



EAST CONTRA
COSTA COUNTY
HABITAT
CONSERVANCY

City of Brentwood

City of Clayton

City of Oakley

City of Pittsburg

Contra Costa County

May 14, 2020

NOTICE OF PUBLIC REVIEW AND NOTICE OF INTENT TO ADOPT A MITIGATED NEGATIVE DECLARATION

Pursuant to the State of California Public Resources Code and the “Guidelines for Implementation of the California Environmental Quality Act of 1970” as amended to date, this is to advise you that the East Contra Costa County Habitat Conservancy (“Conservancy”) has prepared a draft initial study/mitigated negative declaration (IS/MND) for the following project:

PROJECT NAME: PG&E Transmission Pipeline L-114 Replacement Project

LEAD AGENCY: East Contra Costa County Habitat Conservancy

APPLICANT: Pacific Gas and Electric Company (PG&E)

LOCATION: APNs 007-380-018, 007-580-014, 007-570-007, 007-570-006, 007-700-035, 007-680-065, 007-660-037, 010-050-003, and the Marsh Creek Road, Chianti Lane, Barbaresco Lane, and Pioneer Trail public ROW.

DESCRIPTION: The proposed project involves the installation of a new 2,000-foot-long, 24-inch-diameter natural gas transmission pipeline to replace an existing 22-inch natural gas pipeline. The existing natural gas pipeline, which is referred to as Line 114 (L-114) was installed in 1942 and replacement is required under Pacific Gas and Electric Company (PG&E) Integrity Management’s Vintage Pipe Replacement Program. The existing pipeline that was constructed in 1942 would be retired in place. The project site is located within the boundaries of the East Contra Costa County (ECCC) Habitat Conservation Plan (HCP)/Natural Community Conservation Plan (NCCP) Plan Area. The activities proposed as part of this project qualify as “covered activities” under the HCP.

PUBLIC COMMENT PERIOD: The 30-day period for public review and comment on the proposed Mitigated Negative Declaration begins Thursday, May 14, 2020. All comments must be submitted by Monday, June 15, 2020. Any comments should be submitted in writing to the following address:

East Contra Costa County Habitat Conservancy
Attn: Joseph Lawlor
30 Muir Road
Martinez, CA 94553

The proposed Mitigated Negative Declaration will be considered for adoption at a meeting of the East Contra Costa County Habitat Conservancy Governing Board. The tentative meeting date before the Governing Board for the project permit approval and for adoption of the Mitigated Negative Declaration is **Friday, June 26, 2020**. The meeting will be held at 10:00 AM either at the City of Pittsburg, City Council

Chambers, 65 Civic Avenue, Pittsburg, CA 94565 or via telemeeting, in compliance with the Covid Pandemic restrictions and emergency guidelines.

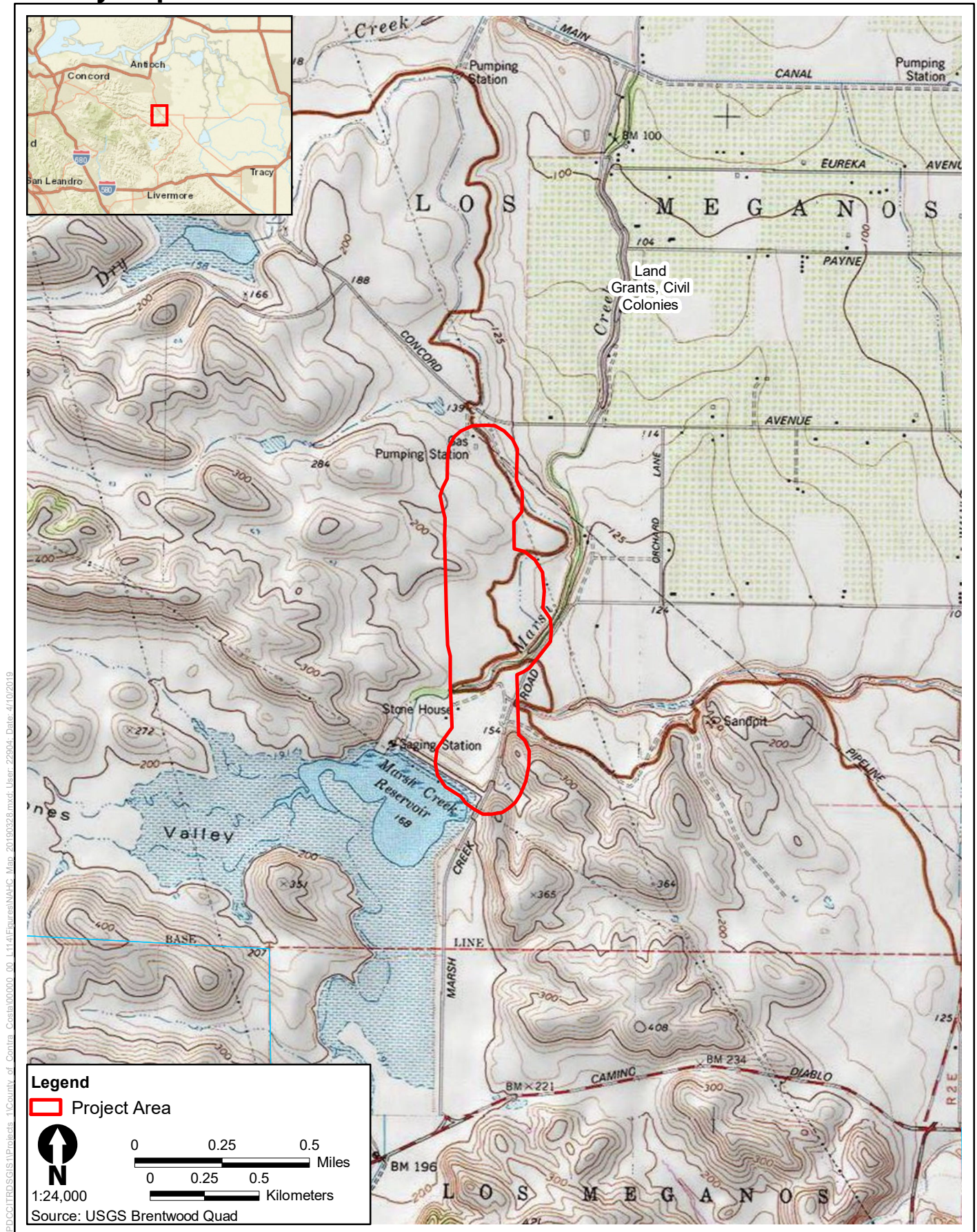
DOCUMENT AVAILABILITY: Copies of the IS/MND are available for public review by contacting the Contra Costa County Department of Conservation and Development at (925) 674-7802 or joseph.lawlor@dcd.cccounty.us. In addition, the IS/MND is available through the East Contra Costa County Habitat Conservancy website at www.cocohcp.org.

ADDITIONAL INFORMATION: For additional information on the Mitigated Negative Declaration and the proposed project you can contact the project planner, Joseph Lawlor, by telephone at (925) 674-7802 or e-mail at joseph.lawlor@dcd.cccounty.us.

A handwritten signature in cursive script, appearing to read "Joseph Lawlor".

Attachment: Project Vicinity Map

Vicinity Map



Project Area
Line-114 Vintage Pipeline Replacement Project

PG&E TRANSMISSION PIPELINE L-114 REPLACEMENT PROJECT INITIAL STUDY/MITIGATED NEGATIVE DECLARATION

PREPARED FOR:

East Contra Costa County Habitat Conservancy
30 Muir Road
Martinez, CA 94553
Contact: Joseph W. Lawlor Jr, AICP
925.674.7802

PREPARED BY:

ICF
201 Mission Street, Suite 1500
San Francisco, CA 94105
Contact: Greta Brownlow
415.677.7100

May 2020



Contents

List of Tables	iii
List of Figures.....	iii
List of Acronyms and Abbreviations.....	iv
 Chapter 1 Project Description	1-1
Introduction.....	1-1
East Contra Costa County Habitat Conservation Plan/Natural Community Conservation Plan	1-1
Habitat Conservation Plan/Natural Community Conservation Plan Coverage.....	1-1
CEQA Tiering	1-2
Project Location.....	1-2
Construction	1-3
Transmission Line Retirement	1-3
Installation of New Transmission Line	1-3
Vehicular and Emergency Access.....	1-5
Cross-compression Activities	1-5
Construction Equipment.....	1-5
Construction Schedule, Duration, and Number of Employees	1-6
Operation and Maintenance	1-6
Natural Gas Capacity	1-6
 Chapter 2 Environmental Checklist	2-1
Environmental Factors Potentially Affected	2-3
Determination	2-3
Evaluation of Environmental Impacts	2-4
I. Aesthetics.....	2-5
II. Agricultural and Forestry Resources.....	2-8
III. Air Quality	2-11
IV. Biological Resources	2-17
V. Cultural Resources.....	2-33
VI. Energy	2-38
VII. Geology, Soils, and Paleontological Resources.....	2-40
VIII. Greenhouse Gas Emissions.....	2-45
IX. Hazards and Hazardous Materials	2-48
X. Hydrology and Water Quality	2-53
XI. Land Use and Planning.....	2-57

XII. Mineral Resources	2-59
XIII. Noise	2-60
XIV. Population and Housing.....	2-66
XV. Public Services	2-67
XVI. Recreation.....	2-69
XVII. Transportation	2-71
XVIII. Tribal Cultural Resources	2-73
XIX. Utilities and Service Systems	2-75
XX. Wildfire	2-79
XXI. Mandatory Findings of Significance	2-82
Chapter 3 References Cited	3-1

Appendix A	Air Quality Supporting Information
Appendix B	Biological Resources Information
Appendix C	HDD Execution Plan
Appendix D	Greenhouse Gas Emissions Supporting Information
Appendix E	Geotechnical Report

Tables

		Page
1	Criteria Pollutant Emissions from Project Construction	2-13
2	Federal or State Special-Status Wildlife Species with the Potential to be Affected by the Project	2-21
3	Estimated Unmitigated GHG Emissions from Project Construction	2-46
4	Noise Emission Levels from Construction Equipment	2-62

Figures

	Follows Page
1	Project Location 1-3

Acronyms and Abbreviations

AB	Assembly Bill
BAAQMD	Bay Area Air Quality Management District
Bay Area	San Francisco Bay Area
bgs	below ground surface
BMP	best management practice
BPD	Brentwood Police Department
CAAQS	California ambient air quality standards
CAP	climate action plan
CCFCD	Contra Costa Flood Control District
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society
Conservancy	East Contra Costa County Habitat Conservancy
dB	Decibel
dBA	A-weighted decibel
DPM	diesel particulate matter
ECCC	East Contra Costa County
ECCFPD	East Contra Costa Fire Prevention District
EIR	environmental impact report
EIS	environmental impact statement
EO	Executive Order
ESA	federal Endangered Species Act
FTA	Federal Transit Administration
GHG	greenhouse gas
HCA	high consequence area
HCP	habitat conservation plan
HDD	horizontal directional drill
ILI	in-line inspection
IS	initial study
L-114	Line 114
L _{dn}	day-night sound level
L _{eq}	equivalent sound level
LRA	local responsibility area
MBTA	Migratory Bird Treaty Act
MGD	million gallons per day
MGY	million gallons per year
MND	mitigated negative declaration
NAAQS	national ambient air quality standards
NCCP	natural community conservation plan
NO _x	nitrogen oxides
NSR	New Source Review

PG&E	Pacific Gas and Electric Company
PM	particulate matter
PM2.5	particulate matter 2.5 microns or less in diameter
psig	pounds per square inch gauge
ROG	reactive organic gases
SB	Senate Bill
SR	State Route
SRA	state responsibility area
SWRCB	State Water Resources Control Board
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VHFHSZ	Very High Fire Hazard Severity Zone
WWTP	wastewater treatment plant

This page intentionally left blank.

Introduction

The proposed project involves the installation of a new 2,000-foot-long, 24-inch-diameter natural gas transmission pipeline to replace an existing 22-inch natural gas pipeline. The existing natural gas pipeline, which is referred to as Line 114 (L-114) was installed in 1942 and replacement is required under Pacific Gas and Electric Company (PG&E) Integrity Management's Vintage Pipe Replacement Program. The existing pipeline that was constructed in 1942 would be retired in place.

East Contra Costa County Habitat Conservation Plan/Natural Community Conservation Plan

Habitat Conservation Plan/Natural Community Conservation Plan Coverage

The project site is located within the boundaries of the East Contra Costa County (ECCC) Habitat Conservation Plan (HCP)/Natural Community Conservation Plan (NCCP) Plan Area. The East Contra Costa County Habitat Conservancy (Conservancy) and the co-permittees of the ECCC HCP/NCCP have received authorization from the U.S. Fish and Wildlife Service (USFWS) under incidental take permit TE 160958-0, and the California Department of Fish and Wildlife (CDFW), under incidental take permit 2835-2007-01-03. The activities proposed as part of this project qualify as "covered activities" per Section 2.3.1, *Activities within the Urban Development Area*, of the ECCC HCP/NCCP which states:

This category includes all ground- or habitat-disturbing projects and activities that may occur within the urban development area (UDA). This category is intended to be as inclusive as possible to accommodate urban growth; it includes the construction and maintenance of typical urban facilities, public and private, consistent with local general plans and local, state, and federal laws. This category includes, but is not limited to, the construction, maintenance, and use of the following facilities.

- Public and private utilities including transmission lines, telecommunications lines, and gas lines.

A portion of the project also falls under the category of Utility Line or Facility Operation and Maintenance, per Section 2.3.3, *Rural Infrastructure Operation and Maintenance Activities*, of the ECCC HCP/NCCP. This category only applies to the work within the south work area where the cross-compression activities would take place. See *Cross-compression Activities* below for a description of cross-compression activities, which would not require any replacement of pipelines. The following excerpt from the ECCC HCP/NCCP describes the types of activities that fall under this category:

There are many pipelines and cables in the inventory area outside the initial UDA that are maintained by private companies such as Pacific Gas & Electric Company (PG&E), other natural gas companies, petroleum companies, or telecommunications companies. These companies also operate and maintain electric substations, gas valve stations, radio broadcasting towers, and cellular

telephone towers, among other facilities. The routine operation and maintenance of existing facilities on disturbed ground (e.g., concrete pads, gravel) is not expected to result in take of covered species. However, the routine maintenance of linear facilities such as gas pipelines, electric transmission and distribution lines, and telecommunication lines may result in take of covered species.

Maintenance or repair of linear facilities may involve vegetation clearing (e.g., mowing, disking, herbicide spraying, tree trimming) or excavation of underground utility lines for inspection, maintenance, or replacement. Many utility lines are expected to cross the HCP/NCCP Preserve System. The routine and emergency operation and maintenance of utility lines in the inventory area outside the UDA is a covered activity under this Plan, except for the use of pesticides, which is not covered by the federal permit. Any utility not subject to the jurisdiction of one of the Permittees can request coverage under the HCP/NCCP as a Participating Special Entity as described in Chapter 8. Some energy or water utilities may already have their own endangered species permits for their activities (e.g., PG&E is developing its own HCP for operations and maintenance activities) and will therefore not require coverage under this Plan.

As such, PG&E seeks extension of the Conservancy's permit coverage for the pipeline work. As a Participating Special Entity, PG&E would enter into an agreement with the Conservancy that would allow the activities to be covered by the Federal Permit and the State Permits.

CEQA Tiering

This document was prepared in conformance with California Environmental Quality Act (CEQA) Guidelines Section 15152 to tier from the environmental impact statement (EIS)/environmental impact report (EIR) prepared for the ECCC HCP/NCCP. Section 15152 allows for tiering of environmental review when a later, specific project is separate from but related to the analysis contained in a program EIR prepared for a broader planning level project where the latter project would not result in significant effects on the environment that are adequately addressed in the prior EIR. The Conservation Measures included in Chapter 5, Conservation Strategy and Chapter 6, Conditions on Covered Activities, of the ECCC HCP would be implemented, as applicable, to this project.

The EIS/EIR and related documents are available here: http://www.co.contra-costa.ca.us/depart/cd/water/HCP/archive/final_EIS/eis_eir.html.

Project Location

The project site is located in the City of Brentwood and unincorporated Contra Costa County. The 15-acre project site, which includes all the work areas where construction activities would take place, is bordered by a new residential development that was completed in early 2018 and agricultural land. Furthermore, a community college facility is under construction and is located northeast of the north work area. This community college is expected to open in spring 2020. Marsh Creek intersects the project site and the creek headwaters are south of the project site where the creek flows from the Marsh Creek Reservoir facility. The existing pipeline L-114 crosses under Marsh Creek near Vineyards Parkway and Marsh Creek Road.

The project site includes three work areas: the north work area, central work area, and south work area. Access to the north work area of the project site is provided by Vineyards Parkway and Miwok Avenue. Access to the central work area is provided by an existing paved access road off Marsh Creek Road on the Contra Costa Flood Control District (CCFCD) property. Figure 1 shows the access

road that would be used for the central work area. No staging or storage would occur on this roadway and project construction would not block the access road. The south work area is directly south of the intersection of Marsh Creek Road and Camino Diablo and would be accessed from those two roads.

Construction

Transmission Line Retirement

The existing 22-inch L-114 transmission line would be retired in place by pumping the remaining natural gas from the pipeline to another pipeline in the system, then cutting and capping the line. The existing 22-inch pipe would be cleaned of any liquids at the northern tie-in point adjacent to Miwok Avenue. All liquids removed from the pipeline would be containerized and disposed of at a PG&E authorized disposal facility. The nearest PG&E authorized disposal facility that would be used for the project is Keller Canyon Landfill in Pittsburg, CA. The pipeline would then be filled completely with slurry cement. During the retirement process, a 4-foot by 4-foot and 6-foot by 6-foot sniff hole would be installed to monitor the pipeline and identify any gas leaks. Once the retirement of the existing pipe is complete, all excavations would be backfilled.

Installation of New Transmission Line

A new 24-inch pipeline would be installed using a horizontal directional drill (HDD) to replace the service provided by the existing pipeline. This drilling method would be used in order to avoid impacts on the Marsh Creek waterway, sensitive habitat, and archeological resources within the Marsh Creek State Park.

The process for installing the new L-114 transmission line would include the following steps:

1. Delivery of pipeline in segment, pipeline laydown, coating, and welding
2. Hydrostatic pressure testing
3. Excavation of HDD entry and exit points
4. Drilling of a pilot hole using a drill rig at the HDD entry point
5. Stringing of pipeline at an elevated angle position using side-broom cranes near the HDD exit point
6. Attachment of the pipeline to a reaming assembly at the HDD exit point, and pulling of the pipeline back to the drilling rig at the HDD entry point
7. Excavation for tie-in to the existing natural gas pipelines and tie-in to the existing pipeline

Prior to any drilling, the new pipeline would be delivered on trucks, in segments and laid out on rollers. The new pipeline would be laid down on a 50-foot-wide by 2,800-foot-long work area (north work area). This north work area is within the PG&E right-of-way adjacent to Miwok Avenue and some residences, as shown in Figure 1. The pipeline would then be coated with 3M Skotchkote 323 liquid-epoxy coating and welded together. This phase of construction is anticipated to occur over 5 months.

The pipeline would then be hydrostatically pressure tested (hydro-tested) to ensure pipe integrity. Hydro-testing would verify the maximum operating pressure. Water used for the hydro-test would be brought to the work area from a municipal source by truck. The new pipeline would be filled with water and the water pressure would be slowly raised to the appropriate pressure for a minimum of 8 hours. Once the hydro-test is complete, water would be released from the pipeline and collected in liquid storage tanks staged within the project workspace. Test water would then be hauled offsite to an appropriate disposal site.

The HDD entry pit would be excavated west of Marsh Creek Road, and east of the paved access road.¹ The HDD exit pit would be excavated adjacent to Miwok Avenue as depicted on Figure 1.² Entry and exit pits for the HDD would be approximately 15 feet wide, 30 feet long, and 10 feet deep. An excavator and backhoe would be used to excavate the exit and entry pits for the HDD.

The HDD process would be accomplished with a drill rig that sits on a 40-foot-long trailer at the HDD entry point. The HDD drill rig would require a 30-foot-wide by 60-foot-long area for the drill rig set up. A small diameter pilot-hole would be dug through the pipeline alignment. The hole would reach a maximum depth of 48 feet at the point where the new pipe would cross under Marsh Creek.

After the pilot hole is complete, the next step would be to install the pipeline. HDD requires that the pipeline be installed at an angle. Construction crews would elevate the pipeline near the HDD exit pit, at an angle using side-boom cranes. The pipeline installation would be accomplished by attaching the pre-fabricated pipeline pull section behind a reaming assembly³ at the HDD exit point and pulling the reaming assembly and pull section back to the drilling rig. A swivel⁴ would be utilized to connect the pull section to the leading reaming assembly for the pullback. During the HDD pullback process, no physical excavation would be involved; however, operation of side-boom cranes cradling the pullback section of pipe and the drill rig would occur during this process.

Following the process of pulling the entire length of the pipe, an approximately 4-foot-wide, 100-foot-long, and 8-foot-deep trench would be excavated from the north work area to the northern tie-in point adjacent to Miwok Avenue. A trench that is approximately 4 feet wide, 74 feet long, and 8 feet deep would be excavated from the central work area to the southern tie-in point on the CCFCD property through the use of open-cut trenching. Two bell holes, which are narrow excavations used to expose the pipeline so that work can be completed, would be excavated approximately 8 feet wide, 16 feet long, and 10 feet deep for the tie-in points where the new pipe would be tied into the existing pipeline. The tie-in points at each end of the pipeline and the trenches leading to the tie-in points would be excavated using excavators and/or backhoes. Construction activities associated with the tie-in process are anticipated to occur over 2 months.

While groundwater is not anticipated to be encountered during construction, any groundwater encountered would be pumped into onsite storage tanks and disposed of offsite at an appropriate publicly owned treatment works facility. PG&E would install the new pipeline underneath Marsh Creek and would obtain CDFW, State Water Resources Control Board (SWRCB), and U.S. Army Corps of Engineers (USACE) permits, as required. Construction activities would occur within the designated work areas.

¹ The HDD entry site is where the drill rig is placed and from which the pilot hole is drilled.

² The HDD exit site is where the pipeline is inserted to the pilot hole.

³ A reaming assembly is a tool in the HDD process that enlarges the pilot hole to fit the diameter of the pipeline.

⁴ A swivel is a tool that connects the reamer to the pipeline, so that the pipeline can be installed.

Workspace for the proposed project would include a total of approximately 15 acres for vehicle/crew access, staging, and equipment laydown associated with the pipeline installation and retirement activities. The central work area would include a 10-foot by 15-foot area next to the HDD entry point, where storage for drilling fluids and mud and refueling would occur. Drilling fluids and mud would be stored in the central work area, within a 20,000-gallon movable, covered tank (frac tank). Drilling muds and fluid would be pumped into the tank using a 6-inch pump. The HDD phase of construction is anticipated to occur over a 3-month period.

Vehicular and Emergency Access

As shown in Figure 1, the laydown of the pipeline would require placing the pipeline over two roadways (Barbaresco Lane and Chianti Lane) that provide access to homes on the east side of the pipeline laydown area. These roadways would not be closed concurrently. Access to one of the two roadways would be maintained throughout the entirety of construction, for both emergency access and access to the adjacent homes. Traffic control measures, such as flagging and signage, would be employed during construction, and nearby residences and the fire and police departments would be notified of the dates of the roadway closures by PG&E's Customer Outreach Department prior to the closure. Traffic control plans, which would identify specific traffic control measures, would be submitted to the City of Brentwood as part of the Encroachment Permit request prior to project construction.

Cross-compression Activities

During construction of the new pipeline, natural gas would need to be cleared from the portion of the pipeline that is being replaced. In order to maintain natural gas flow upstream and downstream of the section of the pipeline that would be replaced, cross-compression activities would be necessary. Cross-compression activities would occur at the south work area. Cross-compression trailers would be used at the site to hook up to the existing mainline valves at that south work area to back feed L-114 to an adjacent PG&E transmission pipeline. This would entail hooking up hoses from the trailers to valves located within concrete access vaults. No excavation would occur at this site; however, the grass would need to be mowed within the workspace for the staging of the trailers.

Construction Equipment

Construction of the project would require the use of the following equipment:

- Generator
- Metal plates
- Side-boom cranes
- Drill rig
- Excavator/mini excavator
- Backhoe and backhoe trailer
- Hydro-vacuum truck
- Welding rigs

- Baker tanks
- Front-loader
- Jumping Jack compactor
- Cross-compression trailer

Construction Schedule, Duration, and Number of Employees

Construction activities are anticipated to occur over a 5-month period beginning in June 2021 through October 2021. Most construction activities would occur between 7 a.m. and 5:30 p.m. (Monday through Friday) in accordance with the City of Brentwood Noise Ordinance; however, one night of construction beyond permitted hours would be required. This one-time event would be required during the HDD pullback process because once the HDD pullback process has begun, the process would need to continue uninterrupted, in order to avoid the risk of losing the bore hole. The longer the bore hole is left open, the greater the risk of losing the bore hole. HDD pullback would commence first thing in the morning when the shift starts but would likely need to continue another 4–6 hours beyond normal work hours to complete. During nighttime construction, side-broom cranes would be in use to cradle the pipeline and the drill rig and a mud pump would be in use. At any given time, the maximum number of construction personnel required onsite would be 38.

Operation and Maintenance

Operation of the project would occur completely underground. No new aboveground structures would be constructed as a part of this project. Maintenance activities could include direct examination of the pipeline, which would require excavation that would be limited near the entry and exit points. These direct examination activities are routinely conducted for the existing pipeline. Excavation at the entry and exit pits would be approximately 8-10 feet for maintenance purposes. For the small portion of the new pipeline that would be installed via open-trench near the HDD entry pit, any future excavations would be approximately 5 feet in depth.

Natural Gas Capacity

Under PG&E Integrity Management's Vintage Pipe Replacement Program, the existing natural gas pipeline must be replaced, due to its original 1942 installation date. PG&E considers "vintage pipe" to include pipe that was manufactured/constructed and fabricated using outdated practices and that is not readily assessed using ultrasonic in-line inspection (ILI) or hydrostatic testing. In addition, this section of L-114 to be replaced is situated in an area that has been recently reclassified due to population increase. Because this area is now considered a high consequence area (HCA), the pipeline facility must be upgraded to fit the proper class designation. The new 24-inch pipe is not intended to increase capacity over that of the existing L-114.

This page intentionally left blank.

Chapter 2

Environmental Checklist

1. **Project Title:** PG&E Transmission Pipeline L-114 Replacement Project
2. **Lead Agency Name and Address:** East Contra Costa County Habitat Conservancy
(Conservancy)
30 Muir Road
Martinez, CA 94553
3. **Contact Person and Phone Number:** Joseph W. Lawlor Jr, AICP; 925.674.7802
4. **Project Location:** The project is in eastern Contra Costa County, California (refer to Figure 1). The project site is within the boundaries of the ECCC HCP/NCCP.
5. **Project Sponsor's Name and Address:** Sean Poirier, Senior Land Planner, PG&E; 925.328.4699
6. **General Plan Designation:** City of Brentwood General Plan: Park (P), Community College (CC)
Contra Costa County General Plan: Parks and Recreation (PR), Watershed (WS)
7. **Zoning:** City of Brentwood: Public Facility Zone (PF), Planned Development Zone (PD-64)
Contra Costa County: Heavy Agricultural (A-3), Agricultural Preserve (A-4)
8. **Description of Project:**

The proposed project would involve the decommissioning and replacement of a segment of the existing 22-inch Line 114 (L-114) natural gas transmission pipeline between Mile Points 17.06 and 17.50 that requires replacement under the Vintage Pipe Replacement Program due to the original 1942 installation date. See Chapter 1, *Project Description*, for more details.
9. **Surrounding Land Uses and Setting:**

Open space, agricultural lands, residential (single-family)
10. **Other Public Agencies Whose Approval is Required:**

California State Parks, Contra Costa Flood Control District, Contra Costa Community College District, Contra Costa County, City of Brentwood.
11. **Have California Native American tribes traditionally and culturally affiliated with the project area requested consultation pursuant to Public Resources Code Section 21080.3.1? If so, has consultation begun?**

Note: Conducting consultation early in the CEQA process allows tribal governments, lead agencies, and project proponents to discuss the level of environmental review, identify and address potential adverse impacts to tribal cultural resources, and reduce the potential for delay and conflict in the environmental review process. (See Public Resources Code § 21083.3.2.) Information may also be available from the California Native American Heritage Commission's Sacred Lands File per Public Resources Code Section 5097.96 and the California Historical Resources Information System administered by the California Office of Historic Preservation. Please also note that Public Resources Code Section 21082.3(c) contains provisions specific to confidentiality.

Outreach to California Native American Tribes was conducted in compliance with California Assembly Bill 52 (AB 52) to collect tribal input regarding the significance of cultural resources on the site and to collaborate on the development of mitigation measures, as needed to address any

project impacts. The Native American Heritage Commission (NAHC) was contacted during outreach required by AB52 and a search of their Sacred Lands File (SLF), as well a list of California Native American Tribes who have traditional cultural affiliation with the region, were requested. The NAHC responded with a negative SLF finding and identified eight California Native American Tribal representatives. These eight individuals represent multiple tribes, which are traditionally associated with the greater San Francisco Bay Area and include Costanoan/Ohlone, Northern Valley Yokut, Patwin, Miwok, and Bay Miwok. Letters with project details and a location map were provided to all of the eight representatives. ICF also followed up with each of the individuals listed by the NAHC on June 4, 2019 and June 24, 2014. No responses have been received to-date.

Environmental Factors Potentially Affected

The environmental factors checked below would potentially be affected by this project (i.e., the project would involve at least one impact that is a "Potentially Significant Impact"), as indicated by the checklist on the following pages.

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

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 to 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 an impact on the environment that is "potentially significant" or "potentially significant unless mitigated" 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 ENVIRONMENTAL IMPACT REPORT or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier ENVIRONMENTAL IMPACT REPORT or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the project, nothing further is required.


Signature

5/14/2020
Date

Joseph W. Lawlor Jr, AICP
Printed Name

For

Evaluation of Environmental Impacts

1. A brief explanation is required for all answers except “No Impact” answers that are adequately supported by the information sources a lead agency cites in the parentheses following each question. A “No Impact” answer is adequately supported if the referenced information sources show that the impact simply does not apply to projects like the one involved (e.g., the project falls outside a fault rupture zone). A “No Impact” answer should be explained if it is based on project-specific factors as well as general standards (e.g., the project would not expose sensitive receptors to pollutants, based on a project-specific screening analysis).
2. All answers must take account of the whole action involved, including 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, 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 when the incorporation of mitigation measures has reduced an effect from a “Potentially Significant Impact” to a “Less-than-Significant Impact.” The lead agency must describe the mitigation measures and briefly explain how they reduce the effect to a less-than-significant level. (Mitigation measures from *Earlier Analyses*, as described in #5 below, may be cross-referenced.)
5. Earlier analyses may be used if, pursuant to tiering, program EIR, or other CEQA process, an effect has been adequately analyzed in an earlier EIR or negative declaration (§ 15063(c)(3)(D)). In this case, a brief discussion should identify the following:
 - a. Earlier Analysis Used. Identify and state where earlier analyses 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 Incorporated,” describe the mitigation measures that 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, when 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 a less-than-significant level.

I. Aesthetics

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

Affected Environment

The north work area is located in an urban area where residential development is underway. As noted above, the ECCC HCP/NCCP defines urban sites as areas where the native vegetation has been cleared for residential, commercial, industrial, transportation, or recreational structures. The central work area and the south work area would both be located in non-urban areas that are visible from Marsh Creek Road.

Discussion

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

Less than significant. The City of Brentwood General Plan identifies that scenic resources include views of Mount Diablo, local hills and ridgelines, and open space areas surrounding Brentwood (City of Brentwood 2014). The Contra Costa County General Plan identifies that scenic resources include rangelands, woodlands, and wildlands (Contra Costa County 2005). The north work area would be located primarily within a residential area; however, the area around the HDD exit point does have views of hills and open space. The central and south work areas are both located in open space and have views of open space. Thus, all three work areas for the project would be located in areas that have scenic vistas.

During construction, entry and exit pits for the HDD would be excavated within the project site, which is within the boundaries of the ECCC HCP/NCCP. Each excavation location would temporarily affect a small area approximately 15 feet wide, 30 feet long, and 10 feet deep. The HDD entry and

exit pit excavation sites are visible from public spaces or thoroughfares (e.g., Pioneer Square, Miwok Avenue, and Marsh Creek Road). Construction would also require excavation of two trenches to tie into the existing natural gas pipeline. The trench at the northern tie-in point would be 4 feet wide, 100 feet long, and 8 feet deep and the trench at the southern tie-in point would be 4 feet wide, 74 feet long, and 8 feet deep. Construction activities associated with the proposed project would occur over 5 months, after which time the visibly disturbed surface areas would be returned to pre-project conditions, resulting in no permanent aesthetic change to the excavation area. Construction equipment including side-boom cranes and drill rigs would be used near residences during the HDD process; however, potential impacts associated with construction would be minor and temporary. Therefore, impacts on scenic vistas during construction activities would be less than significant.

No new above-grade structures would be required for operation of the proposed project and there would be no change to the existing topography or visual composition of the landscape; therefore, operation of the project would not result in a permanent impact on scenic vistas.

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

Less than significant. The nearest scenic highway to the project site is Interstate 680, which is over 10 miles west of the nearest excavation sites and separated by mountainous terrain (California Department of Transportation 2019). Furthermore, there are no rock outcroppings or historic buildings within the project site. Thus, the project would have no impact on scenic resources associated with rock outcroppings, historic buildings, and scenic highway.

There are trees on and overhanging the project site, and construction of the proposed project would necessitate trimming of three trees and the removal of nonnative grassland to provide adequate project workspace and access to the workspace. All tree trimming is proposed in the central work area. The three trees that would be trimmed are located along the private road, and the trimming would be needed to provide vehicle access to the central work area. All impacts would be temporary and work areas would be restored to pre-project conditions after project completion. Therefore, due to the short-term temporary nature of the work, and since no above-grade structures would be installed, the impact would be less than significant.

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?

Less than significant with mitigation incorporated. Construction activities including the delivery and laydown of pipeline; hydrostatic pressure-testing; excavation of the HDD exit point; pipeline installation using side-boom cranes; and the pipeline attachment to a reaming assembly, would be visible from residences near the north work area, as well as individuals using the pedestrian and bicycle paths located east of Miwok Avenue. Construction activities would be temporary and are anticipated to occur over five months. However, the project would not degrade the existing visual character or quality of the site and its surroundings, as construction activities would be temporary. Excavation areas would be restored to pre-project conditions following the completion of work, resulting in no permanent aesthetic change to the excavation area.

The north work area is in an urbanized area where residential development is underway. The project site is located in an area zoned by the City of Brentwood as a Public Facility Zone (PF) and

Planned Development Zone (PD-64). The impacts associated with exposing residences to construction equipment would be temporary and would cease after construction is completed. Nonetheless, there is the potential to affect scenic quality due to the pipeline laydown on a recreational facility, which could affect landscaped areas. This would be a potentially significant impact. However, implementation of Mitigation Measure AES-1 would require the restoration of this facility, including landscaping to its pre-construction condition. Therefore, the impact on the scenic quality at the north work area would be less than significant with mitigation incorporated. The central work area and the south work area would both be located in non-urban areas that are visible from Marsh Creek Road. People using these roadways would be exposed to construction equipment; however, this would be temporary and would cease after construction is completed. Therefore, the impact on the scenic quality at the central and south work area would be less than significant.

Project operation would not involve any new above-grade structures. Therefore, operation of the project would not conflict with applicable zoning or degrade the visual character of the site and no impact would occur.

Mitigation Measure AES-1: Restore Recreational Facilities to Pre-Construction Conditions.

Upon completion of construction activities, the proponent shall restore all work areas to pre-construction conditions. The project proponent shall work with the Conservancy and the Park District, to ensure that revegetation activities adequately restore disturbed areas to pre-construction conditions. The proponent shall submit a memorandum to the Conservancy for review and approval documenting how disturbed areas, including the park, have been restored to pre-construction conditions.

d. Create a new source of substantial light or glare that would adversely affect daytime or nighttime views in the area?

Less than significant. Although the proposed project would require one evening of work that would be conducted during nighttime hours, and which would require nighttime lighting, all other construction activities would occur between 7 a.m. and 5:30 p.m. (Monday through Friday) in accordance with the City of Brentwood Noise Ordinance. Construction activities associated with pipeline replacement and transmission line retirement work would be temporary and residences would only be exposed to one night with nighttime lighting. Therefore, impacts associated with light and glare due to construction of the proposed project would be less than significant.

The project would not result in a new source of light or glare that would affect day or nighttime views in the area, as there would be no new structures and the excavation sites would be returned to pre-project conditions following work. Thus, there would be no impact from operation of the pipeline.

II. Agricultural and Forestry Resources

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than- Significant Impact	No Impact
In determining whether impacts on 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 Department of Conservation as an optional model to use in assessing impacts on agriculture and farmland. In determining whether impacts on 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 the Forest Protocols adopted by the California Air Resources Board. Would the project:				
a. Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	☐	☐	☒	☐
b. Conflict with existing zoning for agricultural use or conflict with a Williamson Act contract?	☐	☐	☐	☒
c. Conflict with existing zoning for, or cause rezoning of forest land (as defined in Public Resources Code Section 12220(g)), timberland (as defined by Public Resources Code Section 4526), or timberland zoned Timberland Production (as defined by Government Code Section 51104(g))?	☐	☐	☐	☒
d. Result in the loss of forest land or conversion of forest land to non-forest use?	☐	☐	☐	☒
e. Involve other changes in the existing environment that, 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?	☐	☐	☒	☐

Affected Environment

The project is located in both the city of Brentwood and unincorporated Contra Costa County. The project components within the city of Brentwood (north work area) are in an urban area that is

being increasingly developed. The project components in unincorporated Contra Costa County (central and south work areas) are in areas characterized by open space. The Farmland Mapping and Monitoring Program (California Department of Conservation 2016) identifies the following designations for the project work areas:

- The north work area is designated as both urban and built-up land and Farmland of Local Importance
- The central and south work area is designated as Farmland of Local Importance

A portion of the central work area is located on Contra Costa County lands where cattle grazing is currently allowed.

Discussion

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?

Less than significant. The project work areas are not in areas designated as Prime Farmland, Unique Farmland, or Farmland of Statewide Importance. Therefore, the project would not affect any agricultural areas with these classifications.

All three work areas (north, central, and south) would, however, be located in areas classified as Farmland of Local Importance. Construction activities at the south work area would be limited to cross-compression activities and would not require any ground disturbance. This work would not impede any future agricultural uses in the area classified as farmland of local importance. Construction of the north and central work areas would result in temporary disturbance of small localized areas for excavation of HDD pits and trenches to tie-in to the existing pipeline. Construction activities at the north and central work areas would result in temporary impacts within small areas for a period of 5 months. After completion of the pipeline replacement, the land would be returned to its previous condition. As such, construction of the proposed project would not impede any future agricultural uses in these areas classified as Farmland of Local Importance. Therefore, impacts would be less than significant.

Operation of the project would require a permanent easement for the pipeline. The permanent easement would be located between the exit and entry pit on lands identified as Farmland of Local Importance. The area where the permanent easement would be located does not appear to be actively farmed. The easement would not be located on lands mapped as Prime Farmland, Unique Farmland, or Farmland of Statewide Importance; as such, operation within this area classified as Farmland of Local Importance would be less than significant.

b. Conflict with existing zoning for agricultural use or conflict with a Williamson Act contract?

No impact. The Williamson Act applies to parcels consisting of at least 20 acres of Prime Farmland or at least 40 acres of land not designated as Prime Farmland. The purpose of the act is to preserve agriculture and open-space lands by discouraging premature and unnecessary conversion to urban uses. The Williamson Act enables local governments to enter into contracts with private landowners for the purpose of restricting specific parcels of land for use as agricultural or related open space. The project site is classified as “Non-Enrolled Land” and is not under Williamson Act contract (California Department of Conservation 2013). Thus, construction and operation of the project

would not result in changes in land use and would not conflict with existing zoning for agricultural use or a Williamson Act contract. No impact would occur.

Furthermore, operation of the project would require a permanent easement for the pipeline. The permanent easement would be located between the exit and entry pit, which is located within the jurisdiction of the City of Brentwood in an area that is not zoned for agricultural use. Thus, the project would have no impact on lands with existing zoning for agricultural use.

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))?

No impact. No land zoned as forest land, timberland, or timberland zoned Timberland Production exists within the proposed project boundaries. As such, construction and operation of the proposed project would not conflict with existing zoning for, or cause rezoning of, forest land or timberland resources. Therefore, there would be no impact.

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

No impact. As described above, there are no forest lands within the project site; therefore, construction and operation of the project would not result in the loss of forest land or conversion of forest land to non-forest use. No impact would occur.

e. Involve other changes in the existing environment that, 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?

Less than significant. As explained in impact a., above, construction of the project would result in a less-than-significant impact on areas designated as Farmland of Local Importance. Furthermore, the central work area of the project would be located in an area where cattle grazing is currently allowed. Cattle grazing would not be able to occur during construction; however, cattle grazing would be able to continue after construction has been completed because no new structures would be constructed, and areas used for grazing would be returned to pre-project conditions. Construction of this project would, therefore, not convert grazing lands to non-grazing lands. The construction impacts associated with this project are minimal and are not expected to result in the conversion of farmlands to non-agricultural uses. The project's impacts on agricultural lands due to construction would be less than significant.

Project operation would not involve changes to the existing environment which, due to their location or nature, would result in the conversion of farmland to non-agricultural use or forest land to nonforest use. Therefore, no impact would occur associated with project operation.

III. Air Quality

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than- Significant Impact	No Impact
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?	☐	☒	☐	☐
b. Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is a nonattainment area for an applicable federal or state ambient air quality standard?	☐	☒	☐	☐
c. Expose sensitive receptors to substantial pollutant concentrations?	☐	☒	☐	☐
d. Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?	☐	☐	☒	☐

Affected Environment

Appendix A, *Air Quality Supporting Information*, includes a summary of the pertinent regulations that apply to air quality, including the thresholds for air quality established by the Bay Area Air Quality Management District (BAAQMD) (see Table 2 in Appendix A). Appendix A also includes a summary of the air pollutants of concern in the project site, including their attainment status.

Discussion

The proposed project would not increase operational or maintenance activities or generate a significant number of new vehicles trips in the project site, relative to existing conditions. The following assessment therefore focuses exclusively on construction-related emissions because there would be no impact related to long-term operations.

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

Less than significant with mitigation incorporated. A project is deemed inconsistent with air quality plans if it would result in population or employment growth, or both, that exceeds estimates used to develop applicable air quality plans. Projects that propose development that is consistent with the growth anticipated by the relevant land use plans would be consistent with the current BAAQMD air quality plans. Likewise, projects that propose development that is less dense than anticipated within a general plan (or other governing land use document) would be consistent with the air quality plans because emissions would be less than estimated for the region.

The proposed project involves the installation of a new 24-inch natural gas transmission pipeline to replace an existing 22-inch natural gas pipeline. The installation of the new pipeline would replace an aging pipeline and would not increase the capacity of the natural gas pipeline. The proposed project does not propose land use changes or new development. Accordingly, the proposed project would be consistent with recent growth projections for the region and would not conflict with the current BAAQMD air quality plans.

Consistency with the 2017 Clean Air Plan depends on whether the criteria pollutant mass emissions associated with the project would worsen existing air quality violations beyond BAAQMD's significance thresholds (see Table B-2). As summarized in Table 1, criteria pollutant emissions are less than BAAQMD's significance thresholds. Nonetheless, BAAQMD recommends all projects implement basic fugitive dust control measures to ensure fugitive particulate matter (PM) emissions would be less than significant. Accordingly, the proposed project would implement BAAQMD's Basic Construction Mitigation Measures as Mitigation Measure AQ-1 in order to reduce construction-related fugitive dust generated during all phases of construction. With implementation of the basic construction mitigation measures, impacts of construction-related fugitive dust emissions would be reduced to a less-than-significant level.

Accordingly, the proposed project would not conflict with or obstruct implementation of any applicable air quality plan or policy. Therefore, the impact would be less than significant after implementation of Mitigation Measure AQ-1.

Mitigation Measure AQ-1: Implement BAAQMD's Basic Construction Mitigation Measures for Construction Activities

The Conservancy will require all construction contractors to implement the basic construction mitigation measures recommended by BAAQMD. The emissions reduction measures will include, at a minimum, the following:

- All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads), except for any stockpiles on the CCFCD lands, will be watered two times a day. Exposed surfaces on CCFCD lands will be covered.
- All haul trucks will be covered when transporting soil, sand, or other loose material offsite.
- All visible mud or dirt track-out material on adjacent public roads will be removed using wet-power vacuum-type street sweepers at least once a day. The use of dry-power sweeping is prohibited.
- All vehicle speeds will be limited to 15 miles per hour on unpaved roads.
- All roadways, driveways, and sidewalks that are to be paved will be paved as soon as possible. Building pads will be laid as soon as possible after grading, unless seeding or soil binders are used.
- All construction equipment will be maintained and properly tuned in accordance with manufacturers' specifications. All equipment will be checked by a certified visible-emissions evaluator.
- Idling times will be minimized, either by shutting equipment off when not in use or reducing the maximum idling time to 5 minutes (as required by the California airborne toxics control measure).

- Publicly visible signs will be posted with the telephone number and person to contact at the lead agency regarding dust complaints. This person will respond and take corrective action within 48 hours. BAAQMD's phone number will also be visible to ensure compliance with applicable regulations.

b. Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is a nonattainment area for an applicable federal or state ambient air quality standard?

Less than significant with mitigation incorporated. Criteria pollutant emissions generated by construction of the proposed project were quantified using CalEEMod. Construction emissions would be short-term and occur for a duration of approximately 5 months (June 2021 through October 2021). Table 1 summarizes the results of the emissions modeling. The emissions modeling used a construction date of 2020; however, given a change in the project schedule, construction would occur in 2021. Because average fleet emissions would be lower in 2021 as compared to 2020 construction emissions are expected to be lower than the results shown in Table 1.⁵

Table 1. Criteria Pollutant Emissions from Project Construction (pounds per day)

	ROG	NO _x	CO	PM10		PM2.5	
				Dust	Exhaust	Dust	Exhaust
Maximum Daily Emissions	4	35	22	1	2	< 1	2
<i>BAAQMD Threshold</i>	<i>54</i>	<i>54</i>	<i>--</i>	<i>BMPs</i>	<i>82</i>	<i>BMPs</i>	<i>54</i>
<i>Exceed Threshold?</i>	<i>No</i>	<i>No</i>	<i>--</i>	<i>--</i>	<i>No</i>	<i>--</i>	<i>No</i>

BAAQMD = Bay Area Air Quality Management District

BMPs = best management practices

CO = carbon monoxide

NO_x = nitrogen oxide

PM2.5 = particulate matter no more than 2.5 microns in diameter

PM10 = particulate matter no more than 10 microns in diameter

ROG = reactive organic gases

As shown in Table 1, construction of the proposed project would not generate ROG, NO_x, or PM exhaust in excess of BAAQMD's numeric thresholds. BAAQMD thresholds are based on emissions levels identified under the New Source Review (NSR) program, which is a permitting program established by Congress as part of the Clean Air Act Amendments of 1990 to ensure that air quality is not significantly degraded by new sources of emissions. The NSR program requires stationary sources to receive permits before construction and/or the use of equipment. By permitting large stationary sources, the NSR program ensures that new emissions would not slow regional progress toward attaining the national ambient air quality standards (NAAQS). BAAQMD has concluded that the stationary pollutants described under the NSR program are equally significant to those pollutants generated with land use projects. BAAQMD's thresholds were set as the total emission thresholds associated within the NSR program to help attain the NAAQS. Because the project would not result in reactive organic gases (ROG), nitrogen oxides (NO_x), or PM exhaust emissions in excess

⁵ Note that none of the modeled project construction parameters have been altered except for the beginning and end dates.

of BAAQMD's thresholds, it would not result in a cumulatively considerable net increase of these pollutants.

BAAQMD recommends all projects implement basic fugitive dust control measures to ensure fugitive PM emissions would be less than significant. Accordingly, the proposed project would implement BAAQMD's Basic Construction Mitigation Measures as Mitigation Measure AQ-1 in order to reduce construction-related fugitive dust generated during all phases of construction. With implementation of the Basic Construction Mitigation Measures, impacts of construction-related fugitive dust emissions would be reduced to a less-than-significant level.

Because construction-related criteria pollutant emissions associated with the proposed project would be below BAAQMD's significance thresholds, and dust emissions would be less than significant with implementation of BAAQMD's Basic Control Measures, criteria pollutant emission impacts would be less than significant with mitigation.

c. Expose sensitive receptors to substantial pollutant concentrations?

Criteria Pollutants

Less than significant with mitigation incorporated. Adverse health effects induced by regional criteria pollutant emissions generated by the project (ozone precursors and PM) depend on numerous interconnected variables (e.g., cumulative concentrations, local meteorology and atmospheric conditions, the number and character of exposed individuals [e.g., age, gender]). For these reasons, ozone precursors (ROG and NO_x) contribute to the formation of ground-borne ozone on a regional scale, where emissions of ROG and NO_x generated in one area may not equate to a specific ozone concentration in that same area. Similarly, some types of particulate pollutants may be transported over long distances or formed through atmospheric reactions. As such, the magnitude and locations of specific health effects from exposure to increased ozone or regional PM concentrations are the product of emissions generated by numerous sources throughout a region, as opposed to a single individual project, and a project's incremental contribution cannot be traced to specific health outcomes on a regional scale. Accordingly, a quantitative correlation of project-generated regional criteria pollutant emissions to specific human health impacts is not technically feasible for projects with relatively small emissions contributions (i.e., emissions below the regional air district thresholds).

