Holocarpha macradenia</i> Santa Cruz tarplant	PDAST4X020	Threatened	Endangered	G1	S1	1B.1
<i>Horkelia cuneata</i> var. <i>sericea</i> Kellogg's horkelia	PDROS0W043	None	None	G4T1?	S1?	1B.1
<i>Horkelia marinensis</i> Point Reyes horkelia	PDROS0W0B0	None	None	G2	S2	1B.2
<i>Lasiurus cinereus</i> hoary bat	AMACC05030	None	None	G5	S4	
<i>Lasthenia californica</i> ssp. <i>macrantha</i> perennial goldfields	PDAST5L0C5	None	None	G3T2	S2	1B.2
<i>Laterallus jamaicensis coturniculus</i> California black rail	ABNME03041	None	Threatened	G3G4T1	S1	FP
<i>Lessingia micradenia</i> var. <i>glabrata</i> smooth lessingia	PDAST5S062	None	None	G2T2	S2	1B.2
<i>Linderiella occidentalis</i> California linderiella	ICBRA06010	None	None	G2G3	S2S3	
<i>Lytta moesta</i> moestan blister beetle	IICOL4C020	None	None	G2	S2	
<i>Malacothamnus arcuatus</i> arcuate bush-mallow	PDMAL0Q0E0	None	None	G2Q	S2	1B.2
<i>Margaritifera falcata</i> western pearlshell	IMBIV27020	None	None	G4G5	S1S2	
<i>Maritime Coast Range Ponderosa Pine Forest</i> Maritime Coast Range Ponderosa Pine Forest	CTT84132CA	None	None	G1	S1.1	
<i>Meta dolloff</i> Dolloff Cave spider	ILARA17010	None	None	G1	S1	
<i>Microseris paludosa</i> marsh microseris	PDAST6E0D0	None	None	G2	S2	1B.2
<i>Mielichhoferia elongata</i> elongate copper moss	NBMUS4Q022	None	None	G5	S3S4	4.3
<i>Monardella sinuata</i> ssp. <i>nigrescens</i> northern curly-leaved monardella	PDLAM18162	None	None	G3T2	S2	1B.2
<i>Monolopia gracilens</i> woodland woollythreads	PDAST6G010	None	None	G3	S3	1B.2



Selected Elements by Scientific Name
California Department of Fish and Wildlife
California Natural Diversity Database



Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Monterey Pine Forest Monterey Pine Forest	CTT83130CA	None	None	G1	S1.1	
N. Central Coast Calif. Roach/Stickleback/Steelhead Stream N. Central Coast Calif. Roach/Stickleback/Steelhead Stream	CARA2633CA	None	None	GNR	SNR	
Neochthonius imperialis Empire Cave pseudoscorpion	ILARAD1010	None	None	G1	S1	
Neotoma fuscipes annectens San Francisco dusky-footed woodrat	AMAFF08082	None	None	G5T2T3	S2S3	SSC
North Central Coast Drainage Sacramento Sucker/Roach River North Central Coast Drainage Sacramento Sucker/Roach River	CARA2623CA	None	None	GNR	SNR	
North Central Coast Short-Run Coho Stream North Central Coast Short-Run Coho Stream	CARA2632CA	None	None	GNR	SNR	
Northern Coastal Salt Marsh Northern Coastal Salt Marsh	CTT52110CA	None	None	G3	S3.2	
Northern Interior Cypress Forest Northern Interior Cypress Forest	CTT83220CA	None	None	G2	S2.2	
Northern Maritime Chaparral Northern Maritime Chaparral	CTT37C10CA	None	None	G1	S1.2	
Oncorhynchus kisutch pop. 4 coho salmon - central California coast ESU	AFCHA02034	Endangered	Endangered	G4	S2?	
Oncorhynchus mykiss irideus pop. 8 steelhead - central California coast DPS	AFCHA0209G	Threatened	None	G5T2T3Q	S2S3	
Orthotrichum kellmanii Kellman's bristle moss	NBMUS56190	None	None	G1	S1	1B.2
Pandion haliaetus osprey	ABNKC01010	None	None	G5	S4	WL
Pedicularis dudleyi Dudley's lousewort	PDSCR1K0D0	None	Rare	G2	S2	1B.2
Penstemon rattanii var. kleei Santa Cruz Mountains beardtongue	PDSCR1L5B1	None	None	G4T2	S2	1B.2
Pentachaeta bellidiflora white-rayed pentachaeta	PDAST6X030	Endangered	Endangered	G1	S1	1B.1
Philanthus nasalis Antioch specid wasp	IIHYM20010	None	None	G1	S1	
Pinus radiata Monterey pine	PGPIN040V0	None	None	G1	S1	1B.1
Piperia candida white-flowered rein orchid	PMORC1X050	None	None	G3	S3	1B.2
Plagiobothrys chorisianus var. chorisianus Choris' popcornflower	PDBOR0V061	None	None	G3T1Q	S1	1B.2



Selected Elements by Scientific Name
California Department of Fish and Wildlife
California Natural Diversity Database



Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
<i>Plagiobothrys diffusus</i> San Francisco popcornflower	PDBOR0V080	None	Endangered	G1Q	S1	1B.1
<i>Plagiobothrys glaber</i> hairless popcornflower	PDBOR0V0B0	None	None	GH	SH	1A
<i>Polygonum hickmanii</i> Scotts Valley polygonum	PDPGN0L310	Endangered	Endangered	G1	S1	1B.1
<i>Polyphylla barbata</i> Mount Hermon (=barbate) June beetle	IICOL68030	Endangered	None	G1	S1	
<i>Progne subis</i> purple martin	ABPAU01010	None	None	G5	S3	SSC
<i>Rana boylei</i> foothill yellow-legged frog	AAABH01050	None	Endangered	G3	S3	SSC
<i>Rana draytonii</i> California red-legged frog	AAABH01022	Threatened	None	G2G3	S2S3	SSC
<i>Riparia riparia</i> bank swallow	ABPAU08010	None	Threatened	G5	S2	
<i>Sanicula saxatilis</i> rock sanicle	PDAP11Z0H0	None	Rare	G2	S2	1B.2
<i>Senecio aphanactis</i> chaparral ragwort	PDAST8H060	None	None	G3	S2	2B.2
<i>Sidalcea malachroides</i> maple-leaved checkerbloom	PDMAL110E0	None	None	G3	S3	4.2
<i>Speyeria adiate adiate</i> unsilvered fritillary	IILEPJ6143	None	None	G1G2T1	S1	
<i>Stebbinsoseris decipiens</i> Santa Cruz microseris	PDAST6E050	None	None	G2	S2	1B.2
<i>Streptanthus albidus ssp. peramoenus</i> most beautiful jewelflower	PDBRA2G012	None	None	G2T2	S2	1B.2
<i>Stygobromus mackenziei</i> Mackenzie's Cave amphipod	ICMAL05530	None	None	G1	S1	
<i>Taxidea taxus</i> American badger	AMAJF04010	None	None	G5	S3	SSC
<i>Thaleichthys pacificus</i> eulachon	AFCHB04010	Threatened	None	G5	S3	
<i>Trifolium buckwestiorum</i> Santa Cruz clover	PDFAB402W0	None	None	G2	S2	1B.1
<i>Trifolium polyodon</i> Pacific Grove clover	PDFAB402H0	None	Rare	G1	S1	1B.1
<i>Trimerotropis infantilis</i> Zayante band-winged grasshopper	IORT36030	Endangered	None	G1	S1	
<i>Tryonia imitator</i> mimic tryonia (=California brackishwater snail)	IMGASJ7040	None	None	G2	S2	



Selected Elements by Scientific Name
California Department of Fish and Wildlife
California Natural Diversity Database



Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
<i>Usnea longissima</i> Methuselah's beard lichen	NLLEC5P420	None	None	G4	S4	4.2

Record Count: 124

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APPENDIX E

IPaC RESOURCES LIST FOR THE SURVEY AREA



United States Department of the Interior



FISH AND WILDLIFE SERVICE
Ventura Fish And Wildlife Office
2493 Portola Road, Suite B
Ventura, CA 93003-7726
Phone: (805) 644-1766 Fax: (805) 644-3958

In Reply Refer To:
Consultation Code: 08EVEN00-2020-SLI-0598
Event Code: 08EVEN00-2020-E-01276
Project Name: Quail Hollow Pipeline

August 26, 2020

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

To Whom It May Concern:

The enclosed list identifies species listed as threatened and endangered, species proposed for listing as threatened or endangered, designated and proposed critical habitat, and species that are candidates for listing that may occur within the boundary of the area you have indicated using the U.S. Fish and Wildlife Service's (Service) Information Planning and Conservation System (IPaC). The species list fulfills the requirements under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.). Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the species list should be verified after 90 days. We recommend that verification be completed by visiting the IPaC website at regular intervals during project planning and implementation for updates to species lists following the same process you used to receive the enclosed list. Please include the Consultation Tracking Number in the header of this letter with any correspondence about the species list.

Due to staff shortages and excessive workload, we are unable to provide an official list more specific to your area. Numerous other sources of information are available for you to narrow the list to the habitats and conditions of the site in which you are interested. For example, we recommend conducting a biological site assessment or surveys for plants and animals that could help refine the list.

If a Federal agency is involved in the project, that agency has the responsibility to review its proposed activities and determine whether any listed species may be affected. If the project is a major construction project*, the Federal agency has the responsibility to prepare a biological assessment to make a determination of the effects of the action on the listed species or critical habitat. If the Federal agency determines that a listed species or critical habitat is likely to be adversely affected, it should request, in writing through our office, formal consultation pursuant to section 7 of the Act. Informal consultation may be used to exchange information and resolve conflicts with respect to threatened or endangered species or their critical habitat prior to a

written request for formal consultation. During this review process, the Federal agency may engage in planning efforts but may not make any irreversible commitment of resources. Such a commitment could constitute a violation of section 7(d) of the Act.

Federal agencies are required to confer with the Service, pursuant to section 7(a)(4) of the Act, when an agency action is likely to jeopardize the continued existence of any proposed species or result in the destruction or adverse modification of proposed critical habitat (50 CFR 402.10(a)). A request for formal conference must be in writing and should include the same information that would be provided for a request for formal consultation. Conferences can also include discussions between the Service and the Federal agency to identify and resolve potential conflicts between an action and proposed species or proposed critical habitat early in the decision-making process. The Service recommends ways to minimize or avoid adverse effects of the action. These recommendations are advisory because the jeopardy prohibition of section 7(a)(2) of the Act does not apply until the species is listed or the proposed critical habitat is designated. The conference process fulfills the need to inform Federal agencies of possible steps that an agency might take at an early stage to adjust its actions to avoid jeopardizing a proposed species.

When a proposed species or proposed critical habitat may be affected by an action, the lead Federal agency may elect to enter into formal conference with the Service even if the action is not likely to jeopardize or result in the destruction or adverse modification of proposed critical habitat. If the proposed species is listed or the proposed critical habitat is designated after completion of the conference, the Federal agency may ask the Service, in writing, to confirm the conference as a formal consultation. If the Service reviews the proposed action and finds that no significant changes in the action as planned or in the information used during the conference have occurred, the Service will confirm the conference as a formal consultation on the project and no further section 7 consultation will be necessary. Use of the formal conference process in this manner can prevent delays in the event the proposed species is listed or the proposed critical habitat is designated during project development or implementation.

Candidate species are those species presently under review by the Service for consideration for Federal listing. Candidate species should be considered in the planning process because they may become listed or proposed for listing prior to project completion. Preparation of a biological assessment, as described in section 7(c) of the Act, is not required for candidate species. If early evaluation of your project indicates that it is likely to affect a candidate species, you may wish to request technical assistance from this office.

Only listed species receive protection under the Act. However, sensitive species should be considered in the planning process in the event they become listed or proposed for listing prior to project completion. We recommend that you review information in the California Department of Fish and Wildlife's Natural Diversity Data Base. You can contact the California Department of Fish and Wildlife at (916) 324-3812 for information on other sensitive species that may occur in this area.

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

Attachment(s):

- Official Species List
-

Official Species List

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

This species list is provided by:

Ventura Fish And Wildlife Office

2493 Portola Road, Suite B

Ventura, CA 93003-7726

(805) 644-1766

Project Summary

Consultation Code: 08EVEN00-2020-SLI-0598

Event Code: 08EVEN00-2020-E-01276

Project Name: Quail Hollow Pipeline

Project Type: WATER SUPPLY / DELIVERY

Project Description: Installation of water distribution pipeline

Project Location:

Approximate location of the project can be viewed in Google Maps: <https://www.google.com/maps/place/37.08016513199321N122.06234914833158W>



Counties: Santa Cruz, CA

Endangered Species Act Species

There is a total of 20 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries¹, as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

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

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

Birds

NAME	STATUS
California Least Tern <i>Sterna antillarum browni</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/8104	Endangered
Least Bell's Vireo <i>Vireo bellii pusillus</i> There is final critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/5945	Endangered
Marbled Murrelet <i>Brachyramphus marmoratus</i> Population: U.S.A. (CA, OR, WA) There is final critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/4467	Threatened
Southwestern Willow Flycatcher <i>Empidonax traillii extimus</i> There is final critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/6749	Endangered

Reptiles

NAME	STATUS
San Francisco Garter Snake <i>Thamnophis sirtalis tetrataenia</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/5956	Endangered

Amphibians

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

Fishes

NAME	STATUS
Tidewater Goby <i>Eucyclogobius newberryi</i> There is final critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/57	Endangered

Insects

NAME	STATUS
Mount Hermon June Beetle <i>Polyphylla barbata</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/3982	Endangered
Ohlone Tiger Beetle <i>Cicindela ohlone</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/8271	Endangered
Smith's Blue Butterfly <i>Euphilotes enoptes smithi</i> There is proposed critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/4418	Endangered
Zayante Band-winged Grasshopper <i>Trimerotropis infantilis</i> There is final critical habitat for this species. Your location overlaps the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/1036	Endangered

Flowering Plants

NAME	STATUS
Ben Lomond Spineflower <i>Chorizanthe pungens</i> var. <i>hartwegiana</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/7498	Endangered
Ben Lomond Wallflower <i>Erysimum teretifolium</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/7429	Endangered
Marsh Sandwort <i>Arenaria paludicola</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/2229	Endangered
Menzies' Wallflower <i>Erysimum menziesii</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/2935	Endangered
Santa Cruz Tarplant <i>Holocarpha macradenia</i> There is final critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/6832	Threatened
Scotts Valley Polygonum <i>Polygonum hickmanii</i> There is final critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/3222	Endangered
Scotts Valley Spineflower <i>Chorizanthe robusta</i> var. <i>hartwegii</i> There is final critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/7108	Endangered

Conifers and Cycads

NAME	STATUS
Santa Cruz Cypress <i>Cupressus abramsiana</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/1678	Threatened

Critical habitats

There is 1 critical habitat wholly or partially within your project area under this office's jurisdiction.

NAME	STATUS
Zayante Band-winged Grasshopper <i>Trimerotropis infantilis</i> https://ecos.fws.gov/ecp/species/1036#crithab	Final

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Appendix C.

Draft Geotechnical Design Report – San Lorenzo Valley Water District 2019
Waterline Project

DRAFT GEOTECHNICAL DESIGN REPORT

SAN LORENZO VALLEY WATER DISTRICT 2019 WATERLINE PROJECT

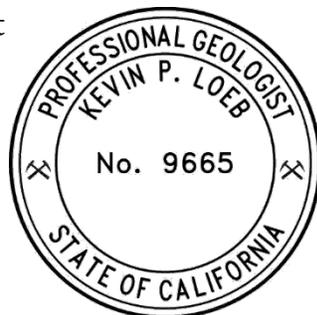
CE&G DOCUMENT NO.: 191110.001

JANUARY 30, 2020

Prepared for:

Schaaf & Wheeler Consulting Civil Engineers
Attn: Andrew Sterbenz, P.E.
3 Quail Run Circle, Suite 101
Salinas, CA 93907-2348

Kevin Loeb, PG 9665
Project Geologist



Dan Peluso, PE 49562, GE 2367
Principle Engineer



TABLE OF CONTENTS

1.0	Introduction.....	1
1.1	General.....	1
1.2	Project Description.....	1
1.3	Purpose and Scope of Services.....	1
2.0	Site Description.....	2
2.1	Site Description.....	2
2.2	Information Provided.....	3
3.0	Geologic Conditions.....	4
3.1	Regional Geologic Setting.....	4
3.2	Geohazard Mapping.....	6
3.3	Regional Groundwater.....	7
3.4	Seismicity.....	7
4.0	Field Investigations.....	11
4.1	Site Reconnaissance.....	11
4.2	Subsurface Explorations.....	11
4.3	Soil Conditions Encountered.....	13
4.4	Groundwater Conditions Encountered.....	14
4.5	Geotechnical Laboratory Testing.....	14
5.0	Conclusion and Discussion.....	16
5.1	Excavatability.....	16
5.2	Shoring and Excavation Stability.....	16
5.3	Groundwater.....	16
5.4	Seismic Loading.....	17
5.5	Corrosion.....	18
6.0	Design and Construction Recommendations.....	20
6.1	Design Groundwater level.....	20
6.2	Dewatering.....	20
6.3	Shoring.....	20
6.4	Pipeline Design Loads and Installation.....	22
6.5	Manholes and Other Structures.....	23
6.6	Earthwork.....	24
6.7	Pavement Replacement.....	25
6.8	Technical Review and Construction Observation.....	25
7.0	Limitations.....	27
8.0	References.....	28

FIGURES

Figure 1. Site Location Map

Figure 2A-2E. Site Plans

Figure 3. Regional Geology Map

Figure 4. Fault Activity Map

Figure 5. Landslide Activity Map

APPENDICES

Appendix A. Boring Logs

Appendix B. Laboratory Testing

1.0 INTRODUCTION

1.1 GENERAL

Cal Engineering & Geology, Inc. (CE&G) has provided geotechnical design services to Schaaf & Wheeler Consulting Civil Engineers (S&W), for the 2019 pipeline Project. The pipeline system is owned and maintained by SLVWD. The project includes five pipeline segments located in the Santa Cruz Mountains in the vicinity of Boulder Creek, California. The project sites are identified based on the roads where they are located; as follows: Hillside Drive, Sequoia Avenue, HWY 236 (Lyon Zone), California Drive, and Quail Hollow Road (Figures 1 & 2). This report has been prepared to provide geotechnical recommendations for the construction of the pipelines.