Localized criteria pollutant generated by a project (e.g., fugitive dust) are deposited and potentially affect population near the emissions source. Because these pollutants dissipate with distance, emissions from individual projects can result in direct and material health impacts to adjacent sensitive receptors. As discussed above, the NAAQS and California ambient air quality standards (CAAQS) are health protective standards and define the maximum amount of ambient pollution that can be present without harming public health.

As discussed above, BAAQMD has developed region-specific CEQA thresholds of significance in consideration of existing air quality concentrations and attainment designations under the NAAQS and CAAQS. The NAAQS and CAAQS are informed by a wide range of scientific evidence that demonstrates there are known safe concentrations of criteria pollutants. While recognizing that air quality is a cumulative problem, BAAQMD typically considers projects that generate criteria pollutant and ozone precursor emissions below these thresholds to be minor in nature and would not adversely affect air quality such that the NAAQS or CAAQS would be exceeded. As shown in Table 1, construction of the proposed project would not generate ROG, NO_x, or PM exhaust in excess

of BAAQMD's numeric thresholds. As such, construction would not be expected to contribute a significant level of air pollution such that regional air quality within the San Francisco Bay Area Air Basin would be degraded.

During grading and excavation activities, localized fugitive dust would be generated. The amount of dust generated is highly variable and dependent on the size of the disturbed area at any given time, the amount of activity, soil conditions, and meteorological conditions. BAAQMD's *CEQA Air Quality Guidelines* consider the dust impacts to be less than significant if BAAQMD's construction best management practices (BMPs) are employed to reduce these emissions. BAAQMD's Basic Construction Mitigation Measures would be implemented as Mitigation Measure AQ-1; thus, construction-related fugitive dust emissions would be less than significant.

Naturally Occurring Asbestos

Projects in areas that are known to contain naturally occurring asbestos or that may disturb asbestos in soil or building materials must comply with the California Air Resources Board's (CARB's) Asbestos Airborne Toxic Control Measure for Construction, Grading, Quarrying, and Surface Mining Operations. For projects that are not in an area known to contain naturally occurring asbestos or that do not involve earth-disturbing activity, it can be assumed that the projects would not have the potential to expose people to airborne asbestos particles.

The project site is not in an area known to contain naturally occurring asbestos (U.S. Geological Survey and California Geological Survey 2011). Accordingly, the proposed project is not required to comply with CARB's notification requirements for asbestos. In addition, implementation of BAAQMD's Basic Construction Mitigation Measures would reduce and control fugitive dust emissions. Therefore, impacts associated with asbestos emissions would be less than significant and construction of the project would not expose receptors to substantial public health risks related to asbestos.

Diesel Particulate Matter and PM2.5 Exhaust

Cancer health risks associated with exposure to diesel particulate matter (DPM) are typically related to chronic exposure (30-year exposure period). BAAQMD has determined that construction activities occurring at distances of greater than 1,000 feet from a sensitive receptor most likely do not pose a significant health risk. As previously discussed, however, there are sensitive land uses (residences) within 1,000 feet of the project site.

Residences are immediately adjacent to the project site. However, construction activities would occur over a total of 5 months, a construction duration that is substantially lower than the 30-year exposure period typically associated with chronic cancer health risks. In addition, construction-generated DPM emissions would be minor (see Table 1). Heavy duty drilling activities would occur in the HDD exit and entry pit areas, which are approximately 200 feet and 900 feet, respectively, from the nearest residences. This would limit the exposure of any individual sensitive receptor located near the HDD exit and entry pit areas to construction-related DPM and PM 2.5 microns or less in diameter (PM2.5) exhaust emissions. Furthermore, construction generated DPM emissions associated with pipeline laydown activities are minor and would not occur at a single location. Rather, the pipeline laydown activities would occur linearly over the approximately 0.5-mile alignment. This method of construction would limit the exposure of any individual sensitive receptor located near the pipeline laydown area to construction-related DPM and PM2.5 exhaust emissions to no more than a few weeks. Accordingly, construction activities would not result in a

significant increase in cancer or non-cancer risks at nearby sensitive receptors. Therefore, impacts would be less than significant.

d. Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?

Less than significant. While offensive odors rarely cause any physical harm, they can be unpleasant, leading to considerable distress among the public and often generating citizen complaints to local governments and air districts. Any project with the potential to frequently expose the public to objectionable odors would be deemed to have a significant impact.

Potential odor sources during repair activities include diesel exhaust from construction equipment and vehicles. Odor impacts resulting from construction-related activity would be temporary and limited due to the short duration over which construction activity would occur. Thus, construction activities would not be likely to result in nuisance odors that would violate BAAQMD's Regulation 7, which pertains to odorous substances. Although such brief exhaust-related odors may be considered adverse, they would not affect a substantial number of people and would dissipate rapidly with distance from the source because exhaust-related odors are a highly localized effect. Accordingly, the project is not expected to result in nuisance odors. This impact is considered less than significant.

IV. Biological Resources

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than- Significant Impact	No Impact
Would the project:				
a. Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?	☐	☒	☐	☐
b. Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?	☐	☒	☐	☐
c. Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marshes, vernal pools, coastal wetlands, etc.) through direct removal, filling, hydrological interruption, or other means?	☐	☒	☐	☐
d. Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	☐	☐	☐	☒
e. Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☐	☐	☒	☐
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?	☐	☐	☐	☒

Affected Environment

Land Cover

Although among gently rolling terrain, the topography of the work areas is predominately flat; the elevation of the project site ranges from approximately 100 feet to 200 feet above mean sea level. The north work area is located adjacent to Miwok Avenue (east), among urban (e.g., roadways and housing development), ruderal, and annual grassland land cover types. The central work area, is located adjacent to Marsh Creek Road (west), approximately 125 feet from Marsh Creek and 350 feet northeast of Marsh Creek Reservoir. This work area is among annual grassland adjacent to urban (i.e., Marsh Creek Road) and nonnative woodland land cover types. The south work area is

among annual grassland adjacent to urban (i.e., Marsh Creek Road and Camino Diablo) and oak savannah (planted). Although fragmented by nearby roadways, the land surrounding the central and south work areas is predominately undeveloped. A summary of each land cover type found in the project site is provided below.

Annual Grassland

As described in the ECCC HCP/NCCP, annual grassland is characterized by grass and forb species dominating the land cover and where trees and shrubs comprise less than 5 percent canopy cover (East Contra Costa County Habitat Conservancy 2006). The dominant grass species are nonnative annuals. Nonnative grassland is a dense to sparse cover of annual grasses with flowering culms up to 3 feet (1 meter) tall (Holland 1986). Species that tend to co-occur with the dominant species include “showy-flowered” native annual forbs. This community occurs on fine-textured, usually clay soils that are moist or even waterlogged during the winter rainy season and very dry during the summer and fall. Germination occurs with the onset of the late fall rains while growth, flowering, and seed-set occur from winter through spring. With a few exceptions, the plants are dead through the summer and fall dry season, persisting as seeds. This community usually occurs below 3,000 feet but reaches 4,000 feet in the Tehachapi Mountains and interior San Diego County, and intergrades with coastal prairie along the Central Coast. The largest acreage of the survey area is annual grassland. This land cover type is dominated by nonnative annual grasses including slender oats (*Avena barbata*), soft chess (*Bromus hordeaceus*), hare barley (*Hordeum murinum* subsp. *leporinum*), six weeks fescue (*Festuca myuros*), and Italian ryegrass (*Festuca perennis*). Other nonnative species include red-stemmed filaree (*Erodium cicutarium*), rose clover (*Trifolium hirtum*), bur clover (*Medicago polymorpha*), and scattered individuals of black mustard (*Brassica nigra*), among others. Native herbs present in this community include bicolored lupine (*Lupinus bicolor*), succulent lupine (*Lupinus succulentus*), purple owls clover (*Castilleja exserta* subsp. *exserta*), virgate tarweed (*Holocarpha virgata* subsp. *virgata*), tall willowherb (*Epilobium brachycarpum*), Fitch’s spikeweed (*Centromadia fitchii*), and few-flowered evax (*Hesperis matronalis* var. *sparsiflora*), among others.

Ruderal

As described in the ECCC HCP/NCCP, ruderal vegetation is characterized by sparse nonnative, typically weedy vegetation occupying vacant parcels surrounded by developed areas such as black mustard, thistles (*Cirsium* spp.), and wild radish (*Raphanus sativa*) that tend to colonize quickly after disturbance. Existing unpaved dirt access roads, road shoulders, and areas that have been disturbed by heavy equipment or earth moving are mapped as ruderal vegetation. These roads and disturbed areas are primarily unvegetated but contain scattered ruderal grasses and forbs along the margins and in the center of the road. In these areas ruderal vegetation is characterized by a dominance of nonnative black mustard, stinkwort (*Diurasis graveolens*), charlock (*Sinapis arvensis*), and Italian and slender-flower thistles (*Carduus pycnocephalus* subsp. *pycnocephalus* and *C. tenuiflorus*). Some nonnative annual grasses may also be present.

Nonnative Woodland

As described in the ECCC HCP/NCCP, nonnative woodland are areas where ornamental and other introduced species of trees have been planted or naturalized and dominate to form a dense canopy. There is a stand of nonnative cypress (*Cupressus* sp.) at the base of the Marsh Creek Reservoir Dam adjacent to the Central Work Area.

Urban

The ECCC HCP/NCCP defines urban sites as areas where the native vegetation has been cleared for residential, commercial, industrial, transportation, or recreational structures. Urban areas include areas that have structures, paved surfaces, horticultural plantings, and lawns smaller than 10 acres.

Soils

The north work area is located within Kimball gravelly clay loam and Sorrento silty clay loam; the central work area has similar soils to the north work area in addition to Altamont-Fontana complex; and the south work area is located within Altamont-Fontana complex and Brentwood clay loam.

Literature Review and Field Visits

Impacts on biological resources are evaluated based on the likelihood that special-status species, sensitive habitats, wildlife corridors, and protected trees are present within the project site, and the likely effects that construction might have on these resources. To evaluate whether special-status species or other sensitive biological resources could occur in the project site and vicinity, ICF biologists reviewed existing resource information and previously prepared environmental documents related to the project to determine whether special-status species or other sensitive biological resources (e.g., waters of the United States) could occur in the study area. The sources listed below were reviewed.

- ECCC HCP/NCCP (East Contra Costa County Habitat Conservancy 2006)
- East Contra Costa County Habitat Conservation Plan/Natural Community Conservation Plan: Assessment of Plan Effects on CEQA Species (H.T. Harvey & Associates 2015)
- California Natural Diversity Database (CNDDB) occurrences of special-status species and sensitive natural communities within U.S. Geological Survey (USGS) 7.5-minute Antioch South, Brentwood, Byron Hot Springs, and Tassajara quadrangles (California Department of Fish and Wildlife 2019)
- California Native Plant Society (CNPS) Inventory of Rare and Endangered Plants of California species list query of the USGS 7.5-minute Antioch South, Brentwood, Byron Hot Springs, and Tassajara quadrangles (California Native Plant Society 2019b)
- USFWS Information for Planning and Conservation species list query of the project site (U.S. Fish and Wildlife Service 2019)
- eBird online database of bird distribution and abundance (eBird 2012)
- Identification of waters and wetlands using existing water/wetland inventory data such as the USFWS National Wetland Inventory (U.S. Fish and Wildlife Service 2018)
- U.S. Department of Agriculture Natural Resources Conservation Service Web Soil Survey (U.S. Department of Agriculture 2017)
- CNPS Calscape (California Native Plant Society 2019a)
- Aerial imagery on Google Earth
- City of Brentwood Municipal Code, Contra Costa County Municipal Code, and City of Brentwood's Urban Forest Guidelines (City of Brentwood 2019)

In addition, ICF biologist Ross Wilming conducted a brief site visit of the central work area on April 1, 2019. The purpose of the site visit was to confirm presence or absence of habitat relating to a CNDDDB occurrence that overlapped with the central work area. It was observed during the site visit that habitat relating to the CNDDDB occurrence was not present due to recent development of the central work area.

Special-Status Species

Special-status species are those with one or more of the following characteristics.

- Plants or animals listed or proposed for listing as threatened or endangered under the federal Endangered Species Act (ESA). For these species, federal designations of critical habitat were considered where applicable.
- Plants or animals that are candidates for possible future listing as threatened or endangered under the ESA.
- Plants or animals listed or proposed for listing as threatened or endangered under the California Endangered Species Act (CESA).
- Plants listed as rare under the California Native Plant Protection Act (California Fish and Game Code § 1900 et seq.).
- Plants assigned to the following California Rare Plant Ranks by the CNPS and collaborators.
 - 1A – Presumed extirpated in California and either rare or extinct elsewhere.
 - 1B – Rare, threatened, or endangered in California and elsewhere.
 - 2A – Presumed extirpated in California, but more common elsewhere.
 - 2B – Rare, threatened, or endangered in California, but more common elsewhere.
 - 3 – Plants about which more information is needed to determine their status.
 - 4 – Plants with limited distribution; species on a watch list.
 - 0.1-Seriously threatened in California (over 80 percent of occurrences threatened/high degree and immediacy of threat)
 - 0.2-Moderately threatened in California (20–80 percent occurrences threatened/moderate degree and immediacy of threat)
 - 0.3-Not very threatened in California (less than 20 percent of occurrences threatened/low degree and immediacy of threat or no current threats known)
- Animal species, subspecies, or distinct populations designated as Species of Special Concern by CDFW.
- Animals designated as Fully Protected under Sections 3511 (birds), 4700 (mammals), 5515 (fish), and 5050 (reptiles and amphibians) of the California Fish and Game Code.
- Plants or animals determined to meet the definitions of rare or endangered under Section 15380 of the CEQA Guidelines.
- Plants or animals with no formal special status but considered by experts to be rare or in serious decline and that may warrant special status based on recent information.

Based on the literature review and the field visit, a list of special-status species and other sensitive biological resources that could be present in the project vicinity was developed (see Appendix B, *Biological Resources Information*). While 74 special-status plant, wildlife, and fish species have the potential to occur in the project region, suitable habitat for 21 special-status wildlife and 7 special-status plant species are present in the project site.

Discussion

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

Less than significant with mitigation incorporated. Construction activities could potentially result in the direct mortality or injury of special-status plant and wildlife species through crushing by equipment or placement of soil, disturbance through noise or vibration, and temporary loss or modification of habitat. In addition, the project has the potential to directly or indirectly affect special-status species habitat. Special-status species that could be affected either directly or indirectly by the proposed project, including those covered by the ECCC HCP/NCCP and those not included under coverage of the HCP/NCCP, are listed in Table 2.

Table 2. Federal or State Special-Status Wildlife Species with the Potential to be Affected by the Project

Common Name	Scientific Name	Status under ECCC HCP/NCCP	Federal Status	State Status	CNPS Rank
<i>Wildlife</i>					
American badger	<i>Taxidea taxus</i>	Not Covered	-	CSSC	-
Burrowing owl	<i>Athene cunicularia</i>	Covered	-	CSSC	-
California glossy snake	<i>Arizona elegans occidentalis</i>	Not Covered	-	CSSC	-
California red-legged frog	<i>Ambystoma californiense</i>	Covered	FT	CSSC	-
California tiger salamander	<i>Ambystoma californiense</i>	Covered	FT	ST	-
Coast horned lizard	<i>Phrynosoma blainvillii</i>	Not Covered	-	CSSC	-
Golden eagle	<i>Aquila chrysaetos</i>	Covered	PR	FP	-
Grasshopper sparrow	<i>Ammodramus savannarum</i>	Not Covered	-	CSSC	-
Loggerhead shrike	<i>Lanius ludovicianus</i>	Not Covered	-	CSSC	-
Northern California legless lizard	<i>Anniella pulchra</i>	Covered	-	CSSC	-
Northern harrier (foraging only)	<i>Circus cyaneus</i>	Not Covered	-	CSSC	-
Pallid bat	<i>Antrozous pallidus</i>	Not Covered	-	CSSC	-
Peregrine falcon (foraging only)	<i>Falco peregrinus</i>	Not Covered	-	FP	-
San Joaquin coachwhip	<i>Masticophis flagellum ruddocki</i>	Not Covered	-	CSSC	-

Common Name	Scientific Name	Status under ECCC HCP/NCCP	Federal Status	State Status	CNPS Rank
San Joaquin kit fox	<i>Vulpes macrotis mutica</i>	Covered	FE	FT	-
Short-eared owl	<i>Asio flammeus</i>	Not Covered	-	CSSC	-
Swainson's hawk	<i>Buteo swainsoni</i>	Covered	-	ST	-
Tricolored blackbird (foraging only)	<i>Agelaius tricolor</i>	Covered	-	ST	-
Western pond turtle	<i>Emys marmorata</i>	Covered	-	CSSC	-
Western spadefoot toad	<i>Spea hammondi</i>	Not Covered	-	CSSC	-
White-tailed kite	<i>Elanus leucurus</i>	Not Covered	-	FP	-

Plants

Big tarplant	<i>Blepharizonia plumosa</i>	Covered	-	-	1B.1
Round-leaved filaree	<i>California macrophylla</i>	Covered	-	-	-
Small-flowered morning-glory	<i>Convolvulus simulans</i>	Not Covered	-	-	4.2
Mount Diablo buckwheat	<i>Eriogonium truncatum</i>	No Take Species	-	-	1B.1
Diamond-petaled poppy	<i>Eschscholzia rhombipetala</i>	No Take Species	-	-	1B.1
Stinkbells	<i>Fritillaria agrestis</i>	Not Covered	-	-	4.2
Showy golden madia	<i>Madia radiata</i>	Covered	-	-	1B.1

FE = Federal Endangered

FT = Federal Threatened

PR = Federal Protected

SE = California State Endangered

ST = California State Threatened

SC = California State Candidate

FP = California Fully Protected

CSSC = California Species of Special Concern

CNPS assigns plants to one of the following California Rare Plant Ranks (See <http://www.cnps.org/cnps/rareplants/ranking.php> for more information):

1A – Presumed extirpated in California and either rare or extinct elsewhere.

1B – Rare, threatened, or endangered in California and elsewhere.

2A – Presumed extirpated in California, but more common elsewhere.

2B – Rare, threatened, or endangered in California, but more common elsewhere.

3 – Plants about which more information is needed to determine their status.

4 – Plants with limited distribution; species on a watch list.

.1= Seriously endangered in California (over 80% of occurrences threatened—high degree and immediacy of threat).

.2= Fairly endangered in California (20-80% occurrences threatened).

.3= Not very threatened in California (less than 20% of occurrences threatened / low degree and immediacy of threat or no current threats known).

*=The species *Navarretia nigelliformis* subsp. *nigelliformis* is no longer considered to occur within Contra Costa County based on specimen annotations at the UC and Jepson Herbaria at the University of California Berkeley as well as the opinions of experts in the genus. This taxon is now recognized as *Navarretia nigelliformis* subsp. *radians*. Any subspecies of *Navarretia nigelliformis* encountered as a part of botanical surveys in support of an ECCC HCP Planning Survey Report should be considered as covered under the HCP/NCCP.

For the purposes of this analysis, three categories of special-status species have been identified:

- Category 1: Special-status species that are covered by the HCP/NCCP

- Category 2: Special-status species that are not covered by the HCP/NCCP. The impact from covered activities on these species has already been analyzed in the *East Contra Costa County Habitat Conservation Plan/Natural Community Conservation Plan: Assessment of Plan Effects on CEQA Species* (Assessment) (H.T. Harvey & Associates 2015)
- Category 3: Special-status species that are not covered by the HCP/NCCP. The impact on these species has not been previously analyzed.

Potential impacts to special-status species covered by the HCP/NCCP (Category 1) would be minimized or avoided by obtaining incidental take coverage under the ECCC HCP/NCCP.

Implementation of various conditions of the ECCC HCP/NCCP (listed below) would result in a less-than-significant impact on special-status species covered by the HCP/NCCP. These conditions, which are detailed in Chapter 6, Conditions on Covered Activities, of the ECCC HCP/NCCP include requirements for projects seeking take authorization under the Plan, such as mitigation fee payment, planning surveys, pre-construction surveys, avoidance, minimization and construction monitoring, as well as specific conditions on covered activities in the form of conservation measures. The following Conservation Measures, which are described in detail in Chapter 6 of the HCP/NCCP, would be applied as a part of this project and are summarized below.

- Conservation Measure 1.11. Avoid Direct Impacts on Extremely Rare Plants, Fully Protected Wildlife Species, or Covered Migratory Birds. This measure requires that all projects will avoid impacts on all “no-take” species listed in the HCP/NCCP, which are presumed extinct or extirpated from the area. Planning surveys will determine if no-take species are present in the project area and if a new population of such species are identified, all direct and indirect impacts must be avoided. If a no-take plant is identified, it is the responsibility of the property owner to prepare a long-term management and monitoring plan and coordinate with the USFWS and CDFW. If habitat for no-take wildlife species are identified, which only include fully protected bird species, project proponents must not disturb or destroy nests of these fully protected species or of other birds through nesting season avoidance, nesting bird surveys, and appropriate no work buffers around active nests (per Section 3503 of the California Fish and Game Code and the Migratory Bird Treaty Act [MBTA]). All birds covered by the HCP/NCCP (tricolored blackbird, western burrowing owl, golden eagle, and Swainson’s hawk) are also considered migratory birds and subject to the prohibitions of the MBTA. Actions conducted under the HCP/NCCP must comply with the provisions of the MBTA. To fulfill the requirements of the MBTA, covered activities must not result in take as defined by the MBTA of covered bird species.
- Conservation Measure 2.12. Wetland, Pond, and Stream Avoidance and Minimization. This measure applies to all projects that have the potential to discharge fill into waters and wetlands and includes requirements to obtain the applicable permits, stream setback requirements (as applicable), staking of wetlands/waters that will not be affected, environmental training of personnel working near wetlands/waters, trash and debris removal, 200-foot equipment and vehicle refueling setbacks from wetlands/waters, appropriate erosion control measures, and native seed revegetation.
- Conservation Measure 3.10. Plant Salvage when Impacts are Unavoidable. Where impacts on covered plants are unavoidable, this measure includes measures to salvage the affected plants through transplanting or seed collection (including greenhouse germination of seeds). Salvaged plants will be transplanted to suitable habitat sites on ECCC HCP/NCCP preserves to establish new populations. Additional guidance is provided specific to annual plants.

The following species special-status species have the potential to be affected by the project, but are not covered by the HCP/NCCP (Category 2): American badger, coast horned lizard, grasshopper sparrow, loggerhead shrike, northern harrier, pallid bat, peregrine falcon, San Joaquin coachwhip, short-eared owl, western spadefoot toad, white-tailed kite, small-flowered morning-glory, and stinkbells. While these species are not covered by the HCP/NCCP, the impact of covered activities on these species has been previously analyzed in the Assessment of Plan Effects on CEQA species, as noted above (H.T. Harvey & Associates 2015). The Assessment prepared for the HCP/NCCP is used to analyze the potential impacts of the project on these species. This Assessment considered the extent of habitat and populations of these species that could be affected within areas of anticipated development, as well as in areas that may be preserved, enhanced, and managed for covered species and communities by the HCP/NCCP, to determine the net cumulative impact of the HCP/NCCP on each CEQA species. The cumulative impacts of HCP/NCCP implementation on the Category 2 species was included in the Assessment and the impact was categorized into one of four groups: beneficial, neutral, adverse but less than significant, or potentially significant. The Assessment found that the cumulative effects of the HCP/NCCP, including the category of covered activities that includes the proposed project, on the Category 2 species fell into one of the first three groups (i.e., beneficial, neutral, adverse but less than significant). Because the proposed project is a covered activity under the HCP/NCCP, the Assessment serves as a cumulative impact assessment for all of the Category 2 species that may be affected by the project. Through payment of HCP/NCCP fees, the project would contribute to the HCP/NCCP's conservation strategy, thereby benefiting the Category 2 species. Therefore, with incorporation of HCP/NCCP fees and adherence to other HCP/NCCP conditions, this project's individual impacts and its contribution to cumulative impacts on the Category 2 species would be less than significant.

The following species is considered a special-status species which has the potential to be affected by the project: California glossy snake. This species is not covered by the HCP/NCCP, and the impact has not been previously analyzed (Category 3). The species inhabits arid scrub, rocky washes, grasslands, and chaparral sheltering in rocks and burrows; the species prefers microhabitats of open areas with loose soil for burrowing. As a species with a similar conservation status, that has similar habitat type requirements as Category 2 species, the net effect of the HCP/NCCP for the California glossy snake would be similar to the impact on Category 2 species, and therefore would have a neutral or beneficial effect. Therefore, with incorporation of HCP/NCCP fees and adherence to other HCP/NCCP conditions, this project's individual impacts and its contribution to cumulative impacts on the California glossy snake would be less than significant.

The project would result in a less-than-significant impact overall on the habitat of special-status species. Nonetheless, there is still a potential to affect individual special-status species as well as the potential to indirectly affect the Marsh Creek habitat due to potential pollution. This impact would be minimal because project excavation locations are geographically dispersed, the dig sites are small, the work would be limited in duration and temporary, and work sites would be restored to pre-project conditions. Nonetheless, this impact would be considered potentially significant.

Potential impacts on special-status species would be avoided and minimized by obtaining incidental take coverage under the ECCC HCP/NCCP, which requires implementation of species planning surveys, pre-construction surveys, avoidance, minimization and construction monitoring, and conservation measures applicable to covered activities. Specifically, Conservation Measures 1.11, 2.12, and 3.10, listed above, would be applied as a part of this project.

Project impacts would be further reduced with implementation of Mitigation Measures BIO-1 through BIO-4, which would require pre-construction surveys, avoidance and minimization requirements, and monitoring for San Joaquin Kit Fox, Western Burrowing Owl, Swainson's hawk, and Golden Eagle. Furthermore, BMPs would be implemented as part of Mitigation Measure BIO-5, which would avoid and minimize the risk of incidental take of special-status wildlife and plants, as well as protect nearby jurisdictional wetlands and waterways.

With implementation of HCP/NCCP requirements and the mitigation measures listed below, the project's impact on special-status wildlife species would be reduced to a less-than-significant level.

Mitigation Measure BIO-1: San Joaquin Kit Fox

Preconstruction Surveys

Prior to any ground disturbance related to covered activities, a USFWS/CDFW– approved biologist will conduct a preconstruction survey in areas identified during HCP/NCCP-required planning surveys as supporting suitable breeding or denning habitat for San Joaquin kit fox. The surveys will establish the presence or absence of San Joaquin kit foxes and/or suitable dens and evaluate use by kit foxes in accordance with USFWS survey guidelines (U.S. Fish and Wildlife Service 1999). Preconstruction surveys will be conducted within 30 days of ground disturbance. On the parcel where the activity is proposed, the biologist will survey the proposed disturbance footprint and a 250-foot radius from the perimeter of the proposed footprint to identify San Joaquin kit foxes and/or suitable dens. Adjacent parcels under different land ownership will not be surveyed. The status of all dens will be determined and mapped. Written results of preconstruction surveys will be submitted to USFWS within 5 working days after survey completion and before the start of ground disturbance. Concurrence is not required prior to initiation of covered activities.

If San Joaquin kit foxes and/or suitable dens are identified in the survey area, the measures described below will be implemented.

Avoidance and Minimization Requirements

If a San Joaquin kit fox den is discovered in the proposed development footprint, the den will be monitored for 3 days by a USFWS/CDFW– approved biologist using a tracking medium or an infrared beam camera to determine if the den is currently being used.

- Unoccupied dens should be destroyed immediately to prevent subsequent use.
- If a natal or pupping den is found, USFWS and CDFW will be notified immediately. The den will not be destroyed until the pups and adults have vacated and then only after further consultation with USFWS and CDFW.
- If kit fox activity is observed at the den during the initial monitoring period, the den will be monitored for an additional 5 consecutive days from the time of the first observation to allow any resident animals to move to another den while den use is actively discouraged. For dens other than natal or pupping dens, use of the den can be discouraged by partially plugging the entrance with soil such that any resident animal can easily escape. Once the den is determined to be unoccupied it may be excavated under the direction of the biologist. Alternatively, if the animal is still present after 5 or more consecutive days of plugging and monitoring, the den may have to be excavated when, in the judgment of a biologist, it is temporarily vacant (i.e., during the animal's normal foraging activities).

Construction Monitoring

If dens are identified in the survey area outside the proposed disturbance footprint, exclusion zones around each den entrance or cluster of entrances will be demarcated. The configuration of exclusion zones should be circular, with a radius measured outward from the den entrance(s). No covered activities will occur within the exclusion zones. Exclusion zone radii for potential dens will be at least 50 feet and will be demarcated with four to five flagged stakes. Exclusion zone radii for known dens will be at least 100 feet and will be demarcated with staking and flagging that encircles each den or cluster of dens but does not prevent access to the den by kit fox.

Mitigation Measure BIO-2: Western Burrowing Owl*Preconstruction Surveys*

Prior to any ground disturbance related to covered activities, a USFWS/CDFW- approved biologist will conduct a preconstruction survey in areas identified during HCP/NCCP-required planning surveys as having potential burrowing owl habitat. The surveys will establish the presence or absence of western burrowing owl and/or habitat features and evaluate use by owls in accordance with CDFW survey guidelines (California Department of Fish and Game 1995).

On the parcel where the activity is proposed, the biologist will survey the proposed disturbance footprint and a 500-foot radius from the perimeter of the proposed footprint to identify burrows and owls. Adjacent parcels under different land ownership will not be surveyed. Surveys should take place near sunrise or sunset in accordance with CDFW guidelines. All burrows or burrowing owls will be identified and mapped. Surveys will take place no more than 30 days prior to construction. During the breeding season (February 1– August 31), surveys will document whether burrowing owls are nesting in or directly adjacent to disturbance areas. During the nonbreeding season (September 1–January 31), surveys will document whether burrowing owls are using habitat in or directly adjacent to any disturbance area. Survey results will be valid only for the season (breeding or nonbreeding) during which the survey is conducted.

Avoidance and Minimization and Construction Monitoring

This measure incorporates avoidance and minimization guidelines from CDFW's *Staff Report on Burrowing Owl Mitigation* (California Department of Fish and Game 1995).

If burrowing owls are found during the breeding season (February 1 – August 31), the project proponent will avoid all nest sites that could be disturbed by project construction during the remainder of the breeding season or while the nest is occupied by adults or young. Avoidance will include establishment of a non-disturbance buffer zone (described below). Construction may occur during the breeding season if a qualified biologist monitors the nest and determines that the birds have not begun egg-laying and incubation or that the juveniles from the occupied burrows have fledged. During the nonbreeding season (September 1 – January 31), the project proponent should avoid the owls and the burrows they are using, if possible. Avoidance will include the establishment of a buffer zone (described below).

During the breeding season, buffer zones of at least 250 feet in which no construction activities can occur will be established around each occupied burrow (nest site). Buffer zones of 160 feet will be established around each burrow being used during the nonbreeding season. The buffers will be delineated by highly visible, temporary construction fencing.

If occupied burrows for burrowing owls are not avoided, passive relocation will be implemented. Owls should be excluded from burrows in the immediate impact zone and within a 160-foot buffer zone by installing one-way doors in burrow entrances. These doors should be in place for 48 hours prior to excavation. The project area should be monitored daily for 1 week to confirm that the owl has abandoned the burrow. Whenever possible, burrows should be excavated using hand tools and refilled to prevent reoccupation (California Department of Fish and Game 1995).

Plastic tubing or a similar structure should be inserted in the tunnels during excavation to maintain an escape route for any owls inside the burrow.

Mitigation Measure BIO-3: Swainson's hawk

Preconstruction Survey

Prior to any ground disturbance related to covered activities that occurs during the nesting season (March 15–September 15), a qualified biologist will conduct a preconstruction survey no more than 1 month prior to construction to establish whether Swainson's hawk nests within 1,000 feet of the project site are occupied. If potentially occupied nests within 1,000 feet are off the project site, then their occupancy will be determined by observation from public roads or by observations of Swainson's hawk activity (e.g., foraging) near the project site. If nests are occupied, minimization measures and construction monitoring are required (see below).

Avoidance and Minimization and Construction Monitoring

During the nesting season (March 15–September 15), covered activities within 1,000 feet of occupied nests or nests under construction will be prohibited to prevent nest abandonment. If site-specific conditions or the nature of the covered activity (e.g., steep topography, dense vegetation, limited activities) indicate that a smaller buffer could be used, the Implementing Entity will coordinate with CDFW/USFWS to determine the appropriate buffer size.

If young fledge prior to September 15, covered activities can proceed normally. If the active nest site is shielded from view and noise from the project site by other development, topography, or other features, the project applicant can apply to the Implementing Entity for a waiver of this avoidance measure. Any waiver must also be approved by USFWS and CDFW. While the nest is occupied, activities outside the buffer can take place.

Mitigation Measure BIO-4: Golden Eagle

Preconstruction Survey

Prior to implementation of covered activities, a qualified biologist will conduct a preconstruction survey to establish whether nests of golden eagles are occupied (see Section 6.3.1, Planning Surveys). If nests are occupied, minimization requirements and construction monitoring will be required.

Avoidance and Minimization

Covered activities will be prohibited within 0.5 mile of active nests. Nests can be built and active at almost any time of the year, although mating and egg incubation occurs late January through August, with peak activity in March through July. If site-specific conditions or the nature of the covered activity (e.g., steep topography, dense vegetation, limited activities) indicate that a smaller buffer could be appropriate or that a larger buffer should be implemented, the Implementing Entity will coordinate with CDFW/USFWS to determine the appropriate buffer size.

Construction Monitoring

Construction monitoring will focus on ensuring that no covered activities occur within the buffer zone established around an active nest. Although no known golden eagle nest sites occur within or near the ULL, covered activities inside and outside of the Preserve System have the potential to disturb golden eagle nest sites. Construction monitoring will ensure that direct effects to golden eagles are minimized.

Mitigation Measure BIO-5: Best Management PracticesWildlife Protection BMPs:

- The boundaries of the dig workspaces will be staked and the area of disturbance will be encircled with wildlife exclusion fencing installed according to the manufacturer's guidelines to prevent small animals from entering the workspace. The fencing will be equipped with one-way doors that allow small animals to exit the work space.
- All construction equipment operation and ground-disturbing work will be limited to the area within the exclusion fencing. The only exception will be the transportation of equipment and materials to and between the digs.
- Open excavations will be covered, or the ends of the excavation ramped each night to prevent animals that might enter the excavation from becoming entrapped. Each morning (or prior to continuation of work), a qualified biological monitor will inspect open excavation areas for trapped wildlife. If any entrapped animals are found, the biological monitor will follow proper procedures to release any entrapped animals.
- Trash and food scraps will be placed in a covered trash receptacle and removed from the jobsite daily to reduce the potential for attracting wildlife or predatory species (i.e., crows and/or ravens).
- No BMPs or other construction materials containing monofilament netting, or other plastic netting that could entangle California tiger salamanders or other reptiles or amphibians will be used.
- Onsite monitoring will be conducted throughout the construction period to ensure that disturbance limits, BMPs, and HCP/NCCP conditions are being implemented properly.
- A designated biological monitor will be contacted immediately in the case of an in-stream frac-out, and shall monitor implementation of the HDD Execution Plan.

Special-Status Plant Species BMPs:

- To prevent the loss of topsoil and aid revegetation, the top 6 to 9 inches of soil will be excavated and stockpiled separately for reuse (un-compacted) over the filled and compacted dig location.
- The general orientation of soil types will be maintained when backfilling the excavation.

Stormwater Pollution Prevention, and Waters and Wetlands Protection BMPs:

- Silt fence will be installed along the downslope boundary of each dig to prevent the mobilization of soil from the site into nearby aquatic habitats (where present). The fencing will be installed per the manufacturer's guidelines and will be regularly inspected.

- Equipment will be refueled offsite to the extent possible. If refueling is needed onsite, it will occur at least 100 feet from a surface water feature, and in a designated refueling area with secondary containment/plastic sheeting and a spill containment kit.
- If contaminated soils or materials are discovered, they will be excavated and removed from the site and disposed of appropriately.
- Following the completion of the repair action, the site will be regraded to match the original site contours.
- Disturbed areas will be reseeded at a rate of approximately 60 pounds per acre with a Conservancy-approved native seed mix.
- Disturbed areas with a slope of 5 percent or greater will be covered with a layer of jute matting or certified weed-free straw.
- Straw wattles (certified weed-free straw), and other BMPs as needed, will be installed following guidelines in the California Stormwater Quality Association Construction BMP handbook.
- Spill guards and a spill containment basin will be placed underneath the frac tank where drilling mud and drilling fluid is being stored.

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 the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?

Less than significant with mitigation incorporated. Planned activities would have temporary impacts to annual grassland, ruderal, nonnative woodland, and urban land cover types. These land covers are not considered sensitive natural communities. Furthermore, there is no riparian habitat or other sensitive natural community located within the project work areas. Thus, the project would not have a direct impact on any sensitive natural communities.

Riparian habitat related to Marsh Creek is predominantly east and south of the north work area. Riparian habitat related to Marsh Creek Reservoir is southwest of the central work area. HDD was selected to avoid impacts on Marsh Creek, by placing the pipeline 48 feet under Marsh Creek. Prior to HDD activities, tracer wire would be laid on the ground to aid in location of the drill and pipe. This would occur between the north and central work areas. The wire would be removed after HDD activities are completed. Laying and removal of the wire would be done by hand; no ground disturbance or vehicular access would be required. Laying wire across the creek channel and through riparian habitat would have minor temporary and less-than-significant impacts on these habitats.

Although there are no planned activities outside designated work areas other than laying tracer wire, there is a potential to affect Marsh Creek and Marsh Creek Reservoir indirectly if a spill were to occur within the designated work areas or if construction activities would result in pollution of these waterbodies. In addition, there is a potential for frac-out between the north and central work area HDD pits that could temporarily affect Marsh Creek or surrounding riparian habitat. This would be a potentially significant impact.

Receiving take coverage under the HCP/NCCP would require the project to implement Conservation Measure 2.12, which requires that all projects that discharge into or fill wetlands and waters obtain permits from USACE, RWQCB, and CDFW. Furthermore, Mitigation Measure BIO-6 would require the

implementation of an HDD Execution Plan (see Appendix C) to address any impacts associated with a potential frac-out. This HDD Execution Plan includes requirements to monitor the pipeline for any release of fluids or changes in pressure and implementation of measures to cleanup drilling fluids, if necessary.

In addition, Mitigation Measure BIO-6 requires that the construction contractor consult with CDFW, SWRCB, RWQCB, and USACE to determine if any permits are required for drilling prior to project construction and to notify the Conservancy if a frac-out occurs. Mitigation Measure BIO-6 also would be implemented to protect the creek and riparian habitat from indirect impacts such as hazardous spills occurring within the designated work areas. Therefore, with this mitigation, the project would have a less-than-significant impact.

Mitigation Measure BIO-6: HDD Frac-Out Plan

PG&E will prepare an HDD Execution Plan to be implemented by construction contractors (See Appendix C of this IS/MND).

In the event of a frac-out, and as detailed in the HDD Execution Plan, the HDD contractor will determine an appropriate drill continuance plan. A drill continuance plan will include measures to control the frac-out such as fracture plugging agents; down hole cementing; drilling mud containment and control; and partial hole recovery. In certain types of formations or conditions, non-toxic fracture plugging agents such as ground pieces of carpet, corn husks, sawdust, bentonite pellets, walnut husks, sealant or other commercially available products are inserted into the drill hole and left undisturbed for a predetermined length of time, where upon drilling is restarted.

If the fracture zone is determined to be too large for the use of plugging agents, the drill string may be inserted to a predetermined depth to allow a quick setting cement or non-toxic thermal resin to be pumped down-hole in sufficient quantities to seal off the problem zone. If the inadvertent release is on land, determined not to be causing an adverse effect, and the surface migration of the drilling mud can be adequately contained and controlled, then drilling can continue with conditions identified in the drill continuance plan.

In the event that fracture plugging agents are unsuccessful, down-hole cementing could be used to seal off a substantial portion of the existing hole back to a point where a “kick-off” can take place. The drilling is then advanced along a different path usually at a lower elevation. Careful monitoring of drilling fluids and drill path will be carried out using the same principles and contingency plans; if not, drilling will be halted. In the event that none of the above procedures are successful or considered feasible, the hole will be abandoned, and a re-drill will be considered at a second location if it can be determined that more favorable geotechnical conditions exist, using the same principles and contingency plans.

To ensure specific measures to minimize potential impacts are in place if an inadvertent mud release were to occur, an HDD Mud Release Contingency Plan also will be implemented. The HDD Mud Release Contingency Plan will require development and implementation of corrective action processes to properly manage inadvertent releases of drilling mud in the event of a frac-out.

Specific measures related to the cleanup plan, monitoring, and waste management are identified in the HDD Execution Plan. In addition to the requirements in the HDD Execution Plan, the construction contractors will also be required to implement the following measures:

- Notify the Conservancy when HDD is planned.
- Notify the Contra CCFD and the California Division of Safety of Dams (DSOD) when HDD is planned on Contra Costa County Flood Control District property.
- Notify the Conservancy and all other appropriate regulatory agencies, including the CCFD and the DSOD immediately (within 24 hours), if there is any evidence of return of drilling fluid or changes in pressure, during HDD.
- If there are any changes in pressure during HDD, immediately perform a visual inspection of the HDD corridor, as well as Marsh Creek, with the assistance of a qualified biological monitor.
- Prior to construction, consult with CDFW, SWRCB, RWQCB, and USACE to determine if any permits are required for drilling prior to project construction.

c. Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marshes, vernal pools, coastal wetlands, etc.) through direct removal, filling, hydrological interruption, or other means?

Less than significant with mitigation incorporated. There are no state or federally protected wetlands or other jurisdictional waters in the designated work areas; thus, the project would not directly affect any state or federally protected wetlands or other jurisdictional waters.

As indicated above in Impact IV.b., potentially significant indirect impacts on state or federally protected wetlands (Marsh Creek and Marsh Creek Reservoir) would be mitigated to a less-than-significant level after incorporation of Mitigation Measures BIO-5 and BIO-6.

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?

No impact. A wildlife corridor is defined as “any space, usually linear in shape that improves the ability of organisms to move among patches of their habitat” (Hilty et al. 2006:50). Corridors can be viewed over broad spatial scales, from those connecting continents (e.g., Isthmus of Panama) to structures crossing canals or roads. Most wildlife corridors analyzed within the context of land use planning, including those in this Initial Study (IS)/Mitigated Negative Declaration (MND), are moderate in scale and used to facilitate regional wildlife movement among habitat patches and through human-dominated landscapes.

There are no wetlands, running water, or riparian habitat within the designated work area; therefore, the project would not interfere with movement of native resident or migratory fish species. The project would not result in any permanent impacts and would not change the current use of land in any way which could alter movement of native wildlife species. The pipeline laydown area is separated from the larger, southern half of the central work area by a rock wall and is therefore not a wildlife corridor between the urban developments (see Figure 1). Therefore, the project would not interfere with movement of native resident or migratory wildlife species,

interfere with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites. Therefore, as a result of the project, there would be no impact.

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

Less than significant. Construction of the project would require the trimming of three trees to provide adequate project workspace and access to the workspace. All tree trimming is proposed in the central work area, which is located entirely within the City of Brentwood City limits. The trees proposed for trimming are valley oak (*Quercus lobata*) and Monterey cypress (*Cupressus macrocarpa*). In addition, mowing of annual grassland for fire safety is planned at the central and south work areas. All tree trimming would comply with the following local policies or ordinances:

- City of Brentwood Municipal Code
 - Chapter 7.03 Trees and Shrubs
 - Chapter 17.470.006 Oak Tree Preservation
- City of Brentwood's Urban Forest Guidelines

Because all tree trimming would comply with the City of Brentwood's Urban Forest Guidelines and the City of Brentwood Municipal Code, conflict with any local policies or ordinances protecting biological resources, as a result of the project would be less than significant.

f. Conflict with the provisions of an adopted habitat conservation plan, natural community conservation plan, or other approved local, regional, or state habitat conservation plan?

No impact. The project is within the boundaries of the ECCC HCP/NCCP and is a covered activity of the ECCC HCP/NCCP. As such, the project proponent can obtain take coverage from the Conservancy. As part of that coverage, the project proponent is required to mitigate for impacts to covered species. Mitigation of impacts would be accomplished, in part, through payment of mitigation fees, which are then used to implement the ECCC HCP/NCCP conservation strategy. The proposed project would also be required to implement the HCP/NCCP conservation measures along with Mitigation Measures BIO-1 through BIO-6, as detailed above. Therefore, the project would not conflict with the ECCC HCP/NCCP and there would be no impact.

V. Cultural Resources

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than- Significant Impact	No Impact
Would the project:				
a. Cause a substantial adverse change in the significance of a historical resource pursuant to Section 15064.5?	☐	☐	☒	☐
b. Cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5?	☐	☒	☐	☐
c. Disturb any human remains, including those interred outside of dedicated cemeteries?	☐	☒	☐	☐

Introduction

Several methods were deployed to identify cultural resources within the project site, and to assess the potential for the proposed project to impact cultural resources. The prehistoric chronology of the Bay Area, as well as ethnographic and historic contexts were established to outline the past development of project site. Consultation with the Native American Heritage Commission (NAHC) and California Native American Tribes also was conducted to identify any sites that may have special meaning or that are significant to local tribes. Additionally, a records search was conducted at the Northwest Information Center (NWIC) to identify any previously identified cultural resources within the project site.

Affected Environment

The project site is located within the City of Brentwood, in Eastern Contra Costa County, it is located on a broad flood plain east of Mt. Diablo, within the Marsh Creek watershed, surrounded by agricultural and industrial land uses, with pockets of suburban tract housing. Marsh Creek runs through the project site. Marsh Creek State Park is also located within the project site.

One pre-contact archaeological site was identified within proximity to the project site. CA-CCO-18/H (P-07-000037) is a large scale habitation site that has been listed to the National Register of Historic Places (NRHP) under criterion D. Due to the presence of this resource near the site, presence-absence testing was conducted to better understand the resource boundaries and to determine whether any portion of the resource extends into the areas of proposed ground disturbance.

Native American Correspondence

Outreach to California Native American Tribes was conducted in compliance with California Assembly Bill 52 (AB 52) to collect tribal input regarding the significance of CA-CCO-18/H and to collaborate on the development of mitigation measures, as needed to address any project impacts.

The Native American Heritage Commission (NAHC) was contacted during outreach required by AB 52, and a search of their Sacred Lands File (SLF), as well a list of California Native American Tribes

who have traditional cultural affiliation with the region, were requested. The NAHC responded with a negative SLF finding and a list of eight California Native American Tribal representatives. These eight individuals represent multiple tribes, which are traditionally associated with the greater San Francisco Bay Area and include Costanoan/Ohlone, Northern Valley Yokut, Patwin, Miwok, and Bay Miwok. These representatives include:

- Valentin Lopez, Chairperson - Amah Mutsun Tribal Band
- Irenne Zweirlein, Chairperson - Amah Mutsun Tribal Band of Mission San Juan Bautista
- Ann Marie Sayers, Chairperson - Indian Canyon Mutsun Band of Coastanoan
- Kathrine Erolinda Perez - North Valley Yokuts Tribe
- Charlene Nijmeh, Chairperson - Muwekma Ohlone Indian Tribe of the SF Bay Area
- Andrew Galvan – The Ohlone Indian Tribe
- Antonio Ruiz, Cultural Resources Officer - Wilton Rancheria
- Raymond Hitchcock, Chairperson - Wilton Rancheria

Letters with project details and a location map were provided to each of the eight representatives. Initial outreach to each of these eight individuals was conducted via letter on May 15, 2019. This outreach provided project information and a request to consult on the proposed project. On May 28, 2019, the Wilton Rancheria contacted ICF via email with a written request to consult. After May 28, ICF contacted the Wilton Rancheria on three separate occasions but to-date have not received a response. ICF also followed up with each of the individuals listed by the NAHC on June 4, 2019 and June 24, 2019, during and after the completion of the Archaeological Testing Plan (ATP), described in detail below. ICF requested the tribal representatives input on the ATP. However, to-date, no responses have been received.

Presence-Absence Archaeological Testing (ATP)

The majority of the project would be completed using a horizontal directional drill (HDD) method, which requires excavation for entry and exit pits. The HDD entry pit would be located west of Marsh Creek Road, and east of the paved access road. The HDD exit pit would be located adjacent to Miwok Avenue. Entry and exit pits for the HDD would extend approximately 10 feet below ground surface. In addition to entry and exit pits, two trenches, approximately 8 feet deep, would be excavated to the northern and southern tie-in points adjacent to Miwok Ave. Two bell holes, which are narrow (approximately 10-foot-deep) excavations used to expose the existing pipeline, would be excavated where the new pipe would be tied into the existing pipeline.

Due to the lack of subsurface investigations that have taken place in this area, it is unknown based on past studies whether portions of CA-CCO-18/H exist where excavation is proposed. Therefore, presence-absence testing was conducted in these areas to define the boundaries of the resource in the vicinity of the proposed project.

ICF completed and submitted an ATP to guide these efforts (ICF 2019a). ICF archaeologists conducted presence-absence testing on July 8, 9, and 10, 2019. As outlined in the ATP, six test units were hand excavated within the proposed entry and exit pits, where the majority of project related ground disturbance would occur. All test units measured 50 centimeters (cm) by 50 cm and were

hand excavated to a depth of 100 cm below ground surface (bgs). Once 100 cm bgs was reached, an auger unit was placed at the center of the test unit and excavated an additional 150 cm bgs. Twelve additional auger units were placed through the vicinity of the proposed entry and exit pit locations and varying in depth from 20 cm bgs to 220 cm bgs.

No cultural material was identified during presence-absence testing (ICF 2019b). Therefore, CA-CCO-18/H is not believed to exist where ground disturbance is proposed.

Discussion

a. Cause a substantial adverse change in the significance of a historical resource pursuant to Section 15064.5?

Less than significant. The John Marsh House is located adjacent to the project site. The residence was designed by San Francisco architect Thomas Boyd for the Marsh family and was built circa 1856 (John Marsh Historic Trust 2019). It was placed on the National Register in 1971 and is currently managed by the John Marsh Historic Trust (National Park Service 2019).