1.2 PROJECT DESCRIPTION

The project consists of 5 waterline segments, totaling approximately 17,300 lineal feet, that are to be replaced. Each pipeline segment ranges in length from 800 to 7,500 feet. Existing pipe diameters range from 2 to 12-inch pipe. It is anticipated the replacement pipes will consist of a variety of materials, including ductile iron, PVC and HDPE. Each pipe segment will generally be replaced with pipes larger than existing service pipes. Pipe replacement is anticipated to consist of open trench replacement.

1.3 PURPOSE AND SCOPE OF SERVICES

The purpose of CE&G's geotechnical investigation was to assess the existing surface and subsurface conditions along the planned pipeline alignments, develop geotechnical design recommendations, and prepare this geotechnical design report for the proposed installation of the new water pipelines.

The scope of work completed for this geotechnical investigation and report include: project coordination and consultation with SLVWD and S&W; geologic reconnaissance to observe current site conditions and to mark for USA (Underground Service Alert); subsurface exploration using a truck-mounted drill rig and hand excavation equipment; laboratory testing to determine selected engineering properties; development of geotechnical design recommendations; and the preparation of this report.

2.0 SITE DESCRIPTION

2.1 SITE DESCRIPTION

The five planned water line replacement segments are located in the central area of Santa Cruz County, in the vicinity of Boulder Creek, California. Each of the five pipeline segments vary in topographic settings and have differing site features, which are describe below.

Site specific topographic surveys were provided by (S&W) and is used as the primary base in the attached Site Plan (Figure 2).

2.1.1 Hillside Drive Alignment

The Hillside Drive alignment is located in a forested, residential area of Boulder Creek California (Figure 2A). Starting at, this segment of the pipeline extends from the intersection of Fern Drive and Reynolds Drive southwest along Reynolds drive and continues north along Hillside Drive to the intersection with Fern Drive. Existing vegetation along the roadway consists of large trees and shrubs. Residential properties along the road consist of single-family homes. Overall, the project area is on moderately steep hillside terrain that slopes to the east/northeast towards the San Lorenzo River. The elevation within the project area varies between approximately 617 and 673 feet above sea level (WGS84).

2.1.2 Sequoia Avenue Alignment

The Sequoia Avenue segment of the pipeline extends from the southern end of Sequoia Avenue across an east/west trending ridge to the northwestern end of Margaret Drive (Figure 2B). The area is densely vegetated with shrubs and trees with moderately steep terrain. The elevation within the project area varies between approximately 679 and 730 feet above sea level (WGS84).

2.1.3 Lyon Zone Alignment

The Lyon Zone segment of the pipeline begins at the intersection of Lomond Street and State Highway 9 in downtown Boulder Creek (Figure 2C). The alignment extends southwest along Lomond Street, then continues northwest along Pine Street to the intersection with HWY 236 (Big Basin Way), where it extends west/northwest to the intersection with South Redwood Drive. The alignment trends southwest along South Redwood Drive and continues along Madrone Drive. The southeastern portion of the segment is located in a residential and gently sloping area of downtown. The northwestern portion of the alignment is in moderately steep and densely vegetated terrain. The

elevation within the project area varies between approximately 492 and 680 feet above sea level (WGS84) but increase overall from southeast to northwest.

2.1.4 California Drive Alignment

This segment is in a residential area of unincorporated Ben Lomond, California. This pipeline segment extends along Middle Drive from the intersection of Riverside Drive and Middle Road to the intersection with California Drive, trends along California Drive to the intersection with Riverside Drive (Figure 2D). The topography in this area slopes gently down to the east towards the San Lorenzo River. Single family homes are located along both sides of the streets along this alignment. The elevation within the project area varies between approximately 374 feet and 400 feet above sea level (WGS84).

2.1.5 Quail Hollow Road Alignment

This segment is located along Quail Hollow Road between Cumora Lane and West Zayante Road in Felton, California (Figure 2E). The hillside areas along this segment are generally moderately vegetated with grass, shrub, and trees, with some areas along the segment that are more sparsely vegetated, with grassy land and scattered trees and shrubs. The elevation within the project area varies between approximately 344 feet and 655 feet above sea level (WGS84).

2.2 INFORMATION PROVIDED

Prior to beginning work, S&W provided a request for proposal (RFP) that contained a plan view of the five pipeline alignments to aid in developing a work plan and determine boring locations.

3.0 GEOLOGIC CONDITIONS

3.1 REGIONAL GEOLOGIC SETTING

The five pipeline alignments are located in the Santa Cruz Mountains, within the Coast Ranges geomorphic province of California (Fig. 1). This province is characterized by northwest-southeast trending mountain ranges such as the Santa Cruz Mountains and intervening valleys such as that occupied by San Francisco Bay. The Santa Cruz Mountains mark a mountain-range scale regional uplift centered on the San Andreas fault. The geologic setting is shown on our Regional Geologic Map (Figure 3).

The general vicinity of the pipeline alignments has been mapped several times, at different scales, and with different emphasis. Notable compilations include: Brabb and others (1997); Wentworth and others (1999); and Graymer and others (2006). The resulting geologic maps from these studies are in general agreement. For the purposes of this study, we reference the site geology using Brabb and others (1997).

The various pipeline segments are geographically separated and mapped within different geologic units. In the sections below, we review the dominant bedrock type in each segment's area.

3.1.1 Hillside Drive Alignment

The southern portion of the Hillside Drive alignment is in an area mapped as the Twobar Shale Member (Eocene) of the San Lorenzo Formation (Brabb and others, 1997). This unit is described as "very thin bedded and laminated olive-gray shale." The northern portion of the alignment is in an area mapped as the Rices Mudstone Member (Oligocene and Eocene) of the San Lorenzo Formation and is described as "olive-gray mudstone and massive medium light-gray, very fine- to fine-grained arkosic sandstone" (Brabb and others, 1997). The Twobar Shale and Rices Mudstone Members are shown as having been juxtaposed by the Butano Fault, which crosses the center of the Hillside Drive alignment (Brabb and others, 1997).

3.1.2 Sequoia Avenue Alignment

Brabb and others (1997) show the area of the Sequoia Avenue segment overlying southwesterly dipping Vaqueros Sandstone (Lower Miocene and Oligocene). This unit is described as "thick-bedded to massive yellowish-gray, very fine- to fine-grained arkosic sandstone containing interbeds of olive-gray shale and mudstone."

3.1.3 Lyon Zone Alignment

The Lyon Zone segment extends across three different geologic units as mapped by Brabb and others (1997). The northwestern portion of the alignment is in an area mapped as Lompico Sandstone (Middle Miocene in age), which is shown dipping to the southwest and is described as “thick-bedded to massive yellowish-gray, medium- to fine-grained calcareous arkosic sandstone.” The center portion of the alignment is in an area mapped as Monterey Formation bedrock, which is shown in the site vicinity as dipping southwest and overlying the Lompico Sandstone. The Monterey Formation bedrock is described as “medium- to thick bedded and laminated olive-gray to light-gray semi-siliceous organic mudstone and sandy siltstone” (Brabb and others, 1997). The southeastern portion of the segment is shown in an area mapped as undifferentiated alluvial deposits (Holocene), which overlie both the Monterey Formation and Lompico Sandstone. The alluvium is described as “unconsolidated, heterogenous, moderately sorted silt and sand containing discontinuous lenses clay and silty clay, which locally includes large amounts of gravel” (Brabb and others, 1997).

The entire Lyon Zone segment is in an area mapped northeast of the Ben Lomond Fault (see Figure 3; Brabb and others, 1997).

3.1.4 California Drive Alignment

The California Drive segment is in an area mapped as Quaternary age, undifferentiated alluvial deposits (described above), concentrated along a valley floor. Monterey Formation bedrock (Middle Miocene) appears to underlie the alluvium (Brabb and others, 1997).

The northwest-trending Ben Lomond Fault is shown as crossing the southwestern portion of the California Drive segment (Brabb and others, 1997).

3.1.5 Quail Hollow Road Alignment

Mapping by Brabb and others (1997) show the Quail Hollow Road segment on the northeastern side of the Scotts Valley Syncline, in an area underlain by the Santa Margarita sandstone (Upper Miocene). This sandstone is described as “very thick-bedded to massive thickly cross bedded, yellowish-gray to white, friable, medium- to fine-grained arkosic sandstone” (Brabb and others, 1997). The southeastern part of the alignment is in an area mapped as northeasterly dipping Monterey Formation bedrock, described above.

3.2 GEOHAZARD MAPPING

3.2.1 State and Regional Geohazard Mapping

The California Geological Survey (CGS) has not established Seismic Hazard Zone maps for the quadrangles encompassing the project alignments, and/or has not evaluated the vicinity of the segments. This map series identifies zones of required investigation for liquefaction and landslides.

The United States Geological Survey (USGS) produced an Interactive Fault Map using their Quaternary Fault and Fold Database (USGS, 2006). This database includes information on faults and associated folds throughout the U.S. that show geological evidence of coseismic surface deformation in large earthquakes during the past 1.6 million years. These faults and folds are divided into various categories based on evidence of their most recent movement and include: Historic (< 150 years); Latest Quaternary (< 15,000 years); Late Quaternary (< 130,000 years); Middle and Late Quaternary (< 750,000 years); and Undifferentiated Quaternary (< 1.6 million years). According to the Fault Interactive Map, there are no Quaternary faults shown crossing the pipeline alignments for the Sequoia Avenue, Lyon Zone, California Drive, and Quail Hollow Road segments (Figure 4) (USGS, 2015). A splay of the Butano fault, labeled as undifferentiated Quaternary, is shown as crossing the Hillside Drive pipeline segment (see Figure 4; USGS, 2006)

3.2.2 Local Geohazard Mapping

Santa Cruz County produced maps showing Fault Zone Hazard Areas, which included review of the Butano, Sargent, Zayante, Corralitos, and San Andreas faults (County of Santa Cruz, Emergency Management GIS web page ([http://www.co.santacruz.ca.us/Departments/GeographicInformationSystems\(GIS\).aspx](http://www.co.santacruz.ca.us/Departments/GeographicInformationSystems(GIS).aspx)), accessed January 2020). According to Santa Cruz County, the Hillside Drive, Sequoia Avenue, California Drive, and Quail Hollow Road alignments are not in areas mapped as fault hazard zones. The Lyon Zone alignment is shown in an area mapped as lying within a 0.5-mile buffer of fault zones but not within a fault zone itself.

Santa Cruz County also produced maps showing Liquefaction Hazard Areas, which designate various liquefaction potential levels varying from low to very high potential (County of Santa Cruz, Emergency Management GIS web page ([http://www.co.santacruz.ca.us/Departments/GeographicInformationSystems\(GIS\).aspx](http://www.co.santacruz.ca.us/Departments/GeographicInformationSystems(GIS).aspx)), accessed January 2020). The pipeline alignments for Hillside Drive, Sequoia Avenue, and Quail Hollow Road are not shown in areas mapped as potentially

liquefiable. The eastern portion of the Lyon Zone segment as well as most of the California Drive segment are mapped in areas of moderate liquefaction potential.

The County of Santa Cruz produced landslide hazard maps in 2018, which uses Landslide Hazard Areas derived from various USGS open files and a 1975 Landslide Deposit Map of Santa Cruz County by Cooper-Clark and Associates. According to the Santa Cruz County (2018) Big Basin, Felton, and Castle Rock Ridge quad series, the five pipeline alignments are not mapped within landslide hazard zones. (County of Santa Cruz, Emergency Management GIS web page ([http://www.co.santacruz.ca.us/Departments/GeographicInformationSystems\(GIS\).aspx](http://www.co.santacruz.ca.us/Departments/GeographicInformationSystems(GIS).aspx)), accessed January 2020).

3.3 REGIONAL GROUNDWATER

The pipeline alignments, with the exception of Hillside Drive, are located in an area within the Santa Margarita groundwater basin. (County of Santa Cruz, Emergency Management GIS web page ([http://www.co.santacruz.ca.us/Departments/GeographicInformationSystems\(GIS\).aspx](http://www.co.santacruz.ca.us/Departments/GeographicInformationSystems(GIS).aspx)), accessed January 2020).

Groundwater within the hillslope areas encompassing the some of the pipeline alignments is likely variable, with the water table commonly sloping downhill toward the closest drainage axis. We did not identify long-term springs and seeps in the site vicinities, although expressions of these are likely present seasonally.

3.4 SEISMICITY

3.4.1 Active Faults

The five pipeline alignments are located within the greater San Francisco Bay Area, which is recognized as one of the more seismically active regions of California. The right-lateral strike-slip San Andreas fault system controls the northwest-southeast structural grain of the Coast Ranges and the Bay Area. The fault system marks the major boundary between two of earth's tectonic plates, the Pacific Plate on the west and the North American Plate on the east. The Pacific Plate is moving north relative to the North American plate at approximately 40 mm/yr in the Bay Area (WGCEP, 2003).

The transform boundary between these two plates has resulted in a broad zone of multiple, subparallel faults within the North American Plate, along which right-lateral strike-slip faulting predominates. In this broad transform boundary, the San Andreas Fault accommodates less than half of the average total relative plate motion. Much of the remainder in the greater South Bay Area is distributed across faults such as the San

Gregorio-Hosgri, Monte Vista-Shannon, Sargent, Berrocal, Hayward (southern segment), Calaveras, Zayante-Vergeles, and Greenville fault zones.

Since the pipeline alignments are in the seismically active San Francisco Bay Area, they will likely experience significant ground shaking from moderate or large ($M_w > 6.7$) earthquakes on one or more of the nearby active faults during the design lifetime of the project. Some of the seismic sources in the San Francisco Bay area and their distances from the sites are summarized in Table 3-1.

Seismogenic (capable of generating significant earthquakes) earthquake faults near the site include the Zayante-Vergeles and the San Andreas fault.

Table 3-1. Distances to Selected Major Active Faults

Pipeline Segment	Fault Name	Approximate Distance and Direction from Site to the nearest Surface Fault Traces
Hillside Drive	Butano	0.0 km
	Zayante-Vergeles-Upper	4.5 km southwest
	San Andreas	8.6 km northeast
	Berrocal	10.9 km northeast
	San Gregorio	14.9 km southwest
	Monte Vista-Shannon	15.0 km northeast
	Sargent	18.2 km east-southeast
	Monterey Bay-Tularcitos	28.7 km south
	Hayward (southern segment)	35.2 km northeast
Sequoia Avenue	Zayante-Vergeles-Upper	1.3 km southwest
	Butano	2.7 km north-northeast
	San Andreas	10.6 km northeast
	Berrocal	13.4 km northeast
	San Gregorio	13.7 km southwest
	Sargent	16.8 km east
	Monte Vista-Shannon	17.2 km northeast
	Monterey Bay-Tularcitos	24.8 km south-southeast
	Hayward (southern segment)	36.7 km northeast
Lyon Zone	Zayante-Vergeles-Upper	0.6 km northeast
	Butano	5.0 km north
	San Andreas	11.7 km northeast
	San Gregorio	12.8 km southwest
	Berrocal	15.2 km northeast
	Sargent	15.8 km east-northeast
	Monte Vista-Shannon	18.7 km northeast
	Monterey Bay-Tularcitos	22.0 km south-southeast
	Hayward (southern segment)	37.5 km northeast

Table 3-1. Continued

Pipeline Segment	Fault Name	Approximate Distance and Direction from Site to the nearest Surface Fault Traces
California Drive	Zayante-Vergeles-Upper	2.7 km northeast
	Butano	9.0 km northwest
	San Andreas	12.2 km northeast
	Sargent	14.0 km northeast
	San Gregorio	15.1 km southwest
	Berrocal	16.2 km northeast
	Monterey Bay-Tularcitos	18.9 km south
	Monte Vista-Shannon	19.2 km northeast
	Hayward (southern segment)	37.2 km northeast
Quail Hollow Road	Zayante-Vergeles-Upper	2.8 km north
	San Andreas	11.2 km northeast
	Butano	11.4 km northwest
	Sargent	12.2 km northeast
	Berrocal	16.0 km northeast
	Monterey Bay-Tularcitos	16.5 km south-southwest
	San Gregorio	16.5 km southwest
	Monte Vista-Shannon	18.9 km northeast
	Hayward (southern segment)	35.7 km northeast

3.4.2 Liquefaction and Seismic Densification

Soil liquefaction is a phenomenon in which saturated, cohesionless soils (generally sands) lose their strength due to the build-up of excess pore water pressure during cyclic loading, such as that induced by earthquakes. Soils most susceptible to liquefaction are saturated, clean, loose, fine-grained sands and silts. The primary factors affecting soil liquefaction include: 1) intensity and duration of seismic shaking; 2) soil type and relative density; 3) overburden pressure; and 4) depth to ground water.

Based on subsurface information collected during this investigation, we judge the potential for liquefaction within the upper 10 feet at the sites to be moderate for the California Drive segment and eastern portion of the Lyon Zone segment due to the presence of shallow groundwater in loose to medium dense alluvial soils. We judge the potential for liquefaction within the upper 10 feet of the Hillside Drive, Sequoia Avenue, and Quail

Hollow Road segments, as well as the western portion of the Lyon Zone segment to be to be low.

Seismic densification is the densification of unsaturated, loose to medium dense granular soils due to strong vibration such as that resulting from earthquake shaking. We judge the potential for seismic densification at the pipeline alignments to be moderate for the encountered alluvial materials because they are loose to medium dense, granular, and generally unsaturated in the upper 10 feet. The uppermost sandy, weathered bedrock along the Quail Hollow Road alignment are unsaturated and granular but is judged too dense for seismic densification.

4.0 FIELD INVESTIGATIONS

4.1 SITE RECONNAISSANCE

CE&G performed geologic reconnaissance of the project site in advance of performing subsurface exploration. Site reconnaissance consisted of photographic documentation of the project pipeline alignments, identification and marking of the boring locations, and marking for USA.

4.2 SUBSURFACE EXPLORATIONS

4.2.1 Scope of Explorations

Subsurface exploration consisted of drilling 15 borings along the proposed pipeline alignments to assess the soil and/or bedrock conditions. Before drilling, CE&G marked and coordinated utility clearance through USA. The approximate locations of the borings are shown on Figures 2A through 2E.

Fourteen of the borings (B-1 through B-14) were drilled by Cenozoic Exploration, LLC., from November 18, 2019 to November 20, 2019 using a SIMCO 2400 truck-mounted drill rig equipped with 6-inch-diameter, solid flight augers. An additional boring (B-15) was drilled by a CE&G geologist on December 16, 2019 using a hand auger. The depths of each boring as well as the pipeline segment along which the borings were drilled are listed in Table 4.1 below. The ground surface conditions are also listed in the table.

Table 4.1

Pipeline Segment	Boring ID	Depth (feet)	Ground Surface Conditions
Lyon Zone	B-1	10	Asphalt Pavement (approx. 3")
	B-2	10	Asphalt Pavement (approx. 4")
	B-3	10	Asphalt Pavement (approx. 4")
	B-5	10	Asphalt Pavement (approx. 3")
Quail Hollow Road	B-6	9.5	Asphalt Pavement (approx. 5")
	B-7	10	Asphalt Pavement (approx. 7")
	B-8	10	Asphalt Pavement (approx. 5")
	B-9	9.5	Asphalt Pavement (approx. 4")
	B-10	10	Asphalt Pavement (approx. 4")
Hillside Drive	B-11	10	Gravel
	B-12	10	Asphalt Pavement (approx. 3")
California Drive	B-4	10	Asphalt Pavement (approx. 4")
	B-13	10	Asphalt Pavement (approx. 3")
	B-14	10	Asphalt Pavement (approx. 3")
Sequoia Avenue	B-15	6.5	Topsoil & weeds

Upon completion of drilling, the boreholes were backfilled neat cement grout. The upper two feet of the boreholes were backfilled with concrete and troweled smooth to match the existing grade, where appropriate. Boring B-15 was backfilled with soil cuttings from the hand auger.

4.2.2 Logging and Sampling

The soil material encountered in the borings were logged in the field by a CE&G professional geologist. The soil was visually classified in the field, office, and laboratory according to the Unified Soil Classification System (USCS) in general accordance with ASTM D2487 and D2488.

During the drill operation, soil samples were obtained using the following sampling methods:

- California Modified (CM) Sampler; 3-inch outer diameter (O.D.), 2.5-inch inner diameter (I.D.) (ASTM D1586)
- Standard Penetration Test (SPT) Split-Spoon Sampler; 2-inch O.D., 1.375-inch I.D. (ASTM D1586)

The samplers were driven 18 inches, unless otherwise noted on the boring logs, with a 140-pound hammer dropped from a height of 30 inches. The number of blows required to drive the samplers through 6-inch intervals was recorded and are included on the boring logs in Appendix A. The number of blows on the boring logs is an uncorrected value and represents the field count.

Soil samples obtained for the borings were packaged and sealed in the field to reduce the potential for moisture loss and disturbance. The samples were taken to CE&G's local laboratory for storage and further analysis.

4.3 SOIL CONDITIONS ENCOUNTERED

Subsurface soil conditions encountered in our borings were generally consistent with regional geologic mapping. Following are descriptions of the soils encountered in our borings along each pipeline segment:

4.3.1 Hillside Drive Alignment

Borings B-11 and B-12 were drilled along this alignment. Subsurface materials encountered beneath the eastern portion of the alignment consists of approximately 5 feet of what was interpreted to be artificial fill composed of medium dense sandy silt. Underlying this fill is alluvial deposits consisting of medium dense, poorly graded sand. The materials encountered along the western portion of the alignment also consisted of artificial fill composed of medium dense sandy silt. This fill overlies colluvium, which is composed of very stiff to hard sandy lean clay with gravel.

4.3.2 Sequoia Avenue Alignment

Boring B-15 was drilled along this alignment. Subsurface materials encountered in a boring along the center of the proposed segment consist of loose, sandy silt topsoil over loose to medium dense sandy silt colluvium/residual soil, which extends to approximately 4 feet bgs where completely weathered silty sandstone was encountered.

4.3.3 Lyon Zone Alignment

Borings B-1, B-2, B-3 and B-5 were drilled along this alignment. Subsurface materials encountered beneath the center and eastern portions of the Lyon Zone segment primarily consist of alluvial deposits. Alluvium encountered near the eastern portion of the segment consists of medium dense, silty and clayey sand, whereas the alluvium encountered along the central portion of the alignment generally consists of loose to medium dense, well graded sand of granitic source with varying amounts of silt in gravel. Subsurface materials

encountered beneath the western end of the alignment consist of hard, gravely lean clay and sandy lean clay (colluvium), which overly extremely weak and highly weathered siltstone.

4.3.4 California Drive Alignment

Borings B-4, B-13 and B-14 were drilled along this alignment. Borings drilled along the eastern portion of this segment encountered alluvial soils generally consisting of medium dense sandy silt and silty sand. Very stiff lean clay was encountered in one of the eastern borings. The boring drilled along the western portion of the segment consists of alluvium composed of stiff, elastic silt to approximately 5 feet bgs. Beneath this elastic silt is loose to medium dense sandy silt and silty sand. Slightly weathered siltstone was encountered in the western boring at approximately 9.5 feet bgs, but it is unknown whether the retrieved siltstone is part of underlying bedrock or a boulder.

4.3.5 Quail Hollow Road Alignment

Borings B-6, B-7, B-8, B-9 and B-10 were drilled along this alignment. Subsurface materials encountered beneath the Quail Hollow Road segment primarily consists of medium dense to very dense silty sand and poorly graded sand. These sands are most likely representative of completely weathered bedrock from the underlying, weathered sandstone, which was encountered along the segment at depths ranging from 2 to greater than 10 feet bgs.

For a more detailed description of the materials encountered during this investigation, the boring logs and laboratory test results are included in Appendices A and B.

4.4 GROUNDWATER CONDITIONS ENCOUNTERED

Groundwater was only encountered in 2 of the 15 borings during this investigation. Groundwater was encountered in Boring B-1 at approximately 6 feet bgs and in Boring B-4 at approximately 5.5 feet bgs.

4.5 GEOTECHNICAL LABORATORY TESTING

Testing was performed to obtain information concerning the qualitative and quantitative physical properties of the subsurface soil from the samples recovered. Testing was performed by CE&G's testing laboratory in Hayward, California and Cooper Testing Laboratory in Palo Alto, California, in general conformance with the applicable ASTM and the California Department of Transportation (Caltrans) standards:

- Moisture Content and Dry Unit Weight (ASTM D2216)
- Particle Size Analysis (ASTM D422 and D1140)
- Atterberg Limits (ASTM D4318; dry method)
- Minimum Resistivity (Caltrans 643)
- pH (Caltrans 643)
- Sulfate Content (Caltrans 417)
- Chloride Content (Caltrans 422)

The results of the laboratory tests are summarized in Appendices A and B.

5.0 CONCLUSION AND DISCUSSION

The design for the proposed improvements is being completed by Schaaf & Wheeler. The primary geotechnical issues to be considered in the design of the planned improvements include the following:

- Excavatability of encountered materials;
- Shoring and excavation stability;
- Groundwater
- Effects of seismic loading and anticipated ground motions on design and performance; and
- Corrosion.

5.1 EXCAVATABILITY

Subsurface exploration was completed using solid flight augers and did not encounter auger refusal to the depths explored. Based on the subsurface exploration, we anticipate that an appropriately sized backhoe or excavator will be capable of excavating the soil and weathered bedrock underlying the project pipeline alignments in the areas explored. Medium to very dense sandstone that was encountered in our borings along Quail Hollow Road will likely require more effort if encountered in the pipeline trench excavations.

5.2 SHORING AND EXCAVATION STABILITY

The excavations for the pipelines are anticipated to extend to depths between approximately 4 and 6 feet below grade. The sides of the excavations are anticipated to be shored where required.

The soil conditions along the pipeline alignments within the anticipated trench depth of approximately 5 feet primarily consisted of sandy and silty soils of variable consistency, from loose to medium dense to very dense, sand and silt mixtures, with some areas containing lean clays. Although some subsurface materials along the anticipated trench locations contain some cohesion and/or are likely to be stable in a temporary open trench, shoring will be required for excavations greater than 4 feet.

5.3 GROUNDWATER

Groundwater was only encountered in two of our exploratory borings, both of which were drilled in the valley alluvial deposits along the Lyon Zone and California Drive alignments.

Groundwater depths at these locations ranged from 5.5 to 6 feet bgs. There is a possibility that similar or shallower groundwater conditions will be encountered during construction within alluvial soils, especially during the winter and spring rainy season. If groundwater is encountered for any of the alignments, elevated groundwater may affect the design and construction of temporary shoring, the design and performance of the below ground structures as it pertains to the potential for buoyant uplift, and the means and methods to be considered for construction and future maintenance.

Although it is not anticipated, if high groundwater is encountered at the sites along some portions of the pipeline alignments, the excavation and possibly adjacent areas will need to be dewatered for construction and compaction of trench backfill materials.

5.4 SEISMIC LOADING

Geologic research has revealed that the proposed Quail Hollow Road, California Drive, Lyon Zone, and Sequoia Avenue alignments do not cross mapped active faults. These pipeline alignments are not expected to be damaged as a result of direct fault displacement. However, the planned Hillside Drive alignment crosses an active fault (Butano fault) that shows evidence of activity during the past 1.6 million years. Over the operational life of the Hillside Drive pipeline alignment, the pipelines are likely to be affected by seismic loading from a large earthquake. The most significant potential impacts from ground motions are displacements and possible rupturing of the pipelines due to soil softening or liquefaction of underlying cohesionless deposits.

5.4.1 Seismically Induced Displacements

Due to the flexible nature of HDPE and PVC pipe, other specific design components for seismic elements to mitigate displacements are judged to be unwarranted. For Ductile Iron Pipe, consideration should be given for flexible connections.

5.4.2 Liquefaction

We judge the potential for liquefaction within the upper 10 feet at the sites to be moderate for the California Drive segment and eastern portion of the Lyon Zone segment due to the presence of shallow groundwater in loose to medium dense alluvial soils. We judge the potential for liquefaction at Hillside Drive, Sequoia Avenue, and Quail Hollow Road segments, as well as the western portion of the Lyon Zone segment to be to be low due to the lack of encountered groundwater.

5.5 CORROSION

Corrosion testing was performed on two soil samples in general accordance with Caltrans methods. Testing results are presented below:

Table 5-1. Corrosion Testing Results

Boring (depth in feet)	Resistivity (Ohm-cm)	Chloride (mg/kg)	Sulfate (mg/kg)	pH
B-1 (3.5-5)	3378	5	98	8.6
B-10 (3.5-5)	47581	4	20	7.8

Caltrans Corrosion Guidelines, January 2015, identifies a site to be corrosive for structural elements if one or more of the following conditions exist:

- Chloride concentration is 500 ppm or greater;
- Sulfate concentration is 2000 ppm or greater;
- pH is 5.5 or less.

A minimum resistivity value for soil and/or water less than 1000 ohm-cm indicates the presence of high quantities of soluble salts and a higher propensity for corrosion. Based on the results of the laboratory testing performed, the soil sample tested had values for Chloride, Sulfate, pH that do not meet the Caltrans criteria for a corrosive site. The resistivity of the tested soil sample was above the 1000 ohm-cm threshold defined.

According to ACI 318 Section 4.3, Table 4.3.1:

- Sulfate concentration below 0.10 percent by weight (1,000 ppm) is negligible (no restrictions on concrete type)
- Water-soluble chloride content of less than 500 ppm is generally considered non-corrosive to concrete.

Based on the results of the laboratory testing performed, the soil sample tested had values for Sulfate and Chloride that do not meet ACI criteria and is considered non-corrosive to concrete.

Corrosion results are to be considered preliminary and are an indicator of potential soil corrosivity for the sample tested. Other soils or bedrock found onsite may be more, less, or of similar corrosive nature. Our scope of services does not include corrosion engineering; therefore, a detailed analysis of the corrosion tests is not included.

6.0 DESIGN AND CONSTRUCTION RECOMMENDATIONS

6.1 DESIGN GROUNDWATER LEVEL

For the design of the planned improvements, a design groundwater level of 5 feet below the ground surface is recommended for design and construction in the valley floor portions of the sites that lie within alluvial soils. The contractor and shoring designer should refer to our boring logs presented in Appendix A.

6.2 DEWATERING

Dewatering is generally not anticipated to be required since groundwater was only encountered in two of the borings at depths greater than the anticipated trenching depths. However, within the lower portion of excavations for the replacement waterlines and associated manholes within alluvial soils, especially if work is performed during the winter and spring months, groundwater could be encountered in the excavations. Dewatering, if needed, will be the responsibility of the contractor.

The area within the excavations should be dewatered to at least 3 feet below the bottom of the excavation or deeper as determined by the contractor to facilitate their operations. We recommend the contractor prepare and submit a dewatering plan prior to beginning work in this area. It is anticipated that the contractor will need to be prepared to provide a sump system as a minimum; the need for dewatering well points is not currently anticipated.

6.3 SHORING

The design of temporary excavation shoring should be made the responsibility of the contractor. Shoring design should be completed for the contractor by a qualified California-registered civil engineer and submitted to the Engineer for review and approval prior to construction. It is recommended that all temporary shoring be designed in conformance with the State of California, Department of Transportation, Trenching and Shoring Manual.

The soil conditions along the pipeline alignments within the anticipated trench depth of approximately 5 feet primarily consisted of sandy and silty soils of variable relative density/consistency, from loose to medium dense to very dense, sand and silt mixtures, with some areas containing lean clays. Although some subsurface materials along the anticipated trench locations contain some cohesion and/or are likely to be stable in a temporary open trench, shoring should still be required for excavations greater than 4 feet.

Shoring design should be based on OSHA Type C Soil. The impact of elevated groundwater conditions on the temporary shoring can be mitigated by implementing contractor-designed dewatering measures and designing the shoring to be water-tight and to account for the loading imposed by the groundwater in accordance with the recommendations provided herein.

Shoring should be designed to resist static (braced) earth pressures in combination with hydrostatic pressures where groundwater is encountered. Construction-induced vibrations should be minimized during shoring placement.

6.3.1 Lateral Earth Pressures

Static lateral earth pressure will be imposed on all shored excavations. Table 6-1 summarizes the lateral earth pressures recommended for use in design of unbraced temporary shoring. Active pressure should be assumed for conditions where the top of the wall is free to deflect up to ½ inch. Passive pressure should be ignored for a depth of 24 inches and may be utilized to resist overturning and sliding. Where structures will be located below groundwater, hydrostatic pressures should be added to the passive lateral earth pressure values shown in Table 6-1. As noted previously, the design of unbraced shoring will likely be controlled by deflections, as a result, calculations should also consider allowable ground deformations.

Table 6-1: Lateral Earth Pressures

Pressure Type	Above Groundwater Level (Equiv. Fluid Pressure)	Below Groundwater Level (Buoyant Equiv. Fluid Pressure + Hydrostatic)
Active	42 pcf	83 pcf
At-Rest	63 pcf	94 pcf
Passive	375 pcf	250 pcf

If the temporary shoring will be braced, a rectangular or trapezoidal loading diagram such as those recommended by Terzaghi & Peck, Tschebortarioff, and others (Caltrans Trenching and Shoring Manual and FHWA GEC No. 4) should be used. These methods generally correlate the earth pressure load to a percentage of the unit weight of the soil times the height of the excavation. The method and loading should be determined by the contractor and provided to the Engineer for review.

Surcharge loading from traffic on the adjacent pavement and construction equipment can be modeled as a minimum uniform ground pressure of 250 psf or higher as otherwise determined by the contractor's shoring design engineer.

6.3.2 Installation and Removal of Shoring

To reduce the potential for vibration induced settlements during construction, it is recommended that the contractor monitor the soils encountered during excavation and at a minimum avoid the generation of vibrations at locations where loose cohesionless soils are encountered. Settlement of adjacent improvements during the removal of shoring should not be allowed and should be monitored during removal.

6.4 PIPELINE DESIGN LOADS AND INSTALLATION

6.4.1 Pipe Loading

The pipe should be evaluated and designed for earth, surcharge, and hydrostatic loads, in conformance with Chapter 7 of the Plastic Pipe Institute's *Handbook of Polyethylene Pipe 2nd Edition* (PPI, 2007). Overburden loads should be calculated using the total unit weights of 130 pcf or buoyant unit weights of 67 pcf while the hydrostatic pressure should be determined based on the design groundwater level. In addition to the soil and hydrostatic loads, the pipe will be subjected to live load from vehicular traffic. At a minimum, the pipe design should assume H20 loading for vehicular traffic. The County Traffic Engineer should be consulted to determine if these loadings are appropriate.

6.4.2 Foundation Material

Foundation material should be installed where the excavation bottom is unstable (pumping subgrade, boiling, etc.) and where over excavation of the trench occurs as a result of an unstable or soft trench bottom.

Where required, foundation material should consist of a minimum of 12 inches of clean, durable, 1½-inch crushed rock wrapped in a 6 oz./sy non-woven geotextile. The geotextile shall be designed for separation, stabilization and permeability and constructed of polyester, nylon, and/or polypropylene formed into a stable network meeting the minimum parameters shown in Table 6-2.

Table 6-2 – Geotextile Fabric Requirements

Property	Test Value	Test Method
Weight	6 oz/yd ²	ASTM D5261
Grab tensile strength	150 lbs.	ASTM D4632
Puncture strength	80 lbs.	ASTM D4833
Permittivity	1.0 sec ⁻¹	ASTM D4491
UV Resistance	70%	ASTM D4355

6.5 MANHOLES AND OTHER STRUCTURES

Design and construction of manholes within areas of high groundwater will require a means of preventing uplift of the manhole. This may be accomplished with an extended base around the perimeter of the manhole over which soil backfill is placed. Other means of preventing buoyancy uplift include using a cone or reducer section in the manhole and considering friction on the sides of the manhole. If the groundwater encountered during construction is found to be much higher than at the time of drilling, the potential for buoyant uplift should be reevaluated.

6.5.1 Bearing Capacity

It is recommended that the structures be designed as fully compensated structures. Fully compensated structures are those which do not result in a net increase in the load on the soil underlying the structure. If fully compensated design is not possible, the increase in earth pressure should be limited to less than 800 psf to limit total settlement and differential settlement. All permanent buried structures that extend below the design groundwater elevation should be designed with consideration of hydraulic uplift forces due to buoyancy effects.

6.5.2 Lateral Loads

In addition to hydrostatic pressure, the water pipeline should be designed to resist an at-rest lateral earth pressures of 63 pcf for soil above the design groundwater elevation and 94 pcf for soil below the groundwater elevation. These values are consistent with the lateral earth pressures previously described.