A concrete dam was built south of the Stone House circa 1962 and is also adjacent to the project site. The dam was evaluated as a potential contributor to the Stone House and as an individual resource and has been determined ineligible for the National Register under all four criteria.⁶ No other potentially significant buildings or structures are on or immediately adjacent to the project site.

While the John Marsh House is adjacent to the project site, it would not be directly impacted by the proposed project, because ground disturbance involved with the installation of the pipeline is not proposed in the vicinity of the resource. Furthermore, the pipeline would be located primarily underground and would not disrupt the setting of the Stone House. Therefore, the project would have a less-than-significant impact on known historic resources.

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

Less than significant with mitigation incorporated. Two previously identified resources were identified in proximity to the project site during the records search at the NWIC. These include one historic-era built resources (P-07-002991) and multi-component resource (CA-CCO-18/H). Project related ground disturbance is not proposed in the vicinity of the resources. Therefore, the project is not anticipated to affect either of the historic era-built resources.

While it is believed that CA-CCO-18/H does not exist where ground disturbance is proposed, the potential remains for project related ground disturbance to encounter as-yet undocumented archaeological deposits. This potential remains for both excavation activities during construction, as well as any potential excavation activities for maintenance of the project after the pipeline has been installed. This impact would be significant. Implementation of the mitigation measures outlined below would reduce this impact to less than significant.

Mitigation Measure CULT-1: Develop and Implement an Archaeological Monitoring Plan

Due to the reasonable potential for archaeological resources to be present within proximity of the project site, the following measures will be undertaken to avoid any significant impacts to

⁶ Site record for CA-CCO-18/H (P-07-000037) on file at the Northwest Information Center, Rohnert Park, CA.

archaeological resources. Prior to project related ground disturbance, including excavation related to operations and maintenance activities, the project proponent will develop and implement an Archaeological Monitoring Plan (AMP). The AMP would describe procedures for response and monitoring by a qualified archeologist associated with any required responses to a potential frac-out. The AMP will be authored by a qualified archaeologist and will determine specific areas of archaeological sensitivity within proposed entry and exit pit locations. The AMP will include protocol that outlines archaeological monitoring best practices, anticipated resource types, and an Unanticipated Discovery Protocol (UDP). The UDP will be implemented by the applicant and will describe steps to follow if unanticipated archaeological discoveries are made during construction activities work, including the following:

- A qualified archeologist will be onsite during any excavation activities.
- Stop work if archaeological resources are encountered
- The process of identifying and assessing the integrity and significance of the archeological deposit
- Identify a chain of contact

Mitigation Measure CUL-2: Preconstruction Archaeological Resources Sensitivity Training

Due to the potential for discovery of as-yet undocumented buried archaeological resources, prior to commencement of the ground disturbance, the general contractor and those conducting ground-disturbing activities will be given archaeological sensitivity training regarding archaeological resource protection, resource identification and protection, and the laws and penalties governing such protection. This training will be administered by the project archaeologist and will include the following:

- The types of archaeological resources that are likely to be encountered,
- The procedures to be taken in the event of an inadvertent archaeological resource discovery,
- The penalties for disturbing or destroying archaeological resources

Mitigation Measure CUL-3: Stop Work if Human Remains are Encountered During Ground-disturbing Activities

If human remains of Native American origin are discovered during ground-disturbing activities, it will be necessary to comply with state laws regarding the disposition of Native American burials, which fall within the jurisdiction of the Native American Heritage Commission (Pub.Res. Code Sec. 5097). If human remains are discovered or recognized in any location other than a dedicated cemetery, there will be no further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent human remains until:

1. The county coroner has been informed and has determined that investigation of the cause of death is required; and
2. If the remains are of Native American origin:

- a. The descendants of the deceased Native Americans have made a recommendation to the landowner or the person responsible for the excavation work for means of treating or disposing of, with appropriate dignity, the human remains and any associated grave goods as provided in Pub. Res. Code Sec. 5097.98; or
- b. The Native American Heritage Commission was unable to identify a descendent or the descendent failed to make a recommendation within 24 hours after being notified by the commission.

According to California Health and Safety Code, six or more human burials at one location constitute a cemetery (Section 8100), and disturbance of Native American cemeteries is a felony (Section 7052). Section 7050.5 requires that excavation be stopped in the vicinity of the discovered human remains until the coroner can determine whether the remains are those of a Native American.

c. Disturb any human remains, including those interred outside of dedicated cemeteries?

Less than significant with mitigation incorporated. As stated above, CA-CCO-18/H was identified within the vicinity of the project site. Given that the presence-absence testing described above identified no archeological material in the area proposed for ground disturbance, the likelihood of encountering as-yet undocumented archaeological resources is low. However, the potential remains for project related ground disturbance, during both construction and maintenance of the project, to encounter sparsely distributed archaeological deposits with associated human remains. This impact would be significant. The implementation of CUL-1, CUL-2, and CUL-3 would reduce this impact to less than significant.

VI. Energy

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than- Significant Impact	No Impact
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?	☐	☐	☒	☐
b. Conflict with or obstruct a state or local plan for renewable energy or energy efficiency?	☐	☒	☐	☐

Affected Environment

Both the State and Contra Costa County have plans for promoting energy efficiency and reductions of greenhouse gas (GHG) emissions. Appendix D, *Greenhouse Gas Emissions Supporting Information*, includes a summary of these plans. In addition, the City of Brentwood is in the process of completing a Climate Action Plan (CAP). The City of Brentwood General Plan identifies goal COS 9, which promotes the conservation of energy and other natural resources (City of Brentwood 2014).

Discussion

a. Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?

Less than significant. Construction of the project would require the use of energy (e.g., electricity and fuel) for various purposes, such as the use of construction equipment and tools as well as excavation and construction vehicle travel.

Construction vehicles would consume fuel. However, the U.S. Environmental Protection Agency adopted the Heavy-Duty National Program to establish fuel efficiency and GHG emissions standards in the heavy-duty highway vehicle sector, which includes combination tractors (semi-trucks), heavy-duty pickup trucks and vans, and vocational vehicles (including buses and refuse or utility trucks). These standards include targets for gallons of fuel consumed per mile beginning in model year 2014. Although construction activities would require a commitment of energy sources, the efficiency standards would further the goal of conserving energy in the context of project development (U.S. Environmental Protection Agency n.d.). Accordingly, the project would result in less-than-significant impacts with respect to wasteful, inefficient, or unnecessary consumption of energy resources.

Operations of the project would be similar to existing operations. The project would not result in an expansion of natural gas service and would not result in an increased use of energy for operation and maintenance. The installation of the new pipeline would replace an aging pipeline, to make assessments of the pipeline easier to conduct. The installation of the new pipeline also would create efficiencies during operation and would therefore not result in the wasteful, inefficient, or unnecessary consumption of energy. The impact would be less than significant.

b. Conflict with or obstruct a state or local plan for renewable energy or energy efficiency?

Less than significant with mitigation incorporated. The State, Contra Costa County, and the City of Brentwood have identified goals of minimizing GHG emissions through energy efficiency. The project would replace aging infrastructure and would not permanently induce growth. Thus, the project would not increase the demand on energy and operation of the project would not conflict with or obstruct plans for renewable energy or energy efficiency. No impact would occur from project operation. The project would, however, require the use of energy during construction. As described in Section VIII, *Greenhouse Gas Emissions* (Impact VIII.b), construction would generate GHG emissions, which is considered a potentially significant impact. However, with the implementation of Mitigation Measures AQ-1 and GHG-1, the project would be consistent with policies described in the Scoping Plans for Assembly Bill (AB) 32, Senate Bill (SB) 32, Contra Costa County's CAP, BAAQMD's 2017 Clean Air Plan, and Plan Bay Area 2040. Thus, the impact would be less than significant after mitigation.

VII. Geology, Soils, and Paleontological Resources

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than- Significant Impact	No Impact
Would the project:				
a. Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:				
1. 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.	☐	☐	☒	☐
2. Strong seismic ground shaking?	☐	☐	☒	☐
3. Seismic-related ground failure, including liquefaction?	☐	☐	☒	☐
4. Landslides?	☐	☐	☒	☐
b. Result in substantial soil erosion or the loss of topsoil?	☐	☒	☐	☐
c. Be located on a geologic unit or soil that is unstable or that would become unstable as a result of the project and potentially result in an onsite or offsite landslide, lateral spreading, subsidence, liquefaction, or collapse?	☐	☐	☒	☐
d. Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property?	☐	☐	☒	☐
e. Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems in areas where sewers are not available for the disposal of wastewater?	☐	☐	☐	☒
f. Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☐	☒	☐	☐

Affected Environment

The project site is on the eastern end of the San Francisco Bay section of the Coast Ranges Geomorphic Province. The Coast Ranges are northwest-trending mountain ranges and associated valleys, bounded to the north by the Klamath Mountains, to the east by the Great Valley, to the south by the Transverse Ranges, and to the west by the Pacific Ocean. The ranges and valleys trend northwest, subparallel to the San Andreas Fault. Strata dip beneath alluvium of the Great Valley to

the east. The Coast Ranges are composed of thick Mesozoic and Cenozoic sedimentary strata. The northern and southern ranges are separated by a depression containing the San Francisco Bay. The eastern border is characterized by strike ridges and valleys in Upper Mesozoic strata. In several areas, Franciscan rocks are overlain by volcanic cones and flows of the Quien Sabe, Sonoma and Clear Lake volcanic fields.

According to the Geologic Map of California (DOC 2010), the local geology consists of Eocene marine deposits. The lithology is well consolidated and consists of marine shale, sandstone, and conglomerate limestone. Subsurface soils in the area are primarily composed of sands and clays (Appendix E, *Geotechnical Report*).

The north work area contains soils including Kimball gravelly clay loam and Sorrento silty clay loam; the central work area has similar soils to the north work area in addition to Altamont-Fontana complex; and the south work area is located within Altamont-Fontana complex and Brentwood clay loam.

Discussion

a. Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:

1. **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.**

Less than significant. The project site is in a known seismically active region where several known earthquake faults occur; however, no known active faults exist within the project site. Additionally, the project site is not within a State of California Earthquake Fault Zone (formerly known as an Alquist-Priolo Special Studies Zone) (DOC 2019). The site is not located in a mapped Alquist-Priolo zone and therefore the potential of faulting and surface rupture as a result of project construction and operation is low, and the impact would be less than significant.

2. **Strong seismic ground shaking?**

Less than significant. The project site is in an area of high seismicity and is subject to strong ground shaking. Design and implementation of the proposed project is required to comply with all seismic-safety development requirements, including the recommendations set forth in the geotechnical report (Appendix E). Section 2.1.3 of the geotechnical report identifies that the impact of strong ground motions on the proposed pipeline can be addressed by implementing the design recommendations provided in the latest California Building Code and the appropriate pipeline specific building codes. Thus, conformance with all applicable seismic-safety development requirements would minimize seismic ground-shaking effects in the event of a major earthquake and ensure that the potential seismic or geologic hazard impacts are not significant. Therefore, impacts associated with strong seismic ground shaking during construction and operation of the proposed project would be less than significant.

3. Seismic-related ground failure, including liquefaction?

Less than significant. The project site is within a seismic hazard liquefaction zone (California Geological Survey 2018). Under the Seismic Hazards Mapping Act, permit review is required prior to issuing development permits for sites within Seismic Hazard Zones until appropriate site-specific geologic or geotechnical investigations have been carried out and measures to reduce potential damage have been incorporated into the development plans. A geotechnical exploration report was prepared for the project (refer to Appendix E for additional details). As noted in Appendix E, soils encountered during test boring were predominantly cohesive with a significant clay fraction and moderate to high plasticity. Typically, soils with a significant clay fraction that exhibit cohesion are less susceptible to liquefaction. However, a layer of sand with gravel and silt was identified during drilling between depths of approximately 17 to 21 feet-below ground surface (bgs). Considering the post drilling, equilibrium static water level was measured at approximately 28 feet bgs, combined with the material's compact relative density, this layer is considered to have a low susceptibility to liquefaction. In general, the risk of liquefaction is considered low. Therefore, construction of the proposed project would not expose people or structures to potentially substantial adverse effects—including the risk of loss, injury, or death involving seismic-related ground failure, including liquefaction—and impacts would be less than significant.

Project operation would not expose people or structures to potentially substantial adverse effects associated with seismic-related ground failure, including liquefaction. Therefore, impacts would be less than significant.

4. Landslides?

Less than significant. The project site is within a flatland area that is not identified as an earthquake-induced landslide zone (California Geological Survey 2018). Due to the flat topography of the project site and the depth of the pipeline, landslide hazards associated with the construction and operation of the proposed project would be less than significant.

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

Less than significant with mitigation incorporated. The project has the potential to cause erosion and result in the loss of topsoil due to soil disturbance associated with pipeline installation and construction workspaces. The soils that underlay the project site consist of Sorrento silty clay loam (Sm), Kimball gravelly clay loam (KaC), and Brentwood clay loam (Bb) (U.S. Department of Agriculture 2018). After construction of the pipeline replacement is completed, the sites would be returned to pre-project contours and soils would be stabilized through revegetation. Nonetheless, erosion could still occur during construction and the impact would be potentially significant during construction. Mitigation Measure BIO-5 would require the implementation of BMPs related to erosion and stormwater, including stockpiling of topsoil for revegetation, reseeding disturbed areas with native seeds prior to the onset of the rainy season, and installation of stormwater BMPs such as silt fencing and straw wattles per the California Stormwater Quality Association Construction BMP handbook (i.e., maintaining BMPs until 70 percent vegetative cover has been established). Implementation of these BMPs would minimize the risk of erosion and loss of topsoil and this impact would be less than significant after mitigation. As such, construction of the proposed project would not result in substantial soil erosion or the loss of topsoil, and impacts would be less than significant after implementation of mitigation.

Project operation would not require excavation and would thus not result in soil erosion or the loss of topsoil. Therefore, no impact would occur for operation of the project.

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 an onsite or offsite landslide, lateral spreading, subsidence, liquefaction, or collapse?

Less than significant. The project would not result in new above-grade structures. Excavation for the HDD pits and tie-in points to the existing pipeline would be between 8 and 10 feet deep. Excavation sites would be restored to pre-project conditions following ground disturbance. As a result, the underlying geologic structure of the project site would not become unstable as a result of construction of the project, resulting in an onsite or offsite landslide, lateral spreading, subsidence, liquefaction, or collapse. Therefore, construction impacts would be less than significant.

Project operation would not result in soil erosion or the loss of topsoil. As a result, the underlying geologic structure of the project site would not become unstable as a result of the project, resulting in an onsite or offsite landslide, lateral spreading, subsidence, liquefaction, or collapse. Therefore, there would be no operation impacts.

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?

Less than significant. Expansive soils are fine-grained soils (generally high-plasticity clays) that can undergo a significant increase in volume with an increase in water content and a significant decrease in volume with a decrease in water content. Changes in the water content of an expansive soil can result in severe distress to structures constructed upon the soil. As noted above under Impact VII.a.3, soils within the project site are predominantly cohesive with a significant clay fraction where the likelihood of liquefaction is low to moderate. Additionally, construction activities associated with the proposed project would comply with the recommendations set forth in the geotechnical report prepared for the project (Appendix E). Therefore, construction impacts related to expansive soils would be less than significant.

Project operation would not result in direct or indirect risks to life or property associated on expansive soils. Therefore, operational impacts related to expansive soils would be less than significant.

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

No Impact. No septic tanks or alternative wastewater disposal systems are proposed as part of the project or required for operation of the project. Therefore, no impact would occur.

f. Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?

Less than significant with mitigation incorporated. The project would not include any work that would disturb bedrock or rock outcrops. Excavation would be at depths of 8 and 10 feet and would be limited to the areas around the HDD pits, which are located in the city of Brentwood. The City of Brentwood General Plan EIR identifies that there are no known paleontological resources in the Brentwood Planning Area (City of Brentwood 2014). Nonetheless, a potentially significant impact could occur if any previously unknown or undiscovered paleontological resources were found

during excavation or HDD. Mitigation Measure GEO-1 requires that appropriate measures be taken, including ceasing work until appropriate protection measures are in place to protect any previously undiscovered paleontological resources. With implementation of Mitigation Measure GEO-1, the impact would be minimized to a less-than-significant level.

No excavation would result during project operations. Therefore, no impact would occur during project operation.

Mitigation Measure GEO-1: Previously Undiscovered Paleontological Resources

A qualified paleontologist will be present on site during all ground disturbing activities. If construction activities result in the discovery of significant paleontological resources, as determined by the paleontological resources monitor, all work within 100 feet of the discovery will cease; the Conservancy will be notified within 24 hours; the resources will be examined by the qualified paleontologist for appropriate protection and preservation measures; and work may only resume when appropriate protection measures are in place and have been approved by the Conservancy.

VIII. Greenhouse Gas Emissions

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than- Significant Impact	No Impact
Would the project:				
a. Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	☐	☒	☐	☐
b. Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	☐	☒	☐	☐

Affected Environment

Appendix D includes a summary of the pertinent regulations that apply to GHG emissions and provides an overview about climate change.

Discussion

As discussed in Section III, *Air Quality*, the proposed project would not increase operational or maintenance activities or generate a significant number of new vehicles trips in the project area, relative to existing conditions. The following assessment therefore focuses exclusively on construction-related emissions because there would be no impact related to long-term operations.

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

Less than significant with mitigation incorporated. Construction emissions would be short-term and occur for a duration of approximately 5 months (June 2021 through October 2021). The emissions generated during construction of the proposed project are summarized in Table 3. The modeling used a construction date of 2020; however, given changes in the timing of project implementation, construction would occur in 2021. Because average fleet emissions would be lower in 2021 as compared to 2020, construction emissions are expected to be lower than the results shown in Table 3.⁷ As shown in Table 3, it is estimated that construction of the proposed project would generate approximately 62 metric tons of carbon dioxide equivalent. This quantity of emissions is equivalent to the emissions that would be emitted from adding 13 typical passenger vehicles to the road during the construction period for the proposed project (U.S. Environmental Protection Agency 2018). The emissions generated during construction of the proposed project would primarily be the result of diesel-powered construction equipment (e.g., excavators, graders). Construction emissions would cease once construction of the project is complete, and, thus, they are considered short-term.

⁷ Note that none of the modeled project construction parameters have been altered except for the beginning and end dates.

Table 3. Estimated Unmitigated GHG Emissions from Project Construction (metric tons per year)

	CO ₂	CH ₄	N ₂ O	CO ₂ e
Project Construction	62	< 1	< 1	62
CO ₂ =	carbon dioxide			
CH ₄ =	methane			
N ₂ O =	nitrous oxide			
CO ₂ e =	carbon dioxide equivalent, which includes the relative warming capacity (i.e., global warming potential) of each GHG			

BAAQMD's CEQA Air Quality Guidelines do not identify a GHG emission threshold for construction-related emissions, but they recommend that GHG emissions from construction be quantified and disclosed, and that a determination regarding the significance of these GHG emissions be made with respect to whether a project is consistent with the state GHG emission reduction goals. As shown in Table 3, GHG emissions associated with the project are minor and would cease once construction activities are complete. As described below under Impact VIII.b., construction activities associated with the project are not considered in the 2017 Scoping Plan Update as a significant emissions source. Consequently, the project would not impede achievement of the state's GHG emissions reduction goals. Regardless, BAAQMD recommends implementation of BMPs to reduce GHG emissions from construction activities, in compliance with BAAQMD, and to further minimize GHG emissions, the proposed project would implement Mitigation Measure GHG-1, which includes BAAQMD BMPs to reduce GHG emissions during construction. Thus, this impact would be less than significant with mitigation.

Mitigation Measure GHG-1: Implement BAAQMD's BMPs to reduce GHG emissions from construction

- Use alternative-fuel (e.g., biodiesel, electric) construction vehicles/equipment (more than 15 percent of the fleet).
- Recycle more than 50 percent of construction waste or demolition materials.

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

Less than significant with mitigation incorporated. AB 32 establishes a statewide goal to reduce GHG emissions to 1990 levels by 2020. The CARB adopted the AB 32 Scoping Plan as a framework for achieving AB 32 goals. The scoping plan outlines a series of technologically feasible and cost-effective measures to reduce statewide GHG emissions. CARB adopted the 2017 Climate Change Scoping Plan Update in November 2017 to meet the GHG reduction requirement set forth in SB 32, and it proposes continuing the major programs of the previous Scoping Plan. Similarly, the CAP for Contra Costa County includes a variety of measures to reduce a portion of its estimated GHG emissions to assist the County in reducing GHG emissions to comply with AB 32 and SB 32.

The 2017 Scoping Plan Update targets sources with the greatest GHG emissions potential, including transportation, building energy consumption, and waste generation. Construction activities associated with the project are not considered by the Scoping Plan Update as a significant emissions source, and as such, none of the measures outlined in the Scoping Plan Update are directly applicable to the project.

Nonetheless, because the project would generate GHG emissions during construction, this impact is considered potentially significant. The project would implement Mitigation Measure AQ-1 and GHG-1, which is consistent with Contra Costa County CAP Measure LUT 3—Off-Road Vehicles and Equipment (Reduce emissions from off-road vehicles and equipment). LUT 3 was adopted to help the County achieve the State’s overall GHG reduction goals indicated in AB 32, SB 32, and Executive Order (EO) S-3-05.

BAAQMD’s 2017 Clean Air Plan includes performance objectives, consistent with the State’s climate protection goals under AB 32 and SB 375, designed to reduce emissions of GHG emissions to 1990 levels by 2020 and 40 percent below 1990 levels by 2030. The 2017 Clean Air Plan identifies a range of Transportation Control Measures, Land Use and Local Impacts Measures, and Energy and Climate Measures that make up the Clean Air Plan’s control strategy for emissions, including GHGs. The project is consistent with Clean Air Plan measure SS36—Particulate Matter from Trackout, because the project would implement BAAQMD’s Basic Construction Mitigation Measures as Mitigation Measure AQ-1.

Under the requirements of SB 375, the Metropolitan Transportation Commission and Association of Bay Area Governments have developed and adopted a sustainable community strategy, *Plan Bay Area 2040*, to achieve the San Francisco Bay Area’s (Bay Area’s) regional GHG reduction target. Targets for the Bay Area, approved in March 2018 by CARB, include a 10 percent reduction in GHG per capita from passenger vehicles by 2020 compared to emissions in 2005. The adopted target for 2035 is a 19 percent reduction per capita from passenger vehicles compared to emissions in 2005. The emission reduction targets are for those associated with land use and transportation strategies only. The project would not contribute to a substantial increase in passenger vehicle travel within the region, because no new land use development would be constructed.

The project would temporarily generate GHG emissions over the 5-month construction period. The project would implement construction GHG BMPs, as Mitigation Measure GHG-1, consistent with BAAQMD’s guidance to reduce construction-generated GHG emission consistent with State goals.

Based on the above analysis, the project includes objectives and measures that are consistent with applicable policies described in the Scoping Plans for AB 32, SB 32, Contra Costa County’s CAP, BAAQMD’s 2017 Clean Air Plan, and *Plan Bay Area 2040*. Consequently, the project would not conflict with achievement of the AB 32 reduction goals for 2020, the SB 32 reduction goal for 2030, or applicable State and local GHG reduction plans. Therefore, this impact would be less than significant with incorporation of mitigation.

IX. Hazards and Hazardous Materials

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than- Significant Impact	No Impact
Would the project:				
a. Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	☐	☒	☐	☐
b. Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	☐	☐	☒	☐
c. Emit hazardous emissions or involve handling hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☐	☐	☒	☐
d. Be located on a site that is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	☐	☐	☐	☒
e. Be located within an airport land use plan area or, where such a plan has not been adopted, be within two miles of a public airport or public use airport, and result in a safety hazard or excessive noise for people residing or working in the project area?	☐	☐	☐	☒
f. Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☐	☒	☐
g. Expose people or structures, either directly or indirectly, to a significant risk of loss, injury, or death involving wildland fires?	☐	☐	☒	☐

Affected Environment

The project site is not located on a site listed on the Department of Toxic Substances Control Hazardous Waste and Substances Site List (Department of Toxic Substances Control 2019) or the SWRCB GeoTracker hazardous waste site database (State Water Resources Control Board 2019).

Discussion

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

Less than significant with mitigation incorporated. Construction activities associated with the proposed project would involve the use of hazardous materials. Drilling fluid used for the HDD would consist of bentonite and water. Drilling fluids as well as drilling mud that would be generated during HDD would be stored in a covered frac tank. If a spill of drilling fluid or mud were to occur, this would be a potentially significant impact. Mitigation Measure BIO-5 would require implementation of BMPs to minimize impacts, including the implementation of spill guards and a spill containment basin to minimize impacts from spills. In addition, as explained further below, PG&E would obtain a Spill Prevention Countermeasure Control Plan, which would include requirements for the storage of secondary containment on-site. With implementation of these measures, the construction impacts related to the storage of drilling fluids and drilling mud would be less than significant with mitigation.

In addition, during HDD, there is a potential for a frac-out, which is an unintentional return of drilling fluids to the surface during HDD. This would be considered a potentially significant impact. Mitigation Measure BIO-6 would require implementation of an HDD Execution Plan (see Appendix C), which would help protect surface water in Marsh Creek. According to the HDD Execution Plan prepared for the project, waste cuttings and drilling fluids would be disposed of at an approved disposal site. The project site would be checked a minimum of twice daily for signs of unplanned leaks or seeps. A written record is required to be maintained by the contractor of all inspections and submitted with a daily report to the Company Representative. The HDD phase of construction is temporary and is anticipated to occur over a 3-month period. Therefore, construction impacts related to the routine transport, use, or disposal of hazardous materials would be less than significant with mitigation.

Construction also would require the use of typical materials associated with construction activities (e.g., diesel fuel, gasoline, oil, hydraulic fluid, engine exhaust, solvent for welding). Any hazardous materials used during project construction would be transported, used, and stored in accordance with state and federal regulations regarding hazardous materials. Therefore, construction of the proposed project would not create a significant hazard to the public or the environment and impacts would be less than significant.

Project operation would not involve the routine transport, use, or disposal of hazardous materials. Therefore, no impact would occur.

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

Less than significant. L-114 transports natural gas that could be released to the environment should a pipeline break or a rupture occur during pipeline replacement. Precautions incorporated into the proposed project to prevent and minimize the environmental effects of an inadvertent release of potentially hazardous materials are included below.

- Welding and coating inspections would be completed prior to the HDD pullback to ensure that the new pipeline does not have any defects (e.g., dents, gouges), coating damage, or improper welds.

- Hydro-testing would be implemented prior to the HDD pullback to ensure the pipeline can withstand the maximum allowable pressure prior to being brought into service.
- During the retirement process, a 4-foot by 4-foot and 6-foot by 6-foot sniff hole would be installed. The construction crew would monitor the pipeline during the retirement process and would identify any gas leaks.
- Cross-compression activities would be implemented to clear the natural gas from the portion of the pipeline that is being replaced.
- All liquids removed from the pipeline would be containerized and disposed of at a PG&E authorized disposal facility.

Implementation of these precautions would minimize the potential impact of releasing natural gas during construction to a less-than-significant level.

As noted above, project construction would require the use of typical materials associated with construction activities (e.g., diesel fuel, gasoline, oil, hydraulic fluid, engine exhaust, solvent for welding). The construction contractor would be responsible for obtaining a Spill Prevention Countermeasure Control Plan, per PG&E protocol, prior to the commencement of construction. This plan would include requirements for the storage of secondary containment on-site. All deleterious substances would be stored in the approved containers and would be disposed of under the direction of the PG&E Environmental Field Specialist. The PG&E Environmental Field Specialist would authorize the off-hauling of all waste to the appropriate disposal facilities. With implementation of the Spill Prevention Countermeasure Control Plan, impacts would be less than significant.

The proposed project would not change the existing operations at the project site, which do not currently involve the use of hazardous materials, substances, or waste. Therefore, operational impacts for these issues would be less than significant.

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

Less than significant. The closest existing school to the project site is R. Paul Krey Elementary School, approximately 1.5 miles northwest of the most northern point of the pipeline laydown. In addition, construction would take place in an area that is currently vacant but, which is planned for the development of a community college. Construction would take place within 0.25 mile of this planned community college. As described in Impacts IX.a. and IX.b., measures would be taken to minimize the risk of a frac-out; any hazardous materials used during project construction would be transported, used, and stored in accordance with state and federal regulations regarding hazardous materials; and standard procedures would be set to minimize the risk of the rupture of the pipeline, as well as the spills of any hazardous materials. Therefore, impacts would be less than significant.

The proposed project would not change existing operations at the project site, which do not currently involve the use of hazardous materials, substances, or waste. Therefore, operational impacts for these issues would be less than significant.

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

No impact. No listed hazardous materials sites are located within the project site. Therefore, the project would not create a significant hazard to the public or the environment associated with being located on a listed hazardous material site. No impact would occur.

e. Be located within an airport land use plan area or, where such a plan has not been adopted, be within two miles of a public airport or public use airport, and result in a safety hazard or excessive noise for people residing or working in the project area?

No impact. The project site is not located within 2 miles of a public airport or a public use airport. Therefore, construction and operation of the proposed project would not result in a safety hazard related to operation of a public airport or public use airport. No impacts would occur.

f. Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?

Less than significant. Emergency management services for the project site are overseen by the East Contra Costa Fire Protection District (ECCFPD), which serves the City of Brentwood. Construction activities associated with the proposed project would occur on the project site but would not restrict access for emergency vehicles traveling on roads adjacent to the project site. The project would require the temporary laydown of the pipeline across two residential roadways that provide access to several houses. Only one of those two roadways would be closed at any given time during construction, so that emergency access could be maintained. In addition, the fire department and police department would be notified of the dates of the roadway closure prior to the closure. After construction of the proposed project, emergency access to the site would remain similar to existing conditions. Therefore, construction of the proposed project would not impair implementation of, or physically interfere with, an adopted emergency response plan or emergency evacuation plan and the impact would be less than significant.

During operation of the proposed project, emergency access to the site would remain the same as existing conditions. Therefore, operation of the proposed project would not impair implementation of, or physically interfere with, an adopted emergency response plan or emergency evacuation plan. Therefore, there would be no impact.

g. Expose people or structures, either directly or indirectly, to a significant risk of loss, injury, or death involving wildland fires?

Less than significant. The project would involve welding of the pipeline segments. This hot work activity, as well as the elevated risk of fire arising from working in wildland settings, increases the potential for wildland fires. State law requires all local jurisdictions to identify any Very High Fire Hazard Severity Zone (VHFHSZ) within their areas of responsibility (California Government Code §§ 51175–51189). Inclusion within these zones is based on vegetation density, slope severity, and other relevant factors that contribute to fire severity. The project site is located in a non-VHFHSZ portion of an incorporated local responsibility area (LRA) (California Department of Forestry and Fire Protection 2009), and it is not within a high or very high fire hazard severity zone in a state responsibility area (SRA) (State of California 2020). Therefore, construction of the proposed project would not expose people or structures, either directly or indirectly, to a significant risk of loss, injury, or death involving wildland fires. Impacts would be less than significant.

Operation of the proposed project would not expose people or structures, either directly or indirectly, to a significant risk of loss, injury, or death involving wildland fires. Therefore, there would be no impact.

X. Hydrology and Water Quality

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than- Significant Impact	No Impact
Would the project:				
a. Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or groundwater quality?	☐	☒	☐	☐
b. Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?	☐	☐	☒	☐
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 that would:				
1. Result in substantial erosion or siltation on or off site;	☐	☒	☐	☐
2. Substantially increase the rate or amount of surface runoff in a manner that would result in flooding on or off site;	☐	☐	☒	☐
3. Create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or	☐	☐	☒	☐
4. Impede or redirect flood flows?	☐	☐	☐	☒
d. In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?	☐	☐	☒	☐
e. Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?	☐	☒	☐	☐

Affected Environment

The proposed project would use HDD to drill the pipeline 48 feet underneath Marsh Creek. The central work area is located approximately 125 feet from Marsh Creek and 350 feet northeast of Marsh Creek Reservoir. Construction within the central work area would occur within 113 feet from the edge of a sub-drain ditch managed by the Flood Control District (see Figure 1).

Discussion

a. Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or groundwater quality?

Less than significant with mitigation incorporated. Excavation and backfill construction activities near Marsh Creek and Marsh Creek Reservoir have the potential to release suspended sediment into the surface waters. Water quality impacts on Marsh Creek would be avoided by installing the pipeline approximately 48 feet beneath the channel using HDD. No work is planned within wetland and water features, including Marsh Creek, and at least a 75-foot buffer would be maintained around all water features. Project construction activities would remain outside of this buffer.

Excavation is expected to occur when streams are dry, thereby reducing any potential water quality impacts. If flow is present within the channels during the construction season, all required impact avoidance and minimization measures specified in the CDFW, SWRCB, USACE, and CCFCDD permits would be implemented to reduce the potential for water quality impacts. Nonetheless, the potential impact to the water quality of Marsh Creek and Marsh Creek Reservoir would be potentially significant. Mitigation Measure BIO-5 requires the implementation of BMPs to protect nearby jurisdictional wetlands and waterways. The project would also implement ECCC HCP/NCCP EIS/EIR Mitigation Measure HYD-1, which requires the implementation of erosion and sediment control BMPs. With implementation of the BMPs identified in Mitigation Measure BIO-5 and HYD-1, impacts related to water quality standards and waste discharge requirements due to excavation would be less than significant.

Furthermore, there is a potential for frac-out between the north and central work area HDD pits that could temporarily affect the water quality of Marsh Creek. This would be a potentially significant impact. Mitigation Measure BIO-6 would require the implementation of an HDD Execution Plan (see Appendix C), which includes requirements to monitor the pipeline for any release of fluids or changes in pressure and to implement a contingency plan in the event of a frac-out. In addition, Mitigation Measure BIO-6 requires that the construction contractor consult with CDFW, SWRCB, RWQCB, and USACE to determine if any permits are required for drilling and to notify the Conservancy if a frac-out occurs. Therefore, with this mitigation, the project would have a less-than-significant impact related to water quality effects associated with a frac-out.

As noted above, construction activities in the central work area would be located approximately 113 feet from the edge of a sub-drain ditch managed by the CCFCDD. A potentially significant impact on water quality could occur if polluted runoff from the construction area were to drain to the sub-drain ditch. To minimize such impacts, any drilling fluids or drilling mud in the central work area would be stored in frac tanks. Additionally, Mitigation Measure BIO-5, which requires the implementation of BMPs to protect nearby jurisdictional wetlands and waterways, would be implemented. Mitigation Measure BIO-5 includes BMPs to minimize polluted runoff from the tanks, through the implementation of spill guards and a spill containment basin. The project would also implement Mitigation Measure AQ-1, which would require that exposed surfaces on CCFCDD lands be covered. Additionally, the project would implement ECCC HCP/NCCP EIS/EIR Mitigation Measure HYD-1, which requires the implementation of erosion and sediment control BMPs. This would include installation of silt fencing around the perimeter of the central work area to avoid any runoff from entering the sub-drain ditch. With implementation of these mitigation measures, the project would have a less-than-significant impact related to construction runoff to the sub-drain ditch.

Project operations would remain the same. Therefore, operation of the proposed project would not degrade water quality, and there would be no impact.

Mitigation Measure HYD-1: Implement erosion and sediment control BMPs

For construction or restoration of habitat within the preserves, the Implementing Entity or its designated agents will implement multiple erosion and sediment control BMPs in areas with potential to drain to surface waters. These BMPs will be selected to achieve maximum sediment removal and represent the best available technology that is economically achievable. BMPs to be implemented as part of this mitigation measure could include the following.

- Temporary erosion control measures (such as silt fences, staked straw bales/wattles, silt/sediment basins and traps, check dams, geofabric, sandbag dikes, and temporary revegetation or other ground cover) will be employed to control erosion from disturbed areas.
- Drainage facilities in downstream offsite areas will be protected from sediment using BMPs acceptable to the County and Regional Water Quality Control Boards.
- Excavated soil stockpiled at the project site will be covered and stored a minimum 200 feet away from the edge of the CCFCD sub-drain ditch.
- Disturbed areas will be reseeded at a rate of approximately 60 pounds per acre with a Conservancy-approved native seed mix. Grass or other vegetative cover will be established on the construction site as soon as possible after disturbance. At minimum, vegetative application will be completed by October 15 to allow plants to establish. No disturbed surfaces will be left without erosion control measures in place between October 15 and April 15.

b. Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?

Less than significant. The project site is within an established urban community serviced by the City of Brentwood, Water Operations Division, and the project does not propose to use groundwater during construction. The geotechnical report (Appendix E) identifies that groundwater was measured at approximately 27.6 feet bgs at the project site. Excavation for the HDD pits and tie-in points to the existing pipeline would be between 8 and 10 feet deep. Thus, it is unlikely that any groundwater would be encountered during construction. While groundwater is not anticipated to be encountered during construction, any groundwater encountered would be pumped into tanks for storage and would be hauled offsite and disposed of at an appropriate publicly owned treatment works facility. Therefore, construction of the proposed project would not deplete groundwater supplies or interfere substantially with groundwater recharge, and the impact would be less than significant.

Project operations would not result in the expansion of impervious areas and would therefore not interfere with groundwater recharge. Thus, no impact would occur.

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 that would:

1. Result in substantial erosion or siltation on or off site?

Less than significant with mitigation incorporated. During construction, the project would result in the alteration of drainage patterns from temporary ground disturbance. This temporary ground disturbance would be minimal and would be limited at the HDD exit point, HDD entry point, and the two trenches to tie-in to the existing pipeline. Nonetheless, there is the potential that the project could result in erosion or siltation, and this impact would be considered a potentially significant impact. Mitigation Measures BIO-5 and HYD-1 would require the implementation of BMPs to minimize the sediment in runoff. With implementation of these measures, construction of the proposed project would not result in substantial erosion or siltation, and impacts would be less than significant.

Project operation would not involve any ground disturbance or alteration of drainage patterns that could result in erosion or siltation. Therefore, no impact would occur during operation of the project.

2. Substantially increase the rate or amount of surface runoff in a manner that would result in flooding on or off site? And 3. Create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?

Less than significant. Following completion of excavation and pipeline installation, the project site would be regraded to match the original site contours and soils would be stabilized through revegetation. Furthermore, the project would not increase the area of impervious surfaces. Thus, the proposed project would not result in a change in the amount of surface water runoff and would not result in increase the risk of flooding, exceed existing or planned stormwater drainage systems, or increase the volume of polluted runoff. Therefore, the impact would be less than significant.

4. Impede or redirect flood flows?

No impact. The proposed project does not include the construction of any aboveground structures. As such, construction and operation of the proposed project would not alter the existing drainage pattern of the site due to impeding or redirecting flood flows. Therefore, no impacts would occur.

d. In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?

Less than significant. The project site is not located within a potential tsunami flood area and is not at risk for inundation by seiche. According to the Federal Emergency Management Agency's National Flood Hazard mapping, the central and south work area of the project site is mapped as being near but not within "Zone A," which is considered a special flood hazard area (Federal Emergency Management Agency 2017). Because the project would not be located in a flood hazard, tsunami, or seiche zone, the risk of releasing pollutants due to project inundation would be less than significant.

e. Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?

Less than significant with mitigation incorporated. The Contra Costa Clean Water Program is the local water quality management plan that applies to the proposed project. As discussed above under Section X.a., the proposed project would have the potential to affect water quality during construction and the impact would be potentially significant. Mitigation Measures BIO-5 and HYD-1 would require the implementation of BMPs to protect water quality during construction. Therefore, the proposed project would not be in conflict with or obstruct implementation of the applicable water quality control plan for the project site and the impact would be less than significant with mitigation. Given construction of the proposed project would result in less-than-significant impacts to groundwater, the proposed project is not anticipated to conflict with a sustainable groundwater management plan. Construction of the proposed project would not conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan. Impacts would be less than significant.

Project operation would not conflict with or obstruct implementation of a water quality control plan or result in impacts to groundwater. The proposed project is not anticipated to conflict with a sustainable groundwater management plan. Therefore, no impacts would occur for operation of the project.

XI. Land Use and Planning

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

Affected Environment

The project site is within the city of Brentwood and within the boundaries of the ECCC HCP/NCCP Planning Area.

Discussion

a. Physically divide an established community?

Less than significant. The project entails installation of a subsurface pipeline that would not require the establishment of any new above-grade structures that could divide an established community. The project would not require the demolition of any buildings or structures within a community. The project would, however, require the temporary laydown of the pipeline across two streets that provide access to several houses. Only one of those two roadways would be closed at any given time during construction, so that roadway access could be maintained for residents.

Pipeline laydown would not divide a community because access at least one access road to residences would be maintained throughout construction. Therefore, construction of the proposed project would not physically divide an established community, and the impact would be less than significant.

Project operation would not include any structures above ground. No impact associated with dividing and established community would occur.

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?

Less than significant. The project would replace an existing natural gas pipeline and would not conflict with any land use plans, policies, or regulations. The majority of the project is located within the City of Brentwood and the primary planning document for the City of Brentwood is the General Plan. The majority of the area near the north work area is designated for planned development and low-density residential land uses in the General Plan (City of Brentwood 2014).

The surrounding area is currently being developed with residences, consistent with the General Plan planned land uses. This project would not construct new facilities or increase the capacity or function of the existing pipeline; rather, this project is meant to replace an old pipeline. The pipeline replacement is meant to service the new planned land uses, which are under construction or have recently been completed. Thus, the project would not conflict with planned land uses.

Under PG&E Integrity Management 's Vintage Pipe Replacement Program, the existing natural gas pipeline is required to be replaced, due to the original 1942 installation date. PG&E considers "vintage pipe" to include pipe manufactured or constructed and fabricated using historic practices that are no longer being used today and are not as readily assessed using ultrasonic ILI or hydrostatic testing. In addition, this section of L-114 to be replaced is located in an area that has recently changed in class designation due to the population increase in the area. Therefore, this area is considered an HCA and requires that the pipeline facility be brought to the proper class designation. Because the project is meant to service the existing and planned land uses in the area, the project would not conflict with any plans, policies, or regulations in the City of Brentwood and the impact would be less than significant.

The cross-compression activities would occur within unincorporated Contra Costa County. These activities would require the temporary use of the existing mainline valves and would not require the installation of any structures. Thus, these activities in unincorporated Contra Costa County would not conflict with any land use plans, policies, or regulations and the impact would be less than significant.

The project would obtain permit coverage under the ECCC HCP/NCCP as a covered activity and comply with all requirements of the plan through implementation of applicable conservation measures. Thus, the project would be consistent with the ECCC HCP/NCCP and would not conflict with any plans, policies, or regulations and the impact would be less than significant.

XII. Mineral Resources

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than- Significant Impact	No Impact
Would the project:				
a. Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	☐	☐	☐	☒
b. Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan?	☐	☐	☐	☒

Affected Environment

The location of mineral resources is identified in Contra Costa County's General Plan (Chapter 8, *Conservation Element*). Mineral resources in Contra Costa County include clay, diabase, and sandstone in the Domengine Formation. A domengine sandstone deposit is present in eastern Contra Costa County near the eastern end of Vasco Road, located approximately 2 miles from the HDD entry excavation site (Contra Costa County 2008).

Discussion

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?

No impact. Construction of the project would involve small excavations in the alluvium, a general term for clay, silt, sand, gravel, or similar unconsolidated detrital material. Excavation would take place approximately 2 miles west of the domengine sandstone deposit. No mineral extraction or other mining operations occur within the project site and the availability of mineral resources would not be affected by construction of the project. Therefore, no impact would occur.

Project operation would not involve any mineral extraction or other mining operations within the project site. Therefore, no impact would occur.

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

No impact. The project does not occur in areas delineated as locally important mineral resource recovery sites. Therefore, construction and operation of the proposed project would not result in the loss of availability of a locally important mineral resource recovery site, and no impact would occur.

XIII. Noise

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than- Significant Impact	No Impact
Would the project:				
a. Generate a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in a local general plan or noise ordinance or applicable standards of other agencies?	☐	☒	☐	☐
b. Generate excessive groundborne vibration or groundborne noise levels?	☐	☐	☒	☐
c. Be 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 and expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒

Affected Environment

The project site is located across two jurisdictions (City of Brentwood and unincorporated Contra Costa County). The noise ordinance for the City of Brentwood is applicable to the north and central work areas of the project site, including the area to be drilled for the new pipeline. The City code is also applied to the work limits of the central work area within the County Flood Control and Conservation District, encompassing an area just outside of the City limits. County standards are applied to the south work area, located wholly in the jurisdiction of Contra Costa County. The County does not have a noise ordinance; however, guidelines for acceptable noise levels are indicated in the Noise Element of the County General Plan.

Neither the City nor County have numerical noise limits for construction noise. Federal Transit Administration (FTA) guidelines for construction noise limits are included in this assessment to evaluate the potential for construction noise to result in negative community reaction.

Federal Transit Administration Guidance for Vibration from Construction

Vibration impact thresholds are discussed in Chapter 6 of the FTA Manual. A vibration impact due to temporary construction is considered to occur if vibration levels from construction equipment have the potential to result in building damage. The structures adjacent to the project site are assumed to be “non-engineered timber and masonry buildings” for the purposes of vibration analysis prepared for the project. Thus, a vibration impact potentially resulting in building damage could occur at a peak particle velocity of 0.20 inches per second.

City of Brentwood

Section 9.32 of the City code specifies numerical noise limits at residential, commercial and industrial uses. At residences during daytime hours of 7:00 a.m. to 10:00 p.m., exterior noise levels

are not allowed to exceed 60 A-weighted decibels (dBA) equivalent sound level (L_{eq}) for more than 30 minutes in a given hour, or 80 dBA L_{eq} for any length of time. These standards are reduced by 15 decibel (dB) during nighttime hours of 10:00 p.m. to 7:00 a.m. (45 dBA L_{eq} for more than 30 minutes in a given hour, or 65 dBA L_{eq} for any length of time).

The City code in subsection 9.32.050 allows use of heavy earthmoving equipment between 7:00 a.m. and 3:30 p.m., or until 5:30 p.m. with the express written approval of the City. Monday through Friday, and 8:00 a.m. to 5:00 p.m. on Saturday. No construction work is allowed on Sundays and City holidays. The code provides that, "Construction activities within city right-of-way, such as road work or installation of drainage facilities, may be performed outside of the specified work hours of this subsection A, including overnight work, with the express written approval of the city engineer or designee."

Contra Costa County

The County does not have a noise ordinance. The General Plan provides guidance for noise limits at specific types of land uses to promote the County's goals for control of environmental noise. The General Plan includes the following goals and policies associated with noise and vibration:

- Goal 11-A: To improve the overall environment in the County by reducing annoying and physically harmful levels of noise for existing and future residents and for all land uses.
- Goal 11-B: To maintain appropriate noise conditions in all areas of the County.
- Goal 11-C: To ensure that new developments will be constructed so as to limit the effects of exterior noise on the residents.
- Goal 11-D: To recognize the economic impacts of noise control and encourage an equitable distribution of these costs.
- Goal 11-E: To recognize citizen concerns regarding excessive noise levels, and to utilize measures through which the concerns can be identified and mitigated.
- Policy 11-2: The standard for outdoor noise levels in residential areas is a DNL of 60 dB. However, a DNL of 60 dB or less may not be achievable in all residential areas due to economic or aesthetic constraints. One example is small balconies associated with multi-family housing. In this case, second and third story balconies may be difficult to control to the goal. A common outdoor use area that meets the goal can be provided as an alternative.
- Policy 11-3: If the primary noise source is train passbys, then the standard for outdoor noise levels in residential areas is a DNL of 70 dB. A higher DNL is allowable since the DNL is controlled by a relatively few number of train passbys that are disruptive outdoors only for short periods. Even though the DNL may be high, during the majority of the time the noise level will be acceptable.
- Policy 11-4: Title 24, Part 2, of the California Code of Regulations requires that new multiple family housing projects, hotels, and motels exposed to a DNL of 60 dB or greater have a detailed acoustical analysis describing how the project will provide an interior DNL of 45 dB or less. The County also shall require new single-family housing projects to provide for an interior DNL of 45 dB or less.
- Policy 11-5: In developing residential areas exposed to a DNL in excess of 65 dB due to single events such as train operation, indoor noise levels due to these single events shall not exceed a maximum A-weighted noise level of 50 dB in bedrooms and 55 dB in other habitable rooms. Single event indoor residential noise levels from airport related causes will be 45 dB CNEL.
- Policy 11-6: If an area is currently below the maximum "normally acceptable" noise level, an increase in noise up to the maximum should not be allowed necessarily.

- Policy 11-7: Public projects shall be designed and constructed to minimize long-term noise impacts on existing residents.
- Policy 11-8: Construction activities shall be concentrated during the hours of the day that are not noise-sensitive for adjacent land uses and should be commissioned to occur during normal work hours of the day to provide relative quiet during the more sensitive evening and early morning periods.

Noise compatibility standards in the General Plan Noise Element indicate that new construction of residential use with community noise exposure at levels of up to 70 day-night sound level (L_{dn}) is acceptable on the condition that noise reduction requirements have been analyzed, and that noise insulation features or fresh air supply systems are included in the building design. Community noise exposure at levels of 70 L_{dn} or higher is considered “normally unacceptable” for new residential construction. A community noise exposure of 75 L_{dn} or higher is considered “clearly unacceptable.”

Discussion

The proposed project would not introduce new noise sources related to operation or maintenance of the project, and there would be no long-term noise effects. As such, only potential short-term noise and vibration effects are evaluated in the following analysis.

a. Generate a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in a local general plan or noise ordinance or applicable standards of other agencies?

The assessment of potential construction noise levels was based on general assessment methodology developed by FTA. Potential noise effects associated with construction of the project would be temporary and intermittent.

Construction noise source levels are based on equipment noise emission levels developed by FTA. Table 4 summarizes the noise levels produced by project-specific construction equipment. As shown, individual types of construction equipment are expected to generate maximum noise levels ranging from 80 to 88 dBA at a reference distance of 50 feet. The construction noise level at a given noise-sensitive receiver location would depend on the type of construction activity as well as the distance from the activity and intervening shielding between the activity and the receiver.