6.6 EARTHWORK

6.6.1 Excavation

We anticipate that an appropriately sized backhoe or excavator will be capable of excavating the soil and weathered bedrock underlying the project sites. Medium to very dense sandstone that was encountered in our borings along Quail Hollow Road will likely require more effort if encountered in the pipeline trenches. We note that narrower trenches and use of heavier excavating equipment will reduce excavation difficulty.

6.6.2 Subgrade Preparation

The bottom of the water line pipes will generally encounter moist, medium dense sandy and silty materials, although denser and more cohesive materials may be encountered at some locations. In the event the excavation bottom becomes unstable and difficult to achieve compaction of the backfill, the bottom of the excavation should be lined with a layer of geotextile such as Mirafi 500X (or equivalent) and then a minimum 12 inch thick layer of $\frac{3}{4}$ -inch or 1- $\frac{1}{2}$ -inch crushed rock. The crushed rock should be compacted with a manual vibratory compaction plate by making a minimum of three passes until a firm non-yielding surface is achieved.

6.6.3 Bedding and Shading

The utility pipes should be bedded in accordance with the requirements of the SLVWD. The bedding and shading material shall be a minimum 6 inches below and over the pipes and should consist of uniformly-graded sand or other material approved by the Engineer. This sand backfill shall be compacted to a minimum of 95 percent relative compaction in lifts not exceeding 8 inches in uncompacted thickness. All imported bedding and shading material should be sampled, tested and approved by the engineer prior to being transported to site.

6.6.4 Utility Trench Backfill

Following placement and compaction of sand over the pipes, Santa Cruz County design requirements indicate the remainder of the trench under County roads be backfilled with "2-Sack cement/sand slurry", also known as controlled density fill (CDF), controlled low strength material – CLSM, or flowable fill, which is comprised of cementitious material, sand, and water, and has a compressive strength between 100 and 200 psi.

Due to the low percentage of fine-grained material anticipated in excavations, the on-site sandy soil is anticipated to be suitable for use as structure backfill under Caltrans roadways

and under non-pavement areas. Imported granular backfill materials, such as aggregate base or quarry fines, may be used. Structure backfill shall be compacted to at least 95 percent relative compaction; 90 percent relative compaction under non-pavement areas. Backfill material should be placed in lifts not exceeding 8 inches in uncompacted thickness. Thinner lifts may be necessary to achieve the recommended level of compaction of the backfill due to equipment limitations. Compaction should be performed by mechanical means only. Water jetting to attain compaction shall not be permitted.

6.6.5 Import Fill

Import fill is anticipated for bedding and shading of the new pipelines as well as for pavement subgrade. All imported fill must be reviewed and approved by the geotechnical engineer prior to importation to the site. A minimum of five days will be required to evaluate and test the suitability of all planned imported materials. All imported materials should conform to the appropriate provisions of the 2018 Caltrans Standard Specifications.

The imported materials should be non-expansive and have a Plasticity Index less than 15 percent and a Liquid Limit of 30 percent or less. The imported material shall be free of organic debris or contaminated materials.

6.7 PAVEMENT REPLACEMENT

As a minimum, replacement of structural pavement sections above trenches is anticipated to be replaced in-kind, that is, with the same thickness as the existing pavement. The pavement section should meet the requirements of the County or Caltrans, as appropriate.

Pavement sections shall be placed on soil surfaces that have been prepared as outlined in the Earthwork section of this report. The full section of aggregate base as well as the upper 12 inches of subgrade soils should be compacted to a minimum of 95 percent relative compaction (ASTM D1557, latest edition).

Asphalt concrete should meet the requirements for 1/2- or 3/4-inch maximum, medium Type A Hot Mix Asphalt (asphalt concrete), Section 39, Caltrans Standard Specifications, latest edition. The Class 2 aggregate base material should conform to Section 26 of the Caltrans Standard Specifications.

6.8 TECHNICAL REVIEW AND CONSTRUCTION OBSERVATION

Prior to construction the geotechnical engineer should review the project plans for conformance with the intent of the recommendations presented in this report. The

geotechnical engineer should be contacted a minimum of 48 hours in advance of earthwork and excavation operations to observe the subsurface conditions.

7.0 LIMITATIONS

The conclusions and recommendations presented in this report are based on the information provided regarding the planned construction, and the results of the geologic mapping, subsurface exploration, and testing, combined with interpolation of the subsurface conditions between boring locations. Site conditions described in the text of this report are those existing at the time of our last field reconnaissance and are not necessarily representative of the site conditions at other times or locations. This information notwithstanding, the nature and extent of subsurface variations between borings may not become evident until construction. If variations are encountered during construction, Cal Engineering & Geology, Inc. should be notified promptly so that conditions can be reviewed and recommendations reconsidered, as appropriate.

It is the owner's responsibility to ensure that recommendations contained in this report are carried out during the construction phases of the project. This report was prepared based on preliminary design information provided which is subject to change during the design process. At approximately the 90 percent design level, Cal Engineering & Geology, Inc. should review the design assumptions made in this report and prepare addenda or memoranda as appropriate. Any modifications included in these addenda or memoranda should be carefully reviewed by the project designers to make sure that any conclusions or recommendations that are modified are accounted for in the final design of the project.

The findings of this report should be considered valid for a period of three years unless the conditions of the site change. After a period of three years, CE&G should be contacted to review the site conditions and prepare a letter regarding the applicability of this report.

This report presents the results of a geotechnical and geologic investigation only and should not be construed as an environmental audit or study. The evaluation or identification of the potential presence of hazardous materials at the site was not requested and was beyond the scope of this investigation and report.

The conclusions and recommendations contained in this report are valid only for the project described in this report. We have employed accepted geotechnical engineering procedures, and our professional opinions and conclusions are made in accordance with generally accepted geotechnical engineering principles and practices. This standard is in lieu of all other warranties, either expressed or implied.

8.0 REFERENCES

- ASTM Standard D1586, 2011, "Standard Test Method for Standard Penetration Test (SPT) and Split-Barrel Sampling of Soils," ASTM International.
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- Cooper-Clark and Associates, 1975, Preliminary map of landslide deposits in Santa Cruz County, California: unpublished consultants' report to Santa Cruz County Planning Dept. (see Roberts and Baron, 1998).
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- Graymer, R.W. and others (2006), Geologic Map of the San Francisco Bay Region: U.S. Geological Survey Scientific Investigations Map 2918.
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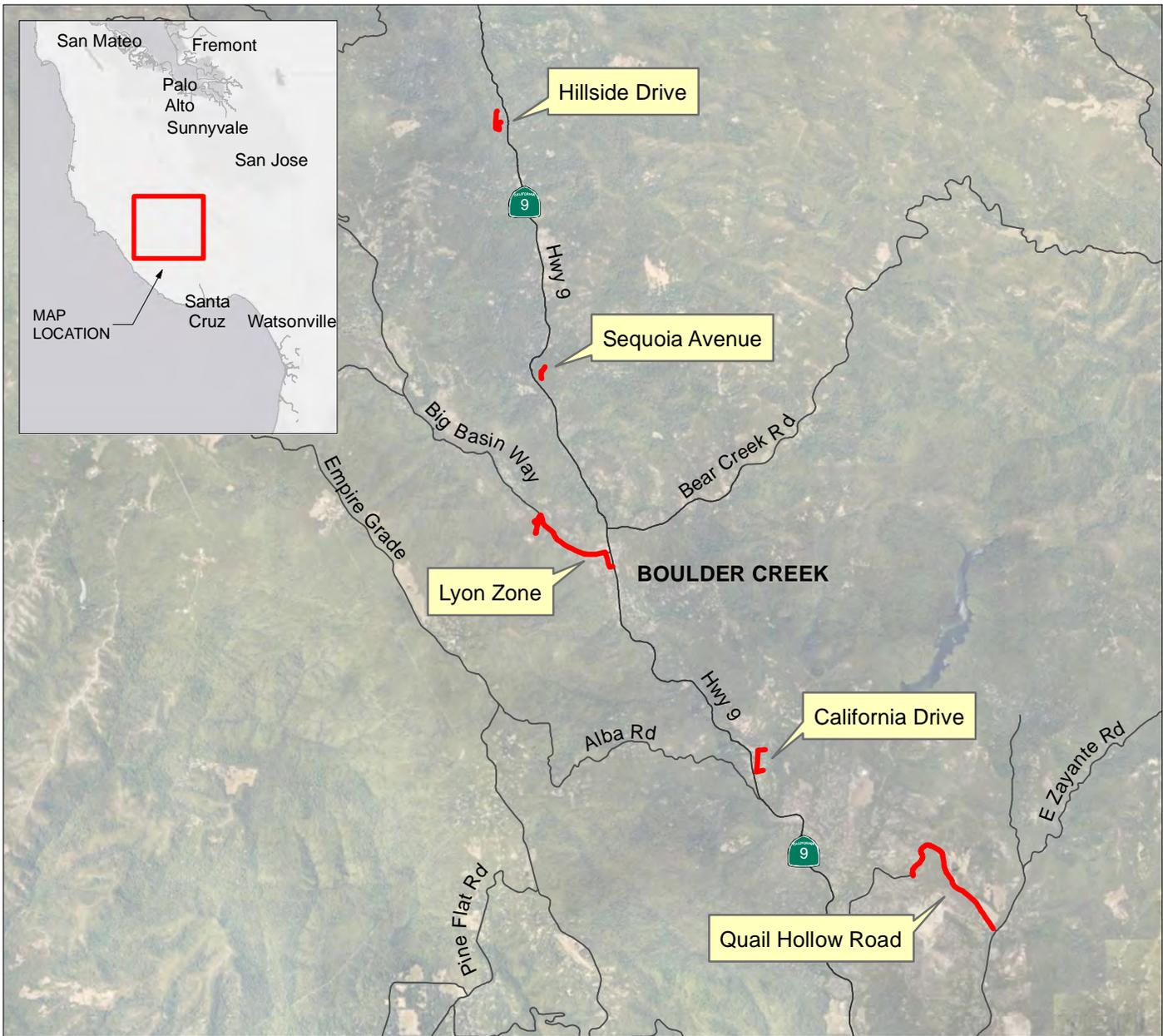
Youd, T. L., et. al. (2001). Liquefaction Resistance of Soils: Summary Report from the 1996 NCEER and 1998 NCEER/NSF. Workshops on Evaluation of Liquefaction Resistance of Soils, ASCE Journal of Geotechnical and Geoenvironmental Engineering, Vol. 127, No. 10.

Draft

*Draft Geotechnical Design Report
San Lorenzo Valley Water District 2019 Waterline Project*

January 30, 2020

Figures



BASEMAP REFERENCE

1. ORTHOIMAGERY FROM SANTA CRUZ COUNTY, 2016.
2. STREET CENTERLINES FROM CALTRANS CALIFORNIA ROAD SYSTEM, DOWNLOADED ON 15 MAY 2016.



M:\2019\191110-Schaaf\Wheeler-SanLorenzo\WD\Pipeline\GIS\ArcGIS\Fig1-Site-Location.mxd : 1/24/2020 : jhausen



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SLVWD 2019 PIPELINE PROJECT
SAN LORENZO VALLEY
BOULDER CREEK, CALIFORNIA
SITE LOCATION MAP

191110

JANUARY 2020

FIGURE 1



M:\2019\191110-Schaal\Wheeler-SanLorenzo\WD\Pipeline\GIS\ArcGIS\Fig2A-SitePlan-Hillside-Drive.mxd: 1/28/2020: jhausen

BASEMAP REFERENCE

1. 5-FOOT CONTOURS DERIVED FROM 2010 LIDAR DATA.
2. ORTHOIMAGERY FROM SANTA CRUZ COUNTY, 2016
3. PIPE ALIGNMENT LOCATIONS ARE APPROXIMATE.
4. PARCEL DATA FROM SANTA CRUZ GIS DATABASE, ACCESSED ONLINE ON 08/03/2018.

LEGEND

B-10 BORING LOCATIONS BY CE&G, DRILLED ON 18-20 NOV AND 16 DEC 2019



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SLVWD 2019 PIPELINE PROJECT
SAN LORENZO VALLEY WATER DISTRICT
SANTA CRUZ COUNTY, CALIFORNIA

HILLSIDE DRIVE

191110

JANUARY 2020

FIGURE 2A

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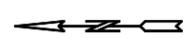


BASEMAP REFERENCE

1. 5-FOOT CONTOURS DERIVED FROM 2010 LIDAR DATA.
2. ORTHOIMAGERY FROM SANTA CRUZ COUNTY, 2016
3. PIPE ALIGNMENT LOCATIONS ARE APPROXIMATE.
4. PARCEL DATA FROM SANTA CRUZ GIS DATABASE, ACCESSED ONLINE ON 08/03/2018.

LEGEND

- B-10  BORING LOCATIONS BY CE&G, DRILLED ON 18-20 NOV AND 16 DEC 2019



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SLVWD 2019 PIPELINE PROJECT
SAN LORENZO VALLEY WATER DISTRICT
SANTA CRUZ COUNTY, CALIFORNIA

SEQUOIA AVE

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JANUARY 2020

FIGURE 2B



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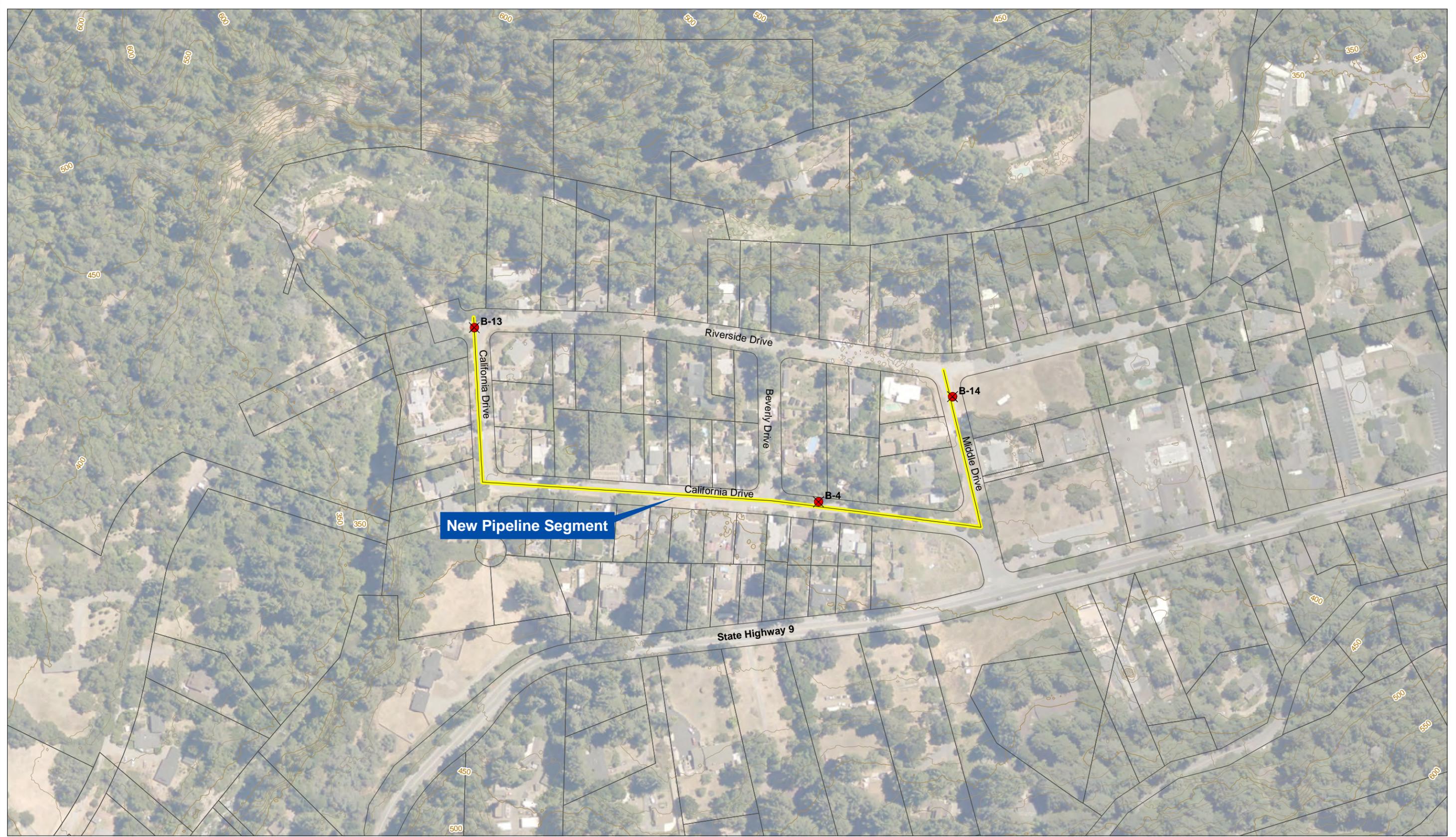
- BASEMAP REFERENCE**
1. 5-FOOT CONTOURS DERIVED FROM 2010 LIDAR DATA.
 2. ORTHOIMAGERY FROM SANTA CRUZ COUNTY, 2016
 3. PIPE ALIGNMENT LOCATIONS ARE APPROXIMATE.
 4. PARCEL DATA FROM SANTA CRUZ GIS DATABASE, ACCESSED ONLINE ON 08/03/2018.

- LEGEND**
- B-10 BORING LOCATIONS BY CE&G, DRILLED ON 18-20 NOV AND 16 DEC 2019



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SLVWD 2019 PIPELINE PROJECT
SAN LORENZO VALLEY WATER DISTRICT
SANTA CRUZ COUNTY, CALIFORNIA
LYON ZONE



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BASEMAP REFERENCE

1. 5-FOOT CONTOURS DERIVED FROM 2010 LIDAR DATA.
2. ORTHOIMAGERY FROM SANTA CRUZ COUNTY, 2016
3. PIPE ALIGNMENT LOCATIONS ARE APPROXIMATE.
4. PARCEL DATA FROM SANTA CRUZ GIS DATABASE, ACCESSED ONLINE ON 08/03/2018.

LEGEND

- B-10 BORING LOCATIONS BY CE&G, DRILLED ON 18-20 NOV AND 16 DEC 2019



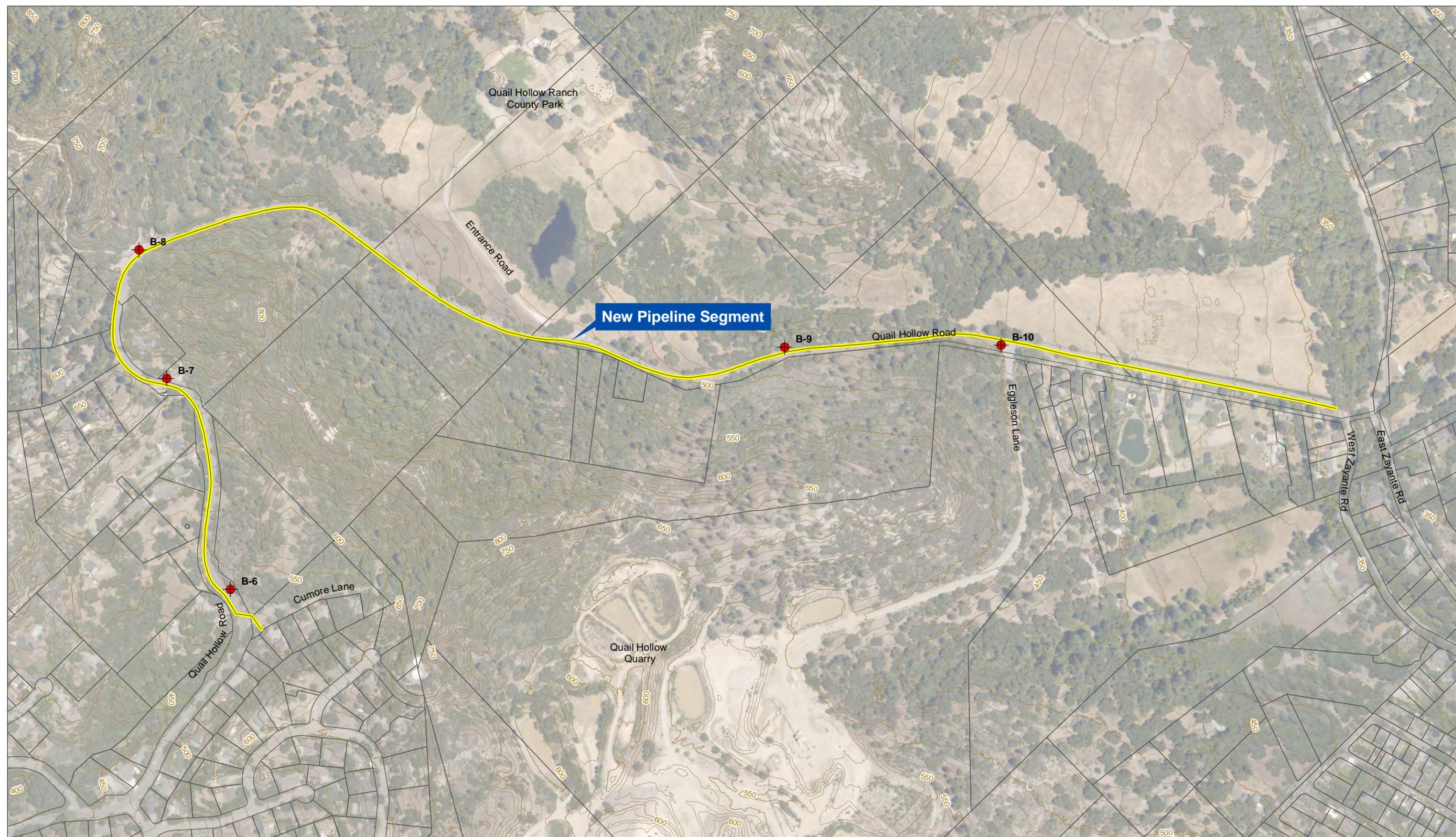
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SAN LORENZO VALLEY WATER DISTRICT
SANTA CRUZ COUNTY, CALIFORNIA
CALIFORNIA AVE

191110

JANUARY 2020

FIGURE 2D



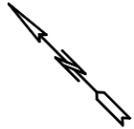
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BASEMAP REFERENCE

1. 5- FEET CONTOURS DERIVED FROM 2010 LIDAR DATA.
2. ORTHOIMAGERY FROM SANTA CRUZ COUNTY, 2016
3. PIPE ALIGNMENT LOCATIONS ARE APPROXIMATE.
4. PARCEL DATA FROM SANTA CRUZ GIS DATABASE, ACCESSED ONLINE ON 08/03/2018.

LEGEND

- B-10 BORING LOCATIONS BY CE&G, DRILLED ON 18-20 NOV AND 16 DEC 2019



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SAN LORENZO VALLEY WATER DISTRICT
SANTA CRUZ COUNTY, CALIFORNIA

QUAIL HOLLOW ROAD

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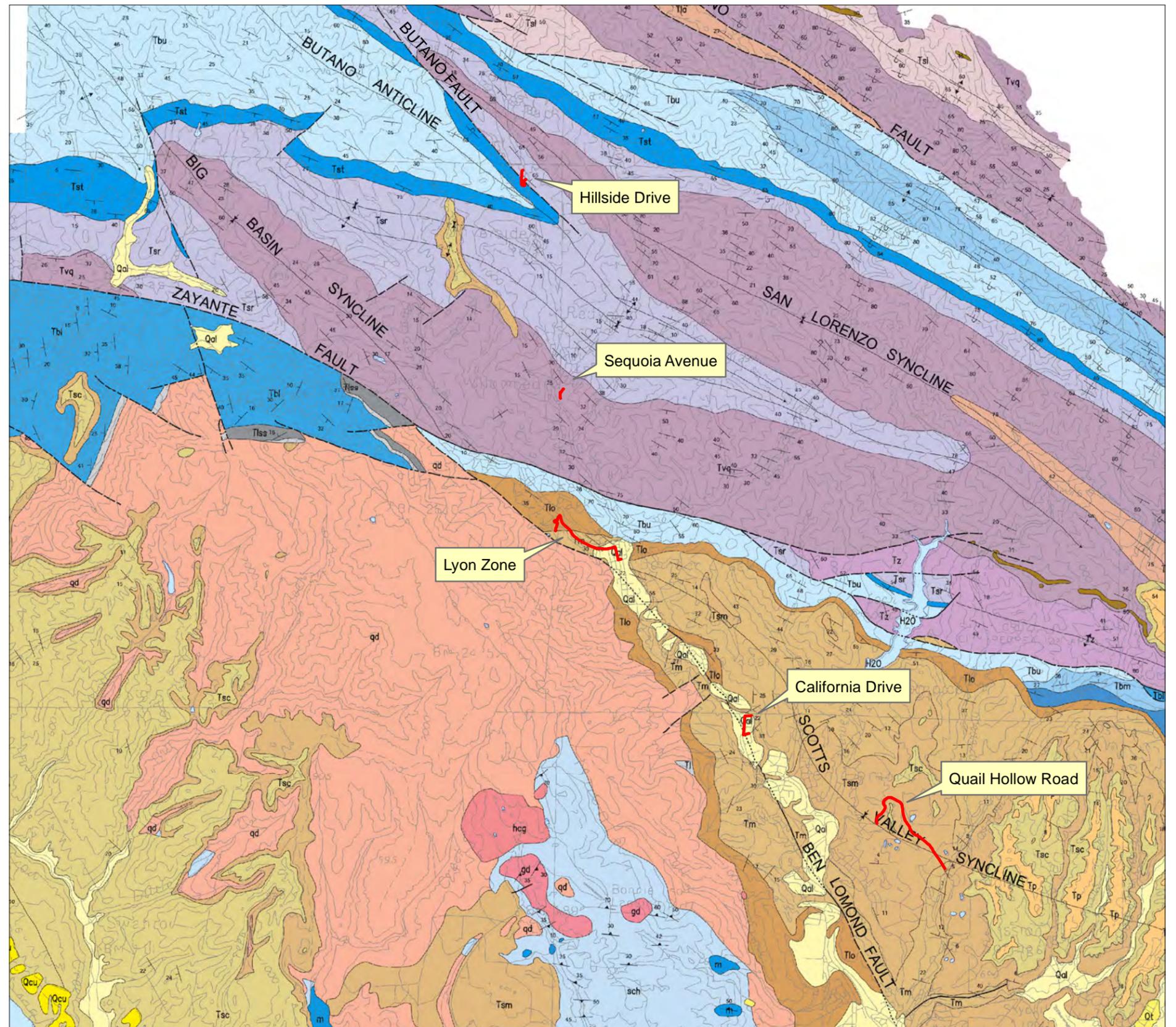
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FIGURE 2E

MAP UNIT DESCRIPTION

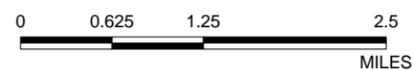
Qcu	COASTAL TERRACE DEPOSITS, UNDIFFERENTIATED (PLEISTOCENE)
Qal	ALLUVIAL DEPOSITS, UNDIFFERENTIATED (HOLOCENE)
Tp	PURISIMA FORMATION (PLIOCENE AND UPPER MIOCENE)
Tsc	SANTA CRUZ MUDSTONE (UPPER MIOCENE)
Tsm	SANTA MARGARITA SANDSTONE (UPPER MIOCENE)
Tm	MONTEREY FORMATION (MIDDLE MIOCENE)
Tlo	LOMPICO SANDSTONE (MIDDLE MIOCENE)
Tvq	VAQUEROS SANDSTONE (LOWER MIOCENE AND OLIGOCENE)
Tz	ZAYANTE SANDSTONE (OLIGOCENE)
Tsl	SAN LORENZO FORMATION, UNDIVIDED (OLIGOCENE AND EOCENE)
Tsr	RICES MUDSTONE MEMBER (OLIGOCENE AND EOCENE)
Tst	TWOBAR SHALE MEMBER (EOCENE)
Tbu	BUTANO SANDSTONE (EOCENE) UPPER SANDSTONE MEMBER
Tbm	MIDDLE SILTSTONE MEMBER
Tl	LOCATELLI FORMATION
Tlss	SANDSTONE
qd	QUARTZ DIORITE (CRETACEOUS)
gd	GNEISSIC GRANODIORITE (CRETACEOUS)
hcg	HORNBLLENDE-CUMMINGTONITE GABBRO (CRETACEOUS)
sch	METASEDIMENTARY ROCKS (MESOZOIC OR PALEOZOIC)
m	MARBLE (MESOZOIC OR PALEOZOIC)

	CONTACT		80 STRIKE AND DIP OF BEDS INCLINED
	FAULT		150 APPROXIMATE DIP OF BEDS
	ANTICLINE		VERTICAL
	SYNCLINE		HORIZONTAL
			60 OVERTURNED
			20 STRIKE AND DIP OF FOLIATION



BASEMAP REFERENCE

1. REGIONAL GEOLOGY FROM BRABB ET AL. 1997.



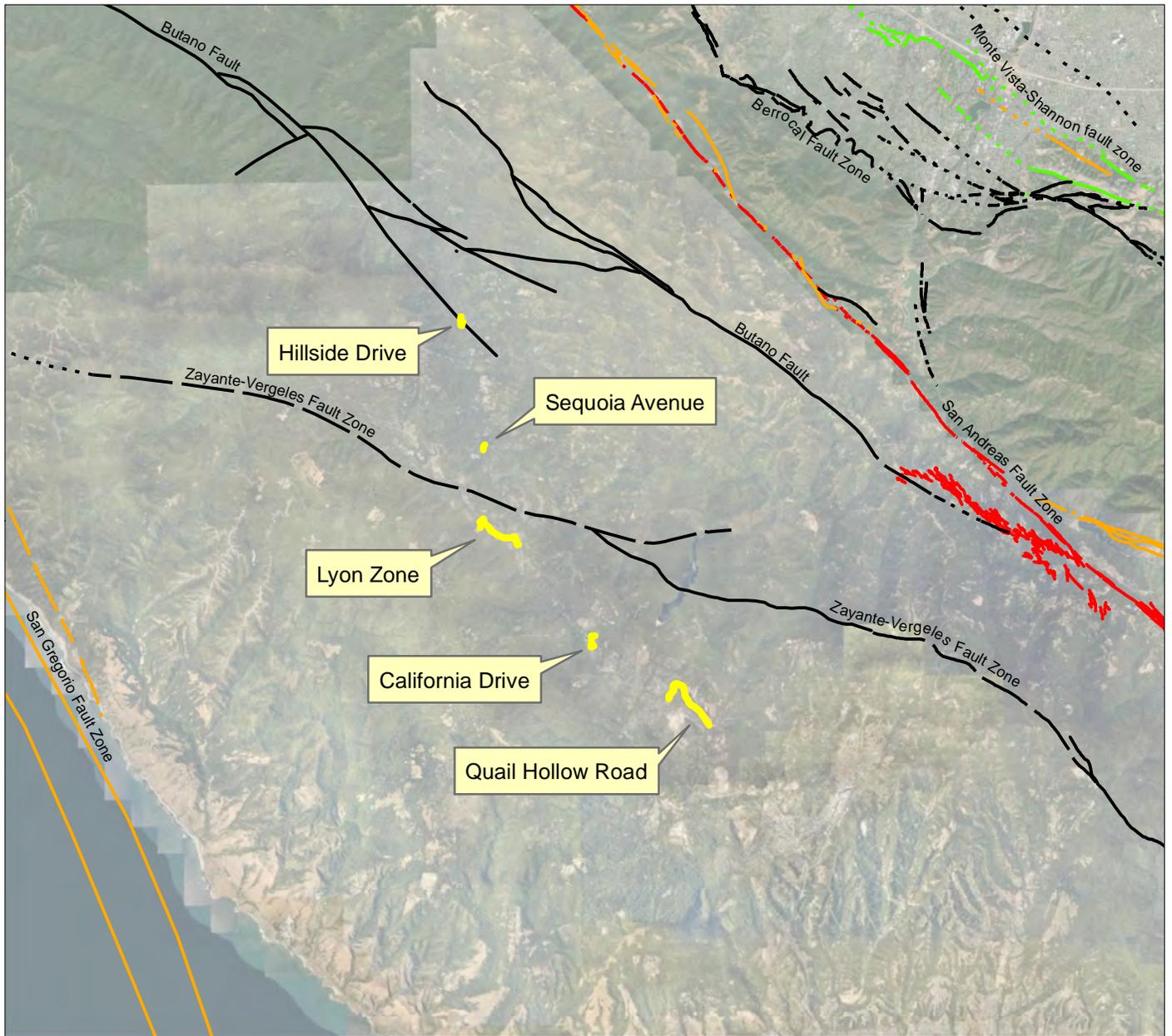
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SAN LORENZO VALLEY
BOULDER CREEK, CALIFORNIA
REGIONAL GEOLOGY MAP

191110

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FIGURE 3



BASEMAP REFERENCE

1. BASEMAP FROM SANTA CRUZ COUNTY, 2016.
2. FAULT LOCATIONS FROM US GEOLOGICAL SURVEY QUATERNARY FAULT AND FOLDS DATABASE, ACCESSED ONLINE ON 12 DECEMBER 2017.

MAP UNIT DESCRIPTION

- | | | | |
|----------------------------|--|---------------------------|---|
| — (Red solid line) | Historical (<150 years), Well Constrained Location | — (Green solid line) | Late Quaternary (<130,000 years), Well Constrained Location |
| - - - (Red dashed line) | Historical (<150 years), Moderately Constrained Location | - - - (Green dashed line) | Late Quaternary (<130,000 years), Moderately Constrained Location |
| · · · (Red dotted line) | Historical (<150 years), Inferred Location | · · · (Green dotted line) | Late Quaternary (<130,000 years), Inferred Location |
| — (Orange solid line) | Latest Quaternary (<15,000 years), Well Constrained Location | — (Black solid line) | Undifferentiated Quaternary (<1.6 million years), Well Constrained Location |
| - - - (Orange dashed line) | Latest Quaternary (<15,000 years), Moderately Constrained Location | - - - (Black dashed line) | Undifferentiated Quaternary (<1.6 million years), Moderately Constrained Location |
| · · · (Orange dotted line) | Latest Quaternary (<15,000 years), Inferred Location | · · · (Black dotted line) | Undifferentiated Quaternary (<1.6 million years), Inferred Location |



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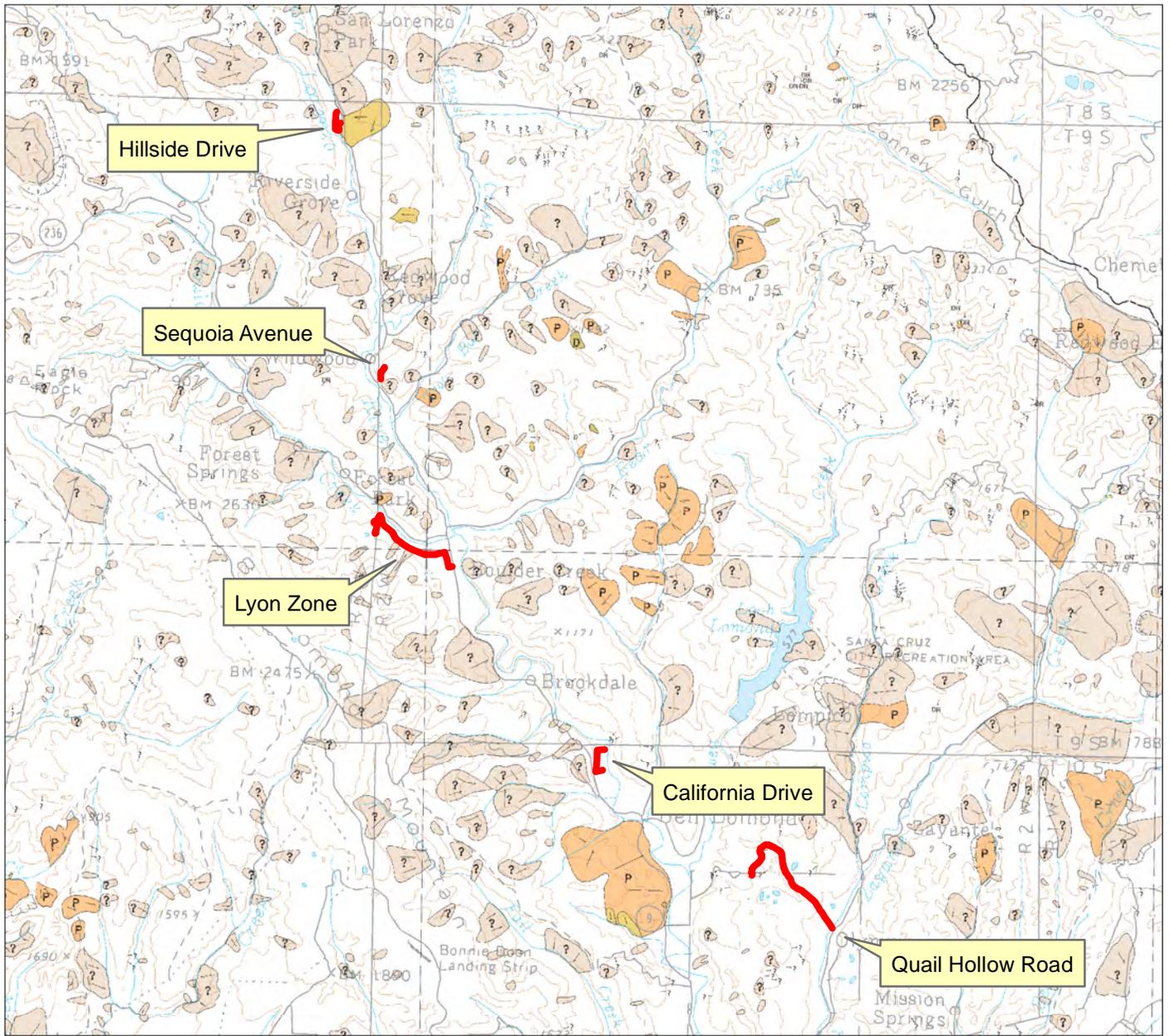
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SAN LORENZO VALLEY
BOULDER CREEK, CALIFORNIA
FAULT ACTIVITY MAP