Table 4. Noise Emission Levels from Construction Equipment

Equipment	Typical Noise Level (dBA) 50 Feet from Source
Truck	88 ¹
Sideboom crane	80 ¹
Backhoe	80 ¹
Excavator	85 ¹
Backhoe	81 ¹
Front loader	80 ¹
Generator	82 ¹
Compactor	82 ¹
Trenching Machine	82 ²

Equipment	Typical Noise Level (dBA) 50 Feet from Source
Drill Rig	85 ²
Mud Pump	88 ³

Sources:
¹ Federal Transit Administration 2018.
² Thalheimer 2000.
³ Source level calculation based on 600 horsepower pump, from methods developed by Hoover & Keith 2000.
dBA = A-weighted decibel

To characterize the source level of the worst-case noise condition during any given phase of project construction, the two loudest pieces of equipment were assumed to operate simultaneously at a perimeter location with a reference distance of 50 feet.

Equipment types used for construction of the project vary by phase and location. The laydown area within north work area is nearest to residences, and would be used for pipeline laydown, coating, and welding prior to installation. Trucks and side-boom cranes would potentially operate at the same time during these activities, producing a worst-case noise level of 89 dBA L_{eq} at a reference distance of 50 feet. However, the nearest residences are about 25 feet away from the laydown area, so equipment noise levels could potentially be as high as 95 dBA L_{eq} at these locations. Based on assumptions of equipment phasing during construction, this is likely the highest level of noise exposure that receivers would experience during project construction. While laydown work would be done only during hours allowed by the City ordinance, the noise levels from equipment during laydown could exceed the FTA daytime noise criteria of 90 dBA L_{eq} .

Nighttime work would be required for the pipeline pullback, which would need to be done continuously until pipeline installation is complete. This is done to reduce the risk of pilot hole collapse during installation. The process is estimated to take an additional four to six hours following normal daytime work hours, but could take longer. The pullback would require use of a drill rig located in the central work area and side-boom cranes at the pilot hole entrance. Noise levels from two cranes operating simultaneously would be up to 83 dBA L_{eq} at a reference distance of 50 feet. The work area at the borehole entrance is approximately 200 feet away from the nearest residence, which has a privacy wall installed around the yards facing the work area. The worst-case nighttime noise level would be about 71 dBA L_{eq} , which would not exceed the FTA nighttime noise criteria of 80 dBA L_{eq} , but would exceed the City noise limit of 45 dBA L_{eq} . To conduct nighttime work, a permit from the City would be required. However, given that nighttime work would only occur for a short period and would not exceed FTA nighttime noise criteria, the nighttime work is not expected to result in a significant impact.

Cross-compression activities would be done at the south work area. This would involve use of trucks and mowers to set up the trailers, but would not involve the use of heavy earthmoving equipment. The residence nearest to the south work area is about 0.5 mile away, so noise from these activities is unlikely to be noticeable above background ambient levels.

Although the use of heavy equipment would be done during daytime work hours as allowed by the City, construction noise could potentially exceed the FTA daytime noise criterion of 90 dBA L_{eq} intermittently during pipeline laydown activities. Therefore, this impact is considered potentially significant. Implementation of Mitigation Measure NOI-1 would reduce this impact to a less-than-significant level.

Mitigation Measure NOI-1: Employ Best Noise Control Practices during Construction

During construction, the contractor will employ best practices to reduce limit construction noise at residences to no more than 90 dBA L_{eq} . Measures used to limit construction noise may include but are not limited to the following:

- Mufflers should be kept operable and effective on all construction equipment, generators, and vehicles. All internal combustion engines must be operated with exhaust and intake silencers. Wherever possible, noise-generating construction equipment should be shielded from nearby residences by noise-attenuating buffers such as structures or truck trailers.
- Prior to construction within 1,000 feet of residences, written notice should be provided to potentially affected residences identifying the type, duration, and frequency of construction activities. Notification materials will also identify a mechanism for residents to register complaints if construction noise levels are overly intrusive or construction occurs outside the required hours.
- Construction staging and stockpile areas will be located at least 1,000 feet from occupied residences, or contractors will be required to provide appropriate noise-reducing engine-housing enclosures. Equipment warm-up areas, water tanks, and storage areas should be located in the established staging area or in other portions of the site more than 1,000 feet from existing residences, as feasible.
- Throughout the construction period, the contractor will implement appropriate additional noise mitigation measures, including changing the location of stationary construction equipment, shutting off idling equipment, rescheduling construction activity, or installing temporary barriers around stationary construction noise sources at the request of the City.
- For the limited locations where PG&E is unable to mitigate noise through resident notification, PG&E shall, on a case-by-case basis when there are special circumstances, such as those residents with verified special medical conditions, offer to temporarily relocate residents to a nearby hotel for the one night of potential HDD activities.

b. Generate excessive groundborne vibration or groundborne noise levels?

Less than significant. Operation of construction equipment could result in perceptible levels of ground-borne vibration in the immediate vicinity of residential properties during construction. Heavy equipment that may be operated in close proximity to residences includes a side-boom crane that would be used for laydown of the pipeline prior to installation. Trucks would be used for a short time for material deliveries and laydown setup. These types of equipment typically produce peak particle velocity vibration levels of less than 0.10 inch per second at a distance of 25 feet, which may intermittently be noticeable inside of buildings, but only occur for a period of days during the laydown of the new pipeline. Construction of the project would not require impact-producing equipment such as pile drivers. Use of heavy equipment would be temporary and cease once construction is complete.

HDD would take place further away from the residential area. The pipeline installation work area for the north work area is approximately 200 feet away from the nearest residence. At this distance, vibration levels from operation of heavy equipment would not be noticeable. HDD and pipeline installation at the central work area would be done in an area of open space not occupied by residences.

The types of equipment scheduled for use in the work areas within the residential subdivision would produce a level of vibration that is not expected to result in a negative community reaction, or cause building damage. Therefore, this impact would be less than significant.

c. Be 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 and expose people residing or working in the project area to excessive noise levels?

No impact. The project does not lie within an airport influence or plan area. There are no airports within 2 miles of the project. Therefore, there would be no impact.

XIV. Population and Housing

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than- Significant Impact	No Impact
Would the project:				
a. Induce substantial unplanned population growth in an area, either directly (e.g., by proposing new homes and businesses) or indirectly (e.g., through extension of roads or other infrastructure)?	☐	☐	☒	☐
b. Displace a substantial number of existing people or housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒

Affected Environment

The City of Brentwood has a population of approximately 51,480 people (U.S. Census 2010). Unincorporated Contra Costa County has a protected population of 166,100 for 2020 (Association of Bay Area Governments 2013)

Discussion

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

Less than significant. Construction of the proposed project would result in the generation of 38 temporary construction jobs; however, the additional jobs are expected to be filled by residents who currently live in the region. At any given time, a maximum of 38 construction personnel would be required, which represents approximately 0.07 percent of the population of the city of Brentwood. As such, the potential increase in population due to construction personnel would not be substantial and the impact would be less than significant.

The project would result in the replacement of an existing pipeline and would not increase the capacity or change the existing operation of the pipeline. The project does not include the construction of any homes or businesses or extension of roads or other infrastructure. The project would provide new infrastructure to support an area that has recently changed in class designation due to the population increase. Therefore, operation of the project would not induce substantial unplanned population growth. No operational impacts would occur.

b. Displace a substantial number of existing people or housing, necessitating the construction of replacement housing elsewhere?

No impact. The project would be located near residences for pipeline laydown and during drilling near the HDD exit pit; however, the project would not require the demolition of any housing. The project would involve short-term construction activities that would cease after 5 months. As such, no existing people or housing would be removed or displaced, the project would not require the construction of replacement housing elsewhere. Therefore, no impacts would occur.

XV. Public Services

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than- Significant Impact	No Impact
Would the project:				
a. Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities or a 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 following public services:				
Fire protection?	☐	☐	☒	☐
Police protection?	☐	☐	☒	☐
Schools?	☐	☐	☒	☐
Parks?	☐	☐	☒	☐
Other public facilities?	☐	☐	☒	☐

Affected Environment

The proposed project is in an urbanized area that is currently served by ECCFPD and the Brentwood Police Department (BPD). The project site falls within Brentwood Union School District. Nearby parks are identified and discussed below in Section XVI, *Recreation*.

Discussion

a. Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities or a 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 following public services:

Fire protection? Police protection? Schools? Other public facilities?

Less than significant. The project is in an urbanized area that is currently served by the ECCFPD, BPD, and Brentwood Union School District. As described in Section XIV, *Population and Housing*, the project would require the use of 38 construction personnel, which is expected to be filled by residents in the area. The introduction of construction personnel would not result in a substantial increase in the population during construction. As such, no additional fire protection services, police protection services, school facilities, or other public facilities would be required to accommodate the construction personnel and the impact would be less than significant.

In addition, the project would require the temporary laydown of the pipeline across two streets that provide access to several houses. Emergency access for fire and police protection would be

maintained throughout construction because at least one of the two roadways would remain open during construction. Traffic control would be put in place and the police and fire department would be notified of the roadway closure prior to any closure. Because access would be maintained, traffic controls would be implemented, and the fire and police department would be notified of the roadway closures, no additional fire or police protection services would be required to accommodate construction of the project. Thus, impacts associated with the provision of new or altered fire and police services would be less than significant.

Project operation would not induce population growth directly or indirectly that could increase the demand on fire protection services, police protection services, school facilities, or other public facilities. Therefore, no impact would occur due to operation of the pipeline.

Parks?

Less than significant. As described above, construction personnel would not result in a substantial increase in the population during construction, and project operation would not induce population growth. Thus, the project would not result in a substantial increase in the demand on nearby parks. As described below in Section XVI, the impact on parks would be less than significant.

XVI. Recreation

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than- Significant Impact	No Impact
Would the project:				
a. Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	☐	☒	☐	☐
b. Include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment?	☐	☐	☒	☐

Affected Environment

The nearest publicly accessible open spaces and recreational facilities in the vicinity of the project site include the Marsh Creek Regional Trail, which is approximately 0.3 mile east of the most northern portion of the pipeline laydown. Oak Meadow Park, Creekside Park, and Orchard Park are located approximately 1.5 mile north of the most northern portion of the pipeline laydown.

Discussion

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?

Less than significant with mitigation incorporated. Construction of the project would not result in a substantial increase in population due to the personnel that would be required to construct the project. There is a pedestrian and bicycle path east of Miwok Avenue. The project would require pipeline laydown at this recreational facility, and for safety reasons the recreational facility would need to be closed during the entire 5-month period of pipeline laydown, welding, fabrication, and stringing of the pipeline.

Because the project would require the closure of a recreational facility for 5-months, users of this park could use other recreational facilities and could result in the physical deterioration of other recreational facilities. Furthermore, if the park were significantly damaged during construction and if the park were not restored to its previous condition, prior to construction, then the potential exists that recreationalists would use other parks, which could result in the physical deterioration of those recreational facilities. Thus, the project's potential impact would be significant.

Implementation of Mitigation Measure REC-1 would require that PG&E coordinate with the City of Brentwood Parks and Recreation Department and that residents be notified in advance of the park's closure. Furthermore, Mitigation Measure AES-1 requires that the park be restored to its pre-construction conditions after the project has been implemented. Due to the temporary 5-month period that this park would be closed and with implementation of Mitigation Measures REC-1 and AES-1, the project would not increase the use of other existing recreational facilities, such that

substantial physical deterioration of the facilities would occur or be accelerated. Therefore, construction impacts would be less than significant with mitigation incorporated.

Project operation would not induce population growth directly or indirectly that could 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. Therefore, no impact would occur.

Mitigation Measure REC-1: Notification of Temporary Closure of Recreational Facility.

The project proponent will consult with the City of Brentwood Parks and Recreation Department to notify them of the closure of the park and to solicit recommendations to minimize impacts to residents. The proponent will submit documentation of this consultation to the Conservancy, including any recommendations made by the City of Brentwood Parks and Recreation Department. Prior to construction, the proponent will notify nearby residents of the park's closure and will include signage at the park to notify of the park's closure, per the guidance of the City of Brentwood Parks and Recreation Department. The project proponent will submit proof of notification and signage to the Conservancy prior to construction.

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

Less than significant. The project does not include any recreational facilities as a part of the project. Furthermore, as discussed in Section XIV.a, construction of the project would require some construction personnel but would not result in a substantial increase in population, employees, number of housing units, or residents in the vicinity. Therefore, construction of the project would not require the construction or expansion of existing recreational facilities that might have an adverse physical effect on the environment. The impact due to construction of the project would be less than significant.

Project operation would not include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment. Therefore, no impact would occur for operation of the project.

XVII. Transportation

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than- Significant Impact	No Impact
Would the project:				
a. Conflict with a program, plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities?	☐	☐	☒	☐
b. Conflict or be inconsistent with State CEQA Guidelines section 15064.3, subdivision (b)?	☐	☐	☒	☐
c. Substantially increase hazards because of a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☐	☐	☒	☐
d. Result in inadequate emergency access?	☐	☐	☒	☐

Affected Environment

State Route (SR) 4 is the predominant feature of the roadway system in the City of Brentwood. SR 4 is a main route through eastern Contra Costa County. Access to the northern and central work areas are provided by Miwok Avenue, Pioneer Square, Vineyards Parkway and Marsh Creek Road. Access to the south work area is provided by Camino Diablo and Marsh Creek Road.

Discussion

a. Conflict with a program, plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities?

Less than significant. The project would entail the replacement of an existing underground pipeline and would, thus, not result in permanent alterations the local circulation system. The project would not induce any permanent growth and would thus not generate any new vehicular trips that could affect the transit, roadway, bicycle, and pedestrian facilities. The project would, however, involve temporary construction activities that could temporarily affect roadway facilities. Construction activities would require the use of the roadway system for the truck trips and construction personnel vehicular trips that would be generated during construction. Furthermore, as discussed in further detail in Section XVII.c, below, construction would require temporarily closing two roadways in order to accommodate pipeline laydown. These impacts would be temporary and would cease after construction is complete. Therefore, the impacts to the circulation system would be less than significant and would not conflict with any applicable plan, ordinance, or policy addressing the circulation system.

b. Conflict or be inconsistent with State CEQA Guidelines section 15064.3, subdivision (b)?

Less than significant. The project entails the replacement of an existing natural gas pipeline with a new natural gas pipeline. The project would not increase the capacity of the natural gas pipeline and

would, therefore, not induce any population or generate new vehicle trips. There would be the potential to generate vehicle trips during construction; however, these trips would be temporary and cease after construction is complete. Therefore, the project's impact in vehicles miles traveled would be less than significant.

c. Substantially increase hazards because of a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?

Less than significant. The proposed project would be located underground and there are no permanent above-grade structures associated with the project. Thus, the project would not introduce any new, permanent geometric design features. Furthermore, because the project would be replacing an existing pipeline, the project would not introduce any incompatible uses that could result in a hazard. Thus, no hazard impact would occur from any new, permanent project features.

The only potential hazard that the project could introduce would be during construction. Pipeline laydown would not present a substantial hazard because although the project would require laydown over two roadways that provide access to houses, only one of those two roadways would be closed at any given time during construction, so that emergency access could be maintained. As described above in the Project Description, traffic control measures would be employed during construction. This would reduce the hazard associated with construction equipment being used near residences. Thus, construction of the proposed project would not increase hazards due to design features or incompatible uses and the impact would be less than significant.

d. Result in inadequate emergency access?

Less than significant. Construction activities would occur on the project site but would not restrict access for emergency vehicles traveling to or nearby the project site. The project would require the temporary laydown of the pipeline across two residential roadways that provide access to several houses. Only one of those two roadways would be closed at any given time during construction, so that emergency access could be maintained. In addition, the fire department and police department would be notified of the dates of the roadway closure prior to the closure. Therefore, construction of the proposed project would not result in inadequate emergency access, and the impact would be less than significant.

During operation of the project, emergency access to the site would remain the same as existing conditions. Therefore, operation of the proposed project would not result in inadequate emergency access, and no impacts would occur.

XVIII. Tribal Cultural Resources

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than- Significant Impact	No Impact
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	☐	☒	☐	☐
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 Resource Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.	☐	☒	☐	☐

Affected Environment

As discussed above, in Section V, *Cultural Resources*, the project site is located within the City of Brentwood, in Eastern Contra Costa County, the project site is located on an extensive flood plain east of Mt. Diablo, within the Marsh Creek watershed, surrounded by agricultural and industrial land uses, with pockets of suburban tract housing. Marsh Creek runs through the project site.

Native American Correspondence

Outreach to California Native American Tribes was conducted in compliance with California Assembly Bill 52 (AB 52) to collect tribal input regarding the significance of CA-CCO-18/H and to collaborate on the development of mitigation measures, as needed to address any project impacts.

The Native American Heritage Commission (NAHC) was contacted during outreach required by AB 52, and a search of their Sacred Lands File (SLF), as well a list of California Native American Tribes who have traditional cultural affiliation with the region, were requested. The NAHC responded with a negative SLF finding and a list of eight California Native American Tribal representatives. These eight individuals (listed above in Section V) represent multiple tribes, which are traditionally associated with the greater San Francisco Bay Area and include Costanoan/Ohlone, Northern Valley Yokut, Patwin, Miwok, and Bay Miwok.

Letters with project details and a location map were provided to each of the eight representatives. Initial outreach to each of these eight individuals was conducted via letter on May 15, 2019. This

outreach provided project information and a request to consult on the proposed project. On May 28, 2019, the Wilton Rancheria contacted ICF via email with a written request to consult. After May 28, ICF contacted the Wilton Rancheria on three separate occasions but to-date has not received a response. ICF also followed up with each of the individuals listed by the NAHC on June 4, 2019 and June 24, 2019. To-date, no responses have been received.

Discussion

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)?***
and
- 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?***

Less than significant with mitigation incorporated. As discussed in Section V, *Cultural Resources*, a records search conducted at the NWIC in April 2019 identified a multi-component archaeological resource CA-CCO-18/H (P-07-000037). The pre-contact component of this resource consists of a complex, multi-phased occupation site with over 480 associated burials. This resource has been subject to numerous archaeological investigations and is listed on the NRHP. While correspondence with the NAHC and outreach to California Native American Tribes did not identify any tribal cultural resources within the project site, the boundary of a large pre-contact archaeological resource is within the vicinity of the project site. Pre-contact archaeological sites have the potential to be tribal cultural resources.

As described above in Section V, presence-absence testing did not identify any archaeological material within areas of proposed ground disturbance. Therefore, the project is not anticipated to affect the resource. However, because open air excavation would occur during construction and maintenance of the project, the potential exists for project related ground disturbance to impact sparsely distributed as-yet undocumented archaeological resources.

While it is unknown if CA-CCO-18/H (P-07-000037) and other deposits would be considered tribal cultural resources, the presence of the pre-contact archaeological resources indicates there is a potential for the project to impact tribal cultural resources. This impact would be significant. The implementation of CUL-1, CUL-2, and CUL-3 would reduce this impact to less than significant.

XIX. Utilities and Service Systems

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than- Significant Impact	No Impact
Would the project:				
a. Require or result in the relocation or construction of new or expanded water, wastewater treatment, stormwater drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects?	☐	☒	☐	☐
b. Have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry, and multiple dry years?	☐	☐	☒	☐
c. Result in a determination by the wastewater treatment provider that 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?	☐	☐	☒	☐
d. Generate solid waste in excess of state or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals?	☐	☐	☒	☐
e. Comply with federal, state, and local management and reduction statutes and regulations related to solid waste?	☐	☐	☒	☐

Affected Environment

Water service is provided to the project site by the City of Brentwood Public Works Department. The City of Brentwood utilizes groundwater and surface water to supply domestic water to about 19,500 service connections through approximately 300 miles of water mains. The ground water is pumped from the City's active ground water wells. Surface water originates from rivers within the Sierra mountain range; the water flows into the Sacramento and San Joaquin rivers, and into the Delta. The surface water is treated at the City of Brentwood Water Treatment Plant and the Randall Bold Water Treatment Plant. Brentwood residents receive a blend of surface and ground water from these sources. The City has multiple storage reservoirs located throughout the City that allow for the storage of water during low demand periods for use during peak demand periods (City of Brentwood 2019a). The total demand for potable and recycled water in 2015 was 3,036 million gallons per year (MGY) (City of Brentwood 2016). The City of Brentwood projects that the water supply would be 9,194 MGY in 2020 and 10,043 MGY from 2025 to 2040 (City of Brentwood 2016).

Wastewater service is provided to the site by the City of Brentwood Wastewater Division, which is responsible for operating, monitoring and maintaining the City's wastewater treatment plant (WWTP). The City's Collections Division is responsible for cleaning wastewater mains, drain inlets, catch basins, and for making repairs to wastewater mains and residential laterals. Wastewater lines are cleaned and camera inspected year-round to prevent Sanitary Sewer Overflows and to ensure the integrity of the collection system. The City's WWTP is a 5.0 million gallon per day (MGD) extended aeration/activated sludge facility. The WWTP discharges tertiary treated effluent into Marsh Creek. This effluent meets or exceeds CA Title 22 drinking water standards. The WWTP was designed and built to facilitate an expansion to an average dry weather flow of 10 MGD (City of Brentwood 2019b).

USS-Posco Industries Waste Management Unit II Landfill is the closest permitted landfill to the project site. It has a remaining capacity of 86,000 cubic yards and is anticipated to cease operations in 2118 (CalRecycle 2019).

Discussion

a. Require or result in the relocation or construction of new or expanded water, wastewater treatment, stormwater drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects?

Less than significant with mitigation incorporated. The project includes replacement of a natural gas pipeline. This IS/MND has concluded that while project construction could result in significant air quality, biological resources, cultural resources, energy, geology/soils/paleontological resources, GHG emissions, hydrology/water quality, and noise impacts, implementation of mitigation measures (AQ-1, BIO-6, GEO-1, GHG-1, HYD-1, and NOI-1) would minimize these impacts to a less-than-significant level. Thus, the construction of the new natural gas pipeline would result in a less-than-significant environmental effect, after the implementation of mitigation.

The project is not proposing to construct any new or expanded water, wastewater treatment, stormwater drainage, electric power, or telecommunications facilities; thus, the project would not result in any environmental effects from construction of these facilities. No impact would occur.

Construction of the project would require the use of water for hydro-testing and dust control, wastewater treatment for wastewater generated during construction, stormwater drainage for any stormwater generated during the project, and electric power. This demand would be temporary and would cease after the 5-month construction period is complete. Thus, construction of the project would not generate a demand for new water or wastewater facilities or the expansion of existing facilities; nor would it result in the demand for or expansion of stormwater drainage facilities or electric power facilities. Impacts would be less than significant.

The project would result in the replacement of an existing pipeline and would not increase the capacity or change the existing operation of the pipeline. Project operation would not require or result in the relocation or construction of new or expanded water, wastewater treatment, stormwater drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects. No operational impacts would occur.

b. Have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry, and multiple dry years?

Less than significant. The project would involve temporary construction activities associated with pipeline retirement and replacement. Water used during construction for the hydro-test would be brought to the work area from a municipal source by truck. The City of Brentwood has identified that the projected water supply for 2020 is 9,149 MGY (City of Brentwood 2016). Based on the water use in 2015 (3,036 MGY), there is sufficient water supply to accommodate the project's temporary water use (City of Brentwood 2016). Thus, the project's impact would be less than significant.

The project would not induce any growth because the project would not increase capacity over what is provided by the existing pipeline. Rather, this project is meant to improve existing, aging infrastructure. Because operation of the project would not induce population growth, project operation would not increase demand for water supplies. The City of Brentwood Public Works Department would have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry, and multiple dry years. Therefore, operation of the proposed project would not require additional water supplies, and no impacts would occur.

c. Result in a determination by the wastewater treatment provider that 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?

Less than significant. As noted above, wastewater treatment service is provided to the project site by the City of Brentwood Wastewater Division. The City's WWTP has a 5.0 MGD capacity. The total amount of wastewater treated at the WWTP in 2015 was 1,189 MGY, which is equivalent to 3.3 MGD. As of 2015, there is remaining capacity at the WWTP.

Wastewater generated from the hydro test during construction activities would be released from the pipeline and collected in liquid storage tanks staged within the project workspace. Test water would then be hauled offsite to an appropriate disposal site. Construction activities would be temporary and the WWTP currently has remaining capacity to serve the project's projected demand in addition to the provider's existing commitments. Therefore, impacts associated with construction of the proposed project would be less than significant.

Project operation would not generate wastewater; therefore, operation of the proposed project would not exceed wastewater treatment demand beyond the provider's existing commitments, and no impacts would occur.

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?

Less than significant. Waste generated by the proposed project would be disposed of at USS-Posco Industries Waste Management Unit II. This landfill has remaining capacity and is anticipated to cease operations in 2118. The project would generate construction debris and waste associated with removing the existing pipeline; however, generated waste is anticipated to be small and well within the capacity of the landfill that would serve the project. Therefore, this impact would be less than significant.

Operation of the project would not generate municipal solid waste. Therefore, operations would not 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. Therefore, no operational impacts would occur.

e. Comply with federal, state, and local management and reduction statutes and regulations related to solid waste?

Less than significant. Waste generated during construction of the proposed project would be served by a permitted landfill. The project would be completed in compliance with federal, state, and local statutes and regulations related to solid waste. Therefore, construction impacts related to solid waste would be less than significant.

Operation of the project would not generate municipal solid waste; therefore, operations would not conflict with any federal, state, and local management and reduction statutes and regulations related to solid waste. Therefore, no operational impacts would occur.

XX. Wildfire

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

Affected Environment

The project site is located in a non-VHFHSZ portion of an incorporated LRA (State of California 2020), and it is not within a high or very high fire hazard severity zone in a SRA. The south work area is located within a moderate fire hazard severity zone in a SRA. (State of California 2020).

Discussion

a. Substantially impair an adopted emergency response plan or emergency evacuation plan?

Less than significant. Construction activities would have the potential to interfere with emergency plans and procedures if authorities are not properly notified, or if multiple roadways used for emergency routes are concurrently blocked. Emergency management services are overseen by the ECCFPD, which serves the City of Brentwood, including the project site. The project would require the temporary laydown of the pipeline across two residential roadways that provide access to several houses. Only one of those two roadways would be closed at any given time during construction, so that emergency access could be maintained. In addition, the fire department and police department would be notified of the dates of the roadway closure prior to the closure. Thus, construction activities associated with the proposed project would not substantially restrict access for emergency response vehicles traveling on roads adjacent to the project site. Therefore, construction of the proposed project would not impair an adopted emergency response plan or emergency evacuation plan and the impact would be less than significant.

Project operation would remain the same as existing conditions. Therefore, operation of the proposed project would not impair an adopted emergency response plan or emergency evacuation plan. Therefore, there would be no impact.

b. Due to slope, prevailing winds, and other factors, exacerbate wildfire risks of, and thereby expose project occupants to, pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire?

Less than significant. The project would involve welding of the pipeline segments. This hot work activity, as well as the elevated risk of fire arising from working in wildland settings, increases the potential for wildland fires. However, the project site is located in a non-VHFHSZ portion of an incorporated LRA (State of California 2020), and it is not within a high or very high fire hazard severity zone in a SRA. The south work area is located within a moderate fire hazard severity zone in a SRA (State of California 2020). Inclusion or non-inclusion within these zones is based on vegetation density, slope severity, and other relevant factors that contribute to fire severity. Therefore, construction of the proposed project would not, due to slope, prevailing winds, and other factors, exacerbate wildfire risks of, and thereby expose project occupants to, pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire. Impacts would be less than significant.

The project would result in the replacement of an existing pipeline and would not increase the capacity or change the existing operation of the pipeline. Therefore, operation of the proposed project would not, due to slope, prevailing winds, and other factors, exacerbate wildfire risks of, and thereby expose project occupants to, pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire.

c. Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines, or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts on the environment?

Less than significant. The project entails the installation of a natural gas pipeline that would replace an existing, aging pipeline. No other infrastructure would be installed as a part of this project. Although, the project would install a new pipeline, the project would not exacerbate fire risk or result in ongoing impacts on the environment. This is because after the project is installed, operations and maintenance would be the same as the existing conditions. Thus, impacts due to the project would be less than significant.

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?

No impact. Wildfire risk tends to be high in locations where dense vegetation occurs on a steep slope. Post-wildfire risks associated with slopes, including mudflow or landslides, could occur when the vegetation that anchors soils to the hillside has burned, increasing the potential for mudflow or landslide in the event of heavy rains (California Department of Forestry and Fire Protection 2019). The project would involve short-term construction activities that would cease after five months. The project site does not contain housing or structures. Construction of the proposed project does not include features that would 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. Contra Costa Flood Control District permit requirements would be implemented to avoid

damage to the Marsh Creek Reservoir Dam related to post-fire conditions such as the potential for flooding or slope instability. Therefore, no impact would occur.

The project would result in the replacement of an existing pipeline and would not increase the capacity or change the existing operation of the pipeline. The project does not include the operation of any new structures or uses that would expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes. No operational impacts would occur.

XXI. Mandatory Findings of Significance

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than- Significant Impact	No Impact
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?	☐	☒	☐	☐
b. Does the project have impacts that are individually limited but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects.)	☐	☒	☐	☐
c. Does the project have environmental effects that will cause substantial adverse effects on human beings, either directly or indirectly?	☐	☒	☐	☐

Discussion

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?

Less than significant with mitigation incorporated. The project's impact on the quality of the environment, including habitat of fish and wildlife species; fish and wildlife populations; plant and animal communities; and rare/endangered plant and animal species would be limited to construction activities because the project would not permanently affect the environment. Construction impacts on plant and animal species are analyzed in Section IV, *Biological Resources*. The project could result in a potentially temporary but significant impact on plant species, animal species, and habitat.

The project would comply with applicable rules and regulations regarding sensitive species under the federal ESA and CESA. To the extent possible, work would be conducted to avoid impacts on all sensitive or listed plant and animal species. Should take occur despite best efforts to avoid it, it would be covered under the mitigation terms of the ECCC HCP/NCCP (East Contra Costa County Habitat Conservancy 2017). Furthermore, BMPs would be implemented as a part of Mitigation Measures BIO-5 and BIO-6 to minimize impacts on habitat. With implementation of mitigation,

compliance with the projects permits, and compatibility with the HCP/NCCP, the impact on species (including rare or endangered species) or their habitat and on plant and animal communities, would be less than significant.

The project's impact on the important examples of the major periods of California history or prehistory are evaluated in Section V, *Cultural Resources*. As described in Section V, historical and archeological resources are located near the project site; however, no archaeological material was identified during testing efforts. Thus, the only potential impact to resources that are examples of major periods of California history or prehistory would be if the project encountered any as-yet undocumented archaeological deposits during any excavation work. This would be a potentially significant impact. The implementation of CUL-1, CUL-2, and CUL-3 would require implementation of an archeological monitoring plan, archeological resources sensitivity training, and stopping work if human remains are encountered. Implementation of these measures would ensure that the impact to any important examples of the major periods of California history or prehistory would be reduced to a less than significant level.

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.)

Less than significant with mitigation incorporated. Because the project would not result in any operational impacts, this discussion is limited to potential cumulative impacts during construction. The northern work area of the project site is located in an area where new residential and public facility developments are being proposed. In fact, this project, in part, is meant to address the recent population changes in the area by replacing an aging pipeline with a new pipeline.

The following projects are located near the northern work area (Nielsen pers. comm.):

- The Los Medanos College Expansion Project is currently under construction and included the construction of facilities of a community college.
- The Barcelona Project includes 72 duplex units on the west side of Miwok Avenue and is under construction.
- The Lark Hill Project includes 50 single family units and is located east of the project site, the project is approved and grading has been completed.
- The Cowell Ranch Project includes 140 duplex units is approved but not under construction.
- An Amphitheater Project is currently in design south of Vineyards Parkway.

A cumulative impact could occur if the construction activities for the project overlapped with the construction activities of other projects. Due to the temporary nature of the construction activities, the project's contribution to a potential cumulative impact—on aesthetics, agricultural and forestry resources, land use and planning, mineral resources, population and housing, public services, recreation, transportation and wildfire—would be very minimal and it is unlikely that the project would contribute to a cumulative impact. There are unlikely to be cumulative impacts on cultural resources, tribal cultural resources, hazards and hazardous materials, and hydrology and water quality because there are federal and state regulations, which each project would be required to adhere to, and which would ensure that impacts would be minimized to less than significant levels. Furthermore, the project's contribution to a potential cumulative impact—on air quality; biological

resources; energy; geology, soils, and paleontological resources; GHG emissions; noise; and utilities and service systems—would be mitigated with the implementation of mitigation measures (AQ-1, BIO-6, GEO-1, GHG-1, HYD-1, and NOI-1). Implementation of these measures would ensure that the project's contribution to a cumulative impact would be less than significant.

c. Does the project have environmental effects that will cause substantial adverse effects on human beings, either directly or indirectly?

Less than significant with mitigation incorporated. The project is not expected to directly or indirectly create substantial adverse effects on human beings. Impacts related to construction activities are expected to be short-term (5 months) and not cause a substantial impact on the surrounding community. Both the central and south work areas are located far away from any residences; however, the north work area would require construction activities near residences. Section III. *Air Quality* and Section XIII. *Noise* identify potentially significant impacts due to fugitive dust emissions and noise that is generated during construction. These impacts would have an effect on human beings and are considered potentially significant. However, with implementation of Mitigation Measures AQ-1 and NOI-1, the impacts associated with fugitive dust and construction noise would be mitigated to a less than significant level. Thus, the construction of the project would not have a substantial adverse effect on human beings. The impact would be less than significant after mitigation.

In addition, this project would have an overall benefit for human beings, because it would replace an aging natural gas pipeline with a new pipeline. Overall impacts are expected to be less than significant.

I. Aesthetics

California Department of Transportation. 2019. Eligible (E) and Officially Designated (OD) Routes.
Available: <http://www.dot.ca.gov/hq/tsip/gis/datalibrary/Metadata/ScenicHwys.html>.

City of Brentwood. 2014. General Plan. Adopted July 22, 2014. Available:
http://brentwood.generalplan.org/sites/default/files/Adopted_Brentwood_General%20Plan_July%2022%202014.pdf

Contra Costa County. 2005. Contra Costa County General Plan 2005-2020. January 18, 2005.
Available: <http://www.co.contra-costa.ca.us/DocumentCenter/View/52196/Title-Page>.

II. Agricultural and Forestry Resources

California Department of Conservation. 2013. *Contra Costa County Williamson Act 2012/2013*.
Available: www.conservation.ca.gov/dlrp/lca.

———. 2016. *Contra Costa Important Farmland*. Available:
<ftp://ftp.consrv.ca.gov/pub/Dlrp/FMMP/pdf/2016/con16.pdf>.

III. Air Quality

U.S. Geological Survey and California Geological Survey. 2011. *Reported Historic Asbestos Mines, Historic Asbestos Prospects, and Other Natural Occurrences of Asbestos in California – Map*.
Available: <http://pubs.usgs.gov/of/2011/1188/pdf/Plate.pdf>. Accessed: April 29, 2019.

IV. Biological Resources

California Department of Fish and Wildlife. 2019. CNDDDB RareFind Records Search of special-status species and sensitive natural communities within 5 miles of the Project site, RareFind Version 5, 2018, <https://www.wildlife.ca.gov/Data/CNDDDB/Maps-and-Data>. Accessed: March 28, 2019

California Native Plant Society. 2019a. Calscape, <https://calscape.cnps.org>. Accessed: April 17, 2019.

———. 2019b. Online Inventory of Rare and Endangered Plants of California, 2018, http://cnps.site.aplus.net/cgi-bin/inv/inventory.cgi/Html?item=checkbox_9.htm. Accessed: March 28, 2019.

City of Brentwood. 2019. City of Brentwood Urban Forest Guidelines, Prepared by City of Brentwood, Brentwood, CA,

<https://www.brentwoodca.gov/civicax/filebank/blobdload.aspx?BlobID=24841>. Accessed: April 16, 2019.

East Contra Costa County Habitat Conservancy. 2006. East Contra Costa County Habitat Conservation Plan/Natural Community Conservation Plan, 2006. Prepared for East Contra Costa County Habitat Conservation Plan Association by Jones & Stokes, San Jose, CA, October. http://www.co.contra-costa.ca.us/depart/cd/water/hcp/archive/final-hcp-rev/final_hcp_nccp.html. Accessed: March 28, 2019.

eBird. 2012. eBird: An Online Database of Bird Distribution and Abundance. Ithaca, NY, 2012, <http://www.ebird.org>. Accessed: March 27, 2019.

H.T. Harvey & Associates. 2015. East Contra Costa County Habitat Conservation Plan/Natural Community Conservation Plan: Assessment of Plan Effects on CEQA Species, 2015. Prepared for the East Contra Costa County Habitat Conservancy by H.T. Harvey & Associates. Page ii-iii. http://www.co.contra-costa.ca.us/depart/cd/water/HCP/documents/CEQA-Species-Analysis-FINAL_WEB.pdf. Accessed: March 28, 2019.

Hilty, J. A., W. Z. Lidicker Jr., and A. M. Merenlender. 2006. *Corridor Ecology: The Science and Practice of Linking Landscapes for Biodiversity Conservation*. Washington, DC: Island Press. Page 50.

Holland, R. 1986. Preliminary Descriptions of the Terrestrial Natural Communities of California. California Department of Fish and Game, The Resources Agency. Page 36-37.

U.S. Department of Agriculture. 2017. USDA NRCS Web Soil Survey, updated: August 21, 2017. <https://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx>. Accessed: April 17, 2019.

U.S. Fish and Wildlife Service. 2018. National Wetland Inventory, 2018, updated: March 22, 2019, <https://www.fws.gov/wetlands/>. Accessed: August 20, 2018.

———. 2019. List of Endangered and Threatened Species that May Occur in the Proposed Project Location and/or May Be Affected by the Proposed Project, 2019, <https://ecos.fws.gov/ipac/>. Accessed: March 28, 2019.

V. Cultural Resources

John Marsh Historic Trust. 2019. The Stone House. Available: <http://johnmarshhouse.com/park/stone-house/>. Accessed: April 25, 2019.

National Park Service. 2019. National Register Database and Research. Available: <https://www.nps.gov/subjects/nationalregister/database-research.htm>. Accessed: April 25, 2019.

VI. Energy

City of Brentwood. 2014. General Plan. Adopted July 22, 2014. Available: http://brentwood.generalplan.org/sites/default/files/Adopted_Brentwood_General%20Plan_July%2022%202014.pdf

Contra Costa County. 2015. Climate Action Plan. Adopted December 15, 2015. Available: <http://www.co.contra-costa.ca.us/DocumentCenter/View/39791/Contra-Costa-County-Climate-Action-Plan?bidId=>

U.S. Environmental Protection Agency. n.d. *Regulations for Greenhouse Gas Emissions from Commercial Trucks and Buses*. Available: www.epa.gov/regulations-emissions-vehicles-and-engines/regulations-greenhouse-gas-emissions-commercial-trucks. Accessed: April 4, 2019.

VII. Geology, Soils, and Paleontological Resources

California Geological Survey. 2018. Earthquake Zones of Required Investigation Brentwood Quadrangle. Available: http://gmw.conservation.ca.gov/SHP/EZRIM/Maps/BRENTWOOD_EZRIM.pdf.

City of Brentwood. 2014. 2014 Brentwood General Plan Update Public Draft Environmental Impact Report. April. Available: http://brentwood.generalplan.org/sites/default/files/Public%20Draft%20EIR_Brentwood_Print_Size.pdf.

DOC (California Department of Conservation). 2010. Geologic Map of California (2010). Available: <http://maps.conservation.ca.gov/cgs/gmc/>.

———. 2019. Earthquake Zones of Required Investigation. Available: <https://maps.conservation.ca.gov/cgs/EQZApp/app/>.

U.S. Department of Agriculture. 2018. Natural Resource Conservation Service: Web Soil Survey. Available: <http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx>.

VIII. Greenhouse Gas Emissions

U.S. Environmental Protection Agency. 2018. *Greenhouse Gas Equivalencies Calculator*. December. Available: <https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator>. Accessed: April 29, 2019.

IX. Hazards and Hazardous Materials

Department of Toxic Substances Control. 2019. EnviroStor Database. Available: <https://www.envirostor.dtsc.ca.gov/public/map/?myaddress=miwok+road+and+vineyard+parkway+brentwood+ca>.

State of California. 2020. California Fire Hazard Severity Zone Viewer. Available: <https://gis.data.ca.gov/datasets/789d5286736248f69c4515c04f58f414>.

State Water Resources Control Board. 2019. GeoTracker. Available: <https://geotracker.waterboards.ca.gov/>.

X. Hydrology and Water Quality

Federal Emergency Management Agency. 2017. Flood Map Service Center. Available: https://p4.msc.fema.gov/arcgis/rest/directories/arcgisjobs/nfhl_print/nfhlprinttool2_gpserver/jcb3a76a625c8439cbea39228c1d3eb0b/scratch/FIRMETTE_106eca40-7368-11e9-bbad-001b21b31e35.pdf.

XI. Land Use and Planning

City of Brentwood. 2014. General Plan. Adopted July 22, 2014. Available: [http://brentwood.generalplan.org/sites/default/files/Adopted Brentwood General%20Plan July%2022%202014.pdf](http://brentwood.generalplan.org/sites/default/files/Adopted%20Brentwood%20General%20Plan%20July%2022%202014.pdf)

Contra Costa County. 2008. *Contra Costa County General Plan – Chapter 3: Land Use Element*. Available: [http://www.co.contra-costa.ca.us/DocumentCenter/View/30913/Ch3-Land-Use-Element?bidId=.](http://www.co.contra-costa.ca.us/DocumentCenter/View/30913/Ch3-Land-Use-Element?bidId=)

XII. Mineral Resources

Contra Costa County. 2008. *Contra Costa County General Plan – Chapter 8: Conservation Element*. Available: [http://www.co.contra-costa.ca.us/DocumentCenter/View/30918/Ch8-Conservation-Element?bidId=.](http://www.co.contra-costa.ca.us/DocumentCenter/View/30918/Ch8-Conservation-Element?bidId=)

XIII. Noise

Contra Costa County. 2005. *Contra Costa County General Plan 2005–2020*. January.

Federal Transit Administration. 2018. *Transit Noise and Vibration Impact Assessment*. FTA Report No. 0123. Available: https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/research-innovation/118131/transit-noise-and-vibration-impact-assessment-manual-fta-report-no-0123_0.pdf. Accessed: May 1, 2019.

Hoover & Keith. 2000. *Noise Control for Buildings, Manufacturing Plants, Equipment, and Products*. Houston, TX.

Thalheimer, Erich. 2000. *Construction noise control program and mitigation strategy at the Central Artery/Tunnel Project*. Noise Control Engineering Journal. Vol. 48. No. 5. Sep-Oct.

XIV. Population and Housing

Association of Bay Area of Governments. 2013a. Plan Bay Area Projections 2013.

U.S. Census Bureau. 2010. *American FactFinder*. Brentwood, California. Available: https://factfinder.census.gov/faces/nav/jsf/pages/community_facts.xhtml

XV. Public Services

None

XVI. Recreation

None

XVII. Transportation

California Department of Transportation. 2014. *California Manual on Uniform Traffic Control Devices*. FHWA's MUTCD 2009 Edition, including Revisions 1 & 2 as amended for use in California. November. Available: http://www.dot.ca.gov/trafficops/camutcd/docs/CAMUTCD2014_rev1.pdf.

XVIII. Tribal Cultural Resources

None

XIX. Utilities and Service Systems

City of Brentwood. 2016. Final 2015 Urban Water Management Plan. June 2016. Available: <https://www.brentwoodca.gov/civicax/filebank/blobdload.aspx?BlobID=34041>.

———. 2019a. Water Supply. Available: <https://www.brentwoodca.gov/gov/pw/water/supply/default.asp>.

———. 2019b. Sewer (Wastewater). Available: <https://www.brentwoodca.gov/gov/pw/sewer/default.asp>.

California Department of Resources Recycling and Recovery. 2019. *USS-Posco Industries Waste Mgmt Unit II (07-AC-0042)*. Available: <https://www2.calrecycle.ca.gov/swfacilities/Directory/07-AC-0042>.

XX. Wildfire

California Department of Forestry and Fire Protection. 2019. *Flood and Mudflow Safety Awareness*. Available: http://www.fire.ca.gov/communications/communications_firesafety_floods.

State of California. 2020. California Fire Hazard Severity Zone Viewer. Available: <https://gis.data.ca.gov/datasets/789d5286736248f69c4515c04f58f414>.

XXI. Mandatory Findings of Significance

Nielsen, Tim. 2019. Development Services Manager. City of Brentwood. March 27, 2019—email regarding cumulative projects.

Appendix A: Air Quality Supporting Information

Introduction

This document summarizes the environmental and regulatory setting for air quality.

Regulatory Setting

This section summarizes federal, state, and local air quality regulations that apply to the project. The air quality management agencies of direct importance in the project area are the Environmental Protection Agency (EPA), California Air Resources Board (CARB), and Bay Area Air Quality Management District (BAAQMD). EPA has established federal air quality standards for which ARB and BAAQMD have primary implementation responsibility. CARB and BAAQMD are also responsible for ensuring that state air quality standards are met.

Federal Clean Air Act

The Clean Air Act (CAA) was first enacted in 1963 and has been amended numerous times in subsequent years (1965, 1967, 1970, 1977, and 1990). The CAA establishes federal air quality standards, known as National Ambient Air Quality Standards (NAAQS), and specifies future dates for achieving compliance. The CAA also mandates that the state submit and implement a State Implementation Plan for local areas not meeting those standards. The plans must include pollution control measures that demonstrate how the standards will be met.

California Clean Air Act

At the state level, the California CAA establishes a statewide air pollution control program. The California CAA requires all air districts in the state to endeavor to meet the California Ambient Air Quality Standards (CAAQS) by the earliest practical date. Unlike the CAA, the California CAA does not set precise attainment deadlines. Instead, the California CAA establishes increasingly stringent requirements for areas that will require more time to achieve the standards. CAAQS are generally more stringent than the NAAQS and incorporate additional standards for sulfates, hydrogen sulfide, visibility-reducing particles, and vinyl chloride.

The CAAQS and NAAQS are listed together in Table 1.

Table 1. National and State Ambient Air Quality Standards

Criteria Pollutant	Average Time	California Standards	National Standards ^a	
			Primary	Secondary
Ozone	1-hour	0.09 ppm	None	None
	8-hour	0.070 ppm	0.070 ppm	0.070 ppm
Particulate matter (PM10)	24-hour	50 µg/m ³	150 µg/m ³	150 µg/m ³
	Annual mean	20 µg/m ³	None	None
Fine particulate matter (PM2.5)	24-hour	None	35 µg/m ³	35 µg/m ³
	Annual mean	12 µg/m ³	12 µg/m ³	15 µg/m ³
Carbon monoxide	8-hour	9.0 ppm	9 ppm	None
	1-hour	20 ppm	35 ppm	None
Nitrogen dioxide	Annual mean	0.030 ppm	0.053 ppm	0.053 ppm
	1-hour	0.18 ppm	0.100 ppm	None
Sulfur dioxide ^b	Annual mean	None	0.030 ppm	None
	24-hour	0.04 ppm	0.014 ppm	None
	3-hour	None	None	0.5 ppm
	1-hour	0.25 ppm	0.075 ppm	None
Lead	30-day average	1.5 µg/m ³	None	None
	Calendar quarter	None	1.5 µg/m ³	1.5 µg/m ³
	3-month average	None	0.15 µg/m ³	0.15 µg/m ³
Sulfates	24-hour	25 µg/m ³	None	None
Hydrogen sulfide	1-hour	0.03 ppm	None	None
Vinyl chloride	24-hour	0.01 ppm	None	None

Source: CARB 2016

^a National standards are divided into primary and secondary standards. Primary standards are intended to protect public health, whereas secondary standards are intended to protect public welfare and the environment.

^b The final 1-hour sulfur dioxide rule was signed June 2, 2010. The annual and 24-hour standards were revoked in that same rulemaking. However, these standards remain in effect until 1 year after an area is designated for the 2010 standard, except in areas designated nonattainment for the 1971 standards, where the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standard are approved.

µg/m³ = micrograms per cubic meter; ppm = parts per million.

Bay Area Air Quality Management District

At the local level, the BAAQMD is responsible for establishing and enforcing local air quality rules and regulations that address the requirements of federal and state air quality laws and for ensuring that NAAQS and CAAQS are met in the San Francisco Bay Area Air Basin (SFBAAB). BAAQMD has adopted advisory emission thresholds to assist CEQA lead agencies in determining the level of significance of a project's emissions, which are outlined in its *California Environmental Quality Act Air Quality Guidelines* (CEQA Guidelines) and presented in Table 2 (Bay Area Air Quality Management District 2017a). The BAAQMD has also adopted air quality plans to improve air quality, protect public health, and protect the climate, including the *2017 Clean Air Plan: Spare the Air, Cool the Climate* (Bay Area Air Quality Management District 2017b).

Table 2. BAAQMD Thresholds of Significance

Pollutant	Construction	Operations
ROG	54 pounds/day	54 pounds/day or 10 tons/year
NO _x	54 pounds/day	54 pounds/day or 10 tons/year
CO	--	Violation of CAAQS
PM ₁₀ (exhaust)	82 pounds/day	82 pounds/day or 15 tons/year
PM _{2.5} (exhaust)	54 pounds/day	54 pounds/day or 10 tons/year
PM ₁₀ /PM _{2.5} (dust)	Best management practices	--
TACs (project-level)	Increased cancer risk of 10 in 1 million; increased non-cancer risk of greater than 1.0 HI; PM _{2.5} increase of greater than 0.3 micrograms per cubic meter	Same as construction
TACs (cumulative)	Increased cancer risk of 100 in 1 million; increased non-cancer risk of greater than 10.0; PM _{2.5} increase of greater than 0.8 microgram per cubic meter at receptors within 1,000 feet	Same as construction
Odors	--	Five complaints per year averaged over 3 years

Source: Bay Area Air Quality Management District 2017a.

CAAQS = California Ambient Air Quality Standards; CO = carbon monoxide; HI = hazard index; NO_x = nitrogen oxide; PM 2.5 = particulate matter no more than 2.5 microns in diameter; PM₁₀ = particulate matter no more than 10 microns in diameter; ROG= reactive organic gases; TACs = toxic air contaminants.

Environmental Setting

The primary factors that determine air quality are the locations of air pollutant sources and the amount of pollutants emitted from those sources. Meteorological and topographical conditions are also important factors. Atmospheric conditions, such as wind speed, wind direction, and air temperature gradients interact with the physical features of the landscape to determine the movement and dispersal of air pollutants. Air quality is indicated by ambient concentrations of criteria pollutants: ozone, carbon monoxide (CO), nitrogen dioxide (NO₂), sulfur dioxide (SO₂), lead, particulate matter (PM₁₀ and PM_{2.5}).

Meteorology and Climate

The project site is located in the City of Brentwood, in eastern Contra Costa County, which is within the SFBAAB. The SFBAAB has a Mediterranean climate characterized by hot, dry summers and cool, rainy winters. During the year, temperatures in Brentwood range from 39°F during the night to 92°F during the day. Average annual rainfall is approximately 13.3 inches, with roughly 84% of the total precipitation falling during the rainy season (generally from November through March) (The Weather Channel 2019). The SFBAAB region lies in the semi-permanent high-pressure zone of the eastern Pacific, resulting in a mild climate tempered by cool sea breezes with light average wind speeds.

The mountains surrounding the SFBAAB create a barrier to airflow, which can trap air pollutants under certain meteorological conditions. The highest frequency of air stagnation occurs in early winter. The lack of surface wind during these periods combined with the reduced vertical flow caused by less surface heating results in a lower influx of outside air and allows air pollutants to become concentrated in a stable volume of air. The surface concentrations of pollutants are highest when these conditions are combined with smoke or when temperature inversions trap cool air, fog, and pollutants near the ground.

Pollutants of Concern

As discussed above, the federal and state governments have established NAAQS and CAAQS, respectively, for six criteria pollutants. Ozone is considered a regional pollutant because its precursors combine to affect air quality on a regional scale. Pollutants such as CO, NO₂, SO₂, and Pb are considered local pollutants that tend to accumulate in the air locally. PM is both a local and a regional pollutant. The primary criteria pollutants of concern generated by the project are ozone precursors (ROG and NO_x), CO, and PM.^{1, 2}

All criteria pollutants can have human health and environmental effects at certain concentrations. The ambient air quality standards for these pollutants (Table 1) are set to protect public health and the environment within an adequate margin of safety (CAA Section 109). Epidemiological, controlled human exposure, and toxicology studies evaluate potential health and environmental effects of criteria pollutants, and form the scientific basis for new and revised ambient air quality standards.

¹ As discussed above, there are also ambient air quality standards for SO₂, lead, sulfates, hydrogen sulfide, vinyl chloride, and visibility particulates. However, these pollutants are typically associated with industrial sources, which are not included as part of the project. Accordingly, they are not evaluated further.

² Most emission of NO_x are in the form of NO (Reşitoğlu 2018). Conversion to NO₂ occurs in the atmosphere as pollutants disperse downwind. Accordingly, NO₂ is not considered a local pollutant of concern for the proposed project and is not evaluated further.

Principal characteristics and possible health and environmental effects from exposure to the primary criteria pollutants generated by the project are discussed below. This section also summarizes potential health effects from exposure to toxic air contaminants (TAC).

Ozone and Precursor Emissions (ROG and NO_x)

Ozone, or smog, is photochemical oxidant that is formed when reactive organic gases (ROG) and nitrogen oxides (NO_x) (both by-products of the internal combustion engine) react with sunlight. **ROG** are compounds made up primarily of hydrogen and carbon atoms. Internal combustion associated with motor vehicle usage is the major source of hydrocarbons. Other sources of ROG are emissions associated with the use of paints and solvents, the application of asphalt paving, and the use of household consumer products such as aerosols. The two major forms of NO_x are nitric oxide (NO) and NO₂. NO is a colorless, odorless gas formed from atmospheric nitrogen and oxygen when combustion takes place under high temperature and/or high pressure. NO₂ is a reddish-brown irritating gas formed by the combination of NO and oxygen. In addition to serving as an integral participant in ozone formation, NO_x also directly acts as an acute respiratory irritant and increases susceptibility to respiratory pathogens.

Ozone poses a higher risk to those who already suffer from respiratory diseases (e.g., asthma), children, older adults, and people who are active outdoor. Exposure to ozone at certain concentrations can make breathing more difficult, cause shortness of breath and coughing, inflame and damage the airways, aggregate lung diseases, increase the frequency of asthma attacks, and cause chronic obstructive pulmonary disease. Studies show associations between short-term ozone exposure and non-accidental mortality, including deaths from respiratory issues. Studies also suggest long-term exposure to ozone may increase the risk of respiratory-related deaths (USEPA 2019a). The concentration of ozone at which health effects are observed depends on an individual's sensitivity, level of exertion (i.e., breathing rate), and duration of exposure. Studies show large individual differences in the intensity of symptomatic responses, with one study finding no symptoms to the least responsive individual after a 2-hour exposure to 400 parts per billion of ozone and a 50% decrement in forced airway volume in the most responsive individual. Although the results vary, evidence suggest that sensitive populations (e.g., asthmatics) may be affected on days when the 8-hour maximum ozone concentration reaches 80 parts per billion (USEPA 2019b). For reference, the average background level of ozone in the Bay Area is approximately 45 parts per billion (BAAQMD 2017b).

In addition to human health effect, ozone has been tied to crop damage, typically in the form of stunted growth, leaf discoloration, cell damage, and premature death. Ozone can also act as a corrosive and oxidant, resulting in property damage such as the degradation of rubber products and other materials.

Carbon Monoxide

Carbon monoxide is a colorless, odorless, toxic gas produced by incomplete combustion of carbon substances, such as gasoline or diesel fuel. In the study area, high CO levels are of greatest concern during the winter, when periods of light winds combine with the formation of ground-level temperature inversions from evening through early morning. These conditions trap pollutants near the ground, reducing the dispersion of vehicle emissions. Moreover, motor vehicles exhibit increased CO emission rates at low air temperatures. The primary adverse health effect associated with CO is interference with normal oxygen transfer to the blood, which may result in tissue oxygen deprivation. Exposure to CO at high concentrations can also cause fatigue, headaches, confusion, dizziness, and chest pain. There are no ecological or environmental effects to ambient CO (CARB 2019a).

Particulate Matter

Particulate matter consists of finely divided solids or liquids such as soot, dust, aerosols, fumes, and mists. Two forms of particulates are now generally considered: inhalable coarse particles, or PM₁₀, and inhalable fine particles, or PM_{2.5}. Particulate discharge into the atmosphere results primarily from industrial, agricultural, construction, and transportation activities. However, wind on arid landscapes also contributes substantially to local particulate loading.

Particulate pollution can be transported over long distances and may adversely affect the human, especially for people who are naturally sensitive or susceptible to breathing problems. Numerous studies have linked PM exposure to premature death in people with preexisting heart or lung disease. Other symptoms of exposure may include nonfatal heart attacks, irregular heartbeat, aggravated asthma, decreased lung function, and increased respiratory symptoms. Studies show that every 1 microgram per cubic meter reduction in PM_{2.5} results in a one percent reduction in mortality rate for individuals over 30 years old (BAAQMD 2017b). Depending on its composition, both PM₁₀ and PM_{2.5} can also affect water quality and acidity, deplete soil nutrients, damage sensitive forests and crops, affect ecosystem diversity, and contribute to acid rain (USEPA 2019c).

Toxic Air Contaminants

Although NAAQS and CAAQS have been established for criteria pollutants, no ambient standards exist for TACs. A TAC is defined by California law as an air pollutant that “may cause or contribute to an increase in mortality or an increase in serious illness, or which may pose a present or potential hazard to human health.” The primary TAC of concern associated with the project are naturally occurring asbestos and diesel particulate matter (DPM).

Asbestos is the name given to several naturally occurring fibrous silicate minerals. Before the adverse health effects of asbestos were identified, asbestos was widely used as insulation and fireproofing in buildings, and it can still be found in some older buildings. It is also found in its natural state in rock or soil. The inhalation of asbestos fibers into the lungs can result in a variety of adverse health effects, including inflammation of the lungs, respiratory ailments (e.g., asbestosis, which is scarring of lung tissue that results in constricted breathing), and cancer (e.g., lung cancer and mesothelioma, which is cancer of the linings of the lungs and abdomen).

CARB estimates that DPM emissions are responsible for about 70% of the total ambient air toxics risk in California (CARB 2019b). Within the Bay Area, the BAAQMD has found that of all controlled TACs, emissions of DPM are responsible for about 82% of the total ambient cancer risk (BAAQMD 2017b). Short-term exposure to DPM can cause acute irritation (e.g., eye, throat, and bronchial), neurophysiological symptoms (e.g., lightheadedness and nausea), and respiratory symptoms (e.g., cough and phlegm). The USEPA has determined that diesel exhaust is “likely to be carcinogenic to humans by inhalation” (USEPA 2002).

Ambient Air Quality Conditions

Existing air quality conditions in the project area can be characterized in terms of the federal and state air quality standards by monitoring data collected in the region. The EPA and CARB maintain an extensive network of monitoring stations throughout California. Table 3 presents pollutant concentrations measured at the Bethel Island Road monitoring station for data are available (2015–2017). The Bethel Island Road monitoring station is located approximately 9 miles northeast of the project site. Data for PM_{2.5} was unavailable from the Bethel Island Road monitoring station so data was

taken from the next nearest monitoring station at the Concord monitoring station, located approximately 18 miles west of the project site.

As shown in Table 3, the monitoring station has experienced exceedances state and federal 8-hour ozone standards, state PM10 standard, and federal PM2.5 standard. The ambient air quality standards define clean air and represent the maximum amount of pollution that can be present in outdoor air without any harmful effects on people and the environment. Existing violations of the ozone and PM ambient air quality standards indicate that certain individuals exposed to this pollutant may experience certain health effects, including increased incidence of cardiovascular and respiratory ailments.

Table 3. Ambient Criteria Air Pollutant Monitoring Data (2015–2017)

Pollutant Standards	2015	2016	2017
<i>Ozone (O₃)</i>			
Maximum 1-hour concentration (ppm)	0.080	0.089	0.090
Maximum 8-hour concentration (ppm)	0.072	0.081	0.071
Number of days standard exceeded ^a			
CAAQS 1-hour (>0.09 ppm)	0	0	0
CAAQS 8-hour (>0.070 ppm)	2	2	2
NAAQS 8-hour (>0.070 ppm)	1	2	1
<i>Carbon Monoxide (CO)</i>			
Maximum 8-hour concentration (ppm)	0.9	1.0	1.0
Maximum 1-hour concentration (ppm)	1.1	2.0	1.6
Number of days standard exceeded ^a			
NAAQS 8-hour (≥9 ppm)	0	0	0
CAAQS 8-hour (≥9.0 ppm)	0	0	0
NAAQS 1-hour (≥35 ppm)	0	0	0
CAAQS 1-hour (≥20 ppm)	0	0	0
<i>Nitrogen Dioxide (NO₂)</i>			
State maximum 1-hour concentration (ppb)	28	32	34
State second-highest 1-hour concentration (ppb)	28	27	33
Annual average concentration (ppb)	5	5	5
Number of days standard exceeded ^a			
CAAQS 1-hour (180 ppb)	0	0	0
<i>Particulate Matter (PM₁₀)</i>			
National ^b maximum 24-hour concentration (µg/m ³)	31.1	25.5	52.1
National ^b second-highest 24-hour concentration (µg/m ³)	30.4	25.5	41.8
State ^c maximum 24-hour concentration (µg/m ³)	33.0	26.0	52.0
State ^c second-highest 24-hour concentration (µg/m ³)	31.0	26.0	45.0
National annual average concentration (µg/m ³)	6.9	7.5	7.9
State annual average concentration (µg/m ³) ^d	*	*	*
Measured number of days standard exceeded ^{a,e}			
NAAQS 24-hour (>150 µg/m ³)	0	0	*
CAAQS 24-hour (>50 µg/m ³)	0	0	1

<i>Particulate Matter (PM_{2.5})</i>			
National ^f maximum 24-hour concentration (µg/m ³)	31.0	20.7	89.4
National ^f second-highest 24-hour concentration (µg/m ³)	30.4	19.4	62.6
State ^g maximum 24-hour concentration (µg/m ³)	31.0	20.7	89.4
State ^g second-highest 24-hour concentration (µg/m ³)	30.4	19.4	62.6
National annual average concentration (µg/m ³)	8.8	5.9	12.0
State annual average concentration (µg/m ³)	*	*	12.0
Measured number of days standard exceeded ^a			
NAAQS 24-hour (>35 µg/m ³)	0	0	6
Source: CARB 2019c; USEPA 2018. Notes: ppm = parts per million NAAQS = National Ambient Air Quality Standards CAAQS = California Ambient Air Quality Standards µg/m ³ = micrograms per cubic meter mg/m ³ = milligrams per cubic meter * = insufficient data available to determine the value a An exceedance is not necessarily related to a violation of the standard. b National statistics are based on standard conditions data. In addition, national statistics are based on samplers using federal reference or equivalent methods. c State statistics are based on approved local samplers and local conditions data. e State criteria for ensuring that data are sufficiently complete for calculating valid annual averages are more stringent than the national criteria. e Measurements usually are collected every 6 days. f National statistics are based on samplers using federal reference or equivalent methods. g State statistics are based on local approved samplers.			

Attainment Status

Local monitoring data (Table 3) are used to designate areas as nonattainment, maintenance, attainment, or unclassified for the ambient air quality standards. The four designations are further defined as shown below.

- Nonattainment—assigned to areas where monitored pollutant concentrations consistently violate the standard in question.
- Maintenance—assigned to areas where monitored pollutant concentrations exceeded the standard in question in the past but are no longer in violation of that standard.
- Attainment—assigned to areas where pollutant concentrations meet the standard in question over a designated period of time.
- Unclassified—assigned to areas where data are insufficient to determine whether a pollutant is violating the standard in question.

Table 4 summarizes the attainment status of the project area in Contra Costa County.

Table 4. Federal and State Attainment Status for the Project Area

Pollutant	National Ambient Air Quality Standards	California Ambient Air Quality Standards
O ₃ (8-hour)	Marginal Nonattainment	Nonattainment
CO	Attainment	Attainment
PM ₁₀	Attainment	Nonattainment
PM _{2.5}	Moderate Nonattainment (2006)	Nonattainment
NO ₂	Attainment	Attainment
SO ₂	Attainment	Attainment
Lead	Attainment	Attainment
Sulfates	(No Federal Standard)	Attainment
Hydrogen Sulfide	(No Federal Standard)	Unclassified
Visibility Reducing Particles	(No Federal Standard)	Unclassified

Sources: CARB 2018; USEPA 2019d.

CO = carbon monoxide
PM₁₀ = particulate matter less than or equal to 10 microns
PM_{2.5} = particulate matter less than or equal to 2.5 microns
NO₂ = nitrogen dioxide
SO₂ = sulfur dioxide

Sensitive Receptors

Sensitive land uses are defined as locations where human populations, especially children, seniors, and sick persons, are located and where there is reasonable expectation of continuous human exposure according to the averaging period for the air quality standards (i.e., 24-hour, 8-hour). Typical sensitive receptors are residences, hospitals, schools, and recreational areas.

BAAQMD recommends that any proposed project that includes the siting of a new source or receptors assess associated impacts within 1,000 feet. Sensitive receptors located within 1,000 feet of the Project site are residences adjacent to the west and east and residences within 1,000 feet to the north, south, east, and west.

References

- Bay Area Air Quality Management District (BAAQMD). 2017a. *California Environmental Quality Act Air Quality Guidelines*. May. San Francisco, CA. Available: http://www.baaqmd.gov/~media/files/planning-and-research/ceqa/ceqa_guidelines_may2017-pdf.pdf?la=en. Accessed: April 29, 2019.
- . 2017b. *Final 2017 Clean Air Plan*. Adopted April 19. Available: <http://www.baaqmd.gov/~media/files/planning-and-research/plans/2017-clean-air-plan/attachment-a-proposed-final-cap-vol-1-pdf>. Accessed: March 27, 2019.
- California Air Resources Board (CARB). 2016. *Ambient Air Quality Standards*. Last Revised: May 4, 2016. Available: <http://www.arb.ca.gov/research/aaqs/aaqs2.pdf>. Accessed: April 29, 2019.

- . 2018. *Area Designations Maps/ State and National*. Last Revised: December 28. Available: <http://www.arb.ca.gov/desig/adm/adm.htm>. Accessed: April 29, 2019.
- . 2019a. What is Carbon Monoxide? Available: <https://ww2.arb.ca.gov/resources/carbon-monoxide-and-health>, Accessed: April 30, 2019.
- . 2019b. Overview: Diesel Exhaust & Health. Available: <https://ww2.arb.ca.gov/resources/overview-diesel-exhaust-and-health>. Accessed: April 12, 2019.
- . 2019c. *iADAM: Air Quality Data Statistics: Top 4 Summary*. Available: <http://www.arb.ca.gov/adam/topfour/topfour1.php>. Accessed: April 29, 2019.
- Reşitoğlu, Ibrahim. 2018. NOx Pollutants from Diesel Vehicles and Trends in the Control Technologies. Available: <https://www.intechopen.com/online-first/nox-pollutants-from-diesel-vehicles-and-trends-in-the-control-technologies>. Accessed: April 30, 2019.
- The Weather Channel. 2019. Brentwood, CA Monthly Weather. Available: <https://weather.com/weather/monthly/l/4f7be9efadefd9ea0f08098eachb062b5a85a56ac8b53dcddabc0c06eff5cce5>. Accessed: May 28, 2019.
- U.S. Environmental Protection Agency (USEPA). 2002. Health Assessment Document for Diesel Engine Exhaust. Available: <http://nepis.epa.gov/Exe/ZyPDF.cgi/300055PV.PDF?Dockey=300055PV.PDF>. Accessed May 1, 2019.
- . 2018. *Monitor Values Report*. Updated July 31. Available: <https://www.epa.gov/outdoor-air-quality-data/monitor-values-report>. Accessed: April 29, 2019.
- . 2019a. Health Effects of Ozone Pollution. Available: <https://www.epa.gov/ground-level-ozone-pollution/health-effects-ozone-pollution>. Accessed: April 30, 2019.
- . 2019b. Health Effects of In the General Population. Available: <https://www.epa.gov/ozone-pollution-and-your-patients-health/health-effects-ozone-general-population>. Accessed: April 30, 2019.
- . 2019c. Health and Environmental Effects of Particulate Matter (PM). Available: <https://www.epa.gov/pm-pollution/health-and-environmental-effects-particulate-matter-pm>. Accessed: April 30, 2019.
- . 2019d. *The Green Book Nonattainment Areas for Criteria Pollutants*. Updated March 1. Available: <https://www.epa.gov/green-book>. Accessed: April 29, 2019.

Appendix B: Biological Resources Information

Appendix B-1

Special-Status Wildlife Species Known or with Potential to Occur in the Project site

Table B-1. Special-Status Wildlife Known or with Potential to Occur in the Project site

Common Name <i>Scientific Name</i> Status under HCP/NCCP	Legal Status ^a Federal/ State/Other	Geographic Distribution	General Habitat Description	Likelihood for Occurrence in Project Site ^b
Invertebrates				
Conservancy fairy shrimp <i>Branchinecta conservation</i> Not Covered	FE/-/-	Disjunct records in Solano, Merced, Tehama, Ventura, Butte, and Glenn Counties	Large, deep vernal pools in annual grasslands	None: Project site located outside species' known range. There are no CNDDDB records within 5 miles of the Project site.
Longhorn fairy shrimp <i>Branchinecta longiantenna</i> Covered	FE/-/-	Eastern margin of central Coast Ranges from Contra Costa County to San Luis Obispo County; fragmented into 4 disjunct populations throughout its range including one location (Vasco Caves Preserve) in Contra Costa County	Small, clear pools in sandstone rock outcrops of clear to moderately turbid clay- or grass-bottomed pools	Low: Project site is within the range of the species but is not located within one of the 4 known populations. No suitable aquatic habitat is present in the Project site. There are 3 CNDDDB records within 5 miles of the Project site. One suppressed CNDDDB record (from 2010) for the species overlaps with the South Work Area (Occ #216; California Department of Fish and Wildlife 2019).

Common Name <i>Scientific Name</i>	Legal Status ^a	Geographic Distribution	General Habitat Description	Likelihood for Occurrence in Project Site ^b
Vernal pool fairy shrimp <i>Branchinecta lynchi</i> Covered	FT/-/-	Central Valley, central and south Coast Ranges from Tehama to Santa Barbara County; isolated populations in Riverside County	Common in vernal pools; also found in sandstone rock outcrop pools	Low: Project site is within the range of the species. Critical habitat for the species is located within the North Work Area of the Project site. No suitable aquatic habitat is present in the Project site. There are 12 CNDDDB records within 5 miles of the Project site. One CNDDDB record (from 1997) for the species overlaps with the North Work Area; the site has been converted from grassland to developed land cover since the record date (Occ #216; California Department of Fish and Wildlife 2019).
Midvalley fairy shrimp <i>Branchinecta Mesovallensis</i> Covered	-/-/-	Limited range in the Central Valley. Species' distribution is limited to the southeastern Sacramento, southern Sierra foothills, San Joaquin, and Solano-Colusa vernal pool regions. Documented in the San Joaquin vernal pool regions, in San Joaquin, Madera, Merced, and Fresno Counties.	Occurs in swales, small, short lived vernal pools, and grass-bottomed swales; tolerant to warm water. Found in alkaline pools.	Low: Project site is within the range of the species but it is not located within the known Contra Costa County population (Byron Airport). No suitable aquatic habitat is present in the Project site. There are 2 CNDDDB records within 5 miles of the Project site. The closest record (date unknown) is located approximately 3.47 miles east (Occ #46; California Department of Fish and Wildlife 2019).
San Bruno elfin butterfly <i>Callophrys mossii bayensis</i> Not Covered	FE/-/-	San Bruno Mountains, Montara Mountains, and northern end of Santa Cruz Mountains in San Mateo County	North-facing slopes and ridges facing Pacific Ocean from 600 to 1,100 feet that support Sedum spathulifolium	None: Project site located outside species' known range. There are no CNDDDB records within 5 miles of the Project site.

Common Name <i>Scientific Name</i>	Legal Status ^a			
Status under HCP/NCCP	Federal/ State/Other	Geographic Distribution	General Habitat Description	Likelihood for Occurrence in Project Site ^b
Valley elderberry longhorn beetle <i>Desmocerus californicus dimorphus</i> Not Covered	FT/-/-	Stream side habitats below 3,000 feet throughout the Central Valley; occur in Colusa, El Dorado, Fresno, Glenn, Kern, Madera, Merced, Placer, Sacramento, San Joaquin, Shasta, Stanislaus, Sutter, Tehama, Tulare, and Yolo counties.	Riparian and oak savanna habitats with elderberry shrubs; elderberries are the host plant	None: Project site located outside species' known range. There are no CNDDDB records within 5 miles of the Project site.
Vernal pool tadpole shrimp <i>Lepidurus packardii</i> Covered	FE/-/-	Shasta County south to Merced County	Found in vernal pools and ephemeral stock ponds	Low: Project site is within the range of the species. No suitable aquatic habitat is present in the Project site. There are no CNDDDB records within 5 miles of the Project site.
Fish				
Delta smelt <i>Hypomesus transpacificus</i> Not Covered	FT/SE/-	Primarily in the Sacramento-San Joaquin Estuary, but has been found as far upstream as the mouth of the American River on the Sacramento River and Mossville on the San Joaquin River; range extends downstream to San Pablo Bay	Occurs in estuary habitat in the Delta where fresh and brackish water mix in the salinity range of 2-7 parts per thousand (Moyle 2002).	None: Project site is outside the species known range. No suitable aquatic habitat for the species is present in the Project site. There are no CNDDDB records within 5 miles of the Project site (California Department of Fish and Wildlife 2019).
Amphibians				

Common Name <i>Scientific Name</i>	Legal Status ^a			
Status under HCP/NCCP	Federal/ State/Other	Geographic Distribution	General Habitat Description	Likelihood for Occurrence in Project Site ^b
California tiger salamander <i>Ambystoma californiense</i> Covered	FT/ST/-	Central Valley, including Sierra Nevada foothills, up to approximately 1,000 feet in elevation, and coastal region from Sonoma County south to Santa Barbara County	Small freshwater ponds, lakes, or vernal pools in grasslands and oak woodlands for breeding; rodent burrows, rock crevices, or fallen logs for upland cover during dry season	High: Project site is within the range of the species. Suitable aquatic breeding habitat is present within 1.24 miles of the Project site including: a wetland west of the HDD Exit in the North Work Area, Marsh Creek Reservoir southwest of the Central Work Area and ponds along Marsh Creek Road/Camino Diablo Road near the South Work Area. Suitable upland habitat (grassland and oak woodland) is present within the Project site. There are 94 CNDDB records within 5 miles of the Project site. Three records (#35, #457, and #461 from 1993, 1993, and 2005 respectively) are located with 0.15 mile of the Project site, and 1 record (Occ #1113 from 2013) overlaps with the South Work Area (California Department of Fish and Wildlife 2019).
Foothill yellow- legged frog <i>Rana boylei</i> Covered	-/SCT/SSC	Klamath, Cascade, north Coast, south Coast, Transverse, and Sierra Nevada Ranges up to approximately 6,000 feet	Streams in woodland, forest, mixed chaparral, and wet meadow habitats with rock and gravel substrate and low overhanging vegetation along the edge; usually found near riffles with rocks and sunny banks nearby	Low: Project site is within the range of the species. No suitable aquatic habitat is present in the Project site. Marsh Creek is potential habitat for the species but is located outside the Project site. There are no CNDDB records within 5 miles of the Project Site (California Department of Fish and Wildlife 2019).

Common Name <i>Scientific Name</i>	Legal Status ^a	Geographic Distribution	General Habitat Description	Likelihood for Occurrence in Project Site ^b
California red- legged frog <i>Rana draytonii</i> Covered	FT/-/SSC	Along the coast and coastal mountain ranges of California from Mendocino County to San Diego County and in the Sierra Nevada from Butte County to Stanislaus County	Permanent and semipermanent aquatic habitats, such as creeks and coldwater ponds, with emergent and submergent vegetation; may aestivate in rodent burrows or cracks during dry periods.	Moderate: Project site is within the range of the species. Suitable aquatic breeding habitat is present near the Project site including: a wetland west of the HDD Exit in the North Work Area, Marsh Creek, Marsh Creek Reservoir, and ponds south of Marsh Creek Road/Camino Diablo Road near the South Work Area. Suitable upland habitat (grassland and oak woodland) is present within the Project site. There are 84 CNDDDB records within 5 miles of the Project site. Five records overlap with the South Work Area (#1010-1012, 1017, and 1018 all from 2007) however, precise locality information for the CNDDDB records for this species are suppressed. The closest, non-suppressed record is located approximately 0.47 miles southeast of the Project Site (California Department of Fish and Wildlife 2019).
Western spadefoot toad <i>Spea hammondi</i> Not Covered	-/-/SSC	Sierra Nevada foothills, Central Valley, Coast Ranges, coastal counties in southern California	Grasslands and occasionally valley-foothill hardwood woodlands; vernal pools or similar ephemeral pools required for breeding.	Moderate: Project site is within the range of the species. No suitable aquatic habitat is present in the Project site but terrestrial, grassland habitat is present. There are no CNDDDB records within 5 miles of the Project site.

Common Name <i>Scientific Name</i>	Legal Status ^a	Geographic Distribution	General Habitat Description	Likelihood for Occurrence in Project Site ^b
Status under HCP/NCCP	Federal/ State/Other			
Reptiles				
Northern California legless lizard <i>Anniella pulchra</i> Covered	-/-/SSC	Along the Coast, Transverse, and Peninsular Ranges from Contra Costa County to San Diego County with spotty records in the San Joaquin Valley	Habitats with loose soil for burrowing or thick duff or leaf litter; often forages in leaf litter at plant bases; may be found on beaches, sandy washes, and in woodland, chaparral, and riparian areas	Moderate: Project site is within the range of the species. Suitable habitat (open, natural grassland and oak woodland) is present within Project Site, particularly near the South Work Area. There is only 1 CNDDDB records within 5 miles of the Project site; the record (unknown date from the 1900's) is located approximately 1.5 miles northeast (Occ #10; California Department of Fish and Wildlife 2019).
California glossy snake <i>Arizona elegans</i> <i>occidentalis</i> Not Covered	-/-/SSC	From the eastern part of the San Francisco Bay Area south to northwestern Baja California. Absent along central coast.	Nocturnal; inhabits arid scrub, rocky washes, grasslands, and chaparral; microhabitat of open areas with loose soil for burrowing; shelters under rocks and in burrows; from sea level to 7,218 feet	Moderate: Project site is within the range of the species. Suitable grassland habitat present in the Project site, particularly at the Central and South Work Areas. There are no CNDDDB records within 5 miles of the Project site.
Western pond turtle <i>Emys marmorata</i> Covered	-/-/SSC	From the Oregon border of Del Norte and Siskiyou Counties south along the coast to San Francisco Bay, inland through the Sacramento Valley, and on the western slope of Sierra Nevada	Ponds, marshes, rivers, streams, and irrigation canals with muddy or rocky bottoms and with watercress, cattails, water lilies, or other aquatic vegetation in woodlands, grasslands, and open forests	Moderate: Project site is within the range of the species. No suitable aquatic habitat is present in the Project site. Suitable aquatic habitat is present near the Project Site in Marsh Creek and Marsh Creek Reservoir. There are 13 CNDDDB records within 5 miles of the Project site. The closest record (unknown date from the 2014) is located approximately 2 miles southwest (Occ #360; California Department of Fish and Wildlife 2019).

Common Name <i>Scientific Name</i>	Legal Status ^a			
Status under HCP/NCCP	Federal/ State/Other	Geographic Distribution	General Habitat Description	Likelihood for Occurrence in Project Site ^b
San Joaquin coachwhip <i>Masticophis flagellum ruddocki</i> Not Covered	-/-/SSC	From Colusa County in the Sacramento Valley southward to the grapevine in the San Joaquin Valley and westward into the inner Coast Ranges. An isolated population occurs at Sutter Buttes. Known elevational range from 20 to 900 meters	Open, dry, vegetative associations with little or no tree cover (e.g., valley grassland and saltbush scrub associations); uses small mammal burrows as refugia	Moderate: The Project site is located within the species range and suitable grassland habitat is present. There is only one CNDDDB records within 5 miles of the Project site; the record (from 1980) is located approximately 2.4 miles south (Occ #17; California Department of Fish and Wildlife 2019).
Alameda whipsnake <i>Masticophis lateralis euryxanthus</i> Covered	FT/ST/-	Restricted to Alameda and Contra Costa Counties; fragmented into 5 disjunct populations throughout its range. Absent from Central Valley floor	Valleys, foothills, and low mountains associated with northern coastal scrub or chaparral habitat; requires rock outcrops for cover and foraging	Low: Although the Project site is within the range of the species and 3 suppressed CNDDDB records (Occ #120-#122) for the species overlaps with the South Work Area, the Project site lacks suitable habitat (chaparral) and is not located within one of the 5 known populations. There are 18 CNDDDB records within 5 miles of the Project site (California Department of Fish and Wildlife 2019).
Coast horned lizard <i>Phrynosoma blainvillii</i> Not Covered	-/-/SSC	Sacramento Valley, including foothills, south through Transverse and Peninsular Ranges from Ventura to San Diego County in southern California; Coast Ranges south of Sonoma County; below 4,000 feet in northern California	Frequents a variety of habitats (from brush-lands to coniferous forests, valley-foothill hardwood, and annual grassland); most common in lowlands along sandy washes with scattered low bushes.	Moderate: Project site is within the range of the species. Suitable open habitat (grassland) occurs where natural, open land cover and friable substrate exists. There is 1 CNDDDB records within 5 miles of the Project site; the record (from 1994) is located approximately 3.25 miles southwest of the South Work Area (Occ #613; California Department of Fish and Wildlife 2019).

Common Name <i>Scientific Name</i>	Legal Status ^a			
Status under HCP/NCCP	Federal/ State/Other	Geographic Distribution	General Habitat Description	Likelihood for Occurrence in Project Site ^b
Giant gartersnake <i>Thamnophis gigas</i> Covered	FT/ST/-	Central Valley from the vicinity of Burrell in Fresno County north to near Chico in Butte County; has been extirpated from areas south of Fresno	Sloughs, canals, low gradient streams and freshwater marsh habitats where there is a prey base of small fish and amphibians; also found in irrigation ditches and rice fields; requires grassy banks and emergent vegetation for basking and areas of high ground protected from flooding during winter	None: Project site located outside of species known range. There are no CNDDDB records within 5 miles of the Project site.
Birds				
Tricolored blackbird (nesting colony) <i>Agelaius tricolor</i> Covered	-/ST/-	Permanent resident in the Central Valley from Butte County to Kern County; breeds at scattered coastal locations from Marin County south to San Diego County, and at scattered locations in Lake, Sonoma, and Solano Counties; rare nester in Siskiyou, Modoc, and Lassen Counties	Nests in dense colonies in emergent marsh vegetation, such as tules and cattails, or upland sites with blackberries, nettles, thistles, and grainfields; habitat must be large enough to support 50 pairs; probably requires water at or near the nesting colony.	Moderate (foraging only): Project site is within the range of the species. Suitable foraging habitat is present in Project site but no nesting habitat is present. There are 5 CNDDDB records within 5 miles of the Project site. The closest record (from 1989) is located approximately 0.6 miles southwest and 0.13 miles northwest of the Central and South Work Areas respectively (Occ #267; California Department of Fish and Wildlife 2019).

Common Name <i>Scientific Name</i>	Legal Status ^a	Geographic Distribution	General Habitat Description	Likelihood for Occurrence in Project Site ^b
Golden eagle (nesting) <i>Aquila chrysaetos</i> Covered	PR/-/FP	Foothills and mountains throughout California. Uncommon nonbreeding visitor to lowlands such as the Central Valley	Nest on cliffs and escarpments or in tall trees overlooking open country. Forages in annual grasslands, chaparral, and oak woodlands with plentiful medium and large-sized mammals	Moderate: Project site is within the range of the species. Suitable nesting habitat (large trees) is not present within the Project site, but is present within 0.5 miles from the project site including trees surrounding Marsh Creek. There are 11 CNDDDB records within 5 miles of the Project site. The closest CNDDDB occurrence (from 1994) is approximately 0.9 miles southeast of the South Work Area (Occ #145; California Department of Fish and Wildlife 2019).
Grasshopper sparrow <i>Ammodramus savannarum</i> Not Covered	-/-/SSC	Summer resident from Humboldt, Del Norte, Trinity and Tehama counties south, west of Cascade-Sierra Nevada and deserts to San Diego County. Reduced numbers in Central Valley. From sea level to 4,900 ft (1494 m).	Breeds in grassland habitats; forages on insects and seeds in open habitats	Moderate: Project site is within the range of the species. Suitable foraging and nesting habitat is within and or adjacent to the Project site predominately at the South Work Area. There are no CNDDDB records within 5 miles of the Project site.
Short-eared owl <i>Asio flammeus</i> Not Covered	-/-/SSC	Breeding range is patchily distributed throughout the State, including portions of the Sacramento and San Joaquin valleys, northeastern California, and a few scattered coastal sites.	Breeds in dense vegetation in open grassland and marshes. Suitable habitats may include salt and freshwater marsh, irrigated alfalfa or grain fields, and ungrazed grasslands. Tule marsh or tall grasslands with cover 30 to 50 cm in height can support nesting pairs.	Moderate: Project site is within the range of the species. Suitable foraging and nesting habitat is within and or adjacent to the Project site predominately at the Central and South Work Areas. There are no CNDDDB records within 5 miles of the Project site.

Common Name <i>Scientific Name</i>	Legal Status ^a			
Status under HCP/NCCP	Federal/ State/Other	Geographic Distribution	General Habitat Description	Likelihood for Occurrence in Project Site ^b
Burrowing owl <i>Athene cunicularia</i> Covered	-/-/SSC	Lowlands throughout California, including the Central Valley, northeastern plateau, southeastern deserts, and coastal areas; rare along south coast	Level, open, dry, heavily grazed or low stature grassland or desert vegetation to forage in with available burrows for refuge and nesting	Moderate: Project site is within the species range and includes suitable annual grassland (nesting and foraging) habitat. There are 49 CNDDDB records within 5 miles of the Project site with the closest record (from 2012) is located approximately 1.6 miles northwest of the Project site (Occ #244; California Department of Fish and Wildlife 2019).
Swainson's hawk <i>Buteo swainsoni</i> Covered	-/ST/-	Lower Sacramento and San Joaquin Valleys, the Klamath Basin, and Butte Valley; highest nesting densities occur near Davis and Woodland, Yolo County	Nests in oaks or cottonwoods in or near riparian habitats; forages in grasslands, irrigated pastures, and grain fields	Moderate: Project site occurs within the range of the species. Suitable foraging habitat (grassland) is located in the Project site. Suitable nesting habitat (riparian and woodland trees) particularly within riparian of Marsh Creek, and foraging habitat (grassland and agricultural fields) located near Project site. There are 12 CNDDDB records within 5 miles of the Project site with the closest record (from 2010) is located approximately 0.14 miles northwest of the Project site (Occ #1684; California Department of Fish and Wildlife 2019).
Northern harrier <i>Circus cyaneus</i> Not Covered	-/-/SSC	Throughout lowland California, but species has been recorded in fall at high elevations	Forages in marshes, grasslands, and ruderal habitats; nests in extensive marshes and wet fields.	Moderate (foraging only): Project site occurs within the range of the species. Suitable foraging and nesting habitat is present in grassland located within and near Project site (predominately at the South Work Area), and west of the Project site in wetland surrounding Marsh Creek Reservoir. There are no CNDDDB records within 5 miles of the Project site.

Common Name <i>Scientific Name</i>	Legal Status ^a			
Status under HCP/NCCP	Federal/ State/Other	Geographic Distribution	General Habitat Description	Likelihood for Occurrence in Project Site ^b
White-tailed kite <i>Elanus leucurus</i> Not Covered	-/-/FP	Lowland areas west of Sierra Nevada from the head of the Sacramento Valley south, including coastal valleys and foothills, to western San Diego County at the Mexico border	Nests in tall shrubs and trees; forages in grasslands, agricultural fields, and marshes	Moderate: Project site occurs within the range of the species. Suitable foraging habitat (grassland) located in the Project site. Suitable nesting habitat (tall trees) present particularly within riparian of Marsh Creek, and foraging habitat (grassland and agricultural fields) located near Project site. There are no CNDDDB records within 5 miles of the Project site.
Loggerhead shrike <i>Lanius ludovicianus</i> Not Covered	-/-/SSC	Resident and winter visitor in lowlands and foothills throughout California; rare on coastal slope north of Mendocino County, occurring only in winter	Nests in tall shrubs and dense trees; forages in grasslands, marshes, and ruderal habitats	Moderate: Project site is within the species range. Suitable foraging habitat is present in the Project site; suitable nesting habitat (trees and shrubs) are present near the Project Site. There are no CNDDDB records within 5 miles of the Project site.
Peregrine falcon <i>Falco peregrinus</i> Not Covered	-/-/FP	Permanent resident along the north and south Coast Ranges. May summer in the Cascade and Klamath Ranges and through the Sierra Nevada to Madera County. Winters in the Central Valley south through the Transverse and Peninsular Ranges and the plains east	Nests primarily on ledges on cliffs and large rock outcrops; forages for birds in a wide variety of open habitats.	Moderate (foraging only): Project site is within the species range and includes suitable foraging habitat for the species. There is 1 CNDDDB records within 5 miles of the Project site; the record (from 2015) is located approximately 1.5 miles west of the South Work Area (Occ #56; California Department of Fish and Wildlife 2019).

Common Name <i>Scientific Name</i>	Legal Status ^a			
Status under HCP/NCCP	Federal/ State/Other	Geographic Distribution	General Habitat Description	Likelihood for Occurrence in Project Site ^b
Mammals				
Pallid bat <i>Antrozous pallidus</i> Not Covered	-/-/SSC, WBWG-High	Widespread throughout California; tends to inhabit foothills and lowlands near water below 6,562 feet	Occurs in a variety of habitats from desert to coniferous forest; most closely associated with oak, yellow pine, redwood, and giant sequoia habitats in northern California; relies heavily on trees for cavity roosts, but will use crevices in man-made structures including buildings	Moderate: Project site is within the range of the species. Suitable man-made structures (roosting habitat) just outside North Work Area. Oak trees present near Central and South Work Areas. Foraging habitat is present throughout and surrounding the Project site. There are no CNDDDB records within 5 miles of the Project site.
Ringtail <i>Bassariscus astutus</i> Not Covered	-/-/FP	Little information on distribution and abundance. Apparently occurs throughout the state except for the southern Central Valley and the Modoc Plateau	Rocky slopes and outcrops, mature woodland, and other habitats providing cavities for denning.	Low: Project site is within the range of the species. No suitable habitat (riparian, forest, and shrub) is present in the Project site. Suitable riparian habitat is present outside the Project site relating to Marsh Creek and Marsh Creek Reservoir. There are no CNDDDB records within 5 miles of the Project site.
Townsend's big-eared bat <i>Corynorhinus townsendii</i> Covered	-/SCT/ WBWG-High	Coastal regions from Del Norte County south to Santa Barbara County	Roosts in caves, tunnels, mines, and dark attics of abandoned buildings; very sensitive to disturbances and may abandon a roost after one onsite visit	Low: The Project site is within the species range. No roosting habitat in or near Project site. There are no CNDDDB records within 5 miles of the Project site.

Common Name <i>Scientific Name</i>	Legal Status ^a			
Status under HCP/NCCP	Federal/ State/Other	Geographic Distribution	General Habitat Description	Likelihood for Occurrence in Project Site ^b
American badger <i>Taxidea taxus</i> Not Covered	-/-/SSC	The majority of the northern, western, and central United States south to Baja California	Open areas with deep soils that facilitate digging of burrows. Forages on ground squirrels, other rodents, snakes, and other small animals.	Moderate: The Project site is within the range of the species. Suitable grasslands and other open habitat is present particularly near the Central and South Work Areas. There are 5 CNDDDB records within 5 miles of the Project site with the closest record (from 1994) located approximately 3.05 miles southwest of the South Work Area (Occ #182; California Department of Fish and Wildlife 2019).
San Joaquin kit fox <i>Vulpes macrotis mutica</i> Covered	FE/ST/-	San Joaquin Valley and adjacent open foothills to the west; recent records from 17 counties extending from Kern County north to Contra Costa County	Saltbush scrub, grassland, oak, savanna, and freshwater scrub	Moderate: Project site is located in the northern distributional range of the species. Suitable grassland and migratory habitat is present, particularly at the South Work Area. There are 12 CNDDDB records within 5 miles of the Project site with the closest record (from 1978) overlapping with the South Work Area (Occ #573; California Department of Fish and Wildlife 2019).

^a Status explanations:

Federal

- E = listed as endangered under the federal Endangered Species Act.
- T = listed as threatened under the federal Endangered Species Act.
- SC= federal species of concern
- PR = protected by the federal Bald and Golden Eagle Protection Act.
- = no listing.

State

- E = listed as endangered under the California Endangered Species Act.
- T = listed as threatened under the California Endangered Species Act.
- SCE = candidate for state endangered listing under the California Endangered Species Act.
- SCT = candidate for state threatened listing under the California Endangered Species Act.
- FP = California fully protected species.
- SSC = species of special concern in California.

SC= federal species of concern.

– = no listing.

WBWG Western Bat Working Group conservation priority (High or Medium)

^b Likelihood for Occurrence in Project site

Low: The Project site is within the species range, and suitable habitat for the species may or may not occur in the inventory area, but species was not recorded in the Project site.

Moderate: The Project site is within the species range, and suitable habitat for the species is present in the Project site, but records for the species in the Project site are only historic, uncertain, or not recorded in the CNDDB (CRPR 4 species).

High: The Project site is within the species range and suitable habitat for the species is present in the Project site, and there are one or more recent records of the species in Project site.

Special-Status Plant Species Known or with Potential to Occur in the Project site

Table B-2. Special-Status Plants Known or with Potential to Occur in the Project site

Common Name <i>Scientific Name</i> Status under HCP/NCCP	Legal Status ^a Federal/ State/ CRPR	California Distribution	General Habitat Description	Blooming Period	Likelihood for Occurrence in Project Site ^b
Large-flowered fiddleneck <i>Amsinckia grandiflora</i> No Take Species	FE/SE/1B.1	Mt. Diablo foothills in Alameda, Contra Costa, and San Joaquin Counties, currently known from only three natural occurrences	Open grassy slopes in cismontane woodland, and valley and foothill grassland, generally on clay soil; 902- 1,804 feet	Apr-May	None. Project site outside known elevation range of species. No CNDDDB occurrences within 5 miles of the Project site.
California androsace <i>Androsace elongata</i> Not covered	-/-/4.2	Scattered locations throughout California, but primarily in east San Francisco Bay, interior South Coast Ranges, San Joaquin Valley, and southwest California	Broadleaved upland forest, coastal bluff scrub, and coastal prairie, often associated with rock outcrops; 490-3,900 feet	Mar-Jun	None. Project site outside known elevation range of species. No CNDDDB occurrences because List 4 species are not tracked in CNDDDB.
Mount Diablo manzanita <i>Arctostaphylos auriculata</i> Covered	-/-/1B.3	Endemic to Contra Costa County especially Mt. Diablo area, San Francisco Bay area; restricted to the eastern and northern flanks of Mt. Diablo and the vicinity of Black Diamond Mines	Chaparral in canyons and on slopes on sandstone, 490-1,650 feet	Jan-Mar	None. Project site outside known elevation range of species and no suitable habitat is present in the Project site. There are 3 CNDDDB records within 5 miles of the Project site. The closest record (from 1988) is located approximately 3.97 miles southwest of the South Work Area (Occ #12; California Department of Fish and Wildlife 2019).

Common Name Scientific Name Status under HCP/NCCP	Legal Status ^a Federal/ State/ CRPR	California Distribution	General Habitat Description	Blooming Period	Likelihood for Occurrence in Project Site ^b
Contra Costa manzanita <i>Arctostaphylos manzanita</i> ssp. <i>laevigata</i> Not covered	-/-/1B.2	Eastern San Francisco Bay region, Mt. Diablo, southern inner north coast range, Vaca Mountains, Contra Costa County	Rocky areas in chaparral on sandstone, 1,640– 3,600 feet	Jan–Feb	None. Project site outside known elevation range of species and no suitable habitat is present in the Project site. There are 2 CNDDDB records within 5 miles of the Project site. The closest record (from 1932) is located approximately 1.06 miles southwest of the South Work Area (Occ #10; California Department of Fish and Wildlife 2019).
Alkali milk-vetch <i>Astragalus tener</i> var. <i>tener</i> No Take Species	-/-/1B.2	Merced, Solano, and Yolo Counties; historically more widespread	Alkaline soils in playas, valley and foothill grasslands underlain by adobe clay, and vernal pool habitats; below 197 feet	Mar–Jun	None. Suitable habitat is not present in the Project site. No CNDDDB occurrences within 5 miles of the Project site.
Heartscale <i>Atriplex</i> <i>cordulata</i> var. <i>cordulata</i> Not covered	-/-/1B.2	Western Central Valley and valleys of adjacent foothills	Chenopod scrub, alkaline sinks and wetlands, alkaline areas of valley and foothill grasslands; below 1,250 feet	Apr–Oct	None. Suitable habitat is not present in the Project site. No CNDDDB occurrences within 5 miles of the Project site.

Common Name Scientific Name Status under HCP/NCCP	Legal Status ^a Federal/ State/ CRPR	California Distribution	General Habitat Description	Blooming Period	Likelihood for Occurrence in Project Site ^b
Crownscale <i>Atriplex coronata</i> var. <i>coronata</i> Not covered	-/-/4.2	Southern Sacramento Valley, San Joaquin valley, eastern Inner South Coast Ranges	Chenopod scrub, alkaline valley and foothill grassland, and alkaline vernal pools; requires strongly alkaline soils; below 1,800 feet	Mar-Oct	Low. Suitable habitat is not present in the Project site. The closest CNPS record (from 2007) is located 0.43 miles west of the Central Work Area (Occ #CHSC98938). No other known CNDDDB occurrences because List 4 species are not tracked in CNDDDB.
Brittlescale <i>Atriplex depressa</i> Covered	-/-/1B.2	Sacramento Valley and valleys of adjacent foothills on west side of San Joaquin Valley	Alkali grassland and alkali wetland; below 660 feet	May-Oct	Low. No suitable habitat is present in the Project site. There are 8 CNDDDB records within 5 miles of the Project site. The closest record (from 1998) is located approximately 0.17 miles south of the South Work Area (Occ #30; California Department of Fish and Wildlife 2019).
Lesser saltscale <i>Atriplex minuscule</i> Not covered	-/-/1B.1	Sacramento and San Joaquin Valley, Butte County and from Merced County to Kern County	Sandy alkaline soils in chenopod scrub, playas, valley and foothill grassland; 50-650 feet	May-Oct	None. No suitable habitat is present in the Project site. No CNDDDB occurrences within 5 miles of the Project site.