191110

JANUARY 2020

FIGURE 4

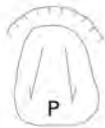


BASEMAP REFERENCE

1. BASEMAP FROM SANTA CRUZ COUNTY, 2016.
2. LANDSLIDE DATA FROM COOPER-CLARK ET AL. 1975.



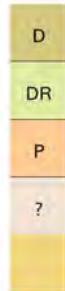
MAP UNIT DESCRIPTION



LARGE LANDSLIDE DEPOSIT



SMALL LANDSLIDE DEPOSIT AND GULLY



D DEFINITE LANDSLIDE DEPOSIT

DR DEFINITE RAPID LANDSLIDE DEPOSIT

P PROBABLE LANDSLIDE DEPOSIT

? QUESTIONABLE LANDSLIDE DEPOSIT

UNATTRIBUTED LANDSLIDE DEPOSIT



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SLVWD 2019 PIPELINE PROJECT
SAN LORENZO VALLEY
BOULDER CREEK, CALIFORNIA
LANDSLIDE ACTIVITY MAP

191110

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FIGURE 5

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*Draft Geotechnical Design Report
San Lorenzo Valley Water District 2019 Waterline Project*

January 30, 2020

Appendix A. Boring Logs

CLIENT Schaaf & Wheeler

PROJECT NAME San Lorenzo Valley Water District 2019 Pipeline Project

PROJECT NUMBER 191110

PROJECT LOCATION Santa Cruz County, CA

LITHOLOGIC SYMBOLS
(Unified Soil Classification System)

-  ASPHALT: Asphalt
-  CH: USCS High Plasticity Clay
-  CL: USCS Low Plasticity Clay
-  FILL: Fill (made ground)
-  MH: USCS Elastic Silt
-  ML: USCS Silt
-  SANDSTONE: Sandstone
-  SC: USCS Clayey Sand
-  SILTSTONE: Siltstone
-  SM: USCS Silty Sand
-  SP: USCS Poorly-graded Sand
-  SP-SM: USCS Poorly-graded Sand with Silt
-  SW: USCS Well-graded Sand
-  SW-SM: USCS Well-graded Sand with Silt

SAMPLER SYMBOLS

-  California Modified Sampler
-  Standard Penetration Test

WELL CONSTRUCTION SYMBOLS

ABBREVIATIONS

- LL - LIQUID LIMIT (%)
- PI - PLASTIC INDEX (%)
- W - MOISTURE CONTENT (%)
- DD - DRY DENSITY (PCF)
- NP - NON PLASTIC
- 200 - PERCENT PASSING NO. 200 SIEVE
- PP - POCKET PENETROMETER (TSF)

- TV - TORVANE
- PID - PHOTOIONIZATION DETECTOR
- UC - UNCONFINED COMPRESSION
- ppm - PARTS PER MILLION
-  Water Level at Time Drilling, or as Shown
-  Water Level at End of Drilling, or as Shown
-  Water Level After 24 Hours, or as Shown



CAL ENGINEERING & GEOLOGY

BORING NUMBER B-01

PAGE 1 OF 1

CLIENT Schaaf & Wheeler
 PROJECT NUMBER 191110
 DATE STARTED 11/20/2019 COMPLETED 11/20/2019
 DRILLING CONTRACTOR Cenozoic Exploration, LLC.
 DRILLING RIG/METHOD Simco 2400/ 6-in. Solid Flight Auger
 LOGGED BY K. Loeb CHECKED BY D. Peluso
 HAMMER TYPE 140 lb hammer with 30 in. cathead

PROJECT NAME San Lorenzo Valley Water District 2019 Pipeline Project
 PROJECT LOCATION Santa Cruz County, CA
 GROUND ELEVATION 496 ft DATUM WGS84 HOLE SIZE 6" in.
 COORDINATES: LATITUDE 37.1242 LONGITUDE -122.12272
 ▽ GROUNDWATER AT TIME OF DRILLING 6.0 ft / Elev 490.0 ft
 GROUNDWATER AT END OF DRILLING --- Not Measured
 ▽ GROUNDWATER AFTER DRILLING 8.0 ft / Elev 488.0 ft

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE	BLOW COUNTS (FIELD VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			FINES CONTENT (%)
								LIQUID LIMIT (%)	PLASTIC LIMIT (%)	PLASTICITY INDEX (%)	
0.0		Asphalt Pavement (approximately 3") Aggregate Base (approximately 6")									
		Silty SAND w/ Gravel (SM): dark yellowish brown, moist, dense, fine to coarse sand, angular granitic gravel up to 1.5" [Fill]									
		Silty SAND (SM): black, moist, medium dense, fine sand [Alluvium]	CM	10-8-5		114	13				
2.5											
		Clayey SAND (SC): dark gray mottled with dark yellowish brown, moist, medium dense, fine sand, medium plasticity fines (Corrosivity test at 3.5-5 feet)	SPT	3-4-10	3.25 3.25			38	17	21	
5.0		becomes very dark gray, fine to medium sand, trace angular gravel									
		▽ decrease in fines, fine to coarse sand, trace subrounded gravel									
		becomes wet poorly graded sand lens	CM	11-12-14		127	14				
7.5											
		▽ becomes moist to wet									
			SPT	7-9-11							
10.0											

Bottom of borehole at 10.0 ft. Borehole backfilled with cuttings.



CAL ENGINEERING & GEOLOGY

BORING NUMBER B-02

PAGE 1 OF 1

CLIENT Schaaf & Wheeler
 PROJECT NUMBER 191110
 DATE STARTED 11/20/2019 COMPLETED 11/20/2019
 DRILLING CONTRACTOR Genozoic Exploration, LLC.
 DRILLING RIG/METHOD Simco 2400/ 6-in. Solid Flight Auger
 LOGGED BY K. Loeb CHECKED BY D. Peluso
 HAMMER TYPE 140 lb hammer with 30 in. cathead

PROJECT NAME San Lorenzo Valley Water District 2019 Pipeline Project
 PROJECT LOCATION Santa Cruz County, CA
 GROUND ELEVATION 527 ft DATUM WGS84 HOLE SIZE 6" in.
 COORDINATES: LATITUDE 37.12499 LONGITUDE -122.12744
 GROUNDWATER AT TIME OF DRILLING --- Not Encountered
 GROUNDWATER AT END OF DRILLING --- N/A
 GROUNDWATER AFTER DRILLING --- N/A

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE	BLOW COUNTS (FIELD VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			FINES CONTENT (%)
								LIQUID LIMIT (%)	PLASTIC LIMIT (%)	PLASTICITY INDEX (%)	
0.0		Asphalt Pavement (approximately 4") Aggregate Base (approximately 6")									
2.5		Well Graded SAND w/ Silt and Gravel (SW-SM):: dark yellowish brown, dry, dense, angular granitic gravel up to 2.5 in., fine to coarse sand [Alluvium]	CM	23-28-29			4				6
5.0		Well Graded SAND with Silt (SW): dark yellowish brown, dense, fine to coarse sand, some angular granitic gravel [Alluvium]	SPT	13-12-21							
7.5		little fine gravel	CM	10-13-19			4				
10.0		becomes medium dense, increase in fine sand	SPT	15-15-13							

Bottom of borehole at 10.0 ft. Borehole backfilled with cuttings.



CAL ENGINEERING & GEOLOGY

BORING NUMBER B-03

PAGE 1 OF 1

CLIENT Schaaf & Wheeler
 PROJECT NUMBER 191110
 DATE STARTED 11/20/2019 COMPLETED 11/20/2019
 DRILLING CONTRACTOR Genozoic Exploration, LLC.
 DRILLING RIG/METHOD Simco 2400/ 6-in. Solid Flight Auger
 LOGGED BY K. Loeb CHECKED BY D. Peluso
 HAMMER TYPE 140 lb hammer with 30 in. cathead

PROJECT NAME San Lorenzo Valley Water District 2019 Pipeline Project
 PROJECT LOCATION Santa Cruz County, CA
 GROUND ELEVATION 551 ft DATUM WGS84 HOLE SIZE 6" in.
 COORDINATES: LATITUDE 37.12738 LONGITUDE -122.13196
 GROUNDWATER AT TIME OF DRILLING --- Not Encountered
 GROUNDWATER AT END OF DRILLING --- N/A
 GROUNDWATER AFTER DRILLING --- N/A

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE	BLOW COUNTS (FIELD VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			FINES CONTENT (%)
								LIQUID LIMIT (%)	PLASTIC LIMIT (%)	PLASTICITY INDEX (%)	
0.0		Asphalt Pavement (approximately 4") Aggregate Base (approximately 6") Well Graded SAND with Silt and Gravel (SW-SM): dark yellowish brown, dry, medium dense, fine to coarse sand, strong granitic clasts in borehole over 5"	CM	7-7-9			3				
2.5		Well Graded SAND (SW): dark yellowish brown, dry, medium dense, little angular granitic gravel up to 1 in.									
5.0			SPT	5-6-5							4
7.5		becomes little angular/subangular granitic gravel up to 1.5", mostly fine to medium sand	CM	6-14-12			4				
10.0			SPT	8-5-3							

Bottom of borehole at 10.0 ft. Borehole backfilled with cuttings.



CAL ENGINEERING & GEOLOGY

BORING NUMBER B-04

PAGE 1 OF 1

CLIENT Schaaf & Wheeler
 PROJECT NUMBER 191110
 DATE STARTED 11/18/2019 COMPLETED 11/18/2019
 DRILLING CONTRACTOR Cenozoic Exploration, LLC.
 DRILLING RIG/METHOD Simco 2400/ 6-in. Solid Flight Auger
 LOGGED BY K. Loeb CHECKED BY D. Peluso
 HAMMER TYPE 140 lb hammer with 30 in. cathead

PROJECT NAME San Lorenzo Valley Water District 2019 Pipeline Project
 PROJECT LOCATION Santa Cruz County, CA
 GROUND ELEVATION 395 ft DATUM WGS84 HOLE SIZE 6" in.
 COORDINATES: LATITUDE 37.09646 LONGITUDE -122.09654
 ▽ GROUNDWATER AT TIME OF DRILLING 5.5 ft / Elev 389.5 ft
 GROUNDWATER AT END OF DRILLING ---
 ▽ GROUNDWATER AFTER DRILLING 4.7 ft / Elev 390.3 ft

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE	BLOW COUNTS (FIELD VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			FINES CONTENT (%)
								LIQUID LIMIT (%)	PLASTIC LIMIT (%)	PLASTICITY INDEX (%)	
0.0		Asphalt Pavement (approximately 4") Aggregate Base (approximately 6")									
2.5		Elastic SILT w/ Sand (MH): brown, moist, stiff, high plasticity, little subangular gravel up to 2" [Alluvium]	CM	5-6-7	1.5	77	38	54	37	17	74
5.0		becomes dark gray ▽ Sandy Elastic SILT (MH): dark gray, moist, stiff, high plasticity, fine sand	SPT	2-3-4	1.5 1.5						
7.5		Clayey SAND (SC): olive gray mottled with oxidized, wet, loose, fine to medium sand Sandy SILT (ML): olive, moist, medium dense, very fine sand	CM	3-5-7		102	27				
10.0		Silty SAND (SM): olive, wet, dense, fine to coarse granitic sand SILTSTONE (BEDROCK or BOULDER?): dark gray, dry, very weak, slightly weathered	SPT	6-20-40							

Bottom of borehole at 10.0 ft. Borehole backfilled with cuttings.



CAL ENGINEERING & GEOLOGY

BORING NUMBER B-05

PAGE 1 OF 1

CLIENT Schaaf & Wheeler
 PROJECT NUMBER 191110
 DATE STARTED 11/20/2019 COMPLETED 11/20/2019
 DRILLING CONTRACTOR Genozoic Exploration, LLC.
 DRILLING RIG/METHOD Simco 2400/ 6-in. Solid Flight Auger
 LOGGED BY K. Loeb CHECKED BY D. Peluso
 HAMMER TYPE 140 lb hammer with 30 in. cathead

PROJECT NAME San Lorenzo Valley Water District 2019 Pipeline Project
 PROJECT LOCATION Santa Cruz County, CA
 GROUND ELEVATION 685 ft DATUM WGS84 HOLE SIZE 6" in.
 COORDINATES: LATITUDE 37.12818 LONGITUDE -122.13488
 GROUNDWATER AT TIME OF DRILLING --- Not Encountered
 GROUNDWATER AT END OF DRILLING --- N/A
 GROUNDWATER AFTER DRILLING --- N/A

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE	BLOW COUNTS (FIELD VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			FINES CONTENT (%)
								LIQUID LIMIT (%)	PLASTIC LIMIT (%)	PLASTICITY INDEX (%)	
0.0		Asphalt Pavement (approximately 3")									
		Aggregate Base (approximately 3")									
		Gravelly Lean CLAY (CL): dark brown, moist, hard, angular gravel up to 2 in., trace sand and root [Colluvium]	CM	9-10-11	>4.5	81	19				66
2.5		Sandy Lean CLAY (CL): dark brown, moist, hard, trace sand and root									
		Sandstone clast, roots	SPT	5-8-7							
5.0											
		Sandy SILT (ML): olive gray mottled with dark yellowish brown, moist, hard,	CM	6-8-13							
7.5											
		SILTSTONE: dark yellowish brown, moist, extremely weak, highly/moderately weathered [Weathered Bedrock]	SPT	6-9-14							
10.0											

Bottom of borehole at 10.0 ft. Borehole backfilled with cuttings.



CAL ENGINEERING & GEOLOGY

BORING NUMBER B-06

PAGE 1 OF 1

CLIENT Schaaf & Wheeler
 PROJECT NUMBER 191110
 DATE STARTED 11/18/2019 COMPLETED 11/18/2019
 DRILLING CONTRACTOR Genozoic Exploration, LLC.
 DRILLING RIG/METHOD Simco 2400/ 6-in. Solid Flight Auger
 LOGGED BY K. Loeb CHECKED BY D. Peluso
 HAMMER TYPE 140 lb hammer with 30 in. cathead

PROJECT NAME San Lorenzo Valley Water District 2019 Pipeline Project
 PROJECT LOCATION Santa Cruz County, CA
 GROUND ELEVATION 525 ft DATUM WGS84 HOLE SIZE 6" in.
 COORDINATES: LATITUDE 37.08205 LONGITUDE -122.06961
 GROUNDWATER AT TIME OF DRILLING --- Not Encountered
 GROUNDWATER AT END OF DRILLING --- N/A
 GROUNDWATER AFTER DRILLING --- N/A

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE	BLOW COUNTS (FIELD VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			FINES CONTENT (%)
								LIQUID LIMIT (%)	PLASTIC LIMIT (%)	PLASTICITY INDEX (%)	
0.0		Asphalt Pavement (approximately 5")									
		Aggregate Base (approximately 7")									
2.5		Silty SAND (SM): light gray brown, dry, medium dense, fine to medium sand, little cementation [Weathered Bedrock]	CM	7-18-21							
		decomes dense									
5.0			SPT	10-16-30							32
7.5		SANDSTONE: olive, dry, extremely weak, slightly weathered, friable, oxidized, fine sand [Bedrock]	CM	39-50/5"							
		becomes pale yellow									
			SPT	27-50							

Bottom of borehole at 9.5 ft. Borehole backfilled with cuttings.



CAL ENGINEERING & GEOLOGY

BORING NUMBER B-07

PAGE 1 OF 1

CLIENT Schaaf & Wheeler
 PROJECT NUMBER 191110
 DATE STARTED 11/18/2019 COMPLETED 11/18/2019
 DRILLING CONTRACTOR Genozoic Exploration, LLC.
 DRILLING RIG/METHOD Simco 2400/ 6-in. Solid Flight Auger
 LOGGED BY K. Loeb CHECKED BY D. Peluso
 HAMMER TYPE 140 lb hammer with 30 in. cathead

PROJECT NAME San Lorenzo Valley Water District 2019 Pipeline Project
 PROJECT LOCATION Santa Cruz County, CA
 GROUND ELEVATION 630 ft DATUM WGS84 HOLE SIZE 6" in.
 COORDINATES: LATITUDE 37.08458 LONGITUDE -122.06806
 GROUNDWATER AT TIME OF DRILLING --- Not Encountered
 GROUNDWATER AT END OF DRILLING --- N/A
 GROUNDWATER AFTER DRILLING --- N/A

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE	BLOW COUNTS (FIELD VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			FINES CONTENT (%)
								LIQUID LIMIT (%)	PLASTIC LIMIT (%)	PLASTICITY INDEX (%)	
0.0		Asphalt Pavement (approximately 4") Aggregate Base (approximately 6")									
2.5		Silty SAND (SM): pale yellow, dry, medium dense, fine sand [Residual Soil]	CM	4-10-15		101	6				12
5.0			SPT	7-10-10							
7.5		becomes brown, moist	CM	9-12-17			5				
10.0			SPT	9-7-7							

SANDSTONE encountered in shoe, strong rock, fine to coarse sand, slightly weathered [Weathered Bedrock]
 Bottom of borehole at 10.0 ft. Borehole backfilled with cuttings.



CAL ENGINEERING & GEOLOGY

BORING NUMBER B-08

PAGE 1 OF 1

CLIENT Schaaf & Wheeler
 PROJECT NUMBER 191110
 DATE STARTED 11/18/2019 COMPLETED 11/18/2019
 DRILLING CONTRACTOR Genozoic Exploration, LLC.
 DRILLING RIG/METHOD Simco 2400/ 6-in. Solid Flight Auger
 LOGGED BY K. Loeb CHECKED BY D. Peluso
 HAMMER TYPE 140 lb hammer with 30 in. cathead

PROJECT NAME San Lorenzo Valley Water District 2019 Pipeline Project
 PROJECT LOCATION Santa Cruz County, CA
 GROUND ELEVATION 659 ft DATUM WGS84 HOLE SIZE 6" in.
 COORDINATES: LATITUDE 37.08592 LONGITUDE -122.06702
 GROUNDWATER AT TIME OF DRILLING --- Not Encountered
 GROUNDWATER AT END OF DRILLING --- N/A
 GROUNDWATER AFTER DRILLING --- N/A

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE	BLOW COUNTS (FIELD VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			FINES CONTENT (%)
								LIQUID LIMIT (%)	PLASTIC LIMIT (%)	PLASTICITY INDEX (%)	
0.0		Asphalt Pavement (approximately 5")									
		Aggregate Base (approximately 5")									
2.5		Poorly Graded SAND (SP): light olive gray, dry, very dense, fine to medium sand [Residual Soil/Weathered Bedrock]	CM	16-22-43							4
5.0			SPT	17-33-50			3				
7.5			SPT	25-50							
10.0			SPT	26-40-50							

Bottom of borehole at 10.0 ft. Borehole backfilled with cuttings.



CAL ENGINEERING & GEOLOGY

BORING NUMBER B-09

PAGE 1 OF 1

CLIENT Schaaf & Wheeler
 PROJECT NUMBER 191110
 DATE STARTED 11/19/2019 COMPLETED 11/19/2019
 DRILLING CONTRACTOR Cenozoic Exploration, LLC.
 DRILLING RIG/METHOD Simco 2400/ 6-in. Solid Flight Auger
 LOGGED BY K. Loeb CHECKED BY D. Peluso
 HAMMER TYPE 140 lb hammer with 30 in. cathead

PROJECT NAME San Lorenzo Valley Water District 2019 Pipeline Project
 PROJECT LOCATION Santa Cruz County, CA
 GROUND ELEVATION 474 ft DATUM WGS84 HOLE SIZE 6" in.
 COORDINATES: LATITUDE 37.07971 LONGITUDE -122.06109
 GROUNDWATER AT TIME OF DRILLING --- Not Encountered
 GROUNDWATER AT END OF DRILLING --- N/A
 GROUNDWATER AFTER DRILLING --- N/A

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE	BLOW COUNTS (FIELD VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			FINES CONTENT (%)
								LIQUID LIMIT (%)	PLASTIC LIMIT (%)	PLASTICITY INDEX (%)	
0.0		Asphalt Pavement (approximately 4") Aggregate Base (approximately 6")									
2.5		Silty SAND (SM): light gray, dry, dense, fine sand, possible soft sandstone [Residual Soil/Weathered Bedrock] becomes light olive brown, trace subangular gravel up to 1"	CM	22-24-20		108	7				23
5.0		becomes medium dense, some oxidation	SPT	8-11-14							
7.5		Silty SAND w/ Gravel (SM): dark yellowish brown, moist, dense, fine to coarse sand									
		SANDSTONE: light gray, dry, dense, fine sand [Weathered Bedrock]	CM	13-20-30							62

Bottom of borehole at 9.5 ft. Borehole backfilled with cuttings.



CAL ENGINEERING & GEOLOGY

BORING NUMBER B-10

PAGE 1 OF 1

CLIENT Schaaf & Wheeler
 PROJECT NUMBER 191110
 DATE STARTED 11/19/2019 COMPLETED 11/19/2019
 DRILLING CONTRACTOR Genozoic Exploration, LLC.
 DRILLING RIG/METHOD Simco 2400/ 6-in. Solid Flight Auger
 LOGGED BY K. Loeb CHECKED BY D. Peluso
 HAMMER TYPE 140 lb hammer with 30 in. cathead

PROJECT NAME San Lorenzo Valley Water District 2019 Pipeline Project
 PROJECT LOCATION Santa Cruz County, CA
 GROUND ELEVATION 424 ft DATUM WGS84 HOLE SIZE 6" in.
 COORDINATES: LATITUDE 37.07792 LONGITUDE -122.05874
 GROUNDWATER AT TIME OF DRILLING --- Not Encountered
 GROUNDWATER AT END OF DRILLING --- N/A
 GROUNDWATER AFTER DRILLING --- N/A

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE	BLOW COUNTS (FIELD VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			FINES CONTENT (%)
								LIQUID LIMIT (%)	PLASTIC LIMIT (%)	PLASTICITY INDEX (%)	
0.0		Asphalt Pavement (approximately 4") Aggregate Base (approximately 6")									
2.5		Silty SAND (SM): dark olive brown, dry, medium dense, fine sand [Alluvium]	CM	13-11-7			4				6
5.0		(Corrosivity test at 3.5 to 5 feet) becomes olive brown, loose, trace roots and gravel up to 1 in.	SPT	2-3-5							
7.5		Poorly Graded SAND (SP): pale olive, dry, dense, fine to medium sand [Residual Soil/Weathered Bedrock]	CM	10-18-30		104	6				
10.0		becomes fine sand, olive becomes medium sand, pale yellow Silty SAND (SM): olive brown, moist, very dense, fine sand	SPT	10-19-33							

Bottom of borehole at 10.0 ft. Borehole backfilled with cuttings.



CAL ENGINEERING & GEOLOGY

BORING NUMBER B-11

PAGE 1 OF 1

CLIENT Schaaf & Wheeler
 PROJECT NUMBER 191110
 DATE STARTED 11/19/2019 COMPLETED 11/19/2019
 DRILLING CONTRACTOR Genozoic Exploration, LLC.
 DRILLING RIG/METHOD Simco 2400/ 6-in. Solid Flight Auger
 LOGGED BY K. Loeb CHECKED BY D. Peluso
 HAMMER TYPE 140 lb hammer with 30 in. cathead

PROJECT NAME San Lorenzo Valley Water District 2019 Pipeline Project
 PROJECT LOCATION Santa Cruz County, CA
 GROUND ELEVATION 641 ft DATUM WGS84 HOLE SIZE 6" in.
 COORDINATES: LATITUDE 37.18308 LONGITUDE -122.14259
 GROUNDWATER AT TIME OF DRILLING --- Not Encountered
 GROUNDWATER AT END OF DRILLING --- N/A
 GROUNDWATER AFTER DRILLING --- N/A

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE	BLOW COUNTS (FIELD VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			FINES CONTENT (%)
								LIQUID LIMIT (%)	PLASTIC LIMIT (%)	PLASTICITY INDEX (%)	
0.0		Sandy SILT (ML): very dark gray brown, moist, medium dense, some organics, fine sand [Fill]									
2.5		becomes dark yellowish brown mottled with olive, dry, trace roots	CM	5-8-11		87	13				
5.0		no mottling	SPT	5-6-7							57
7.5		Poorly Graded SAND (SP): dark yellowish brown, moist, medium dense, fine to medium sand, trace subangular gravel up to 1.5" [Alluvium]	CM	5-10-9		106	11				
10.0		lens with gravel becomes fine sand									
		Poorly Graded SAND with Silt (SP-SM): dark yellowish brown, moist, medium dense, fine sand, trace fine gravel	SPT	4-6-8							

Bottom of borehole at 10.0 ft. Borehole backfilled with cuttings.



CAL ENGINEERING & GEOLOGY

BORING NUMBER B-12

PAGE 1 OF 1

CLIENT Schaaf & Wheeler
 PROJECT NUMBER 191110
 DATE STARTED 11/19/2019 COMPLETED 11/19/2019
 DRILLING CONTRACTOR Cenozoic Exploration, LLC.
 DRILLING RIG/METHOD Simco 2400/ 6-in. Solid Flight Auger
 LOGGED BY K. Loeb CHECKED BY D. Peluso
 HAMMER TYPE 140 lb hammer with 30 in. cathead

PROJECT NAME San Lorenzo Valley Water District 2019 Pipeline Project
 PROJECT LOCATION Santa Cruz County, CA
 GROUND ELEVATION 651 ft DATUM WGS84 HOLE SIZE 6" in.
 COORDINATES: LATITUDE 37.18344 LONGITUDE -122.14306
 GROUNDWATER AT TIME OF DRILLING --- Not Encountered
 GROUNDWATER AT END OF DRILLING --- N/A
 GROUNDWATER AFTER DRILLING --- N/A

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE	BLOW COUNTS (FIELD VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			FINES CONTENT (%)
								LIQUID LIMIT (%)	PLASTIC LIMIT (%)	PLASTICITY INDEX (%)	
0.0		Asphalt Pavement (approximately 3")									
		Aggregate Base (approximately 3")									
		Sandy SILT (ML): dark yellowish brown, medium dense, fine sand some angular gravel [Fill]	CM	7-7-5		75	11				74
2.5		becomes brown, roots, no gravel									
		Sandy Lean CLAY with Gravel (CL): dark yellowish brown, moist, medium dense, little friable gravel, some organics, subangular gravel up to 2.5" [Colluvium]	SPT	3-5-7							
5.0											
		becomes olive brown mottled with dark yellowish brown (oxidized), hard	CM	6-11-13	>4.5	104	19				
7.5											
			SPT	6-9-13	>4.5						
10.0											

becomes olive brown mottled with dark yellowish brown (oxidized), hard
 Bottom of borehole at 10.0 ft. Borehole backfilled with cuttings.



CAL ENGINEERING & GEOLOGY

BORING NUMBER B-13

PAGE 1 OF 1

CLIENT Schaaf & Wheeler
 PROJECT NUMBER 191110
 DATE STARTED 11/18/2019 COMPLETED 11/18/2019
 DRILLING CONTRACTOR Genozoic Exploration, LLC.
 DRILLING RIG/METHOD Simco 2400/ 6-in. Solid Flight Auger
 LOGGED BY K. Loeb CHECKED BY D. Peluso
 HAMMER TYPE 140 lb hammer with 30 in. cathead

PROJECT NAME San Lorenzo Valley Water District 2019 Pipeline Project
 PROJECT LOCATION Santa Cruz County, CA
 GROUND ELEVATION 374 ft DATUM WGS84 HOLE SIZE 6" in.
 COORDINATES: LATITUDE 37.09854 LONGITUDE -122.09525
 GROUNDWATER AT TIME OF DRILLING --- Not Encountered
 GROUNDWATER AT END OF DRILLING --- N/A
 GROUNDWATER AFTER DRILLING --- N/A

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE	BLOW COUNTS (FIELD VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			FINES CONTENT (%)
								LIQUID LIMIT (%)	PLASTIC LIMIT (%)	PLASTICITY INDEX (%)	
0.0		Asphalt Pavement (approximately 3") Aggregate Base (approximately 6")									
		Sandy SILT (ML): very dark gray brown, dry, medium dense, fine sand, trace roots [Alluvium]	CM	9-11-11		94	10				
2.5		Silty SAND (SM): dark yellowish brown, dry, medium dense, fine to medium sand, little subangular gravel									
		becomes dark brown, granitic sand	SPT	10-15-13							14
5.0											
		becomes dark gray, moist, fine to coarse sand, one 2" round clast	CM	15-15-17		111	14				
7.5											
		becomes olive yellow, very dense, fine sand, oxidized	SPT	17-30-40							
10.0											

Bottom of borehole at 10.0 ft. Borehole backfilled with cuttings.



CAL ENGINEERING & GEOLOGY

BORING NUMBER B-14

PAGE 1 OF 1

CLIENT Schaaf & Wheeler
 PROJECT NUMBER 191110
 DATE STARTED 11/18/2019 COMPLETED 11/18/2019
 DRILLING CONTRACTOR Cenozoic Exploration, LLC.
 DRILLING RIG/METHOD Simco 2400/ 6-in. Solid Flight Auger
 LOGGED BY K. Loeb CHECKED BY D. Peluso
 HAMMER TYPE 140 lb hammer with 30 in. cathead

PROJECT NAME San Lorenzo Valley Water District 2019 Pipeline Project
 PROJECT LOCATION Santa Cruz County, CA
 GROUND ELEVATION 380 ft DATUM WGS84 HOLE SIZE 6" in.
 COORDINATES: LATITUDE 37.09567 LONGITUDE -122.09573
 GROUNDWATER AT TIME OF DRILLING --- Not Encountered
 GROUNDWATER AT END OF DRILLING --- N/A
 GROUNDWATER AFTER DRILLING --- N/A

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE	BLOW COUNTS (FIELD VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			FINES CONTENT (%)
								LIQUID LIMIT (%)	PLASTIC LIMIT (%)	PLASTICITY INDEX (%)	
0.0		Asphalt Pavement (approximately 3")									
		Aggregate Base (approximately 3")									
		Lean CLAY (CL): brown, moist, very stiff, roots, low plasticity [Fill]									
2.5		Sandy Lean CLAY (CL): very dark gray, moist, very stiff, fine sand, trace coarse sand	CM	5-8-10	3.25	133	13				
		Silty SAND (SM): dark olive brown, moist, medium dense, fine sand [Alluvium]	CM	6-7-8		103	15				
5.0		becomes dark yellowish brown, decrease in fines									
		becomes oxidized	CM	5-6-8							
7.5		increase in fines, light brown gray									
		Well Graded SAND (SW): dark brown/dark yellowish brown, moist, medium dense, fine to coarse granitic sand, trace subangular gravel	SPT	6-8-8							
10.0		Fat CLAY (CH): gray, moist, stiff, high plasticity									

Bottom of borehole at 10.0 ft. Borehole backfilled with cuttings.



CAL ENGINEERING & GEOLOGY

BORING NUMBER B-15

PAGE 1 OF 1

CLIENT Schaaf & Wheeler
 PROJECT NUMBER 191110
 DATE STARTED 12/16/2019 COMPLETED 12/16/2019
 DRILLING CONTRACTOR N/a
 DRILLING RIG/METHOD Hand Augered by CE&G Staff
 LOGGED BY K. Loeb CHECKED BY D. Peluso
 HAMMER TYPE N/A

PROJECT NAME San Lorenzo Valley Water District 2019 Pipeline Project
 PROJECT LOCATION Santa Cruz County, CA
 GROUND ELEVATION 740 ft DATUM WGS84 HOLE SIZE 3" in.
 COORDINATES: LATITUDE 37.14987 LONGITUDE -122.13425
 GROUNDWATER AT TIME OF DRILLING --- Not Encountered
 GROUNDWATER AT END OF DRILLING --- N/A
 GROUNDWATER AFTER DRILLING --- N/A

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE	BLOW COUNTS (FIELD VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			FINES CONTENT (%)	
								LIQUID LIMIT (%)	PLASTIC LIMIT (%)	PLASTICITY INDEX (%)		
0.0		Sandy SILT (ML): dark brown, moist, loose, very fine sand, roots [Topsoil]										
2.5		Sandy SILT (ML): dark yellowish brown, moist, loose to medium dense, very fine sand, roots [Colluvium/Residual Soil]										
5.0		Silty SAND (SM): olive brown to dark yellowish brown, moist, medium dense, oxidized [Completely Weathered Bedrock]										

Bottom of borehole at 6.5 ft. Borehole backfilled with cuttings.

Draft

*Draft Geotechnical Design Report
San Lorenzo Valley Water District 2019 Waterline Project*

January 30, 2020

Appendix B. Laboratory Testing



CAL ENGINEERING & GEOLOGY

SUMMARY OF LABORATORY RESULTS

PAGE 1 OF 1

CLIENT Schaaf Wheeler

PROJECT NAME San Lorenzo WD Pipeline

PROJECT NUMBER 191110

PROJECT LOCATION San Lorenzo, CA

Borehole	Depth	Date Tested	Liquid Limit	Plastic Limit	Plasticity Index	Maximum Screen Size (mm)	%<#200 Sieve	Classification	Water Content (%)	Dry Density (pcf)	Saturation (%)	Void Ratio
B-01	2.0	12/3/2019							13.2	114.3		
B-01	7.0	12/3/2019							14.2	126.8		
B-02	2.0	12/3/2019				25	6		4.0			
B-02	6.5	12/3/2019							4.4			
B-03	1.5	12/3/2019							3.4			
B-03	3.5	12/3/2019				0.106	4	SP				
B-03	7.0	12/3/2019							3.6			
B-05	2.0	12/3/2019				0.106	66		19.2	80.6		
B-06	3.5	12/3/2019				0.106	32					
B-07	2.0	12/3/2019				0.106	12		6.3	101.4		
B-07	7.0	12/3/2019							5.1			
B-08	1.5	12/3/2019				4.75	4	SP				
B-08	3.5	12/3/2019							2.8			
B-09	2.0	12/3/2019				0.106	23		7.3	108.2		
B-09	8.5	12/3/2019				9.5	62					
B-10	2.0	12/3/2019				0.106	6		3.8			
B-10	7.0	12/3/2019							5.6	103.9		
B-11	2.0	12/3/2019							13.4	87.3		
B-11	3.5	12/3/2019				0.106	57					
B-11	7.0	12/3/2019							10.9	106.2		
B-12	2.0	12/3/2019				0.106	74		10.6	75.1		
B-12	7.0	12/3/2019							18.6	103.5		
B-14	2.0	12/3/2019							12.9	133.3		
B-14	4.5	12/3/2019							15.4	102.5		