Common Name Scientific Name Status under HCP/NCCP	Legal Status ^a Federal/ State/ CRPR	California Distribution	General Habitat Description	Blooming Period	Likelihood for Occurrence in Project Site ^b
Big tarplant <i>Blepharizonia plumosa</i> ssp. <i>plumosa</i> Covered	-/-/1B.1	Interior Coast Range foothills, Alameda, Contra Costa, San Joaquin, Stanislaus*, and Solano* Counties	Annual grassland on dry hills and plains; 50– 1,500 feet	Jul–Oct	Moderate. Suitable habitat (annual grassland) is present in the Project site. There are 10 CNDDDB records within 5 miles of the Project site. The closest record (from 1994) is located approximately 0.14 miles southeast of the South Work Area (Occ #54; California Department of Fish and Wildlife 2019).
Brewer's calandrinia <i>Calandrinia breweri</i> Not covered	-/-/4.2	Widely scattered throughout California: Coast Ranges, central Sierra Nevada Foothills, Western Transverse Ranges	Chaparral and coastal scrub habitats with sandy or loamy soils. Requires recent disturbance (such as a burn); 30-4,000 feet	Mar–Jun	None. No suitable habitat is present in the Project site. No CNPS records within 5 miles of the Project. CNDDDB occurrences unknown because List 4 species are not tracked in CNDDDB.
Round-leaved filaree <i>California macrophylla</i> Covered	-/-/-	Scattered occurrences in the Great Valley, southern North Coast Ranges, San Francisco Bay Area, South Coast Ranges, Channel Islands, Transverse Ranges, and Peninsular Ranges	Cismontane woodland, valley and foothill annual grassland on clay soils; 50-3,940 feet	Mar–May	Moderate. Suitable grassland habitat is present in the Project site. No CNPS and CNDDDB occurrences within 5 miles of the Project site.

Common Name <i>Scientific Name</i> Status under HCP/NCCP	Legal Status ^a Federal/ State/ CRPR	California Distribution	General Habitat Description	Blooming Period	Likelihood for Occurrence in Project Site ^b
Mount Diablo fairy-lantern <i>Calochortus pulchellus</i> Covered	-/-/1B.2	Northeastern San Francisco Bay, Mt. Diablo, Endemic to Contra Costa and Alameda Counties	On wooded, brushy slopes of chaparral, cismontane woodland, riparian woodland, valley and foothill annual grassland, 650–2,600 feet	Apr–Jun	None. Project site outside known elevation range of species. No suitable habitat is present in the Project site. There are 5 CNDDB records within 5 miles of the Project site. The closest record (from 1992) is located approximately 3.6 miles southwest of the South Work Area (Occ #1; California Department of Fish and Wildlife 2019).
Congdon's tarplant (spikeweed) <i>Centromadia (Hemizonia) parryi</i> ssp. <i>congdonii</i> Not covered	-/-/1B.1	East San Francisco Bay Area, Salinas Valley, Los Osos Valley	Valley and foothill grasslands with alkaline soils, alkaline seasonal wetlands; tolerates or even requires moderate disturbance; below 760 feet	Jun–Nov	None. No suitable habitat is present in the Project site. No CNDDB occurrences within 5 miles of the Project site.
Small-flowered morning-glory <i>Convolvulus simulans</i> Not covered	-/-/4.2	San Joaquin Valley, central western and southwestern California, southern Channel Islands; Baja California	Chaparral openings, coastal scrub, and valley and foothill grassland; requires clay soils; shows strong affinity to serpentine seeps; 100- 2,300 feet	Mar–Jul	Moderate. Suitable habitat (annual grassland) is present in the Project site. The closest CNPS record (from 2007) is located 4.1 miles northwest of the North Work Area (Occ #UCD58755). No CNDDB occurrences because List 4 species are not tracked in CNDDB.

Common Name Scientific Name Status under HCP/NCCP	Legal Status ^a Federal/ State/ CRPR	California Distribution	General Habitat Description	Blooming Period	Likelihood for Occurrence in Project Site ^b
Hoover's cryptantha <i>Cryptantha hooveri</i> Not covered	-/-/1A	Northern and central San Joaquin Valley: Contra Costa*, Kern, Madera, Merced, San Joaquin, and Stanislaus* Counties	Coarse, sandy soil in valley and foothill grassland; 30-490 feet	Apr-May	None. Project site located outside species' known range as species believed extirpated from county; has not been seen or collected anywhere since 1939. Contra Costa records are from inland dune habitats that are now lost or fully protected (Antioch Dunes). No CNDDB occurrences within 5 miles of the Project site.
Recurved larkspur <i>Delphinium recurvatum</i> Covered	-/-/1B.2	San Joaquin Valley and central valley of the South Coast Ranges, Contra Costa County to Kern County	Alkali grassland and alkali wetland; 100- 2,000 feet	Mar-May	None. No suitable habitat is present in the Project site. No CNDDB occurrences within 5 miles of the Project site.
Mount Diablo buckwheat <i>Eriogonum truncatum</i> No Take Species	-/-/1B.1	Historically known from Alameda, Contra Costa and Solano Counties	Sandy soils in chaparral, coastal scrub, and valley and foothill grassland habitats; 10-1148 feet	Apr-Sep	Moderate. Suitable habitat (annual grassland) is present in the Project site. The closest CNPS record (from 1860) is located 0.70 miles west of the Central Work Area (Occ#GH26576). There is 1 CNDDB records within 5 miles of the Project site; the record (from 1934) is located approximately 2.72 miles west of the South Work Area (Occ #3; California Department of Fish and Wildlife 2019).

Common Name Scientific Name Status under HCP/NCCP	Legal Status ^a Federal/ State/ CRPR	California Distribution	General Habitat Description	Blooming Period	Likelihood for Occurrence in Project Site ^b
Jepson's coyote- thistle <i>Eryngium jepsonii</i> Not covered	-/-/1B.2	Alameda, Amador, Calaveras, Contra Costa, Fresno, Napa, San Mateo, Solano, Stanislaus, Tuolumne, and Yolo Counties	Vernal pools and mesic valley and foothill grassland; 30-330 feet	Apr-Aug	None. No suitable habitat is present in the Project site. No CNDDB occurrences within 5 miles of the Project site.
Diamond-petaled California poppy <i>Eschscholzia rhombipetala</i> No Take Species	-/-/1B.1	Interior foothills of south Coast Ranges from Contra Costa County to Stanislaus Counties, Carrizo Plain in San Luis Obispo County	Alkaline and clayey soils in valley and foothill grassland habitats; below 3200 feet	Mar-Apr	Moderate. Suitable habitat (annual grassland) is present in the Project site. There is 1 CNDDB records within 5 miles of the Project site; the record (from 1888) is located approximately 3.71 miles southeast of the South Work Area (Occ #4; California Department of Fish and Wildlife 2019).

Common Name Scientific Name Status under HCP/NCCP	Legal Status ^a Federal/ State/ CRPR	California Distribution	General Habitat Description	Blooming Period	Likelihood for Occurrence in Project Site ^b
San Joaquin spearscale <i>Extriplex joaquinana</i> Covered	-/-/1B.2	West edge of Central Valley from Glenn County to Tulare County	Alkaline soils in chenopod scrub, alkali grassland, and alkali wetland; 3-2,740 feet	Apr-Oct	Low. No suitable habitat is present in the Project site. There are 19 CNDDDB records within 5 miles of the Project site. The 2 closest records (from 1993 and 2003) are located approximately 0.16 and 0.54 miles respectively west of the North Work Area (Occ #44 and #93; California Department of Fish and Wildlife 2019). The habitat at these location have been developed. The closest extant record (from 2017) is located approximately 0.69 miles southwest of the South Work Area (Occ #29; California Department of Fish and Wildlife 2019).
Stinkbells <i>Fritillaria agrestis</i> Not covered	-/-/4.2	Alameda, Contra Costa, Fresno, Kern, Mendocino, Monterey, Merced, Monterey, Mariposa, Placer, Sacramento, Santa Barbara, San Benito, San Luis Obispo, San Mateo, Stanislaus, and Tuolumne Counties	Chaparral, cismontane woodland, pinyon- juniper woodland, valley and foothill grassland; requires clay soils and often associated with serpentine features; 30- 5,100 feet	Mar-Jun	Moderate. Suitable habitat (annual grassland) is present in the Project site. There are 6 CNDDDB records within 5 miles of the Project site. The closest record (from 1989) is located approximately 0.15 miles north of the North Work Area (Occ #8; California Department of Fish and Wildlife 2019).

Common Name Scientific Name Status under HCP/NCCP	Legal Status ^a Federal/ State/ CRPR	California Distribution	General Habitat Description	Blooming Period	Likelihood for Occurrence in Project Site ^b
Phlox-leaf serpentine bedstraw <i>Galium andrewsii</i> ssp. <i>gatense</i> Not covered	-/-/4.2	Alameda, Contra Costa, Colusa, Fresno, Los Angeles, Monterey, San Benito, Santa Clara, and San Luis Obispo Counties	Chaparral, cismontane woodland, and lower montane coniferous forest; requires rocky serpentinite soils; 490- 4,750 feet	Apr-Jul	None. Project site outside known elevation range of species and no suitable habitat is present in the Project site. No CNDDDB occurrences because List 4 species are not tracked in CNDDDB.
Diablo helianthella (rock rose) <i>Helianthella</i> <i>castanea</i> Covered	-/-/1B.2	San Francisco Bay area, Alameda, Contra Costa, Marin*, San Francisco*, and San Mateo Counties	At chaparral/oak woodland ecotone, often in partial shade, on rocky soils; 80–3,800 feet	Apr-Jun	Low. No suitable habitat is present in the Project site. There are 4 CNDDDB records within 5 miles of the Project site. The closest record (from 2003) is located approximately 3.97 miles southwest of the South Work Area (Occ #14; California Department of Fish and Wildlife 2019).
Hogwallow starfish <i>Hesperevax</i> <i>caulescens</i> Not covered	-/-/4.2	Alameda, Amador, Butte, Contra Costa, Colusa, Fresno, Glenn, Kern, Merced, Napa, San Diego, San Joaquin, San Luis Obispo, Solano, Stanislaus, Sutter, Tehama, and Yolo Counties	Shallow vernal pools and mesic areas in valley and foothill grassland; requires clay soils; below 1,650 feet	Mar-Jun	Low. No suitable habitat is present in the Project site. No CNDDDB occurrences because List 4 species are not tracked in CNDDDB.

Common Name <i>Scientific Name</i> Status under HCP/NCCP	Legal Status ^a Federal/ State/ CRPR	California Distribution	General Habitat Description	Blooming Period	Likelihood for Occurrence in Project Site ^b
Brewer's western (dwarf) flax <i>Hesperolinon breweri</i> Covered	-/-/1B.2	Southern north inner Coast Range, northeast San Francisco Bay region, especially Mt. Diablo; known only from Contra Costa, Napa, and Solano Counties	Serpentine slopes in chaparral, and annual grasslands; generally, restricted to grassland areas within a 500+ buffer from oak woodland and/or chaparral/scrub; 100–2,300 feet	May–Jul	Low. No suitable habitat (serpentine soils) is present in the Project site. There are 7 CNDDDB records within 5 miles of the Project site. The closest record (from 1997) is located approximately 0.13 miles southeast of the South Work Area (Occ #31; California Department of Fish and Wildlife 2019).
Woolly rose- mallow <i>Hibiscus lasiocarpus</i> var. <i>occidentalis</i> Not covered	-/-/1B.2	Scattered locations in central California in the Central and southern Sacramento Valley, deltaic Central Valley, from Butte to San Joaquin County	Freshwater marshes and swamps along rivers and sloughs, often in riprap on sides of levees; below 390 feet	Jun–Sep	None. No suitable habitat is present in the Project site. No CNDDDB occurrences within 5 miles of the Project site.

Common Name Scientific Name Status under HCP/NCCP	Legal Status ^a Federal/ State/ CRPR	California Distribution	General Habitat Description	Blooming Period	Likelihood for Occurrence in Project Site ^b
Contra Costa goldfields <i>Lasthenia conjugens</i> No Take Species	FE/-/1B.1	Scattered occurrences in Coast Range valleys and southwest edge of Sacramento Valley, Alameda, Contra Costa, Mendocino, Monterey, Napa, Santa Barbara*, Santa Clara*, and Solano Counties; historically distributed through the north coast, southern Sacramento Valley, San Francisco Bay region and the south coast	Mesic cismontane woodlands, alkaline playas, valley and foothill grasslands and vernal pools; below 1542 feet	Mar–Jun	None. No suitable habitat is present in the Project site. No CNDDB occurrences within 5 miles of the Project site.
Showy golden madia <i>Madia radiata</i> Covered	-/-/1B.1	Scattered populations in the interior foothills of the south Coast Ranges, Contra Costa, Fresno, Kings, Kern, Monterey, Santa Barbara, San Benito, San Joaquin, and San Luis Obispo Counties	Oak woodland and savanna, and annual grassland; slopes below 3,000 feet	Mar–May	Moderate. Suitable habitat (annual grassland) is present in the Project site. There is 1 CNDDB records within 5 miles of the Project site; the record (from 1941) is located approximately 3.53 miles northwest of the North Work Area (Occ #25; California Department of Fish and Wildlife 2019).
Hall's bush mallow <i>Malacothamnus hallii</i> Not covered	-/-/1B.2	Alameda, Contra Costa, Merced, Santa Clara, and Stanislaus Counties	Chaparral and coastal scrub; 30–2,500 feet	May–Sep	None. No suitable habitat is present in the Project site. No CNDDB occurrences within 5 miles of the Project site

Common Name Scientific Name Status under HCP/NCCP	Legal Status ^a Federal/ State/ CRPR	California Distribution	General Habitat Description	Blooming Period	Likelihood for Occurrence in Project Site ^b
San Antonio Hills monardella <i>Monardella antonina</i> ssp. <i>antonina</i> Not covered	-/-/3	San Francisco Bay area and Central coast, currently known from Fresno and Monterey Counties	Chaparral, oak woodland, open rocky slopes; 1,050-3,280 feet	Jun-Aug	None. Project site outside known elevation range of species and no suitable habitat is present in the Project site. No CNDDDB occurrences within 5 miles of the Project site.
Tehama navarretia <i>Navarretia heterandra</i> Not covered	-/-/4.3	Interior North Coast Ranges, Cascade Range foothills, western Sacramento Valley, east San Francisco Bay Area, interior South Coast Ranges, Modoc Plateau in Butte, Colusa, Lake, Napa, Shasta, Tehama, Trinity, and Yuba Counties; Oregon	Mesic areas in valley and foothill grasslands, vernal pools; 100-3,300 feet	Apr-Jun	Low. No suitable habitat is present in the Project site. No CNDDDB occurrences because List 4 species are not tracked in CNDDDB.
Adobe navarretia <i>Navarretia nigelliformis</i> ssp. <i>radians</i> ^c Covered	-/-/4.2	Alameda, Butte, Contra Costa, Colusa, Fresno, Kern, Merced, Monterey, Placer, Sutter, Tulare	Generally found on clay barrens in annual grassland ^d ; 330-3,280 feet	Apr-Jun	None. Project site outside known elevation range of species. No CNDDDB occurrences within 5 miles of the Project site.

Common Name Scientific Name Status under HCP/NCCP	Legal Status ^a Federal/ State/ CRPR	California Distribution	General Habitat Description	Blooming Period	Likelihood for Occurrence in Project Site ^b
Shining navarretia <i>Navarretia nigelliformis</i> ssp. <i>radians</i> Not covered	-/-/1B.2	Interior foothills of South Coast Ranges from Merced County to San Luis Obispo County	Mesic areas in cismontane woodland, valley and foothill grassland, and vernal pools; sometimes in clay soils; 250-3,280 feet	Apr-Jul	None. Project site outside known elevation range of species and no suitable habitat is present in the Project site. There is 1 CNDDDB records within 5 miles of the Project site; the record (from 2015) is located approximately 4.65 miles northwest of the North Work Area (Occ #81; California Department of Fish and Wildlife 2019).
Antioch Dunes evening- primrose <i>Oenothera deltooides</i> ssp. <i>howellii</i> Not covered	FE/FE/1B.1	Northeast San Francisco Bay region, known from three native occurrences; Contra Costa and Sacramento Counties	Inland dunes generally below 330 feet	Mar-Sep	None. Project site located outside species' known range. No suitable habitat is present in the Project site. No CNDDDB occurrences within 5 miles of the Project site.
California alkali grass <i>Puccinellia simplex</i> Not covered	-/-/1B.2	Alameda, Butte, Contra Costa, Colusa, Fresno, Glenn, Kings*, Kern, Lake, Los Angeles, Madera, Merced, Napa, San Bernardino, Santa Clara, Santa Cruz, San Luis Obispo, Solano, Stanislaus, Tulare, Yolo Counties; Utah.	Alkaline soils, vernal mesic; sinks, flats, lake margins, chenopod scrub, meadows and seeps, valley and foothill grassland, vernal pools; below 3,050 feet	Mar-May	Low. No suitable habitat is present in the Project site. There is 1 CNDDDB records within 5 miles of the Project site; the record (from 1992) is located approximately 2.81 miles southwest of the South Work Area (Occ #46; California Department of Fish and Wildlife 2019).

Common Name <i>Scientific Name</i> Status under HCP/NCCP	Legal Status ^a Federal/ State/ CRPR	California Distribution	General Habitat Description	Blooming Period	Likelihood for Occurrence in Project Site ^b
Chaparral (rayless) ragwort <i>Senecio aphanactis</i> Not covered	-/-/2B.2	Scattered locations in central western and southwestern California, from Alameda County to San Diego County	Chaparral, cismontane woodland, and coastal scrub; below 2,625 feet	Jan-Apr	Low. No suitable habitat is present in the Project site. There is 1 CNDDDB record within 5 miles of the Project site; the record (from 1888) is located approximately 4.78 miles southeast of the South Work Area (Occ #16; California Department of Fish and Wildlife 2019).
Long-styled sand-spurrey <i>Spergularia macrotheca</i> var. <i>longistyla</i> Not covered	-/-/1B.2	Alameda, Contra Costa, Napa, and Solano Counties	Meadows and seeps, alkaline marshes and swamps; below 840 feet	Feb-May	Low. No suitable habitat is present in the Project site. There are 2 CNDDDB records within 5 miles of the Project site. The closest record (from 2005) is located approximately 2.82 miles south of the South Work Area (Occ #12; California Department of Fish and Wildlife 2019).
Caper-fruited tropidocarpum <i>Tropidocarpum capparideum</i> No Take Species	-/-/1B.1	Historically known from the northwest San Joaquin Valley and adjacent Coast Range foothills	Alkaline clay soils in valley and foothill grassland; below 1,493 feet	Mar-Apr	Low. No suitable habitat is present in the Project site. There is 1 CNDDDB record within 5 miles of the Project site; the record (from 1889) is located approximately 3.66 miles east of the Project site (Occ #6; California Department of Fish and Wildlife 2019).

Common Name <i>Scientific Name</i> Status under HCP/NCCP	Legal Status ^a Federal/ State/ CRPR	California Distribution	General Habitat Description	Blooming Period	Likelihood for Occurrence in Project Site ^b
Oval-leaved viburnum <i>Viburnum ellipticum</i> Not covered	-/-/2B.3	Contra Costa, Fresno, El Dorado, Glenn, Humboldt, Mendocino, Napa, Shasta, Sonoma Counties; Oregon and Washington	Chaparral, cismontane woodland, and lower montane coniferous forests	May-Jun	None. No suitable habitat is present in the Project site. No CNDDDB occurrences within 5 miles of the Project site

- * = known populations believed extirpated from that County
? = uncertainty about distribution or identity

^a Status explanations:

Federal

- FE = listed as endangered under the federal Endangered Species Act.
- = no listing.

State

- = no listing.

California Rare Plant Rank

- 1A = List 1A species: presumed extinct in California.
1B = List 1B species: rare, threatened, or endangered in California and elsewhere.
2 = List 2 species: rare, threatened, or endangered in California but more common elsewhere.
3 = List 3 species: plants about which more information is needed to determine their status.
4 = List 4 species: limited distribution; species on a watch list.
.1 = Seriously endangered in California (over 80% of occurrences threatened—high degree and immediacy of threat).
.2 = Fairly endangered in California (20-80% occurrences threatened).
.3 = Not very threatened in California (less than 20% of occurrences threatened / low degree and immediacy of threat or no current threats known).
- = no listing.

^b Likelihood for Occurrence in Project site

None: The Project site is outside the species range, or suitable habitat is not present in the Project site and no CNDDDB occurrences within 5 miles of the Project site.

Low: The Project site is within the species range, and suitable habitat for the species may or may not occur in the Project site, but species was not recorded in the Project site.

Moderate: The Project site is within the species range, and suitable habitat for the species is present in the Project site, but records for the species in the Project site are only historic, uncertain, or not recorded in the CNDDDB (CRPR 4 species).

High: The Project site is within the species range and suitable habitat for the species is present in the Project site, and there are one or more recent records of the species in the Project site.

^c The species *Navarretia nigelliformis* subsp. *nigelliformis* is no longer considered to occur within Contra Costa County based on specimen annotations at the UC and Jepson Herbaria at the University of California Berkeley as well as the opinions of experts in the genus. This taxon is now recognized as *Navarretia nigelliformis* subsp. *radians*. Any subspecies of *Navarretia nigelliformis* encountered as a part of botanical surveys in support of an ECCC HCP Planning Survey Report should be considered as covered under the HCP/NCCP.

^d Habitat for the *Navarretia nigelliformis* subspecies that occurs within the ECCC HCP inventory area is inaccurately described in the HCP/NCCP as vernal pools. The entity within the Inventory generally occupies clay barrens within Annual Grassland habitat, which is an upland habitat type.

Appendix C: HDD Execution Plan



HDD EXECUTION PLAN

For



*Pacific Gas and
Electric Company*[®]

L-114 MP 17.06-17.51

Brentwood, California

April 15, 2019

HDD Execution Plan for Crossings

Contents

1 INTRODUCTION.....2

 1.1 HORIZONTAL DIRECTIONAL DRILL PROCEDURE 2

2 EXECUTION PLAN.....2

 2.1 NOTIFICATIONS AND PERMITS 2

 2.2 IDENTIFICATION OF BUFFER ZONES 2

 2.3 PRE-CONSTRUCTION SURVEY 2

 2.4 NOISE CONTROL.....2

 2.5 EQUIPMENT ON SITE 2

 2.6 PROJECT ENTRY/EXIT POINTS 3

 2.7 DRILLING DESCRIPTION TIMELINE - 3

 2.8 HDD TRACKING 4

 2.9 DRILL FLUID PRESSURE REPORT 5

 2.10 PILOT HOLE 5

 2.11 REAMING AND HOLE OPENING.....6

 2.12 DRILL CONTINUANCE PLAN.....7

 2.13 DESIGN FLUID PROGRAM 8

 2.14 BUOYANCY CONTROL.....8

 2.15 PULL-BACK PROCEDURE.....8

 2.16 WATER REQUIREMENTS.....9

 2.17 DRILLING FLUID & DRILLING SOLIDS DISPOSAL 9

 2.18 CLEANUP AND RESTORATION 9

3 ENVIRONMENTAL MANAGEMENT 9

 3.1 PLANNING 9

 3.2 MONITORING 10

 3.3 RESPONSE.....11

 3.4 DIRECTIONAL DRILL MUD RELEASE CONTINGENCY PLAN 11

 GROUNDWATER INTRUSION MANAGEMENT - 14

 DRILLING FLUID FLUSH MANAGEMENT PLAN - 14

1 INTRODUCTION

1.1 *Horizontal Directional Drill Procedure*

The trenchless method selected for the crossing(s) is a horizontal directional drill (HDD) crossing technique. The following is an overview of the steps that will be involved in the execution of the HDD of the Marsh Creek Crossing in Brentwood, California. It will also outline some of the mitigated measures that will be taken to ensure the effective installation of the proposed crossings.

2 EXECUTION PLAN

2.1 *Notifications and Permits*

Prior to access or construction activities associated with the crossings, all crossing approvals, permits, and/or notifications will be received or issued respectively. All conditions specified in approvals or permits will be discussed, understood, and adhered to by company personnel and all contractors. Any permits/approvals or notifications will be provided within the timing specified. Notifications will be completed as specified, documented, and maintained in the construction field office.

2.2 *Identification of Buffer Zones*

All buffer zones or restricted areas will be identified and flagged prior to mobilization and site preparation. In addition, any restricted areas identified by permits/approvals will be flagged off.

2.3 *Pre-Construction Survey*

A pre-construction survey will be completed to confirm the entry and exit points for the pilot hole as shown on the construction drawings and as staked in the field. Following the examination of the entry and exit points, the distances between the holes will be verified to the HDD design drawings using survey equipment such as a total station. Field stations and elevations surveyed along the proposed center line will be plotted for monitoring and recording three dimensional coordinates generated by the tracking software during drilling operations. This exercise ensures that the pre-engineered alignment and radius restrictions are maintained during the execution of the drill.

Following receipt of the survey results, a design profile will be developed. The design profile in turn is then verified to the HDD design drawings and presented to Owner and other concerned parties for review. Once the profile has been reviewed and approved the site preparation can commence.

2.4 *Noise Control*

Brotherton Pipeline equipment noise levels will comply with all Applicable Laws and requirements of all authorities having jurisdiction, including meeting the requirements of all municipal by-laws and guidelines.

2.5 *Equipment on Site*

All equipment used on site shall be cleaned and free of oils, fuel, grease, coolant and other hydrocarbons or otherwise toxic substances, or any vegetation, soil or other material prior to mobilization. Oil changes, refueling, and lubrication of mobile construction equipment will only be undertaken at a minimum of 50 ft from a water body and only at approved locations, so as to minimize the potential for water pollution. Fuel containers will be dual walled tanks or alternatively will be contained within containment berms constructed to a capacity of 125% of the fuel stored. Contingency plans will be in place in the event of fuel or hazardous waste spills.

Drill Rig

DitchWitch 550 DWTX

- o 700 HP
 - o Thrust/Pullback: 550,000 lbs.
 - o Rotary Torque: 60,000 ft-lb
- 6 5/8" Double White Band Drill Pipe
- TruTrack Guidance Systems
- (1) Mud Pump: American Auger P750
 - o Rated Capacity: 750 U.S. Gallons
 - o Maximum Pressure: 1,500 psi
- Reclaimer: Vermeer R9X12T
 - o Maximum Capacity: 8,000 gal
 - o Number of tanks: 3
 - o 1000 GPM
- Mud Storage: 20,000 Gallon Tank
- Water Storage: 20,000 Gallon Tank
- 48' Drill Steel Trailers
- 3,000 Gallon Sucker Truck
- Drill bits and reamers
- Kubota SVL75 Skid Steer
- Frac Containment Kit
-



2.6 Project Entry/Exit Points

During site preparation, filter fence\straw bailed berm walls as well as the ingress and egress that will be required for the entry and exit points will be constructed as per the design HDD drawings. Two (2) work areas will be required for the installation of the large diameter pipe under the designated crossing(s).

A primary staging area will be used to string, weld and coat the pipeline before pull through. The primary staging area will be located near the exit side of the crossing and will be contained within the existing right-of-way limits or temporary work space. Typically an area 150 feet by 100 feet (or approximately 15,000 square feet) is sufficient in size but may vary depending on the requirements of the selected drilling contractor. The drill rig location will initially setup at this location and complete the pilot drill and reaming process

The secondary staging area, which is to be located on the entry side of the crossing will be utilized to set-up and install the drilling rig as per the drilling contractor's site plan. Typically an area 150 feet by 100 feet (or approximately 15,000 square feet) is sufficient in size but may vary depending on the requirements of the selected drilling contractor. The drilling rig is used to pull back the inspected and tested pipe pull section from the exit side of the crossing back to the entrance side.

2.7 Drilling Description Timeline -

CONSTRUCTION TIMELINE –

Based on Crew working 10 hours per shift - 6 Days a week.

Marsh Creek Crossing HDD (2035) - 50 Days

(3 Days) Rig Up\Survey
(14 Days) Pilot Drill
(14 Days) Reaming Pass
(14 Days) Reaming Pass
(1 Day) Clean\Swab Hole
(1 Day) Pull in Product Pipe
(3 Days) Rig Down\Cleanup

2.8 HDD Tracking

A magnetic guidance system paired with the TruTrack system will be used to track and to monitor the drill path during the HDD. The tracking system is important to ensuring the proper installation of the HDD as designed. To set-up the tracking system the directional heading (or azimuth) is taken on the proposed alignment of the crossing using the magnetic guidance system. The tracking system verifies the exact azimuth location of the probe and this location is sent to a computer for monitoring. The tracking system allows the steering head to control the path the drill takes and helps calculate the horizontal and vertical coordinates relative to the initial entry point on the surface. The tracking system will be used to generate the As-Built profile of the drill path.

DataTraX Steering Tool Specifications

<u>Inclination Range</u>	<u>0° to 180°</u>
<u>Inclination Accuracy</u>	<u>± 0.1°</u>
<u>Azimuth</u>	<u>± 0.75° (Inc > 10°, Dip < 70°)</u>
<u>Tool Face (Gravity)</u>	<u>± 1.0° (Inc > 10°, Dip < 70°)</u>
<u>Operating Temperature</u>	<u>-40° C to +150° C</u>
<u>Survival Temperature</u>	<u>-40° C to +165° C</u>
<u>Calibrated Op Range</u>	<u>0° C to +150° C</u>
<u>Voltage Supply</u>	<u>+18 to 40 volts</u>
<u>Parameters Sampled</u>	<u>Gx Gy Gz Bx By Bz Temp</u>
<u>Shock Qualification</u>	<u>500G 1ms on three axes 5000 impacts per axes</u>
<u>Vibration Qualification</u>	<u>27.5G for 10 minutes on each of the three axes</u>

<u>Instrument Length</u>	<u>635 mm</u>
<u>Instrument Diameter</u>	<u>36.5 mm (to fit 1.5" case)</u>

2.9 Drill Fluid Pressure Report

High Annulus Pressure

Sudden increase

1. Trip pipe back until pressure drops; a full trip back to entry may be required.
2. Reduce or stop pumping if pressure does not drop
3. Check mud parameters
4. Check for volume loss
5. With pressure stabilized slowly increase pump speed up to a maximum flow capacity

Gradual increase over expected

1. Check fluid parameters and modify if required
2. Compare actual drill path to planned
3. If pressure reaches the upper limit, trip back to lower pressures and condition the hole

Low Annulus Pressure

Sudden decrease below expected

1. Stop pumping
2. Check returning fluid and volume loss
3. Check for correct tool operation (if point 2 is okay)
4. Prepare a lost circulation mixture and pump down.
5. Monitor for fluid loss
6. Trip back to entry to clean hole and allow plugging agents to work
7. Recheck for correct pressure tool operation
8. Trip back while monitoring for fluid loss

Gradual decrease below expected

1. Check drilling fluid parameters
2. Compare drill path to planned
3. Check for reduce flow and fluid loss
4. Mix up lost circulation material and pump down
5. Continue to drill monitoring for reduced flow and volume
6. If losses exist additional plugging agents may be required
7. Monitor for fluid to surface

2.10 Pilot Hole

The first stage of an HDD involves the drilling of a pilot hole using a 12 1/4" Bit along the designated drill path.

A Horizontal Technology Inc. Recorder (HTIR) will be rigged up and activated before any down-hole activity commences. The "HTIR" records the following drilling parameters:

- Rate of penetration (R.O.P.)
- Measure depth
- Pull / Thrust Forces
- Rotary torque
- Rotary speed

- Stand pipe pressure
- Pump strokes (m3 per minute or total m3 pumped)
- Drilling fluid surface tank volume monitoring

CONVENTIONAL METHOD PILOT HOLE –

To initiate the pilot hole, the drill rig is positioned along the same alignment as the azimuth. Next, the bottom hole assembly (BHA) containing the steering probe is drilled in at the entrance point or run inside the casing if applicable. Non-magnetic drill collars are placed behind the BHA in order to create a non-magnetic buffer between steering tool and possible magnetized drill string. The pilot hole is then advanced along the pre-designed profile which has been designed to ensure that the bending radius is appropriate given the size of the pull section product pipe to be installed in this crossing.

The pilot hole is kept on course by using non-rotating drill string with an asymmetrical leading edge. A steering bias is created by the asymmetry of the leading edge. If a change in direction is required, the drill string is rolled so that the direction of the bias is the same as the desired change in direction. The drilling progress is achieved by hydraulic cutting action using nozzles configured at the apex of the drill head. The flow rate will be determined according to fluid make ups, returns, tank levels, pump strokes etc. which will be monitored from pressure gauges in the control trailer throughout the pilot hole drilling operation. Fluid pressure will be continuously monitored to ensure that the pre-determined maximum permissible annular pressure is not exceeded during the drilling of the pilot hole. The actual path of the pilot hole is monitored during drilling by taking periodic readings of the inclination and azimuth of the leading edge using the tracking system and used to calculate the horizontal and vertical coordinates relative to the initial entry point on the surface.

Drilling fluid is used to help drill the pilot holes and subsequent reamers. Drilling fluid for the drill will be composed of non-toxic compounds such as bentonite. A drilling fluid contingency plan is in place to deal with inadvertent fluid migrations (frac-outs). Fully trained and appropriately equipped personnel to deal with frac-outs will be utilized for the HDD operations. During the course of the drill, terrestrial monitoring will be conducted by the HDD Contractor to ensure that frac-outs are detected should they occur. Material Safety Data sheets for the drilling fluid will be on site during drilling operations. Drilling fluid is managed by the rig crew and is contained within a bermed area near the drilling rig to ensure proper containment of the fluid. The drilling rig used will be equipped with a drilling fluid reclaim system.

While drilling the pilot hole, the HDD contractor will mathematically model the drilling fluid in use and calculate the expected annular pressure for the length of the drilled hole. The expected annular pressure will be graphed with the maximum permissible annular pressure.

Brotherton Pipeline will measure the annular pressure while drilling the pilot hole using an electronic sensor package. The real-time pressure will be continuously recorded by the drilling instrumentation system. Off-bottom circulating pressure will be recorded manually at the completion of each drilled segment of drill pipe.

2.11 Reaming and Hole Opening

After the drilling operations of the pilot hole have been completed to the exit point, the reaming phase of construction begins. The pilot hole is enlarged using a reaming process. Hole opening tools will travel through the hole from entry towards exit which is referred to as push reaming. The hole is opened by repeatedly introducing larger diameter reamers into the hole. The hole is opened to a size approximately 1 ½ times larger than the outside diameter of the product line to ensure that when the product pipe is pulled into the final bore hole there is sufficient free space to allow it to move easily. In reaming, sections of drill pipe are continuously added as progress is made, to ensure that there is always a string of pipe in the hole. The reaming tools consist of a

circular set of cutters and drilling fluid jets. The pressurized drilling fluid serves three purposes: to cool the cutting tools, support the reamed hole, and lubricate the trailing drill pipe. The drilling fluid returns coming back to the drill rig side will be collected, cleaned and re-circulated.

While the reaming passes are completed, a “tailing” of the drill steel will be required as each reaming pass is pulled from the exit pit to the entry pit.

Nominal Diameter	Hole Size	Nominal Diameter	Hole Size
4	7	24	36
6	10	30	42
8	13	32	44
10	16	34	46
12	18	36	48
16	24	40	53
20	30	42	55

2.12 Drill Continuance Plan

In the event of a frac-out Brotherton Pipeline along with the consultant and designated contact will determine an appropriate drill continuance plan. A typical drill continuance plan includes the following:

1. Fracture Plugging (Bridging) Agents

In certain types of formations or conditions, fracture plugging agents (non-toxic) have been utilized with limited success. These agents include ground pieces of carpet, corn husks, sawdust, bentonite pellets, walnut husks, sealant or other commercially available products. These are pumped down the drill hole left undisturbed for a predetermined length of time where upon drilling is restarted. If positive circulation is restored, drilling is continued using the same principles and contingency plans; if not drilling is halted.

2. Down Hole Cementing

If the fracture zone is determined to be too large for the use of plugging agents, the drill string may be inserted to a predetermined depth to allow a quick setting cement or thermal resin (non-toxic) to be pumped down-hole in sufficient quantities to seal off the problem zone. If no further fracturing occurs, drilling is continued using the same principles and contingency plans; if, not drilling is halted.

3. Contain and Control

If the inadvertent release is on land, determined not to be causing an adverse effect, and the surface migration of the drilling mud can be adequately contained and controlled, then drilling can continue with the following conditions:

- There are no impacts to the environment or other adverse effects (i.e. no potential to contaminate surface or ground water, third party property damage or safety risks to the landowner, public or animals.)
- The area affected by the inadvertent release is minor and limited to only one spot
- The surface migration of the drilling mud is adequately contained (bermed with subsoil or a catch pit excavated);
- The contained free drilling mud is adequately controlled (any free drilling mud migrating to the surface is immediately and continually removed for the duration of the remaining drilling phase.
- The site is monitored at appropriate periods during the drilling cycle and the drilling contractor reduces pump/hole pressure accordingly in order to maintain control of the amount of mud being contained
- The affected landowner is notified and permission for continued drilling is granted.
- The plan is discussed with appropriate regulatory agencies and their approval is obtained; and
- The affected site is remediated and reclaimed to meet approved criteria.

4. Partial Hole Recovery

In the event that of the above procedures are unsuccessful, down-hole cementing could be used to seal off a substantial portion of the existing hole back to a point where a “kick-off” can take place. The drilling is then advanced along a different path usually at a lower elevation. Again, careful monitoring of drilling fluids and drill path will be carried out using the same principles and contingency plans; if not drilling is halted.

In the event that none of the above procedures are successful or considered feasible, the hole will be abandoned, and a re-drill will be considered at a second location if it can be determined that more favorable geotechnical conditions exist, using the same principles and contingency plans.

2.13 Design Fluid Program

The HDD contractor will execute the mud program with certified mud technician. The drilling fluid will be tested for viscosity, plastic viscosity, sand content, and mud weight and solids control monitoring during drilling and reaming operations. It is expected that the drilling fluid will consist of mainly bentonite.

2.14 Buoyancy Control

Buoyancy control will be used for the pullback operations. The objective of the buoyancy control is to suspend the pipe in the bore hole by creating downward forces that match the uplift forces produced by the submerged pipe. Neutral buoyancy is achieved by adding weight to the pull section internally through controlled loading with water. This ensures that only the lowest portion of the profile is weighted during the pullback.

Project

1) All crossings

Buoyancy Water Required

not required

2.15 Pull-Back Procedure

After hole opening operations are completed, the pipe pull section (pull section) is ready to be pulled back into the opened hole from the exit side. The pull-back process is similar to the hole opening phase except that a reamer is pulled back with the pull section. A swivel connects the pull section to the reamer thus minimizing torsion forces transmitted to the pull section. The pull

section will be supported by positioned pipe rollers as specified. Side booms with cradles elevated in such a manner as to reduce axial loads imposed on the pull section will support the pipe entering the bore hole. The lead side boom will position the leading edge of the pull section to be in the same alignment as the exit angle. The thrust gauging system will be used to monitor pipe pull forces. The rig manager in consultation with the Owner representative will determine an appropriate procedure regarding pipe pull forces.

2.16 Water Requirements

Contractor will provide a water source. Brotherton Pipeline shall provide a storage tank for water.

2.17 Drilling Fluid & Drilling Solids Disposal

Waste cuttings and drilling fluids shall be disposed at a Company approved disposal site. The construction area will be checked a minimum of twice daily for signs of unplanned leaks or seeps. A written record shall be maintained by the contractor of all inspections and submitted with his daily report to the Company Representative.

2.18 Cleanup and Restoration

Following the completion of the HDD, the pipeline right-of-way and associated temporary work space will be cleaned up and restored as specified in the contract documents.

3 ENVIRONMENTAL MANAGEMENT

3.1 Planning

Brotherton Pipeline will adhere to all acts, regulations, Codes of Practice and best management practices that will guide the HDD process to ensure that there are no adverse environmental impacts as a result of the water crossings. The HDD management plan has been developed to avoid any harmful alteration, disruption, or destruction of fish and fish habitat due to drilling fluids and additives entering a water body. The following mitigation measures will be implemented during the HDD crossing.

General

- The HDD contractor will comply with the plan prepared for the works, except where measures must be taken to deal with an emergency.

Deleterious Materials

The prime contractor will:

- Be responsible for managing any dewatering procedures;
- Ensure that effective sediment and erosion control measures are in place along the HDD work-space access route, right-of-way and appurtenances and that they are functioning properly and are maintained and upgraded as required to prevent sediment from entering fish habitat.
- Limit use of hazardous materials.
- MSDS for fuel, lubricants, and mud products will be onsite.

Equipment:

- All HDD equipment arriving on location is free from engine oil, hydraulic oil, fuel, and coolant leaks;
- All HDD equipment arriving on location is free from dirt, mud, vegetative debris, and other substances that may impact the water quality or the fish or fish habitat values of the water or land productivity;
- All equipment is maintained and serviced at least 100 feet from a water body. If it is not possible to conduct such activities greater than 100 feet from the watercourse, these activities will occur within a containment area that is capable of preventing the accidental release of a deleterious substance from entering a water body or contamination of soils or vegetation;
- Restrict all equipment to the cleared Right-of Way and work space;
- All portable equipment using fuels, hydrocarbon lubricants, coolants such as electrical generators and pumps used off of the bermed entry or exit work pad will be positioned inside of a sandbag berm (or equivalent) lined with leak free polyethylene or other containment structure that serves to prevent deleterious substances such as fuel from entering the soil or aquatic environment or contamination of soils or vegetation;
- All fuels, lubricants, coolant, and other substances are contained, controlled, and handled according to Occupational Health Safety regulations and Brotherton Pipeline's safety policy and procedures ;

Work Areas

- All spoil materials from construction activities will be deposited, whether temporarily or permanently, above the high water mark of the water body and in such a manner that does not allow its entry into the riparian zone or the channel of the water body.
- All work areas used by HDD crews have adequate run-off control structures in place to prevent wash materials or exposed or disturbed sediment from entering a water body;

Aquatic Resources

- Ensure generators and pumps used for water intake have secondary containment, when stationed, operated or refueled within 100 m of a watercourse.

Waste Management

- The composition of the drilling fluid will be limited to fresh water and high yield bentonite conforming to or exceeding American Petroleum Institute specifications. Other additives or substitutions will be submitted for approval before being used in the drilling fluid.
- An MSDS sheet is maintained on the work location for all drilling fluid additives.

3.2 Monitoring

- The HDD contractor will monitor, by visual and electronic means:

- The return flow of drilling fluid from the borehole. A reduction in return flow shall be taken as indicating a possible seepage of drilling fluid.
- The annular and / or standpipe pressure. An unplanned reduction in pressure shall be taken as indicating a possible seepage of drilling fluid.
- The tank and pit volumes.

Any unplanned losses or gains will be reported, and increased diligence of upland and in-stream monitoring will be conducted.

- The HDD contractor will inspect all HDD equipment once every 12 hour shift to prevent the deposition of hydrocarbons onto the ground, or into a water body.
- Water Quality Monitoring is not part of Brotherton's scope of work.

3.3 Response

- The Rig Manager is the on-site authority for the HDD contractor. The Rig Manager has the authority to direct the rig crew, and the materials and equipment towards the protection of the environment.

3.4 Directional Drill Mud Release Contingency Plan

Objectives

The contingency plan outlined below has been developed and will be employed to meet the following objectives:

- To ensure Contractor has specific measures in place in the event of an inadvertent mud release and that potential impacts are minimized; and
- To ensure corrective action processes are in place to properly manage inadvertent releases of drilling mud.

The Rig Manager is responsible for implementing and maintaining all mitigation measures unless otherwise specified.

Specific Measures

Cleanup Plan

1. Develop a cleanup plan, before drilling. The plan will be prepared with the drill contractor in consultation with Owners inspection staff. Acquire the appropriate approvals to access the release area if off right-of-way and for mud pump-off.
2. Ensure that supervisory personnel are aware of the contingency plan and cleanup plan before commencement of drilling activity.

Surface Casing

3. Install surface casing at the entry point to a depth that extends beyond the coarsest material, if warranted.

4. Install surface casing at the exit point, after completion of the pilot hole if coarse textured near-surface deposits could interfere with drilling mud circulation.

Mud Composition

5. The composition of drilling fluid will be limited to fresh water and high yield bentonite conforming to or exceeding American Petroleum Institute specifications. Other additives or substitutes will require Owner approval before being used in the drilling fluid.

Drilling Sumps

6. Construct subsoil berm(s) or sump(s) down slope from the entry point and proposed exit point with a capacity adequate to capture anticipated volumes of drilling mud that could be release during pullback and other drilling operations.

Contingency Plan Equipment and Supplies

7. Certain equipment will be required onsite in sufficient quantities during drilling operations to contain any inadvertent drilling mud releases. This equipment and supplies may include:

- Sandbags;
- filter cloth (e.g., silt fence);
- t-bar posts;
- straw bales;
- shovels;
- 55 Gallon Barrels;
- 6 mil polyethylene or equivalent; and
- trash pumps c/w sufficient lengths of leak free hose and suction heads.

All of the HDD equipment on site is available to for use with emergency containment of seepage of drilling fluid, and will be directed by the Rig Manager

Manpower

8. All of the HDD contractor manpower are available to effect an emergency containment of seepage of drilling fluid, and will be directed by the Rig Manager.

Monitoring

9. Supervisory personnel will be onsite during drilling, reaming and pullback operations to ensure that contingency plan measures will be implemented immediately and effectively.
10. Monitor and record the amount of fluid return to the mud tank/pit and the amount of makeup drilling fluid required in the mixing tanks during drilling of the pilot hole and reaming.

Water Quality Monitoring (by others)

11. Ensure the water quality sampling program is in place before drilling and includes the following information:
 - Sample locations (both an upstream control site as well as appropriate downstream sites);
 - Frequency of sampling; and
 - Sampling procedures.

12. Increase the sampling frequency if monitoring of drilling mud returns indicate that a release may have occurred.

Response

13. Where seepage of drilling fluid into a water body or riparian area is detected as possibly occurring, all drilling operations must stop. Rig Manager will initiate emergency response plan if seepage of drilling fluid into a water body or riparian area is confirmed.
14. The observation of a reduction in flow of drilling fluid will constitute a detection of a possible occurrence of seepage, and thus, if a reduction in the return flow of drilling fluid should occur, the Rig Manager will;
 - Stop the advancement of the drilling assembly, pull the drive carriage to the top of the derrick, and shut off the drilling fluid pumps
 - Conduct a survey of the ground surface and water body for evidence of seepage of drilling fluid to surface.
 - Notify the Owners Representative.
 - Assemble measurement data such as annular and/or standpipe pressure, forward thrust pressure, and observations such as the behavior of the return flow. Evaluate the measurement data and observations with the Owners Representative.
 - Assist the Owners representative in developing a Drill Continuance Plan.

Seepage

15. If seepage of drilling fluid to surface does occur, the Rig Manager will:
 - Stop all drilling operations.
 - Contain the seepage by erecting a sandbag and polyethylene berm (or other fit- for-purpose material), or by digging a pit, or a combination of both.
 - Notify the Owners Representative.
 - Develop and implement a recovery and clean up plan with the Owners Representative.
 - Assemble measurement data such as annular and/or standpipe pressure, forward thrust pressure, and observations such as the behavior of the return flow.
 - Evaluate the measurement data and observations with the Owner Representative.
 - Assist the Owners Representative in developing a Continuance Plan.
 - Document the incident according to company procedures.

Pilot Hole Deviation

16. If the pilot bore encounters conditions that interfere with steering accuracy, then the Rig Manager and Owners representative will need to take the appropriate action to complete the crossing. These actions could include:
 - Accepting the new drill path; and/or

- Adjusting the depth of the borehole path so the drill can avoid the problematic stratum; or
- Pulling out, moving over and drilling a new pilot hole

Loss of Circulation

17. If loss of circulation is encountered during the HDD, then the Rig Manager and Owners representative will need to assess the extent of fluid loss, determine its likely cause and take the best remedial action. These actions may include:

- Determining the fluid loss acceptable and continuing to drill/ream/pull; or
- Stopping the operation, re-establishing circulation and restarting the operation; or
- Abandoning the hole, moving over, and boring a new crossing path

Given that there are many factors to consider in determining if the HDD fails, a full evaluation of all relevant data will be made and all reasonable options will be considered prior to seeking approval to use the contingency plan.

Waste Management

18. The Contractor and the Rig Manager will put in place the following measures in place to maintain the cleanliness of the work site.

- Store deleterious substances used in the operation and maintenance of equipment in approved containers, and store containers in a location and in a manner that protects them from being punctured, crushed and leaked into the watercourse.
- Provide segregated waste disposal containers for all general waste, and dispose of such waste.
- Provide sanitary facilities for crew.
- Backfill and stabilize any pits excavated for anchoring or containment.
- Dispose of all waste drilling fluid and drilled solids according to and in conformance with regulatory requirements.

Groundwater Intrusion Management -

- Over-excavate entry pit to dimensions of 8'x 8' by 5' deep pit
- Collect Groundwater flowing into bore pit and pump out into 20,000 gallon frac tank using 6" pump
- Hauled off and dispose of excess groundwater at approved dump site with vacuum trucks.

Drilling Fluid Flush Management Plan -

- Over-excavate entry pit to dimensions of 8'x 8' by 5' deep pit
- Collect drilling fluid flowing into bore pit and pump out into 20,000 gallon frac tank using 6" pump.
- Hauled off and dispose of excess groundwater at approved dump site with vacuum trucks.

DRAFT

Appendix D: Greenhouse Gas Emissions Supporting Information

Introduction

This document summarizes the environmental and regulatory setting for greenhouse gas emissions.

Regulatory Setting

Federal

There is currently no federal overarching law specifically related to climate change or the reduction of GHG emissions. Under the Obama Administration, the United States Environmental Protection Agency (EPA) had been developing regulations under the Clean Air Act (CAA) pursuant to EPA's authority under the act. There have also been settlement agreements between EPA, several states, and nongovernmental organizations to address GHG emissions from electric generating units and refineries, as well as the EPA's issuance of an "Endangerment Finding" and a "Cause or Contribute Finding." EPA has also adopted a Mandatory Reporting Rule and Clean Power Plan. Under the Clean Power Plan, EPA issued regulations to control carbon dioxide (CO₂) emissions from new and existing coal-fired power plants. However, on February 9, 2016 the Supreme Court issued a stay of these regulations pending litigation. Former EPA Administrator Scott Pruitt also signed a measure to repeal the Clean Power Plan. The fate of the proposed regulations is uncertain given the change in federal administrations and the pending deliberations in federal courts.

State

California has adopted statewide legislation addressing various aspects of climate change and GHG mitigation. Most of this legislation establishes a broad framework for the State's long-term GHG reduction and climate change adaptation program. The former and current governors of California have also issued several executive orders (EOs) related to the State's evolving climate change policy. Summaries of key policies, EOs, regulations, and legislation at the state level that are relevant to the project are provided below.

Executive Order S-3-05

On June 1, 2005, Governor Arnold Schwarzenegger signed California Executive Order (EO) S-3-05. The goal of this EO was to reduce California's GHG emissions to (1) 2000 levels by 2010; (2) 1990 levels by 2020; and (3) 80 percent below the 1990 levels by 2050. EO S-3-05 also calls for the California Environmental Protection Agency to prepare biennial science reports on the potential impact of continued global warming on certain sectors of the California economy. As a result of the scientific analysis presented in these biennial reports, a comprehensive Climate Adaptation Strategy was released in December 2009 following extensive interagency coordination and stakeholder input. The latest of these reports, Climate Action Team Biennial Report, was published in December 2010.

Assembly Bill 32

One goal of EO S-03-05 was further reinforced by Assembly Bill (AB) 32 (Chapter 488, Statutes of 2006), the Global Warming Solutions Act of 2006, which requires the state to reduce GHG emissions to 1990 levels by 2020. Since AB 32 was adopted, CARB, the California Energy Commission (CEC), the California Public Utilities commission (CPUC), and the Building Standards Commission have been developing

regulations that will help meet the goals of AB 32. Under AB 32, CARB is required to prepare a Scoping Plan and update it every five years. The Scoping Plan was approved in 2008, the first update approved in 2014, and an additional update was approved in 2017 (see discussion of Senate Bill [SB] 32 below). The Scoping Plan identifies specific measures to reduce GHG emissions to 1990 levels by 2020, and requires CARB and other state agencies to develop and enforce regulations and other initiatives for reducing GHGs. Specifically, the AB 32 Scoping Plan articulates a key role for local governments, recommending they establish GHG reduction goals for both their municipal operations and the community consistent with those of the state.

Executive Order S-01-07

With EO S-01-07, Governor Schwarzenegger set forth the low carbon fuel standard for California in 2007. Under this EO, the carbon intensity of California's transportation fuels is to be reduced by at least 10 percent by 2020.

Senate Bill 32 and Assembly Bill 197

SB 32 (2016) requires CARB to ensure that statewide GHG emissions are reduced to at least 40% below the 1990 level by 2030, consistent with the target set forth in EO B-30-15. The companion bill to SB 32, AB 197, creates requirements to form a Joint Legislative Committee on Climate Change Policies, requires CARB to prioritize direct emission reductions and consider social costs when adopting regulations to reduce GHG emissions beyond the 2020 statewide limit, requires CARB to prepare reports on sources of GHGs and other pollutants, establishes 6-year terms for voting members of ARB, and adds two legislators as non-voting members of CARB. CARB adopted the *2017 Climate Change Scoping Plan* in November 2017 to meet the GHG reduction requirement set forth in SB 32. It proposes continuing the major programs of the previous Scoping Plan, including Cap-and-Trade Regulation, low carbon fuel standard, more efficient cars, trucks, and freight movement, RPS, and reducing methane emissions from agricultural and other wastes.

Executive Order B-55-18

EO B-55-18 acknowledges the environmental, community, and public health risks posed by future climate change. It further recognizes the climate stabilization goal adopted by 194 states and the European Union under the Paris Agreement. While the United States was not party to the agreement, California is committed to meeting the Paris Agreement goals and going beyond them wherever possible. Based on the worldwide scientific agreement that carbon neutrality must be achieved by midcentury, EO B-55-18 establishes a new state goal to achieve carbon neutrality as soon as possible, and no later than 2045, and to achieve and maintain net negative emissions thereafter. The EO charges the CARB with developing a framework for implementing and tracking progress towards these goals. This EO extends EO S-3-05, but is only binding on state agencies.

Local

Bay Area Air Quality Management District

BAAQMD has primary responsibility for air quality management within Contra Costa. BAAQMD directs lead agencies to quantify and disclose GHG emissions and make a determination on the significance of GHG impacts in relation to meeting state GHG reduction goals. BAAQMD's (2017) *CEQA Guidelines* outline advisory thresholds for stationary source and land use development projects. The mass emissions threshold for stationary source projects is 10,000 metric tons per year of carbon dioxide

equivalent (CO₂e). For land use development projects, the guidelines establish three potential analysis criteria for determining project significance: compliance with a qualified climate action plan (CAP), a mass emissions threshold of 1,100 metric tons per year of CO₂e, and a GHG efficiency threshold of 4.6 metric tons CO₂e per service population (project jobs + projected residents). BAAQMD's *CEQA Guidelines* do not identify a GHG emission threshold for construction-related emissions, but they recommend that GHG emissions from construction be quantified and disclosed.

Contra Costa County Climate Action Plan

Contra Costa County adopted a CAP in 2015. The plan outlines a variety of strategies to reduce GHG emissions generated by community activities by 15% below 2005 levels by 2020 (Contra Costa County 2015). The CAP and its reduction measures are primarily applicable to operational emissions sources. As the proposed project would not result in operational changes, the CAP and its reduction measures cannot be used for CEQA tiering purposes for the proposed project.

Environmental Setting

Climate change is a complex phenomenon that has the potential to alter local climatic patterns and meteorology. Increases in anthropogenic GHG emissions have been unequivocally linked to recent warming and climate shifts (Intergovernmental Panel on Climate Change 2018). Although modeling indicates that climate change will result globally and regionally, there remains uncertainty with regard to characterizing the precise local climate characteristics and predicting precisely how various ecological and social systems will react to any changes in the existing climate at the local level. Regardless of this uncertainty in precise predictions, it is widely understood that some degree of climate change is expected as a result of past and future GHG emissions.

The most common GHGs resulting from human activity are CO₂, methane (CH₄), and nitrous oxide (N₂O). State CEQA Guidelines also define GHGs to include perfluorinated carbons (PFCs), sulfur hexafluoride (SF₆), and hydrofluorocarbons (HFCs), although these would not be generated by the proposed project. Unlike criteria air pollutants, which occur locally or regionally, the long atmospheric lifetimes of these GHGs allow them to be well-mixed in the atmosphere and transported over distances. Within California, transportation is the largest source of GHG emissions (41% of emissions in 2016), followed by industrial sources (23%) and in-state electricity generation (10%) (California Air Resources Board 2018).

Table 1 lists the global warming potential of CO₂, CH₄, and N₂O and their lifetimes in the atmosphere.

Table 1. Lifetimes and Global Warming Potentials of Key Greenhouse Gases

Greenhouse Gases	Global Warming Potential (100 years)	Lifetime (years)
CO ₂	1	50–200
CH ₄	25	9–15
N ₂ O	298	121
Sources: Intergovernmental Panel on Climate Change 2007		
CH ₄ = methane		
CO ₂ = carbon dioxide		
N ₂ O = nitrous oxide		
ppb = parts per billion		
ppm = parts per million		

References

- Bay Area Air Quality Management District. 2017. *Final 2017 Clean Air Plan*. April. Available: http://www.baaqmd.gov/~media/files/planning-and-research/plans/2017-clean-air-plan/attachment-a_proposed-final-cap-vol-1-pdf.pdf?la=en. Accessed: April 29, 2019.
- California Air Resources Board. 2018. *California Greenhouse Gas Emission Inventory – 2018 Edition*. Available: <https://www.arb.ca.gov/cc/inventory/data/data.htm>. Accessed: April 29, 2019.
- County of Contra Costa. 2015. *Climate Action Plan*. Adopted December 15. Available: <http://www.co.contra-costa.ca.us/DocumentCenter/View/39791/Contra-Costa-County-Climate-Action-Plan?bidId=>. Accessed: April 29, 2019.
- Intergovernmental Panel on Climate Change. 2007. *Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*. Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis, K. B. Averyt, M. Tignor and H. L. Miller (eds.). Available: http://www.ipcc.ch/publications_and_data/ar4/wg1/en/contents.html. Accessed: April 29, 2019.
- . 2018. *Global Warming of 1.5°C*. October. Available: https://report.ipcc.ch/sr15/pdf/sr15_spm_final.pdf. Accessed: April 29, 2019.

Appendix E: Geotechnical Report



GEOTECHNICAL REPORT

GEOTECHNICAL EXPLORATION REPORT

R-965 L-114 MP 17.06 TO 17.51 MARSH CREEK
CROSSING, BRENTWOOD, CALIFORNIA

Submitted To: Pacific Gas and Electric Company
6121 Bollinger Canyon Road
Building Z, 4th Floor
San Ramon, CA 94583

Submitted By: Golder Associates Inc.
1575 Treat Blvd. Suite 100
Walnut Creek, CA 94598

Distribution: PDF – Francisco Galan Bran (PG&E)
File Copy & PDF – Golder Walnut Creek

October 27, 2017

Project No. 1408253200.202004





Table of Contents

1.0	INTRODUCTION.....	1
1.1	Project Understanding.....	1
2.0	SITE GEOLOGIC CONDITIONS AND HAZARDS	2
2.1.1	Geologic Setting.....	2
2.1.2	Local Geology	2
2.1.3	Site Geologic Hazards	2
3.0	SITE EXPLORATION.....	4
3.1.1	Geophysical Exploration	4
3.1.1.1	MASW Method and Field Program	4
3.1.1.2	Seismic Refraction Method and Field Program	5
3.1.1.3	MASW and Seismic Refraction Results.....	6
3.1.2	Utility Clearance and Permits.....	7
3.1.3	Test Boring.....	8
3.2	Laboratory Testing	9
3.3	Site Subsurface Conditions.....	9
4.0	RECOMMENDATIONS.....	10
4.1.1	Pipe installation.....	10
4.1.2	Open Trench Considerations	10
4.1.2.1	Trench Foundation	10
4.1.2.2	Fill Materials and Placement.....	10
4.1.3	Pipe Trench Excavations	11
4.1.4	Lateral Earth Pressures	12
4.1.5	Restrained Shoring System	12
4.1.6	Unrestrained Shoring System.....	14
5.0	USE OF THIS REPORT.....	15
6.0	CLOSING	16
7.0	REFERENCES.....	17

List of Figures

Figure 1	Site Vicinity Map
Figure 2	Site Plan
Figure 3	Local Geologic Map
Figure 4	Seismic Investigation Line Locations
Figure 5	Seismic Refraction Velocity Model North Tie-In to South of Creek (1080 feet)
Figure 6	Seismic Refraction Velocity Model South Tie-In to South of Creek (1130 feet)
Figure 7	Geologic Cross-Section A-A'
Figure 8	Geologic Cross-Section B-B'



List of Appendices

Appendix A	Summary Boring Log
Appendix B	Groundwater Monitoring Well Construction Details Log
Appendix C	Geotechnical Laboratory Testing Results



1.0 INTRODUCTION

This report presents the results of a geotechnical exploration performed by Golder Associates Inc. (Golder) for the proposed Pacific Gas and Electric Company's (PG&E) L-114 mile post (MP) 17.06 to 17.51 replacement pipeline crossings of Marsh Creek in Brentwood, California (the site). The site location is shown on Figure 1. The geotechnical exploration included one test boring and a geophysical survey. This report presents the project description, site geologic conditions, information obtained from our site investigation, discussion of encountered subsurface conditions, and geotechnical and constructions recommendations for the use of designing the proposed pipeline crossing.

1.1 Project Understanding

PG&E is proposing to replace sections of gas transmission line L-114 from MP 17.06 to 17.51 where it crosses Marsh Creek, as shown on Figure 2. It is our understanding that the proposed replacement of the pipeline is intended to replace a vintage pipe installed in 1942 that contains Bell Chill Ring welding connections. The proposed replacement of the pipelines is a long term solution to protect the pipelines and the surrounding environment and watershed.



2.0 SITE GEOLOGIC CONDITIONS AND HAZARDS

2.1.1 Geologic Setting

The site is located on the eastern end of the San Francisco Bay section of the Coast Ranges Geomorphic Province. The Coast Ranges are northwest-trending mountain ranges and associated valleys, bounded to the north by the Klamath Mountains, to the east by the Great Valley, to the south by the Transverse Ranges, and to the west by the Pacific Ocean. The ranges and valleys trend northwest, subparallel to the San Andreas Fault. Strata dip beneath alluvium of the Great Valley to the east. The Coast Ranges are composed of thick Mesozoic and Cenozoic sedimentary strata. The northern and southern ranges are separated by a depression containing the San Francisco Bay. The eastern border is characterized by strike-ridges and valleys in Upper Mesozoic strata. In several areas, Franciscan rocks are overlain by volcanic cones and flows of the Quien Sabe, Sonoma and Clear Lake volcanic fields.

2.1.2 Local Geology

According to the Geologic Map of California by the United States Geological Survey (2010), the local geology consists of Eocene marine deposits. The lithology is well consolidated and consists of marine shale, sandstone, and conglomerate limestone. Subsurface soils in the area are primarily composed of sands and clays.

2.1.3 Site Geologic Hazards

Specific geologic hazards and their assessment and/or mitigations are summarized below:

- **Settlement:** Settlement is not considered a hazard for the pipeline as there is no significant grading or loading changes associate with the installation of the proposed pipeline. If required, settlement can be mitigated by ground improvement techniques and the implementation of appropriate design measures.
- **Landsliding:** Since the site is located within a flatland area and due to the depth of the proposed pipeline, landslide hazards are considered negligible.
- **Faulting/Surface Rupture:** The site is not located in a mapped Alquist-Priolo zone and therefore the potential of faulting and surface rupture is considered negligible.
- **Strong Ground Motions:** The site is located in an area of high seismicity and is subject to strong ground shaking. Figure 22-7 of ASCE 7-10 (American Society of Civil Engineers, 2010) indicates the peak ground acceleration (PGA) at the project site, corresponding to the maximum considered earthquake (MCE) and Site Class B material, is 0.502g where g is the force of gravity. Since the project site consists of Site Class D material, described in Section 3.1.1.3, the PGA from Figure 22-7 must account for this by using the site coefficient F_{PGA} . F_{PGA} for the project site corresponds to 1.0, per Table 11.8-1 of ASCE 7-10; therefore the site PGA is considered to be 0.502 g. The impact of strong ground motions on the proposed pipeline can be addressed by implementing the design recommendations provided in the latest California Building Code and the appropriate pipeline specific building codes.
- **Liquefaction:** The soils encountered at test boring MW-1 (Figure 2) were predominantly cohesive with a significant clay fraction and moderate to high plasticity. Typically, soils with a significant clay fraction that exhibit cohesion ($PI > 7$) are less susceptible to



liquefaction. However, a layer of sand with gravel and silt was identified during drilling between depths of approximately 17 to 21 feet-bgs. Considering the post drilling, equilibrium static water level was measured at approximately 28 feet-bgs, combined with the material's compact relative density, this layer is considered to have a low susceptibility to liquefaction. In general, the risk of liquefaction is considered low, therefore, a liquefaction assessment was not performed.



3.0 SITE EXPLORATION

The site (Figures 1 and 2) was explored to characterize the subsurface conditions. The following sections summarize the subsurface explorations completed by Golder for the proposed project and the encountered subsurface conditions at the proposed project site.

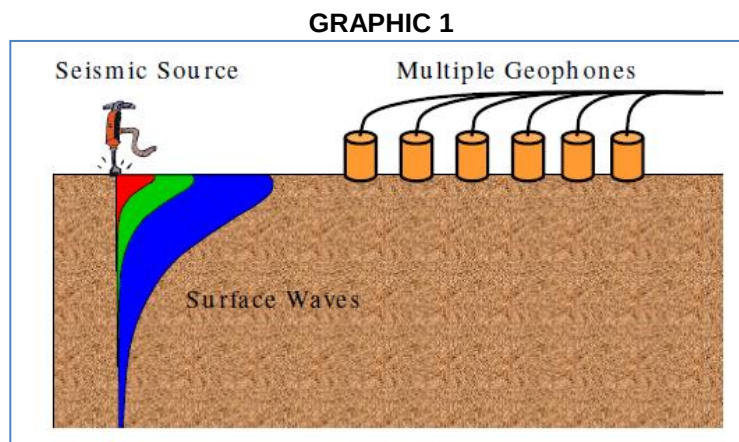
3.1.1 Geophysical Exploration

Golder performed a seismic refraction and multichannel analysis of surface waves (MASW) geophysical exploration at the site on May 10 and May 17, 2017. The investigation consisted of two geophysics lines approximately 1,080 and 1,130 feet in length paralleling the proposed pipeline alignment. One line spanned from the north end of Pioneer Square to approximately 400 feet south of Vineyards Parkway and crossed the borehole location, the other line spanned from approximately 350 to 1,500 feet south of Vineyards Parkway nominally parallel to Marsh Creek Road. Figure 4 depicts locations of the two lines. The results of the geophysical exploration are presented in Figures 5 through 8.

3.1.1.1 MASW Method and Field Program

The MASW method identifies the contrast in surface wave velocity with increasing distances and wavelengths. The data from these measurements are used to model the shear wave velocity of the subsurface. This information can then be used to infer rock/soil types, stratigraphy and soil conditions as the shear wave velocity of a material is typically an indicator of its stiffness.

For this investigation, MASW data were acquired using a Geometrics™ twenty-four channel GEODE digital engineering seismograph coupled with twenty-four geophones evenly spaced 10 feet apart. Graphic 1 below shows the schematic for a typical MASW line. Seismic energy was generated using a 10-lb sledgehammer struck against a steel plate.



MASW data were processed using industry standard, commercially available SeisImager 2D software from Geometrics Inc. For each shot record, the proper channels were grouped and processed using the



SeisImager software module. The following are the processing steps used to produce the 2-dimensional velocity models presented in the results section (3.1.1.3):

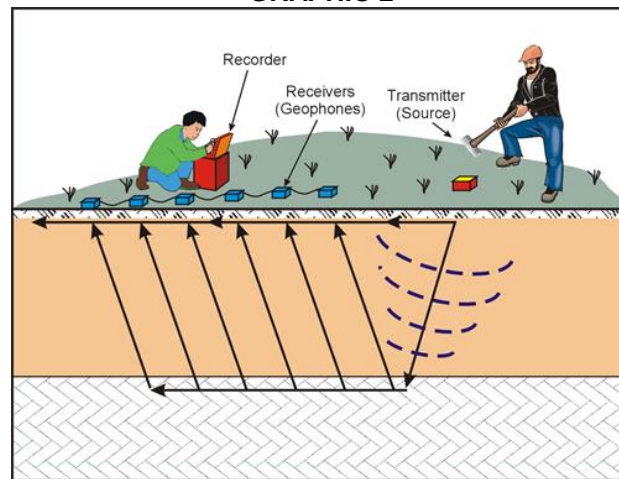
- Edit source and geophone locations
- Pick first arrival times
- Export file of first arrival times and geophone locations
- Generate initial velocity model; 20 layers, 100 feet thick, 900 to 13,000 feet per second
- 2-dimensional inversion to determine shear wave velocity model
- Export model results as x, y, z file
- Plot model results in a color-contoured profile

MASW dispersion curves were processed at 10 foot intervals along each survey line. The dispersion curves were inverted to best fit the dispersion curve to a theoretical shear wave velocity model of the ground at that location. MASW models are interpreted with respect to geologic conditions based primarily on the seismic velocity structure. It was anticipated that the MASW-derived shear wave velocity models would reflect distinct velocity contrasts at points of contact between fill, native soil, and/or rock.

3.1.1.2 Seismic Refraction Method and Field Program

Seismic refraction is the traditional method for mapping the thickness of overburden soils and depth to bedrock using a controlled energy source (hammer in this case) to generate a seismic signal into the earth. The seismic signals are received by a series of geophones (24, for this project) that are connected to a seismic cable laid on the ground in a linear manner. The geophones are placed several inches into the ground and spaced along the geophone cable while the seismic energy source is discharged at several places along the array and off both ends.

The seismic wave front travels through the earth to the geophones. The geophones transfer the acoustic energy in the ground to an electric signal in the geophone cable. The seismograph detects the arriving electric signals with respect to time and stores the records for future data processing. The seismic data is processed to determine the seismic velocity of the earth material through which the energy has traveled and to model the subsurface geology. The geophysical model depicts the earth in cross-section showing the velocity and thickness of the subsurface layers below the seismic line. A field schematic of seismic refraction is shown in Graphic 2 below.

**GRAPHIC 2**

Refraction data were processed using industry standard, commercially available SeisImager 2D PRO software from Geometrics Inc. The processing steps used to produce the 2-dimensional velocity models presented in the results section are provided below:

- Edit source and geophone locations
- Pick first arrival times
- Export file of first arrival times and geophone locations
- Import elevation data
- Generate initial velocity model-10 layers, 120 feet thick, constrained to 900-12,000 feet per second (fps)
- 2-dimensional inversion to determine velocity model
- Export model results as three-column data files containing x, z, and velocity
- Plot model results

3.1.1.3 MASW and Seismic Refraction Results

Sub-foot accurate, DGPS-derived, surface topography as well as geophone and shot geometry were entered into SeisImager along with the measured first arrival times to generate a best-fit tomographic models of shear and compressional seismic velocity. Figures 5 and 6 depict cross-sections of modeled compressional wave (p-wave) and shear wave (s-wave) seismic velocity. Modeled p-wave velocities were primarily used to estimate the depth to rock at the site while s-waves were used to identify any “hidden layers” where loose or poorly-cemented gravels may exist between denser layers above and below. Lower velocity between approximately 300 and 520 feet along the seismic line (between Pioneer Square and Vineyard Parkway) at an elevation of approximately 125 feet (17-22 feet bgs) may be interpreted as a less dense material which could be a thin gravel layer.



Areas of the subsurface with modeled p-wave seismic velocities between 0 and 5,500 feet per second (fps) are interpreted to be variably-saturated soils and sediments. Subsurface materials with modeled velocities between 5,500 and 8,000 fps are interpreted to be weathered to highly weathered rock; and materials above 8,000 fps interpreted to be less weathered and more competent rock. On Figures 5 and 6, the pink line between “hot” colors, indicating high seismic velocities, and “cool” colors, indicating lower seismic velocities, marks the approximate contact where bedrock is interpreted to exist based solely on seismic data.

In absolute terms, shear wave velocities generally range from 500 to 1200 fps in the upper 40 to 60 feet of material and increase with depth. While the MASW data were not used to generate a site-specific seismic site classification (based on average shear velocities with the upper 30 meters or 100 feet; i.e., V_{s-30} or V_{s-100}), material in this velocity range typically classifies as Site Class D.

At the borehole location, geophysical data indicate a strong contrast in compressive wave velocity at approximately 31 feet below ground surface. The drilling operation results described in Section 3.1.3 were used to verify this expected depth to rock and calibrate the results of the geophysical model elsewhere along the seismic lines. Drilling results indicate a gradual transition from sediments to weathered rock that correlate well with seismic data interpretation completed prior to drilling. Seismic model results suggest the soil/rock contact may be abrupt elsewhere along the pipeline alignment. In particular, where the proposed alignment crosses Marsh Creek, from approximately 750 to 835 feet along the seismic line, rock may be very close to the surface. Increased p-wave velocity here may alternatively represent a more cemented sediment layer.

South of Marsh Creek (Figure 6), an interpreted rock surface is presented where both the shear and compressive seismic velocity models show a sharp contrast in velocity. This contact appears to gently slope from approximately 120 feet to 133 feet elevation from north to south (pink line on Figure 6). An inversion of velocity in the shear wave model from 100 to 500 feet along the south seismic line may represent a lower density zone of rock due to fracturing but is not likely a gravel layer based on drilling results at MW-1, and logs for test borings B-2 and B-3 in Klienfelder (2008).

3.1.2 Utility Clearance and Permits

Golder performed a visual reconnaissance of the site on June 1, 2017 to mark the test boring location. Following the June 1 site visit, Golder notified Underground Service Alert (USA) of Northern California of the proposed test boring location as required by law, and obtained the required well installation permits from the Contra Costa County Environmental Health Division (CCCEHD). Golder conducted an onsite meeting on June 9, 2017 with the PG&E locator who responded to the USA ticket to verify the location of a nearby transmission line and clear the test boring location prior to commencing exploratory drilling.



3.1.3 Test Boring

On June 15-16, 2017, Golder performed a subsurface exploration consisting of one test boring. The location of the Golder test boring is shown on Figure 2.

Test boring MW-1 was advanced to a depth of 98 feet below the existing ground surface (bgs). The test boring was advanced using sonic drilling by Cascade Drilling, L.P. using a track-mounted Terra Sonic International 150CC sonic drill rig. This involved sending high frequency resonant vibrations 7-inch diameter hollow steel drill rods and bit to advance through the subsurface. Following the advancement of the drill rod at intervals of 10 to 20 feet, 9-inch diameter steel casings were advanced using high frequency resonant vibrations to create a continuously cased hole. The top six feet of the test boring was excavated using a hand auger.

Sonic drilling produces a near continuous core sample of the subsurface for the extent of the depth drilled. Core barrel samples were collected in nominal 5- to 10-foot runs throughout the depth of the hole. In addition to the core samples, standard penetration testing (SPT) was also conducted to estimate the insitu relative density, consistency, rock strength, and collect split-spoon soil samples. SPTs were performed in accordance with ASTM D1586, a process by which a 140 pound hammer freely falls from a height of 30 inches to deliver a repeatable standardized amount of energy needed to drive the split-spoon sampler a total of 18 inches into the subsurface. A conventional SPT split spoon sampler was used (1.4-inch inside diameter) to collect samples approximately every 5 feet within the upper 50 feet of the borehole, then intermittently to the termination depth.

Drilling was observed by a Golder engineer, who documented the encountered subsurface conditions and collected select samples for further classification and laboratory testing. The encountered subsurface conditions and soil samples were classified in accordance with Golder technical procedures and the Unified Soil Classification System (ASTM D2487). The approximate test boring location and elevation were estimated from Google Earth, Universal Transverse Mercator zone 10 S, datum WGS84. The summary boring log is provided in Appendix A. All samples were placed in air-tight sample bags to prevent moisture loss during storage and transport to the laboratory.

At the completion of the drilling, test boring MW-1 was backfilled using 3/8-inch bentonite chips to a depth of 50 feet-bgs, then a groundwater monitoring well was installed in the upper 50 feet. A Golder engineer was present to observe the backfill and well construction, and a CCCEHD representative was present to observe the well construction. At the time this report was prepared, the monitoring well had yet to be developed. Groundwater monitoring well construction detail log is presented in Appendix B.



3.2 Laboratory Testing

Geotechnical laboratory testing was conducted on three soil samples collected from 9 to 10.5, 19 to 20.5 and 35 to 36.5 feet-bgs. Geotechnical laboratory testing consisted of moisture content, Atterberg limits, particle size analysis, and soil classification. The results of the laboratory testing are provided in Appendix C.

3.3 Site Subsurface Conditions

The subsurface conditions at the site consist of alluvium over weathered rock. Specific subsurface conditions encountered at test boring MW-1 is described below.

- 0 to 25 feet-bgs: low plasticity clay with a 4-foot thick layer of well graded sand with silt and gravel between depths of 17 and 21 feet-bgs.
- 25 to 98 feet-bgs: weathered shale.

The depth to groundwater was not directly measured during drilling due to the use of sonic drilling. Although, a perched water level was initially inferred from 18 to 25 feet-bgs based on the observed moisture of the collected samples. A Golder representative returned to the monitoring well on August 7, 2017 to measure the static, equilibrium water level. Water was measured at approximately 27.6 feet-bgs.

At the borehole location, geophysical data indicate a strong contrast in p-wave velocity that correlates well with the transition from clay to shale observed during drilling of MW-1. The measured p-wave velocities suggest that rock may be very close to the surface where the proposed pipeline alignment crosses Marsh Creek, from approximately 750 to 835 feet along the seismic line (Figure 5). South of Marsh Creek, the interpreted rock surface (pink line on Figure 6) appears to gently slope from approximately 120 feet to 133 feet elevation from north to south. An inversion of shear wave velocity model from 100 to 500 feet along the south seismic line may represent a highly-fractured rock below the interpreted rock contact but is unlikely a gravel layer based on drilling results at MW-1, and logs for B-2 and B-3 in Kleinfelder (2008). Based on seismic results, rock strength appears variable along the proposed alignment.



4.0 RECOMMENDATIONS

Recommendations regarding geotechnical issues and associated design parameters for the proposed pipeline replacement are provided in the following sections.

4.1.1 Pipe installation

It is Golder's understanding that both trenching and trenchless installation methodologies are currently being considered by PG&E. Based on the results of test boring and geophysical exploration, Golder has identified some localized gravel that could present some challenges, especially if HDD is chosen. The depth of the gravel ranges from 17 to 21 feet-bgs in proximity to the North Tie and between Pioneer Square and Vineyard Parkway. The other units are represented by low plasticity clay and extremely weak to weak rock. Variability of rock strength, especially south of the creek, inclined contact planes and layering might also cause difficulties steering an HDD rig and loss of drilling fluid return in fractured areas.

If the open trenching method is selected by PG&E, Golder recommends that a scour analysis of Marsh Creek be conducted to determine design depths for the replacement pipelines. Design and construction considerations for trenching are provided in the following section.

4.1.2 Open Trench Considerations

4.1.2.1 Trench Foundation

The trench subgrade should be a firm and unyielding base for pipe bedding material. Care should be taken to avoid disturbing trench subgrade soils that will remain in place. Areas which become softened or disturbed during construction should be moisture conditioned and recompacted or removed and replaced with 1 inch-minus crushed rock with less than 8 percent by weight passing the ¼-inch sieve and mechanically tamped each 12-inch lift. Geotextile filter fabric should be placed between aggregate rock and the pipe bedding material.

4.1.2.2 Fill Materials and Placement

Fill materials, including the pipe bedding, pipe zone, and trench backfill materials shall be in accordance to PG&E Engineering Material Specification No. 4123 (PG&E Gas Engineering, 2012). The Engineering Material Specification No. 4123 (PG&E Gas Engineering, 2012) requires fill materials to be free of all organic matter, other deleterious substances, and material greater than ½-inch in any dimension.

Fill shall have a moisture content of ± 3 percent of optimum moisture content at the time of compaction as determined from ASTM D1557, be placed in lifts with a maximum loose thickness of 8 inches, and mechanically compacted to a relative compaction of at least 95 percent per ASTM D1557. Compaction by jetting and flooding should not be permitted. It is assumed that provisions for trench dewatering will be provided if the trench is located below the groundwater table or inundated with surface water runoff.



4.1.2.2.1 Pipe Bedding

The pipe bedding material shall have a minimum thickness of 6 inches below the bottom of the pipe and be placed on a firm and unyielding trench foundation as specified in Section 4.1.2.1. Pipe bedding material shall be an imported granular material in accordance with the PG&E Engineering Material Specification No. 4123 (PG&E Gas Engineering, 2012) and meet the placement and compaction requirements as described in Section 4.1.2.2.

4.1.2.2.2 Pipe Zone Backfill

Pipe zone backfill shall be placed with a minimum of height of 12 inches above the top of the pipe and a minimum of 6 inches on the sides of the pipe. Pipe zone backfill material shall be an imported granular material in accordance with the PG&E Engineering Material Specification No. 4123 (PG&E Gas Engineering, 2012) and meet the placement and compaction requirements as described in Section 4.1.2.2.

4.1.2.2.3 Trench Backfill

Trench backfill material is classified as material placed above the pipe zone backfill. Trench backfill material should be placed to the top of the trench finished grade or below surface treatments in finished areas. Trench backfill material shall be an imported granular material in accordance with the PG&E Engineering Material Specification No. 4123 (PG&E Gas Engineering, 2012) and meet the placement and compaction requirements as described in Section 4.1.2.2.

4.1.3 Pipe Trench Excavations

Maintaining safe pipe trench excavations is the responsibility of the contractor. All temporary slopes and excavations should comply with all applicable current OSHA, state (Cal/OSHA), and local standards. The inclination of temporary slopes is dependent on several variables, including the height of the cut, the soil type and density, the presence of groundwater seepage, construction timing, weather, and surcharge loads from adjacent structures, roads and equipment. In no case should excavation slopes be greater than the limits specified in local, state, and federal safety regulations.

If trench shoring is used, the contractor should be responsible for the design, construction and safety of the shoring. All excavations should be evaluated by the contractor's engineer to assess stability. All excavations should be evaluated for stability prior to occupation by construction personnel.

During wet weather, runoff water should be prevented from entering excavations. Water should be collected and disposed of outside the construction limits. Heavy construction equipment, building materials, excavated soil, and vehicular traffic should not be allowed within a distance of one-third the slope height from the top of any excavation.



4.1.4 Lateral Earth Pressures

Temporary earth retaining shoring systems are anticipated for the project. The soils encountered at test boring MW-1 serve as the basis for our recommended geotechnical parameters to calculate lateral earth pressures associated with the design of temporary shoring systems. Because the soils encountered at MW-1 were predominantly cohesive, the following geotechnical parameters are recommended to calculate lateral earth pressures:

- Total unit weight (γ_t) = 125 pounds per cubic foot (pcf)
- Cohesive intercept, (C) = (25) x (Trench Depth), in pounds per square foot (psf), for the upper layer of alluvial clay with a maximum of 600 psf; constant value of 1,000 psf for shale

For the design of shoring systems, the passive resistance provided by the top 2 feet of soil should be ignored. For parts of shoring systems located below the water table without provisions for adequate drainage or dewatering behind the shoring system, the water pressure (hydrostatic pressure distribution at 62.4 pcf) should be added to the lateral earth pressure for the full depth of the shoring system. In addition to lateral earth pressure and hydrostatic pressure, live loading due to construction equipment, materials, soil stockpiles, etc. should be taken into account in the design of the shoring systems.

Considering the length of the proposed pipeline alignment (Figures 2 and 4), if excavations that require temporary earth shoring systems reveal soil conditions different than those encountered at MW-1, Golder should be notified to assess those conditions and provide pertinent recommendations.

4.1.5 Restrained Shoring System

We recommend that the distribution of lateral earth pressures acting on restrained/braced shoring systems be estimated using Chapter 7.2 of the Caltrans Trenching and Shoring Manual, Revision 1 (2011). Figure 7-4 of the manual presents guidelines to estimate the corresponding lateral earth pressures for restrained shoring systems in cohesive soils:

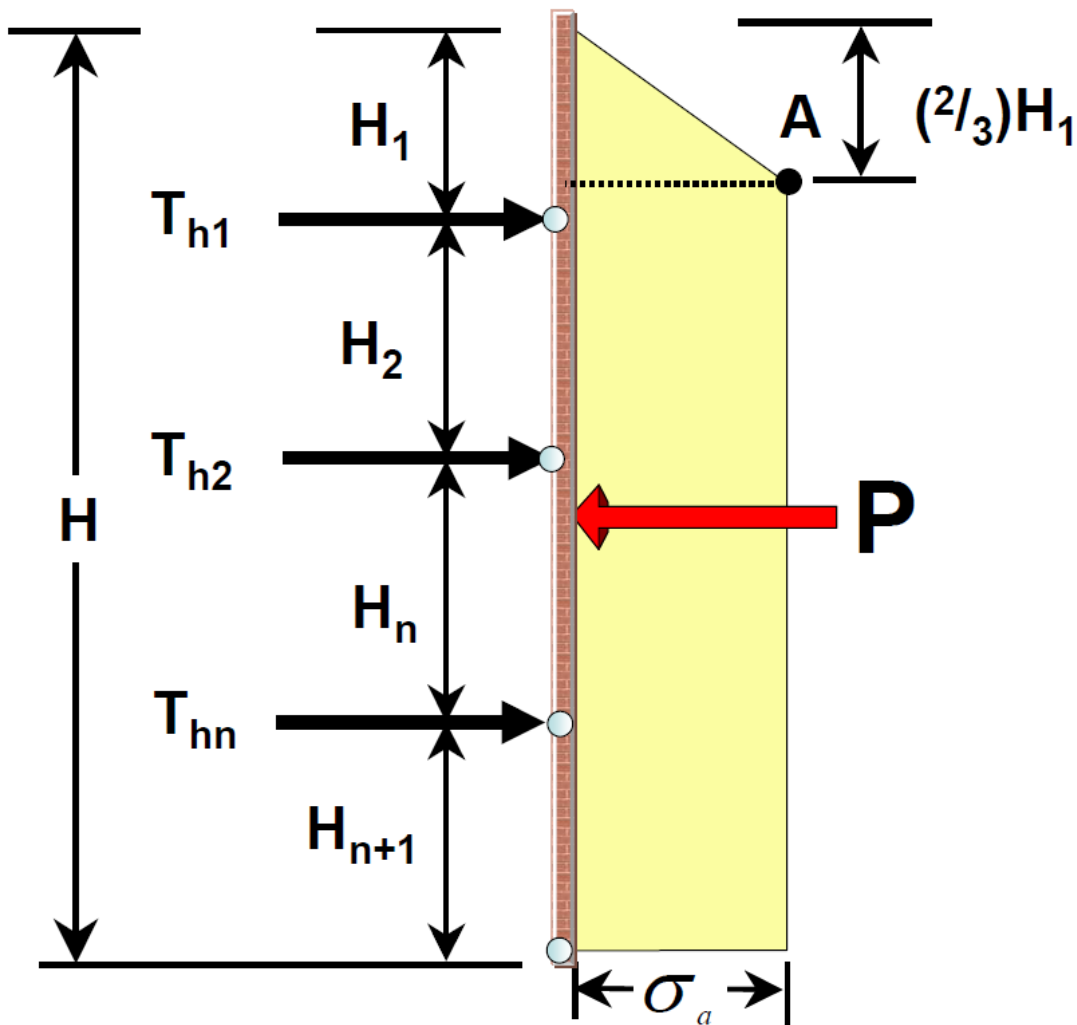


Figure 7-4. Pressure Diagram for Multi Anchored/Braced Wall for Cohesive Backfill

Where:

- σ_a = $0.4\gamma_t H$, based on equation 7-5 of Caltrans Trenching and Shoring Manual
- P = total lateral load
- H = total wall height
- γ_t = total unit weight of the soil
- H_1 = distance from ground surface at top of wall to uppermost level of restraining element
- H_{n+1} = distance from the grade at bottom of a wall to lowermost level of restraining element
- n = number of restraining elements
- T_{hn} = horizontal component of the anchor/strut force at level n

4.1.6 Unrestrained Shoring System

We recommend that the distribution of lateral earth pressures acting on unrestrained shoring systems, such as a sheet pile walls, be estimated using Chapter 6 of the Caltrans Trenching and Shoring Manual, Revision 1 (2011). Figure 6-7 of the manual presents guidelines to estimate the corresponding lateral earth pressures for unrestrained shoring systems in cohesive soils:

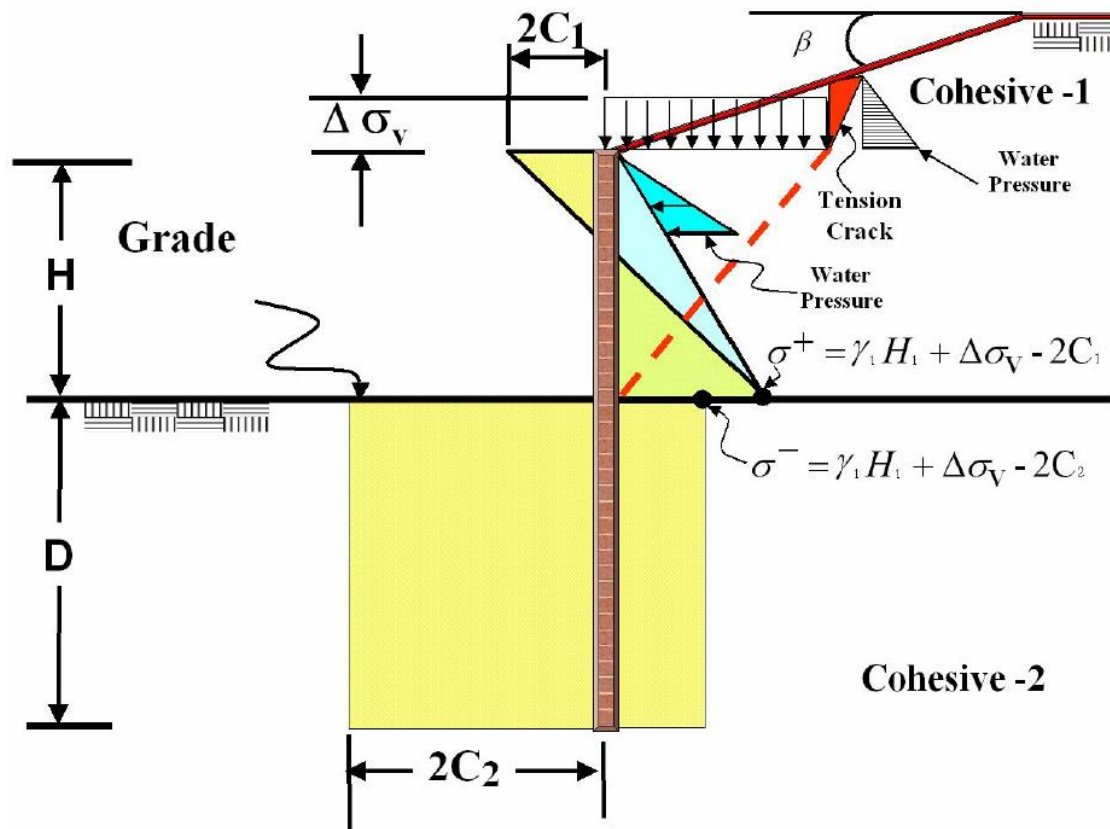


Figure 6-7. Loading Diagram for Multi-Layer

Where:

- $\Delta\sigma_v$ = additional surcharge from backfill above top of wall (if applicable)
- H = total depth of excavation
- D = the required total depth of embedment below the excavation grade
- γ = total unit weight of the soil
- C = the cohesive intercept: component of soil shear strength which is independent of the force pushing the particles together



5.0 USE OF THIS REPORT

This report has been prepared exclusively for the use of PG&E and their consultants and contractors for specific application to the proposed L-114 MP 17.06 to 17.51 replacement Marsh Creek crossing located in Brentwood, California. If the pipeline locations or installation techniques vary from that assumed in this report, Golder should be provided an opportunity to review the revised project plans, and if necessary, complete additional explorations and/or modify or recommendations as may be appropriate.

We encourage review of this report by bidders and/or contractors as it relates to factual data only (laboratory test results, conclusions, etc.). The conclusions presented in this report are based on the explorations and observations completed for this study and are not intended, nor should they be construed to represent, a warranty regarding the conditions, but are forwarded to assist in the planning and design process.

Engineering judgment has been applied in interpreting and presenting the results. Variations in subsurface conditions over small distances are common, and actual conditions encountered during construction may be different from those interpreted herein. We recommend that PG&E retain Golder to provide construction observation to confirm the soil conditions, provide supplementary recommendations as needed and help assure compliance with the conclusions contained in this report.

The site exploration was completed in general accordance with locally accepted geotechnical engineering practice, subject to the time limits and financial and physical constraints applicable to the services for this project, to provide information for the areas explored. There are possible variations in the subsurface conditions between the test borings and variations over time.

The conclusions contained in this report do not include an assessment of the presence or implication(s) of possible surface and/or subsurface contamination resulting from previous site activities and/or resulting from the introduction of materials from offsite sources.



6.0 CLOSING

We appreciate the opportunity to assist Pacific Gas & Electric Company on this project. Please call one of the undersigned if you have any questions or require clarification of our findings.

GOLDER ASSOCIATES INC.



Robert Paul C. Erickson, P.E.
Project Engineer

Brian Avon, P.E.
Associate/Senior Pipeline Engineer



Peter E. Fahringer, LG, PG, PGp
Associate, Senior Geophysicist

RPE/CL



7.0 REFERENCES

American Society of Civil Engineers (2010). Minimum Design Loads for Buildings and Other Structures, ASCE Standard, ASCE/SEI 7-10.

Pacific Gas and Electric Company (2012). Gas Transmission & Distribution, Gas Engineering. *BACKFILL SAND, Engineering Material Specification No. 4123*. Date of Specific Issue: August 30, 2012.

State of California Department of Transportation (2011). *Trenching and Shoring Manual*. Issued by Offices of Structure Construction. Revision 1. August 2011.