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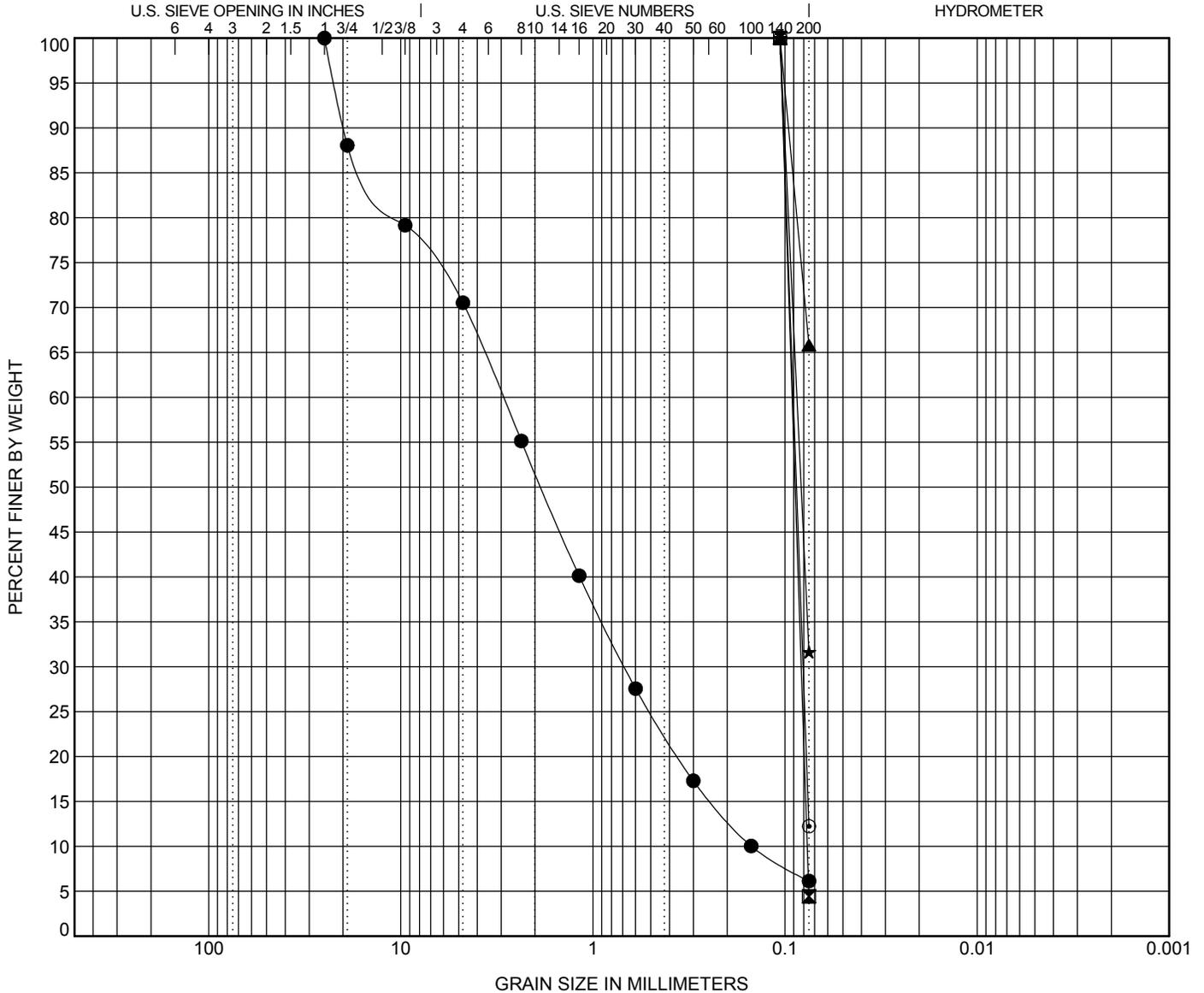
GRAIN SIZE DISTRIBUTION

CLIENT Schaaf Wheeler

PROJECT NAME San Lorenzo WD Pipeline

PROJECT NUMBER 191110

PROJECT LOCATION San Lorenzo, CA



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	DATE TESTED	Classification					LL	PL	PI	Cc	Cu
● B-02	2.0	12/3/2019									1.07	19.74
☒ B-03	3.5	12/3/2019	POORLY GRADED SAND(SP)								0.96	1.20
▲ B-05	2.0	12/3/2019										
★ B-06	3.5	12/3/2019										
⊙ B-07	2.0	12/3/2019									0.96	1.22
BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay			
● B-02	2.0	25	2.944	0.684	0.149	29.5	64.4	6.1				
☒ B-03	3.5	0.106	0.092	0.082	0.077	0.0	95.6	4.4				
▲ B-05	2.0	0.106				0.0	34.2	65.8				
★ B-06	3.5	0.106	0.087			0.0	68.4	31.6				
⊙ B-07	2.0	0.106	0.091	0.08		0.0	87.8	12.2				



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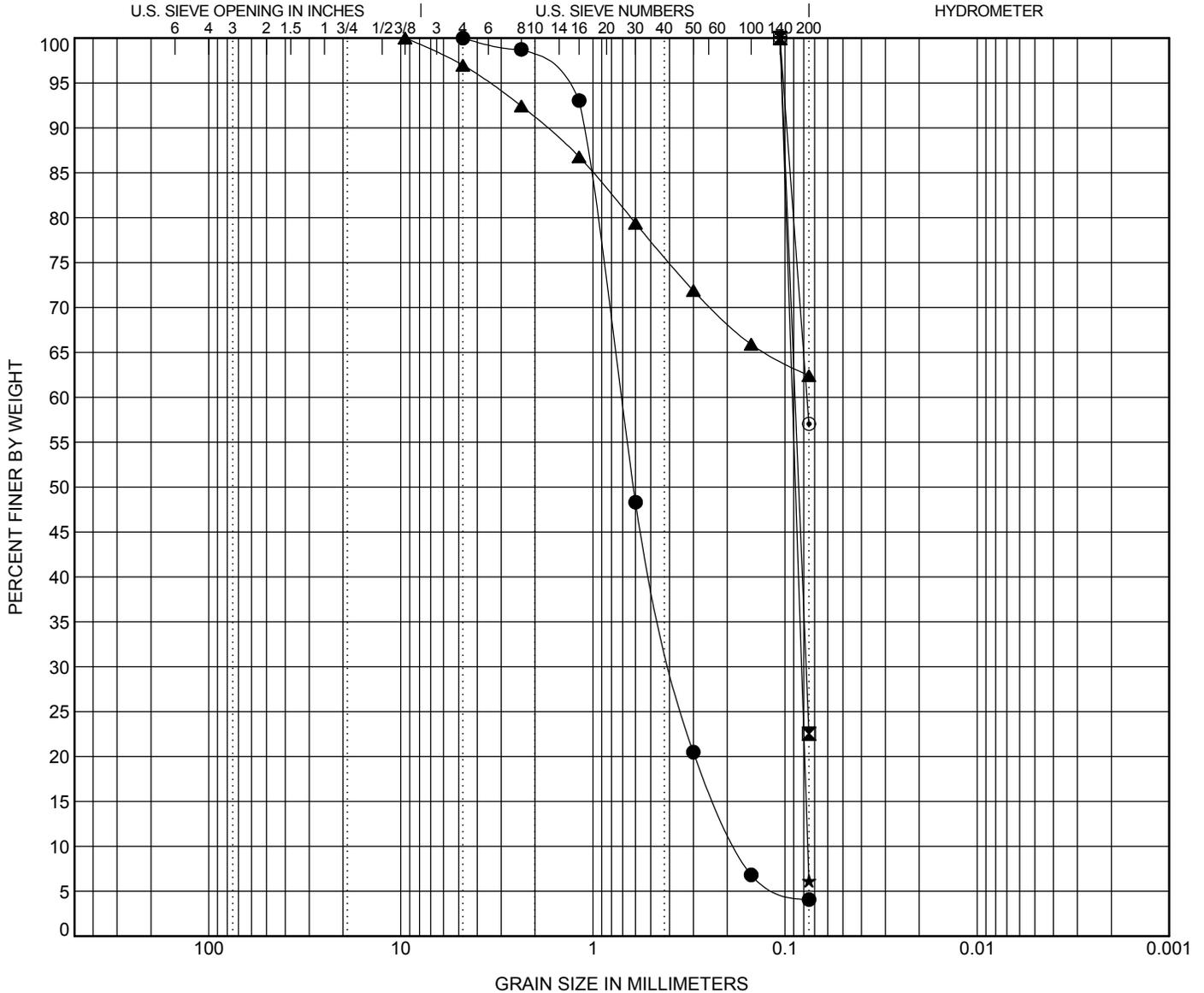
GRAIN SIZE DISTRIBUTION

CLIENT Schaaf Wheeler

PROJECT NAME San Lorenzo WD Pipeline

PROJECT NUMBER 191110

PROJECT LOCATION San Lorenzo, CA



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	DATE TESTED	Classification				LL	PL	PI	Cc	Cu
● B-08	1.5	12/3/2019	POORLY GRADED SAND(SP)							1.15	4.06
☒ B-09	2.0	12/3/2019									
▲ B-09	8.5	12/3/2019									
★ B-10	2.0	12/3/2019							0.96	1.20	
◎ B-11	3.5	12/3/2019									
BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay		
● B-08	1.5	4.75	0.716	0.38	0.176	0.0	95.9	4.1			
☒ B-09	2.0	0.106	0.089	0.078		0.0	77.5	22.5			
▲ B-09	8.5	9.5				3.0	34.6	62.4			
★ B-10	2.0	0.106	0.091	0.082	0.076	0.0	93.9	6.1			
◎ B-11	3.5	0.106	0.077			0.0	43.0	57.0			



CAL ENGINEERING & GEOLOGY

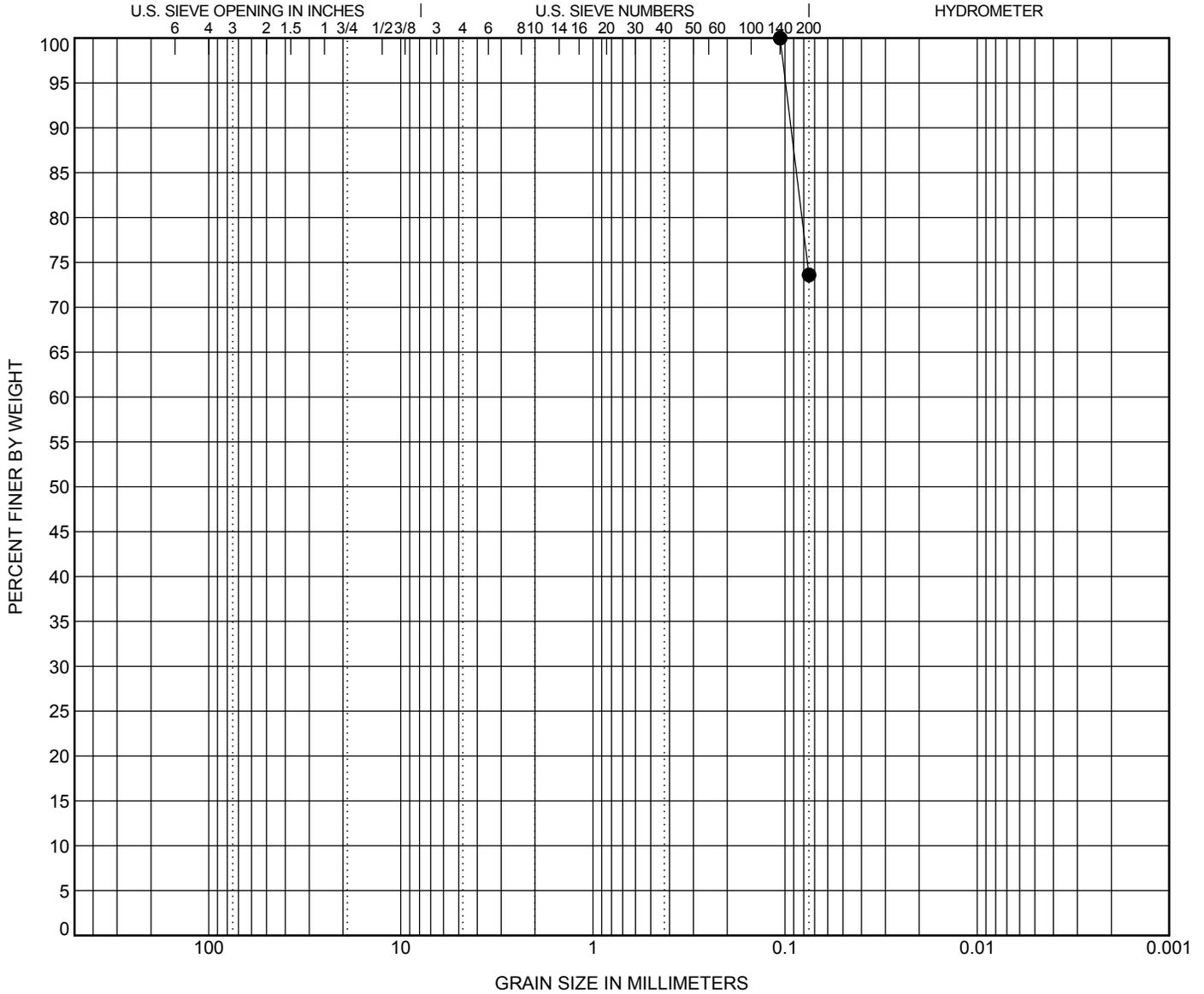
GRAIN SIZE DISTRIBUTION

CLIENT Schaaf Wheeler

PROJECT NAME San Lorenzo WD Pipeline

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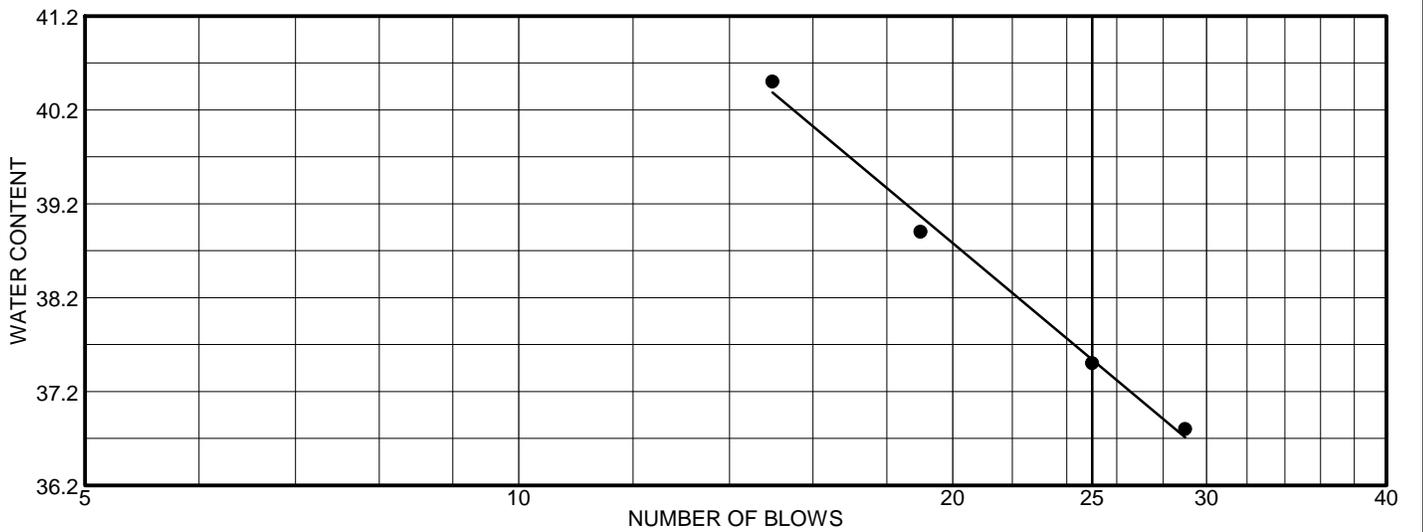
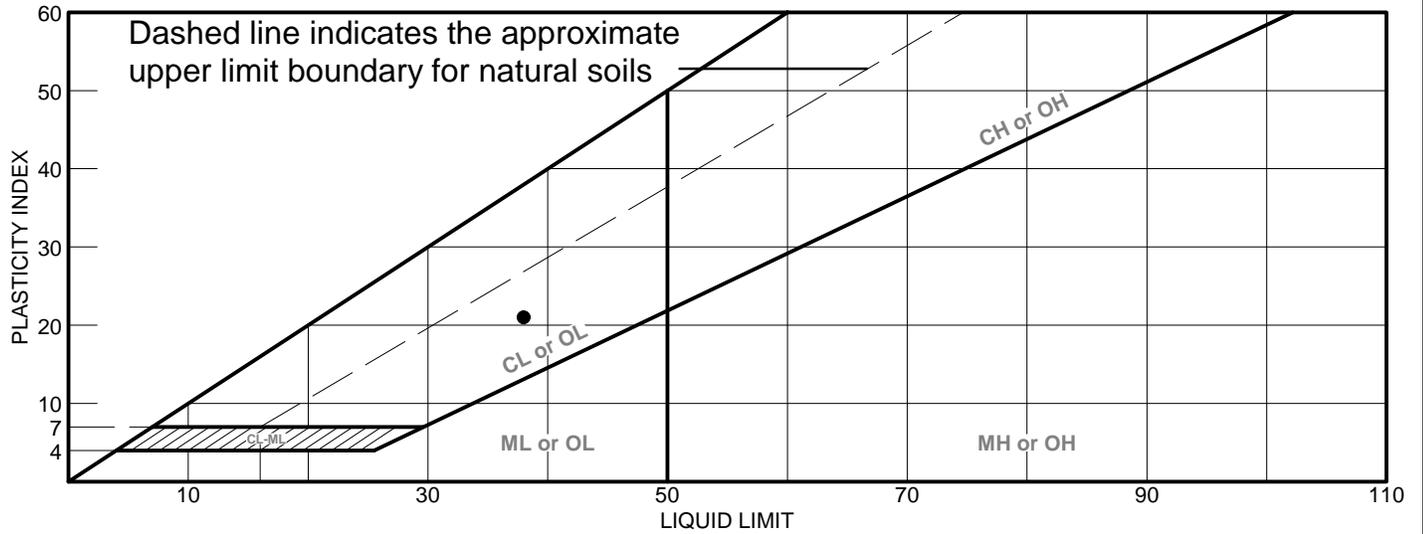
PROJECT LOCATION San Lorenzo, CA



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	DATE TESTED	Classification					LL	PL	PI	Cc	Cu
● B-12	2.0	12/3/2019										
BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt		%Clay		
● B-12	2.0	0.106				0.0	26.4	73.6				

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Dark Gray Lean Clayey SAND	38	17	21			

<p>Project No. 471-290 Client: Cal Engineering & Geology</p> <p>Project: SLVWD Pipeline - 191110</p> <p>● Source: B-1 Sample No.: 1-3 Elev./Depth: 3.5-5'</p>	<p>Remarks:</p> <p>●</p>
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