Kleinfelder (2008). Engineering Geologic and Geotechnical Investigation Report, PG&E, Marsh Creek California. October 31, 2008

FIGURES



LEGEND

- ★ PROJECT LOCATION
- PROPOSED L-114 PIPELINE ALIGNMENT

REFERENCE(S)

AERIAL IMAGERY FROM GOOGLE EARTH PROFESSIONAL, DATED MARCH 11, 2017
KEY MAP FROM USGS 7.5 MINUTE QUADRANGLE, BRENTWOOD, CA., DATED 2015

CLIENT

PACIFIC GAS & ELECTRIC COMPANY
6121 BOLLINGER CANYON ROAD
SAN RAMON, CA 94583

PROJECT

R-965 L-114 MP 17.06-17.51
MARSH CREEK
GEOTECHNICAL EXPLORATION

TITLE

SITE VICINITY MAP

CONSULTANT



YYYY-MM-DD	2017-10-25
DESIGNED	RPCE
PREPARED	MAL
REVIEWED	RPCE
APPROVED	

PROJECT NO.
1408253200

REV.
0

FIGURE
1



LEGEND

-  TEST BORING LOCATION
-  PROPOSED L-114 PIPELINE ALIGNMENT

REFERENCE(S)

AERIAL IMAGERY FROM GOOGLE EARTH PROFESSIONAL, DATED MARCH 11, 2017

CLIENT

PACIFIC GAS & ELECTRIC COMPANY
6121 BOLLINGER CANYON ROAD
SAN RAMON, CA 94583

PROJECT

R-965 L-114 MP 17.06-17.51
MARSH CREEK
GEOTECHNICAL EXPLORATION

TITLE

SITE PLAN

CONSULTANT

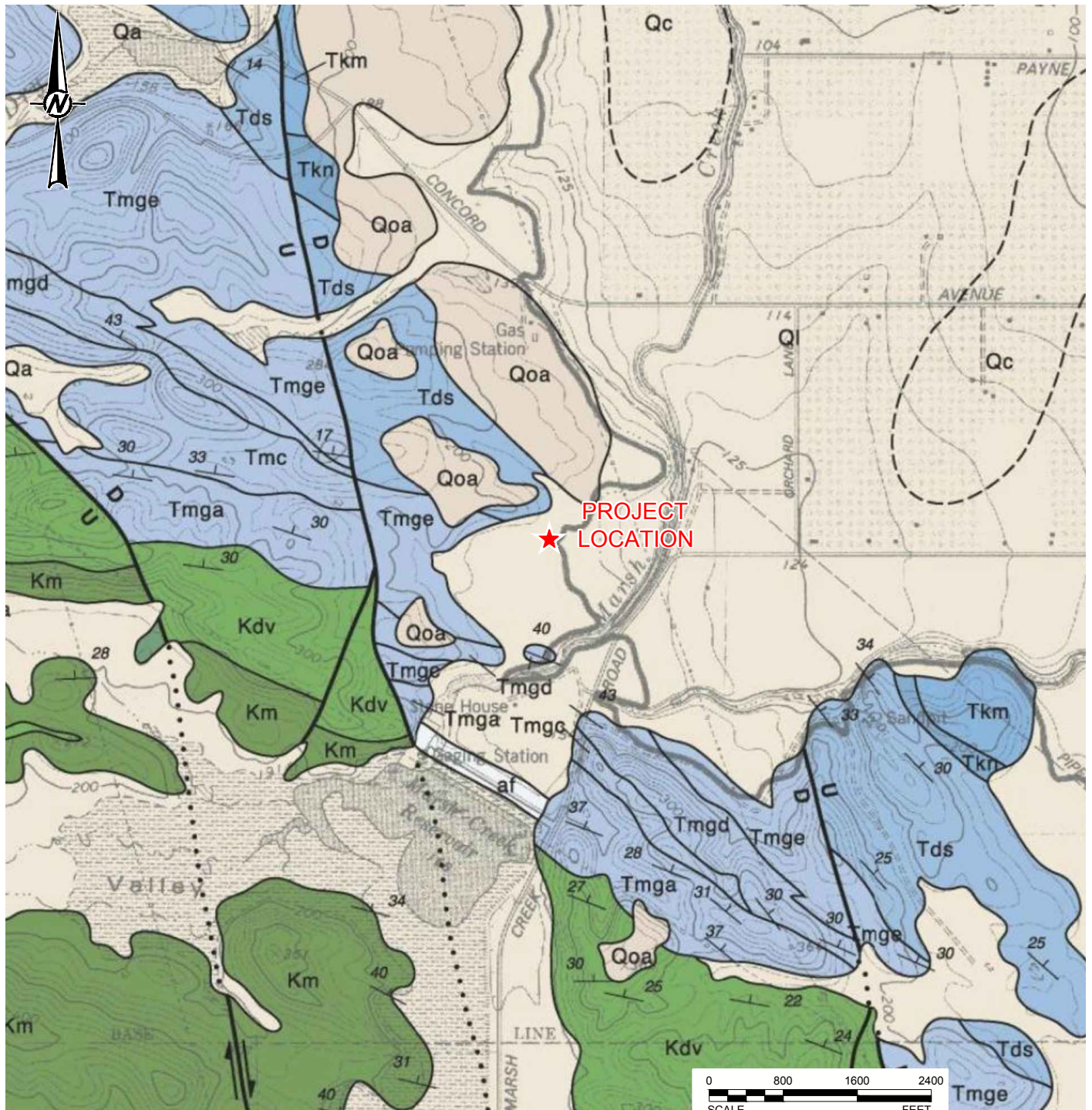


YYYY-MM-DD	2017-10-25
DESIGNED	RPCE
PREPARED	MAL
REVIEWED	RPCE
APPROVED	

PROJECT NO.
1408253200

REV.
0

FIGURE
2



LEGEND

	PROJECT LOCATION		
	DISSECTED OLDER ALLUVIAL DEPOSITS, UNDEFORMED; AGE, LATE PLEISTOCENE		SANDSTONE, LIGHT GRAY TO TAN, FINE TO MEDIUM GRAINED, ARKOSIC
	ALLUVIAL PEBBLE GRAVEL, SAND AND CLAY OF VALLEY AREAS		CLAY SHALE OR CLAYSTONE, GRAY, MICACEOUS; INCLUDES
	ALLUVIAL CLAY OF VALLEY AREAS		SANDSTONE, SIMILAR TO Kps
	MARKLEY SANDSTONE MEMBER, LIGHT GRAY TO TAN, SEMI FRIABLE, BEDDED, FINE TO MEDIUM GRAINED, ARKOSIC		
	SANDSTONE, LIGHT GRAY TO TAN, MEDIUM GRAINED, ARKOSIC		
	GREENISH-GRAY TO LIGHT GRAY, BIOTITE-RICH SILTSTONE AND SILTY MUDSTONE		
	SANDSTONE MEMBER, MEDIUM GRAINED, LIGHT GRAY TO BLuish GRAY SANDSTONE, PEBBLE CONGLOMERATE PRESENT LOCALLY AT BASE		
	SANDSTONE WITH BASAL CONGLOMERATE, MEDIUM TO COURSE GRAINED, CLEAN, WHITE, DISTINCTLY CROSS BEDDED, BIOTITE BEARING ARKOSIC SANDSTONE		

CLIENT

PACIFIC GAS & ELECTRIC COMPANY
6121 BOLLINGER CANYON ROAD
SAN RAMON, CA 94583

PROJECT

R-965 L-114 MP 17.06-17.51
MARSH CREEK
GEOTECHNICAL EXPLORATION

TITLE

LOCAL GEOLOGIC MAP

CONSULTANT

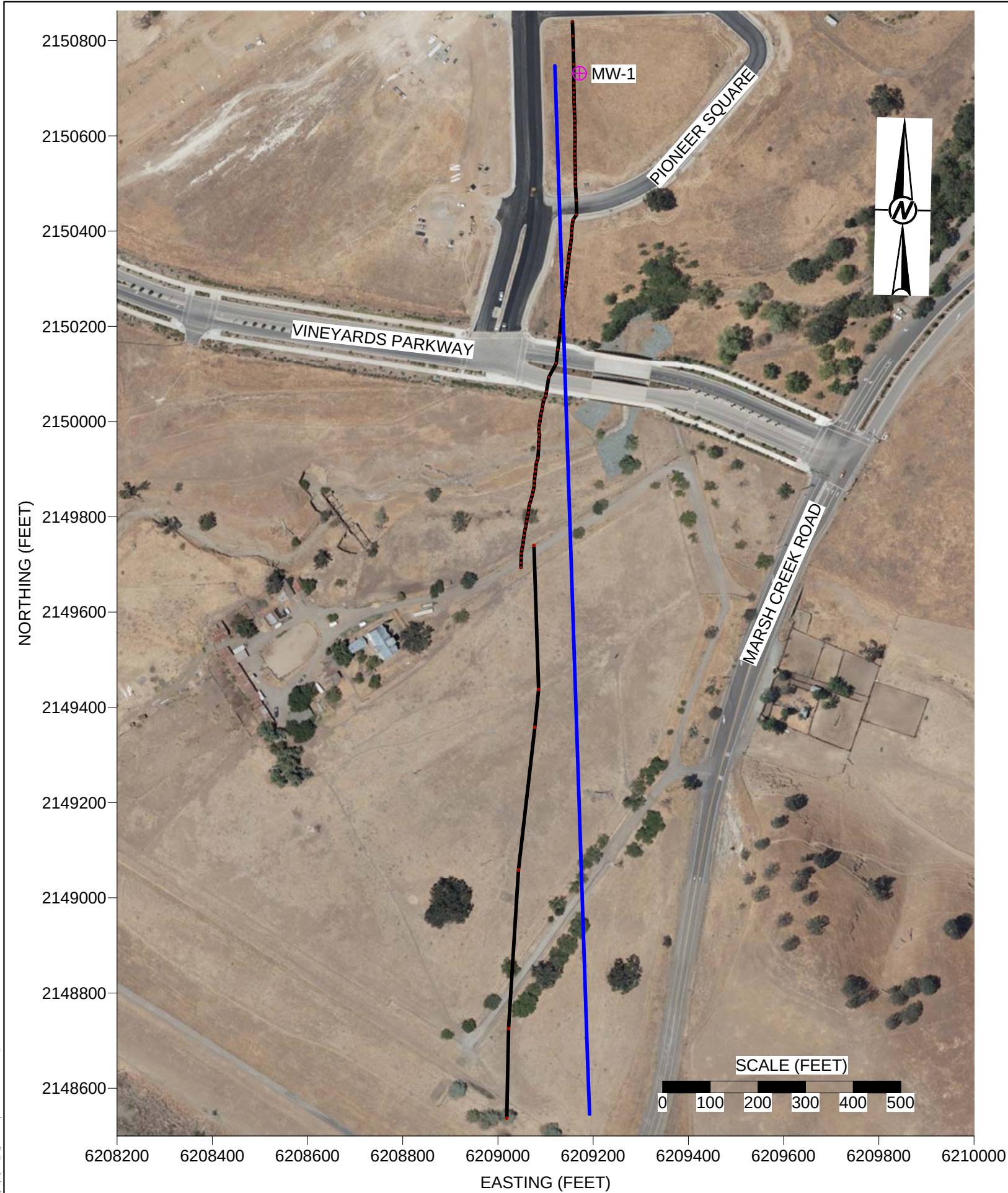


YYYY-MM-DD	2017-10-25
DESIGNED	RPCE
PREPARED	MAL
REVIEWED	RPCE
APPROVED	

PROJECT NO.
1408253200

REV.
0

FIGURE
3



LEGEND

SURVEY POINT

SURVEY LINE

MW-1

PROPOSED L-114 PIPELINE ALIGNMENT

SEE FIGURES 5 AND 6 FOR GEOPHYSICAL DATA

14082532_geophysics_Figure1.dwg | revised: October 26, 2017

HORIZONTAL DATUM: STATE PLANE NAD83, CA III, US FEET.
BASEMAP SOURCE: BING, 2017.

CLIENT

PACIFIC GAS & ELECTRIC COMPANY
6121 BOLLINGER CANYON ROAD
SAN RAMON, CA 94583

CONSULTANT

Golder Associates

YYYY-MM-DD

2017-10-26

PREPARED

DEH

DESIGN

PEF

REVIEW

RPCE

APPROVED

JB

PROJECT

R-965 L-114 MP 17.06-17.51
MARSH CREEK
GEOTECHNICAL EXPLORATION

TITLE

SEISMIC INVESTIGATION LINE LOCATIONS

PROJECT No.

1408253200

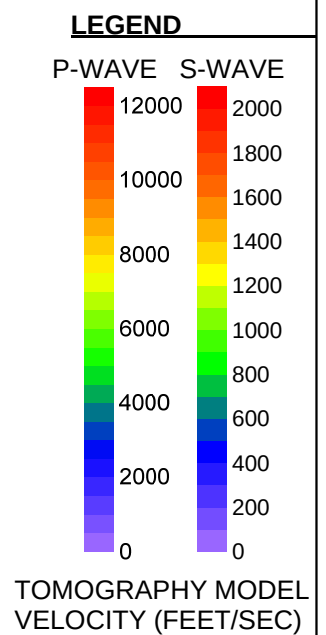
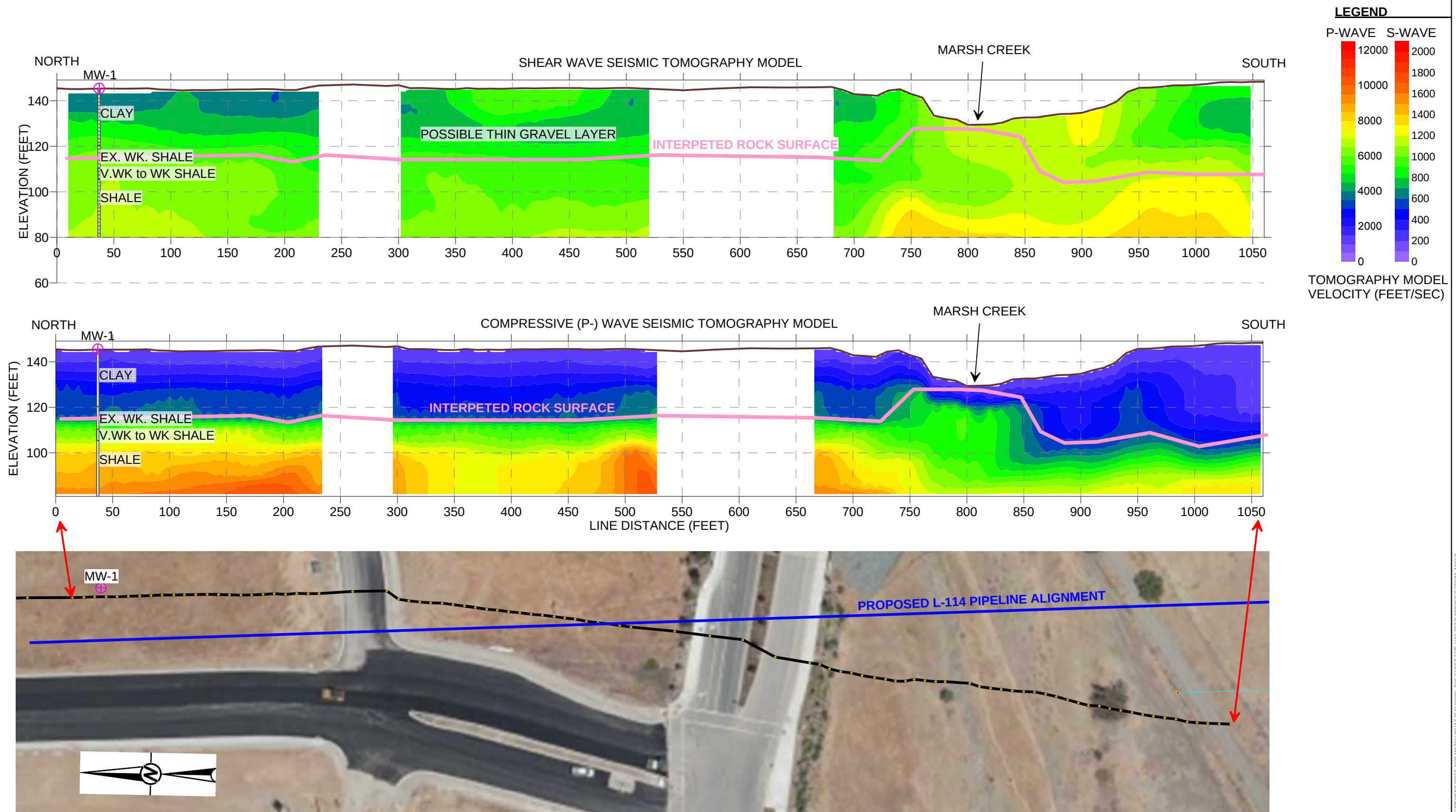
Rev.

0

FIGURE

4

1 inch
IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI B

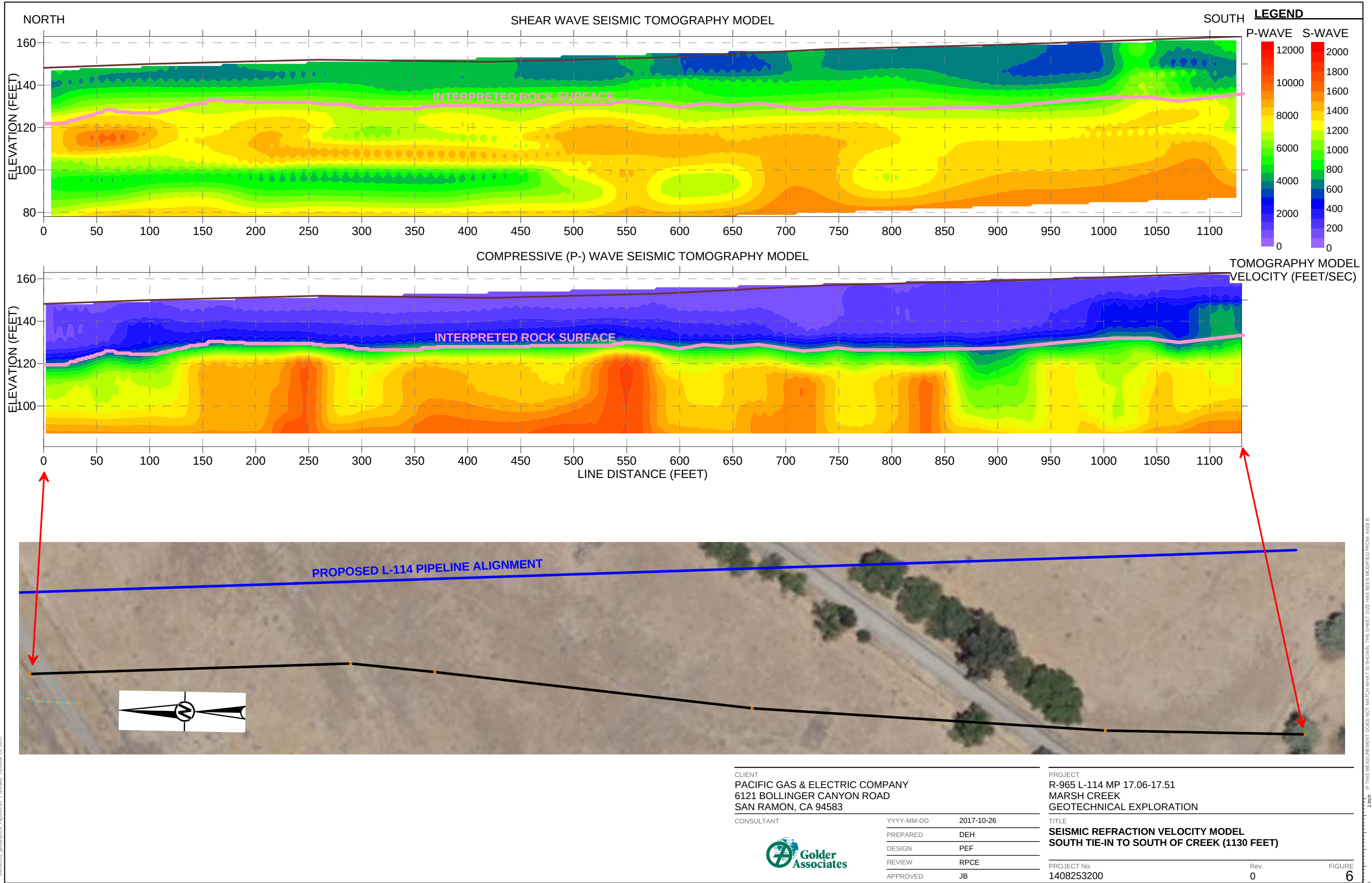


CLIENT		PROJECT	
PACIFIC GAS & ELECTRIC COMPANY		R-965 L-114 MP 17.06-17.51	
6121 BOLLINGER CANYON ROAD		MARSH CREEK	
SAN RAMON, CA 94583		GEOTECHNICAL EXPLORATION	
CONSULTANT		TITLE	
		SEISMIC REFRACTION VELOCITY MODEL	
		NORTH TIE-IN TO SOUTH OF CREEK (1080 FEET)	
		PROJECT No.	
		1408253200	
		Rev.	
		0	
		FIGURE	
		5	



14082532_geophysics_Figure2.srf | revised: October 26, 2017

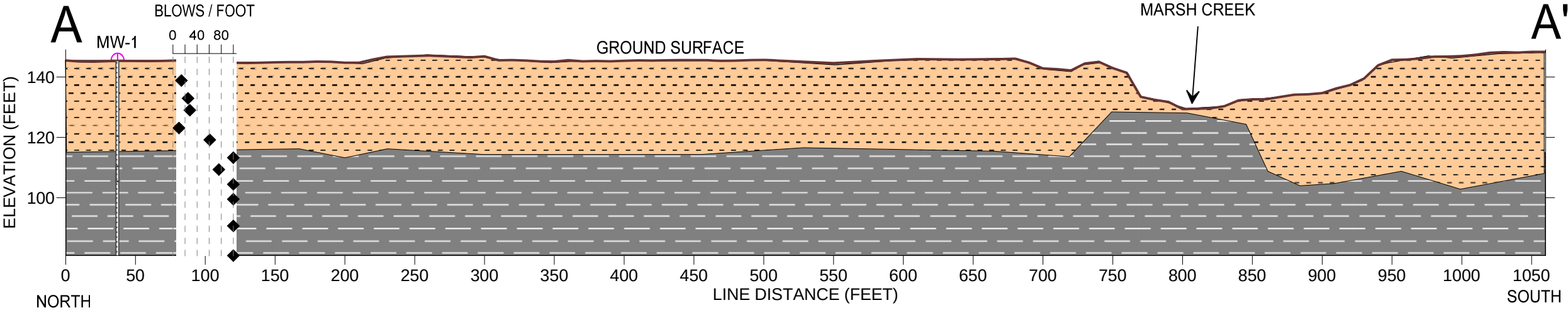
IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI B 1 inch





LEGEND

- SOIL / ALLUVIUM / COLLUVIUM
- SHALE (POSSIBLY MIXED WITH SANDSTONE)
- CROSS-SECTION PROFILE



CLIENT
PACIFIC GAS & ELECTRIC COMPANY
6121 BOLLINGER CANYON ROAD
SAN RAMON, CA 94583

CONSULTANT



YYYY-MM-DD	2017-10-26
PREPARED	BSK
DESIGN	PEF
REVIEW	RPCE
APPROVED	JB

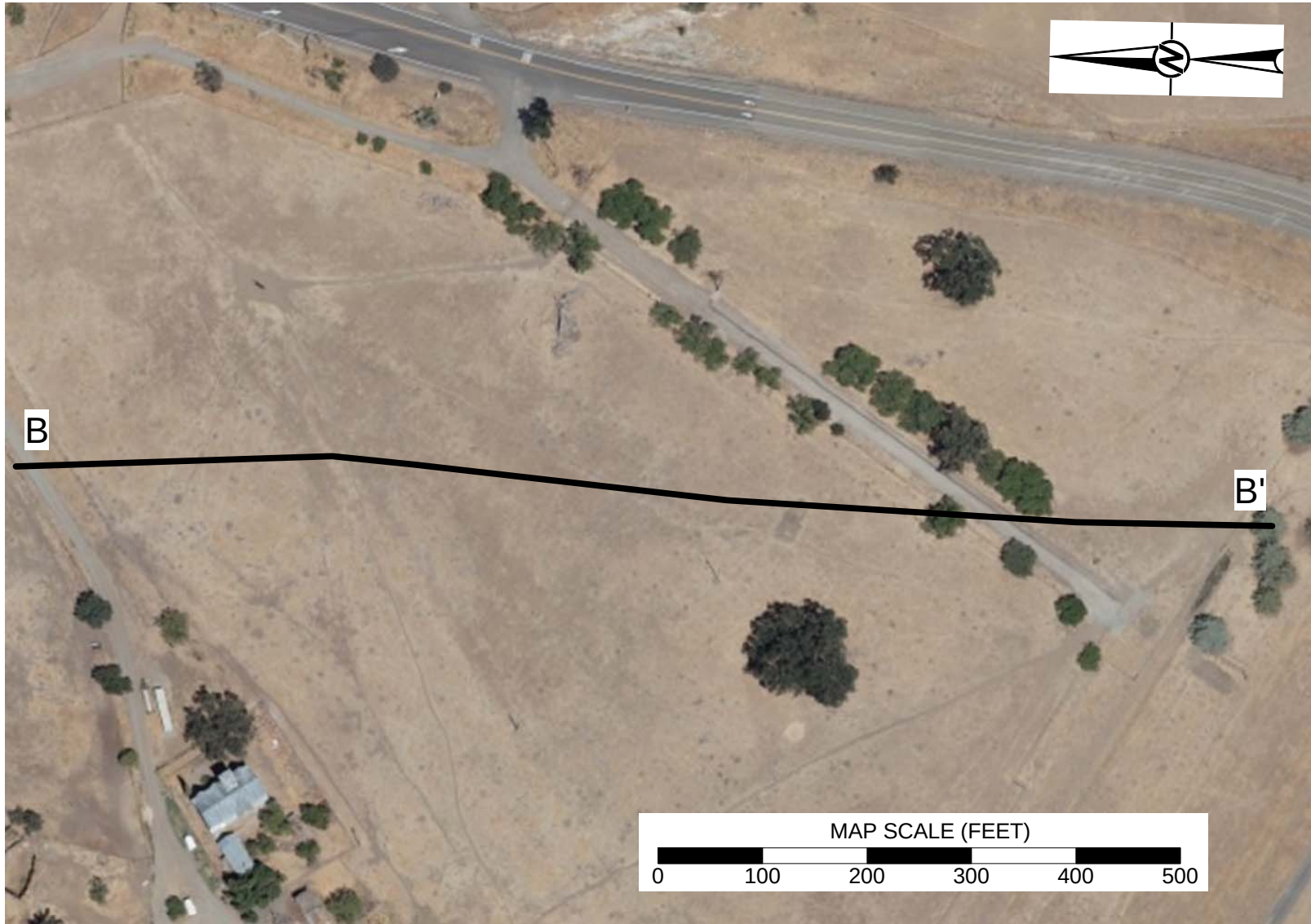
PROJECT
R-965 L-114 MP 17.06-17.51
MARSH CREEK
GEOTECHNICAL EXPLORATION

TITLE
GEOLOGIC CROSS-SECTION A-A'

PROJECT No.
1408253200

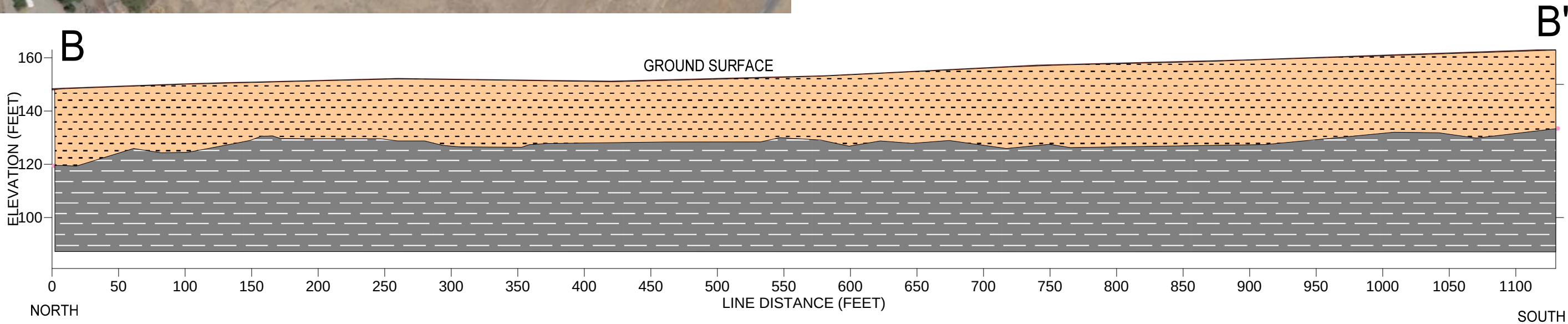
Rev.
0

FIGURE
7



LEGEND

-  - SOIL / ALLUVIUM / COLLUVIUM
-  - SHALE (POSSIBLY MIXED WITH SANDSTONE)
-  - CROSS-SECTION PROFILE



CLIENT
PACIFIC GAS & ELECTRIC COMPANY
6121 BOLLINGER CANYON ROAD
SAN RAMON, CA 94583

CONSULTANT



YYYY-MM-DD	2017-10-26
PREPARED	BSK
DESIGN	DEH
REVIEW	PEF
APPROVED	JB

PROJECT
R-965 L-114 MP 17.06-17.51
MARSH CREEK
GEOTECHNICAL EXPLORATION

TITLE
GEOLOGIC CROSS-SECTION B-B'

PROJECT No.
1408253200

Rev.
0

FIGURE
8

APPENDIX A
SUMMARY BORING LOG

RECORD OF BOREHOLE MW-1

PROJECT: R-965 Marsh Creek
PROJECT NO.: 1408253200.2020
LOCATION: Miwok Ave and Pioneer Square, Brentwood, CA

DRILLING START: June 15, 2017 14:15
DRILLING END: June 16, 2017 13:40
COORDINATES: N: 4,194,939 E: 612,395

SHEET: 1 of 2
GS ELEV.: 143.0
TOC ELEV.: 145.4
DATUM: WGS84

DEPTH (ft)	BORING METHOD	SOIL PROFILE				SAMPLES			PENETRATION RESISTANCE BLOWS / ft		NOTES WATER LEVELS	ADDITIONAL LAB TESTING	
		Depth	DESCRIPTION	Elev	USCS	GRAPHIC LOG	SAMPLE TYPE & NUMBER	BLOWS per 6 in ASTM D1586 140 lb hammer 30 inch drop Automatic	REC ATT (in)	WATER CONTENT (%)			
										W _p			W _L
0		0.0		143.0									
5			(CL), CLAY, low plasticity to medium plasticity fines; red-brown; cohesive, stiff, w < PL		CL								
10						DO 1	4-6-8 14	17 18	14				
15						DO 2	8-12-13 25	15 18	25				
20		17.0	Some sand fine grained, trace gravel fine grained, angular; brown and gray; cohesive, very stiff, w < PL	126.0	SW	DO 3	12-18-10 28	12 18	28				
25		21.0	(SW), SAND, well graded, sand fine to coarse grained, gravel fine to coarse grained, subangular to angular, some; dark brown and gray; compact, wet, well graded SAND with SILT and GRAVEL	122.0									
25	Sonic	25.0	(CL), CLAY, low plasticity to medium plasticity fines, gravel fine to coarse grained, subrounded to subangular, some sand fine grained; gray and brown; cohesive, w > PL	118.0	CL								
30			SHALE, completely weathered, aphanitic, gray, fine grained, non porous, extremely weak			DO 4	2-4-6 10	0 18	10		25: No recovery. Driller believes it was a sandy gravel material.		
35						DO 5	6-21-40 61	15 18		61	27.6 ft, 08/11/2017		
40			Becoming highly weathered and very weak to weak			DO 6	14-38-50/4" 50/4"	18 16		100	35 - 45: Drillers note strong odor.		
45						DO 7	16-31-45 76	18 18		76			
50			Becoming moderately weathered and weak			DO 8	46-50/4" 50/4"	15 10		100			
						DO 9	12-50/6"	18		100			
Log continued on next page													

Log continued on next page

DRILLING CO.: Cascade Drilling, LP
DRILLER: Thomas Hatch
DRILL RIG: Terra Sonic Int. Compact Crawler 150

LOGGED: RPCE
CHECKED: CL
REVIEWED: NK



RECORD OF BOREHOLE MW-1

PROJECT: R-965 Marsh Creek
PROJECT NO.: 1408253200.2020
LOCATION: Miwok Ave and Pioneer Square, Brentwood, CA

DRILLING START: June 15, 2017 14:15
DRILLING END: June 16, 2017 13:40
COORDINATES: N: 4,194,939 E: 612,395

SHEET: 2 of 2
GS ELEV.: 143.0
TOC ELEV.: 145.4
DATUM: WGS84

DEPTH (ft)	BORING METHOD	SOIL PROFILE				SAMPLES			■ PENETRATION RESISTANCE BLOWS / ft		NOTES WATER LEVELS	ADDITIONAL LAB TESTING	
		Depth	DESCRIPTION	Elev	USCS	GRAPHIC LOG	SAMPLE TYPE & NUMBER	BLOWS per 6 in ASTM D1586 140 lb hammer 30 inch drop Automatic	REC ATT	WATER CONTENT (%)			
										W _p			W _L
50		50.0	SHALE, completely weathered, aphanitic, gray, fine grained, non porous, extremely weak (<i>continued</i>)	93.0				50/6"	12				
55													
60						DO 10	26-50/4" 50/4"	16 10			100		
65													
70						DO 11	50/6" 50/6"	8 6			100		
75	Sonic		Becoming dark gray										
80													
85													
90													
95													
		98.0		45.0									
100			Bottom of borehole at 98.0 ft. (Target Depth) Backfilled with bentonite chips and neat cement grout.										

DRILLING CO.: Cascade Drilling, LP
DRILLER: Thomas Hatch
DRILL RIG: Terra Sonic Int. Compact Crawler 150

LOGGED: RPCE
CHECKED: CL
REVIEWED: NK



APPENDIX B
GROUNDWATER MONITORING WELL CONSTRUCTION DETAILS LOG



WELL CONSTRUCTION DETAILS

BORING DESIGNATION: **MW-1**

INSTALLATION

DATE: 6/16/2017 BY: Cascade Drilling, LP

DIMENSIONS

A Total Depth of Boring (ft.)	98
B Borehole Diameter (in.)	10
C Well Casing Diameter (in.)	4
D Well Casing Length (ft.)	50
E Protective Cover Diameter (in.)	10
F Monument Footing Interval (ft.)	0-1.5
G Annular Seal Interval (ft.)	1.5-36
H Annular Seal Interval (ft.)	36-38
I Sand Pack Interval (ft.)	38-50
J Well Casing Slotted Interval (ft.)	40-50
K Well Casing End Cap or Sump (ft.)	0
L Bottom Material Interval (ft.)	50-98
Well Centralizer Depth(s) (ft.)	N/A

MATERIALS DATA

Monument Footing	①	Neat Cement/Fill
Annular Seal	②	Neat Cement
Annular Seal	③	Bentonite
Sand Pack	④	#3 Sand
Bottom Material	⑤	Bentonite
Slotted Casing		0.020-inch Sch 40 PVC
Well Casing		4-inch Sch 40 PVC
Well Centralizers		N/A
		10-inch Christy Box

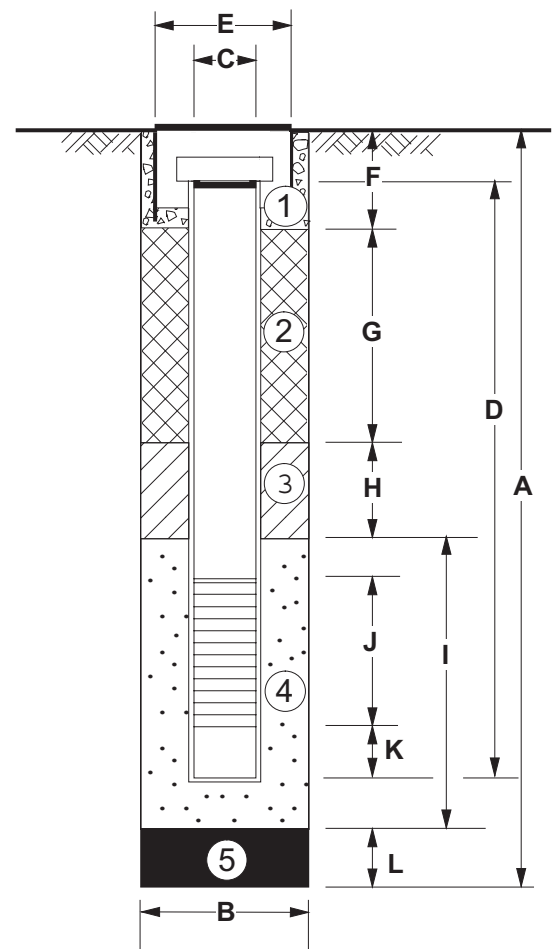
WELL DESIGNATION

MW-1

DEPTH/HEIGHT (FT)

ELEV. (FT MSL)

0	--
--	--
1.5	--
--	--
36	--
38	--
--	--
30	--
50	--
50	--
98	--



SECTION VIEW
(not to scale)

NOTES:

Well construction observed by Golder engineer and Contra Costa County Environmental Health Division representative.

SITE: R-965 L-114 MP 17.06-17.51 Marsh Creek

PROJ. NO: 1408253200.2020

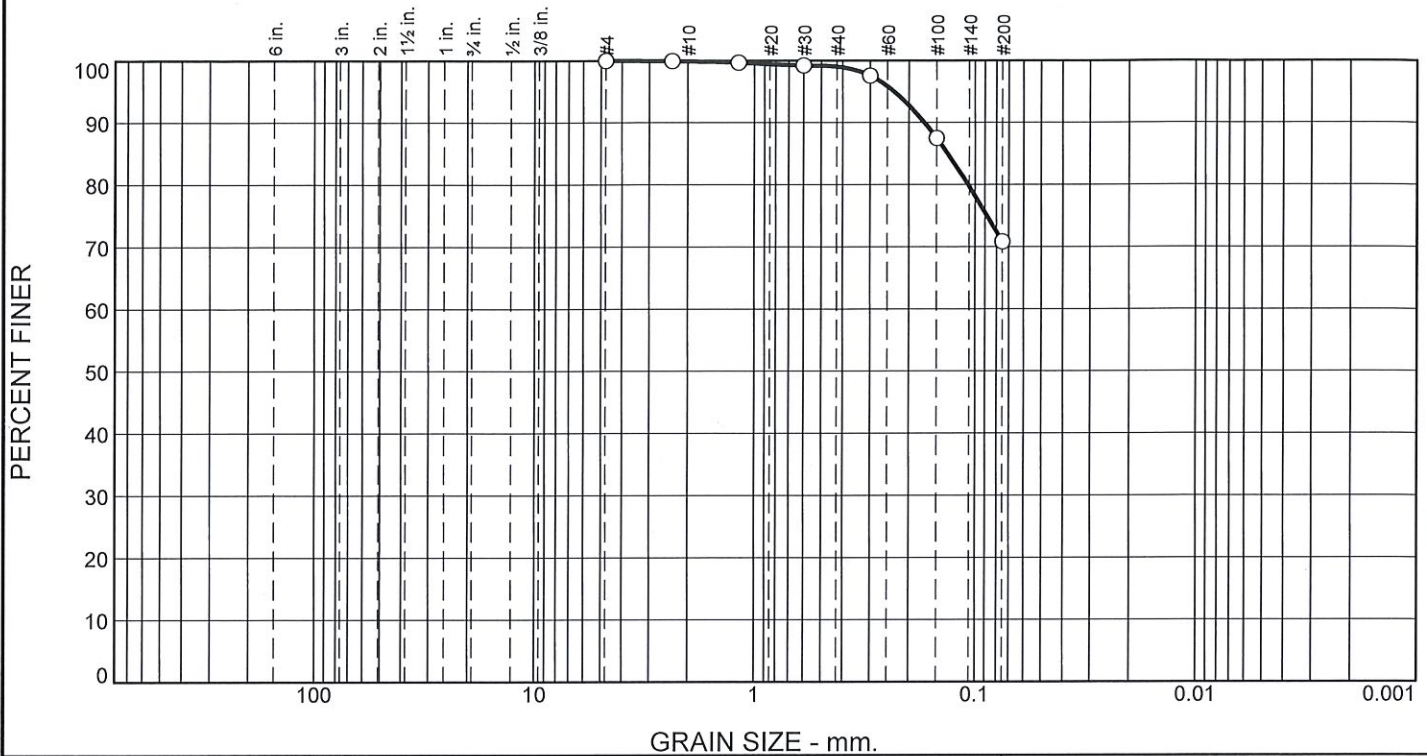
LOCATION: Brentwood, CA

WELL PERMIT NO: WP0023357

T.O.C. ELEV: --

APPENDIX C
GEOTECHNICAL LABORATORY TESTING RESULTS

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	0	0	1	28	71	

Test Results (ASTM D6913 & ASTM D1140)			
Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#4	100		
#8	100		
#16	100		
#30	99		
#50	98		
#100	87		
#200	71		

* (no specification provided)

Material Description	
Red-brown lean clay with sand	
Atterberg Limits (ASTM D 4318)	
PL= 16	LL= 31 PI= 15
Classification	
USCS (D 2487)= CL	AASHTO (M 145)= A-6(8)
Coefficients	
D ₉₀ = 0.1704	D ₈₅ = 0.1335 D ₆₀ =
D ₅₀ =	D ₃₀ = D ₁₅ =
D ₁₀ =	C _u = C _c =
F.M.=0.16	
Remarks	
Date Received: 6/27/17 Date Tested: 6/29/17	
Tested By: JMC	
Checked By: JF	
Title: PM	

Location: MW1

Sample Number: 23143

Depth: 9'-10.5'

Date Sampled: 6/27/17



Client: Golder Associates, Inc.

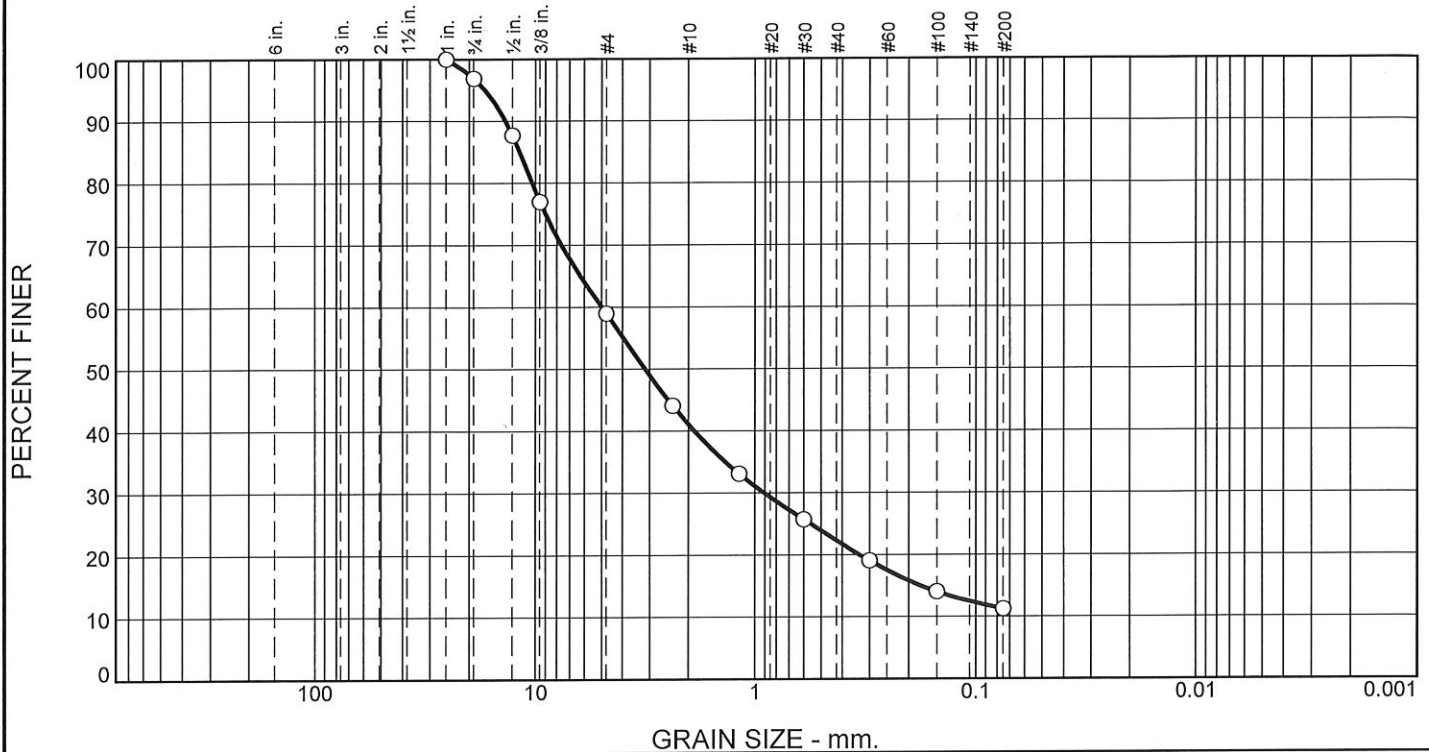
Project: R-965 Marsh Creek

Golder No. 1408253200.202003.03F

Project No: 17-186

Figure

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	3.1	37.9	17.9	18.8	11.0	11.3	

Test Results (ASTM D6913 & ASTM D1140)			
Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1 Inch	100.0		
3/4 Inch	96.9		
1/2 Inch	87.7		
3/8 Inch	77.0		
#4	59.0		
#8	44.1		
#16	33.1		
#30	25.7		
#50	19.0		
#100	14.0		
#200	11.3		

* (no specification provided)

Material Description		
Atterberg Limits (ASTM D 4318) PL= LL= PI=		
Classification USCS (D 2487)= AASHTO (M 145)=		
Coefficients D ₉₀ = 13.6778 D ₈₅ = 11.7697 D ₆₀ = 4.9868 D ₅₀ = 3.1474 D ₃₀ = 0.9074 D ₁₅ = 0.1770 D ₁₀ = C _u = C _c =		
Remarks F.M.=4.31		
Date Received: 8/24/17 Date Tested: 8/28/17 Tested By: JMC Checked By: CMW Title: PM		

Location: MW1

Sample Number: 25172

Depth: 19'-20.5'

Date Sampled:



Client: Golder Associates, Inc.

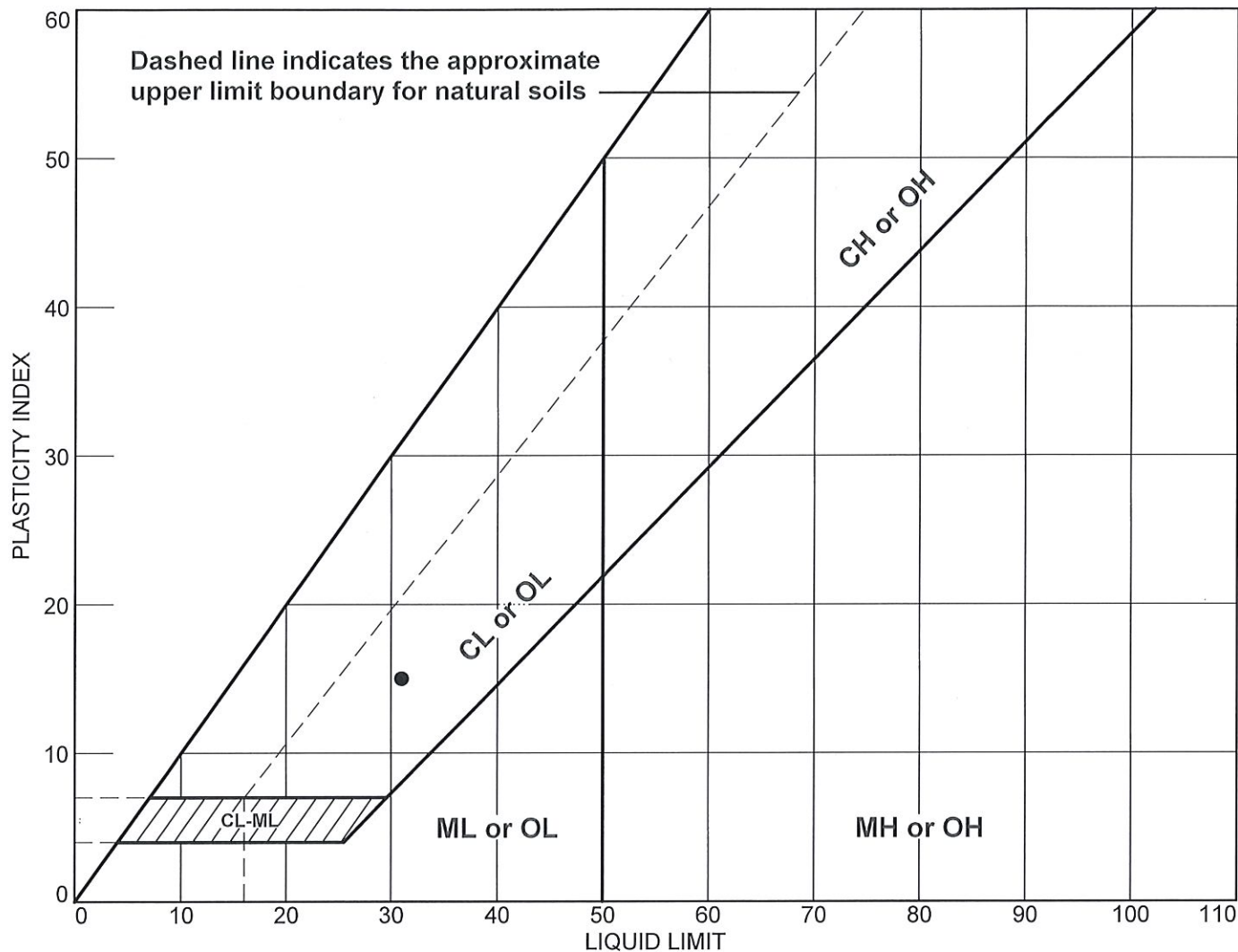
Project: R-965 Marsh Creek

Golder No. 1408253200.202003.03F

Project No: 17-186

Figure

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	MW1	23143	9'-10.5'	15.3	16	31	15	CL



Client: Golder Associates, Inc.

Project: R-965 Marsh Creek

Golder No. 1408253200.202003.03F

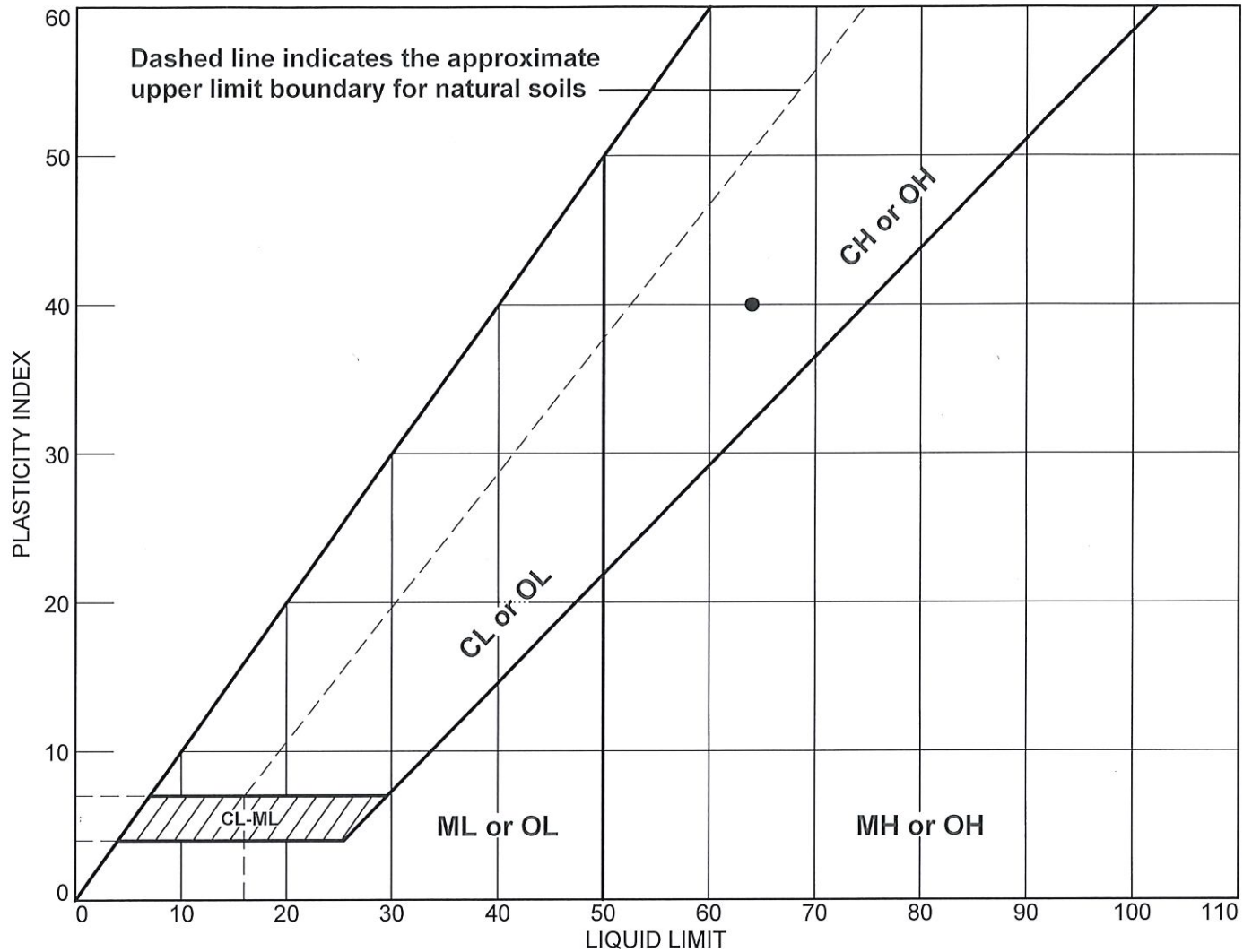
Project No.: 17-186

Figure

Tested By: RH

Checked By: CMW

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
•	MW1	23144	35'-36.5'	16.5	24	64	40	



Client: Golder Associates, Inc.

Project: R-965 Marsh Creek
Golder No. 1408253200.202003.03F

Project No.: 17-186

Figure

Tested By: JM

Checked By: CMW

Established in 1960, Golder Associates is a global, employee-owned organization that helps clients find sustainable solutions to the challenges of finite resources, energy and water supply and management, waste management, urbanization, and climate change. We provide a wide range of independent consulting, design, and construction services in our specialist areas of earth, environment, and energy. By building strong relationships and meeting the needs of clients, our people have created one of the most trusted professional services organizations in the world.

Africa	+ 27 11 254 4800
Asia	+ 852 2562 3658
Australasia	+ 61 3 8862 3500
Europe	+ 356 21 42 30 20
North America	+ 1 800 275 3281
South America	+ 56 2 2616 2000

solutions@golder.com
www.golder.com

Golder Associates Inc.
1575 Treat Blvd. Suite 100
Walnut Creek, CA 94598
Tel: (925) 956-4800
Fax: (925) 956-4801



Engineering Earth's Development, Preserving Earth's Integrity

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation